

Management Plan for The Settlement Lands

Denman Island, British Columbia

Prepared for

Denman Conservancy Association
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In consultation with

Islands Trust Fund
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DENMAN
CONSERVANCY
ASSOCIATION



by

Denman Conservancy Association
Lands Committee
Denman Island, BC

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Approved by
Denman Conservancy Association Board of Directors
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Trust Fund Board
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i. Executive Summary

The Settlement Lands (hereafter “the Lands”) is situated in the northern portion of Denman Island and is comprised of 157 acres in two legal parcels of land. Its name is derived from the history of its acquisition by Denman Conservancy Association (DCA) in 2006 as part of a lengthy and complicated legal settlement, and because beginning in the 1890s early pioneers settled this land, with a homestead and orchard. The Lands were most recently logged in 2000-2001 and are now regenerating naturally after extensive community efforts to protect sensitive ecosystems on Denman. DCA’s acquisition of the Lands and the establishment of the Denman Island Provincial Park together with the existing Inner Island Nature Reserve owned by Trust Fund Board (TFB) and Central Park and Winter Wren Wood owned by DCA, have resulted in an extensive network of protected lands in this area.

The Lands lie within the Coastal Douglas-fir biogeoclimatic zone and contain numerous rare and uncommon species and are characterized by wetlands and high biodiversity. A Butterfly Reserve has been established in the Uplands area for the management of habitat for Taylor’s checkerspot butterfly and other open woodland pollinator species at risk. Beavers occupy the entirety of the property, and are a keystone species in maintaining the ecological composition and integrity of the property and its extensive wetlands.

The Lands are within the asserted traditional territory of four First Nations and seven First Nations Treaty Groups, including the K’ómoks and Tla’amin First Nations. Details of First Nations’ use of the Lands have not yet been identified by DCA but communications have been initiated between the organizations with this intent.

The TFB will soon hold a conservation covenant on the Lands and DCA and Islands Trust Fund (ITF)¹ will work together to ensure that ecological communities and native species are protected in perpetuity on the Lands, as they have in other Denman Island nature reserves. The Purpose, Goals and Objectives defined in this Plan demonstrate how this will be achieved and are approved by both the DCA as the owner of the Lands and the TFB as the holders of the conservation covenant, which is a registered interest in the Lands. Current important threats to the Lands include: degradation of riparian and wetland ecosystems; harm to beaver populations; border encroachment; accidental wildfire; invasive alien species; and, climate change. These were carefully considered in defining the management approaches outlined in this Plan.

In order to achieve the Purpose, Goals and Actions outlined for the Lands, the following actions are recommended: Monitor the Lands, especially its wetlands and riparian areas, on an ongoing basis to ensure that ecological values are protected; carry out habitat stewardship activities, according to best practices, for at-risk pollinator species

¹ The Trust Fund Board is the legal entity that manages the interests of the Islands Trust Fund. See www.islandstrustfund.bc.ca for more information.

within the Butterfly Reserve; control and remove invasive alien species where possible throughout the Lands; establish and maintain a small network of designated trails to encourage low-impact public enjoyment of the Lands through walking and nature observation; and, provide signage, interpretive information and boundary markers where appropriate.

These items and related activities will be addressed in priority sequence by Denman Conservancy Association as resources permit. Covenant monitoring will be carried out by the TFB according to the conservation covenant registered on the land title.

ii. Acknowledgements

The Denman Conservancy Association is grateful to many individuals, organizations, government agencies and the community for their support in acquiring, and now conserving, the Settlement Lands. We acknowledge:

- Denman Conservancy Association’s Board of Directors, Lands Committee, and particularly the Settlement Lands Committee: Jenny Balke (Registered Professional Biologist – Baseline Documentation Report), Erika Bland (DCA Land Manager – Management Plan compiler), Andrew Fyson (PhD botanist, former DCA Land Manager), Jackie Hipwell, John Millen, J Thornton and Patti Willis.
- Denman Conservancy Association General Membership
- Trust Fund Board and Islands Trust Fund Staff
- Denman Island Local Trust Committee
- Community Volunteers
- Contract workers
- Environment and Climate Change Canada’s Habitat Stewardship Program
- Habitat Conservation Trust Fund
- Chris Pielou (PhD Ecologist – leadership in education in identification and protection of Denman’s sensitive ecosystems)
- Legal support in 4064 case: Olstead & Holekamp; Arvay Findlay; and, Underhill, Falkner, Boies Parker
- West Coast Environmental Law (Environmental Dispute Resolution Fund)

iii. Interpretation

Acronyms/Abbreviations/Terms Used:

ALR	Agricultural Land Reserve
DCA	Denman Conservancy Association
ITF	Islands Trust Fund
PAN	Protected Areas Network
TFB	Trust Fund Board (ITF Board of Directors)

“Baseline”	Baseline Documentation Report (Balke 2017)
“The Lands”	The two combined Settlement Lands properties

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1.0 Introduction

1.1 Denman Conservancy Association (DCA)

DCA, owner of the Settlement Lands, is a volunteer organization formed in 1991 to preserve, protect and enhance the quality of the human and natural environment of Denman Island.

The **Vision** of the Society is,

“Diverse and resilient ecosystems in perpetuity, stewarded by an inspired and informed community.”

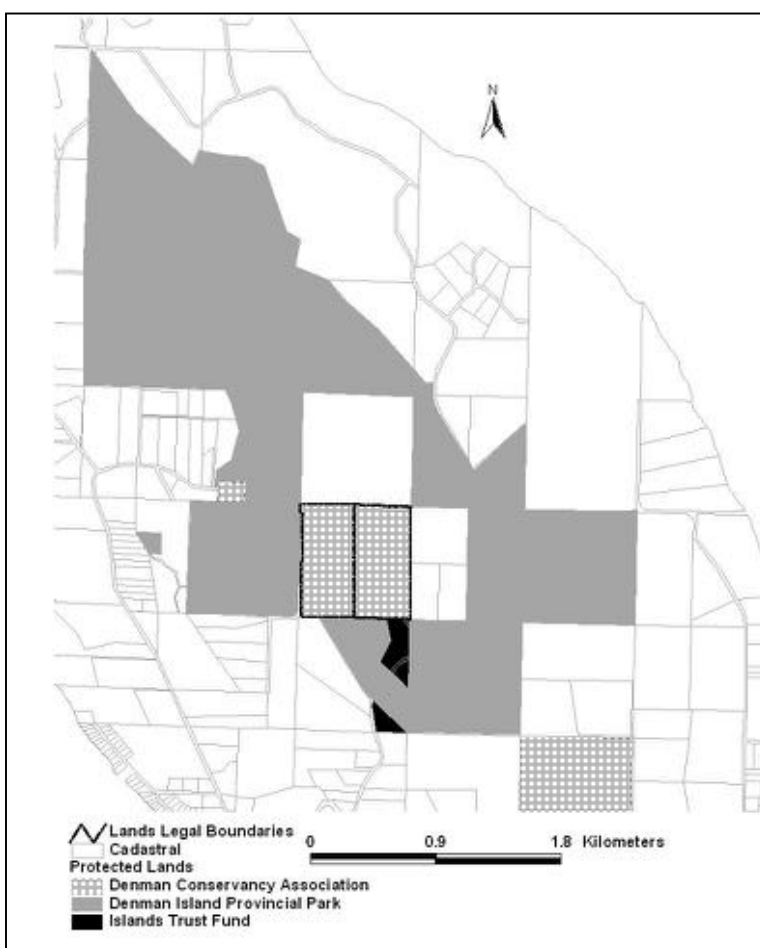
This Vision is enacted through the DCA **Mission**:

“To engage the Denman Island community in the protection of natural ecosystems on the island, through: Education; Building collaborative relationships; Enhancing human and financial resources to assure longevity; Acquisition, Management and Stewardship of Lands; Active, experiential involvement; Examining our work/role in the context of global environment issues.”

1.2 DCA Protected Areas Network “PAN” Vision

DCA has worked, alongside other agencies, toward the vision of a Protected Areas Network (PAN) across Denman Island, by focusing acquisition and stewardship efforts on adjoining parcels of ecologically significant land wherever possible. DCA’s Settlement Lands, Central Park and Winter Wren Wood properties, together with Inner Island Nature Reserve owned by Islands Trust Fund, and the Denman Island Provincial Park, make up a network of linked protected areas covering more than 760 contiguous hectares in the northern half of Denman Island (over one quarter of the total land area from Denman Road north). Depicted in Figure 1, in the context of surrounding protected lands, the Lands provide a key link in this Protected Areas Network.

Figure 1. Settlement Lands Connectivity to Adjacent Protected Lands (Source: Balke 2016)



Settlement Lands Conservation Significance

The Lands' biodiversity of species and habitats is ecologically noteworthy. At least 125 wildlife species were observed including sixteen species and six vegetation communities identified as at risk by either the provincial or federal governments. The abundant wetlands are unusual and important on the usually dry BC Gulf Islands, and the forests consist of patches of older forest, 30-116 years, with over 60 remnant old-growth veteran trees, as well as young regenerating forest areas. The ecosystems of the Lands are particularly significant as the properties are situated in the moist-maritime coastal Douglas-fir biogeoclimatic zone (CDFmm). Due to both growing human populations and accompanying land development pressures, the CDFmm zone is the least protected and most at risk zone in British Columbia (CDFCP, 2017).

1.3 DCA Management Planning

To ensure that the ongoing management of the Lands aligns with the above Vision, Mission and PAN Vision, DCA has undertaken a formal management planning process. A Settlement Lands Committee was formed for the creation of this Plan. Management planning and the implementation of completed plans is informed by the Baseline Documentation Report (hereafter, "Baseline") and undertaken in consultation with the DCA Board of Directors, DCA Lands Committee and Land Manager, DCA general membership, the covenant holder (TFB), relevant agencies (BC Hydro), adjacent landowners and other community members (see Section 5).

1.3.1 *Intent of the Settlement Lands Management Plan*

- (1) Define the Purpose and Goals for the ongoing management of the Lands
- (2) Provide a summary of ecological and cultural attributes of the Lands (making reference to relevant documentation including the Baseline).
- (3) Identify current and ongoing management issues relevant to the Lands
- (4) Establish management strategies and actions that address management issues and fulfill the Purpose of and Goals for the Lands
- (5) Outline the immediate, mid-term and long-term actions for the Lands and provide direction for their implementation

1.3.2 *Management Plan Review and Updates*

A review of this Plan should be completed:

- 5 years after the date of the initial creation of the Plan; and,
- Subsequently at least every 10 years (as required by the conservation covenant).

1.4 Settlement Lands Purpose

The Purpose of the Lands is to protect, restore, maintain and enhance the ecological values identified in the Covenant, and to ensure ongoing stewardship of the diverse ecosystems and species represented therein.

1.4.1 Overarching Goals for the Settlement Lands

- (1) Conserve habitat for native wildlife and plant species;
- (2) Provide for the use, enjoyment and education of the residents of Denman Island through low-impact activities such as walking, hiking and nature viewing, where appropriate; and,
- (3) Undertake or endorse scientific research, monitoring and ecological restoration activities on the Lands that is consistent with the conservation covenant.

1.5 Covenant Holder, Trust Fund Board

The object 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 through its mission to

"protect special places by encouraging, undertaking, and assisting in voluntary conservation initiatives within the Islands Trust Area."

This Plan was created in conjunction with the conservation covenant held by the TFB, and in accordance with the above objectives of the Islands Trust and the ITF. Prior to registration of the covenant, this Plan was reviewed and approved by the TFB.

2.0 Property Information

2.1 Location

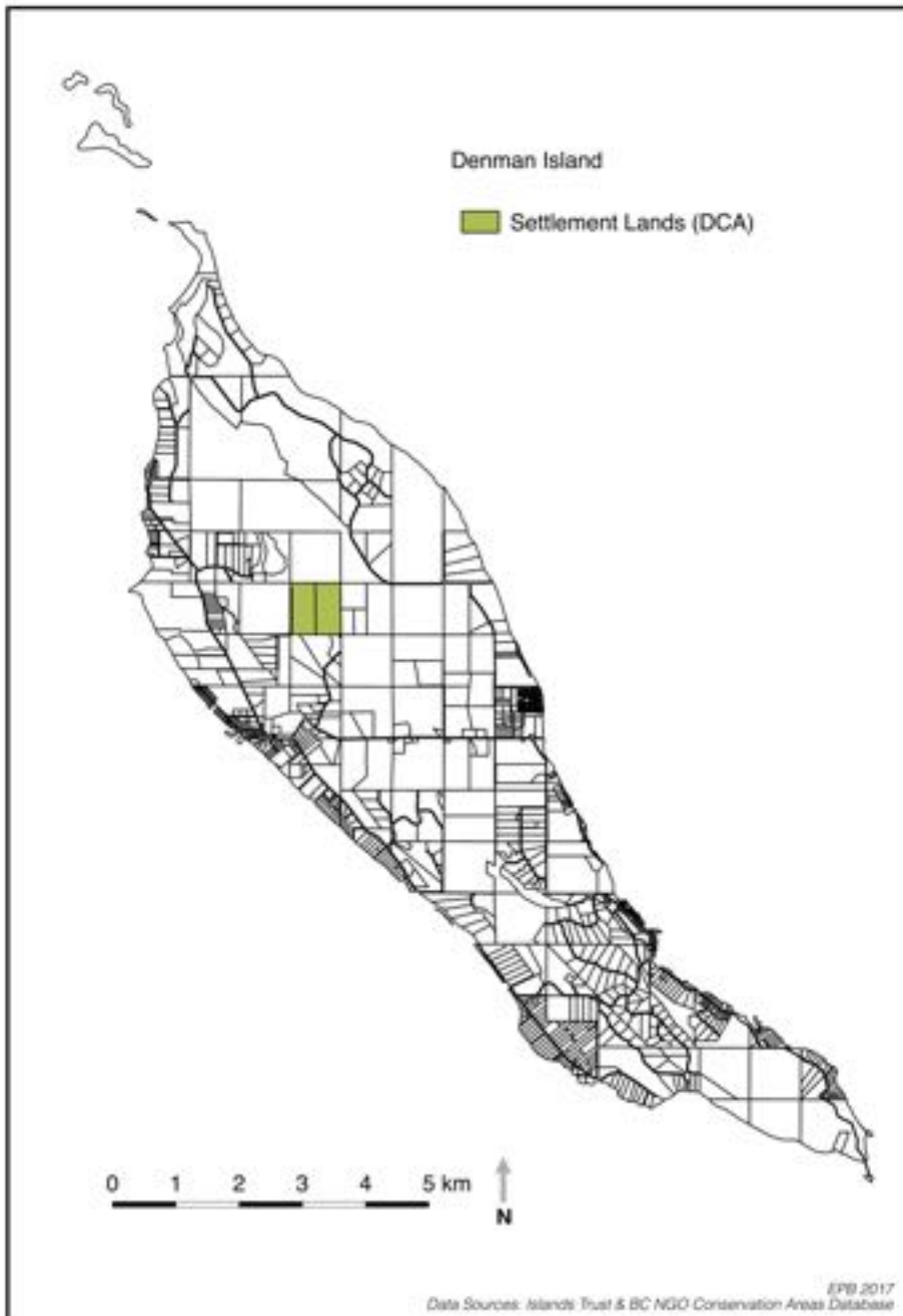
The location of the Lands is shown in Figure 2.

The Settlement Lands is located near the middle of Denman Island, British Columbia, north of Denman Road, and 4 km from the B.C. Ferries' Denman West terminal. The total size of the two properties together is 63.14 ha (156 acres) consisting of 30.69 ha (76 acres) for the western parcel and 32.45 ha (80 acres) for the eastern parcel. The property in its entirety is nearly square and is most of a quarter section.

2.2 Directions to the Settlement Lands

From the ferry on Denman Road, travel up the ferry hill, then up the big hill on Denman's longitudinal ridge. At the crest of this hill 1.6 km from the ferry, turn sharp left onto Pickles Road. There is a large painted fence on the south side of Denman Road at the hillcrest opposite the Pickles Road junction. Continue northwest on Pickles Road. Cross Pickles Marsh bridge at 2.7 km from the ferry and at 3.1 km turn left onto Central Road. Going straight at this curve continues into private property, the Swale Farm. Central Road crosses the southeast border into the Lands' eastern parcel and at 4.0 km is the designated parking area for the Lands. Central Road continues at a diagonal across both parcels and emerges near the northwest corner of the western parcel.

Figure 2. Location of the Settlement Lands on Denman Island



2.3 Legal Description

Lot 1: E 1/2 of NE 1/4 Section 21 Denman Island. Folio Number 107385000; Parcel Identifier (PID): 006-639-771; 32.45ha

Lot 2: W 1/2 of NE 1/4 Section 21 Denman Island, except that part in Plan VIP78186; Folio Number 77107386000 Parcel Identifier (PID): 006-657-656; 30.69ha

District: Nanaimo

2.4 Local and Regional Context

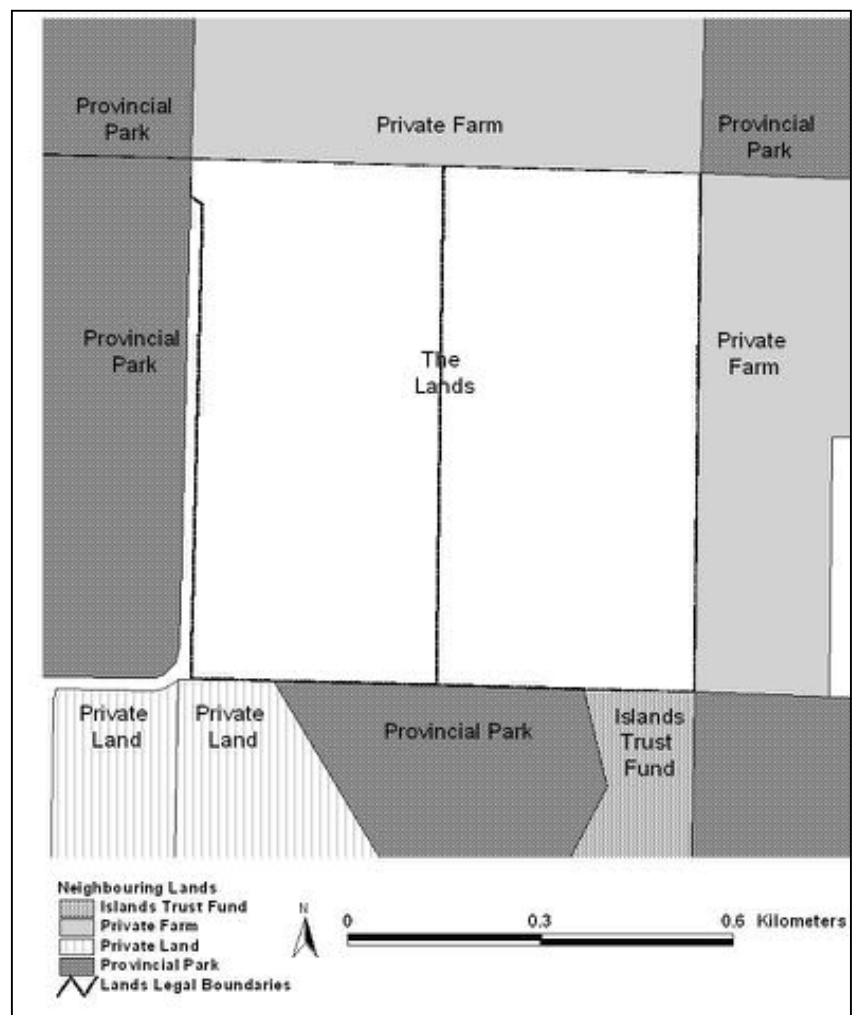
Denman Island is within the Comox Valley Regional District (CVRD) area, and land use activities and decision making are governed by Islands Trust, in addition to provincial and federal laws.

2.4.1 Adjacent Land Use

Figure 3 shows the Lands in relation to surrounding properties. Provincial parkland borders three of the four corners of the Lands, as well as along Chickadee Road that borders the property's west side and approximately 60% (in the centre) of the southern border. The Inner Island Nature Reserve, owned by TFB, is adjacent to 20% of the southern border.

The Lands are bisected on a NW-SW diagonal by a non-gazetted section of Central Road and bordered on the west by the newer Chickadee Road, constructed in 2005-6 to access a new subdivision to the southwest. Large, private lots, all greater than 15 acres, border the remainder of the Lands and are either settled and managed for agriculture (Swale Farm and Chickadee Lake Farm), undeveloped and awaiting sale or occupation (Raven Forest Products).

Figure 3. Adjacent Land Uses (Source: Balke 2017)



2.5 Site History

Below is a brief description of previous uses of the Lands. The Baseline describes use and occupation history in further detail. Other land uses prior to DCA acquisition include:

- First Peoples use and occupation
- Residential occupation of an historic homestead site;
- Selective logging and more recent high-grade logging;
- Agriculture including orchard cultivation and livestock grazing;
- Transportation along Central Road and various logging tracks and railway grades;
- Transmission of power via a BC Hydro line at the northeast corner of the Lands; and,
- Refuse dumping at an old community landfill site at the northwest corner of the Lands.

2.5.1 *First Peoples*

As noted in the Baseline, First Nations use of the Denman shoreline dates from at least 3500 years ago, and Denman was known to be the location of a Pentlatch village. Information about the use of the interior areas of Denman Island by First Nations peoples is scarce and we were unable to find reference to First Nations' historic use of the Lands, but a request for more information was submitted to K'ómoks, Qualicum and Tla'amin Nations in February 2017.

It is likely that the Lands were used by First Nations because of the proximity to beaches with abundant shellfish and the presence of freshwater creeks and wetlands, as well as the presence and abundance of native species which were used by Coast Salish First Peoples.

The Lands are within the asserted traditional territory of four First Nations and seven First Nations Treaty Groups, including the K'ómoks and Tla'amin First Nations². Tla'amin Nation negotiated a Final Treaty Agreement as of April 5, 2016, and, to date, K'ómoks Nation is in Stage 5 of the BC Treaty process (Negotiation to Finalize a Final Agreement)³. Details of First Nations' use of the Lands have not yet been identified by DCA but communications have been initiated between DCA and K'ómoks First Nation with this intent. Further consultation with regional First Nations is needed.

2.5.2 *European Settlement*

European settlement in the area began in 1876. The area was pioneered by European settlers around the 1890s, though sections of split rail fence and an overgrown orchard

² Indigenous and Northern Affairs Canada: https://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-BC/STAGING/texte-text/trynegc_1100100021020_eng.pdf (accessed March 14, 2017)

³ Government of British Columbia: <http://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/consulting-with-first-nations/first-nations-negotiations/first-nations-in-treaty-process> (accessed March 14, 2017)

of old apples trees are all that remain of the original homestead on the Lands. According to neighbours and more recent land titles records, ownership of the Lands included the following families or parties, in order from earliest to latest:

- Pickles Family (first David, then Bert)
- Collieries Family
- Weldwood of Canada Ltd.
- Hancock Timber Resource Group
- Comox Timber Ltd.
- 4064 Investments Ltd.
- 0736800 Ltd.

Travel between Swale Farm and Chickadee Lake Farm along an existing 4-metre wide farm track at the northeast corner of the Lands continues to date since it was first established to facilitate early settlement and agricultural activities in the area. It is not clear whether the Pickles Right of Way 51870G from 1924 listed in Section 2.6.3 describes this farm track.

2.5.3 Logging and Agriculture

Railway logging took place on north Denman in the late 1890s, early 1900s and remnants of two old railway grades remain on the property. Sections of the grade on which the rails were placed, consisted of elevated mounds built in order to cross the lowland wetlands. Some sections of the railway mounds have remnants of the original wooden ties.

The Lands were ‘messily’ logged during 2000-1 and is crossed by skid roads and landings created during this period. Ditches were dug in several locations on the eastern property to drain the area for agriculture. Beaver have continually created dams in the ditches and have enhanced the water coverage of the Homestead Marsh. Water levels in this marsh were high despite the summer drought of 2015. Ongoing monitoring of beaver populations and activity throughout the property will be prioritized and undertaken as capacity allows.

2.5.4 Old Landfill and Dumping Sites

As noted in the Baseline and in Appendix B, a former official landfill site (Figure 5) is located near the northwest corner of the Lands, but was closed and has not been used for over 20 years. This site is now a sand/dirt-floored gully with large trees along the edges, considerable forest regeneration throughout, and numerous invasive species. Unofficial dumping at a cliff site along Pickles Marsh also occurred decades ago (see Figure 5). More recently, particularly since the 2000 logging, unauthorized dumping has occurred infrequently along Central Road and other easily accessible areas.

Along with this debris, a mixed patch of invasive St. John’s Wort and Periwinkle was introduced through previous dumping of garden waste (See also Section 6.7.1).

In 2016, volunteers removed much of the exposed garbage and debris from the Old Landfill Site, along the Pickles Marsh Edge cliff area, and a few deposits near the parking area and along Central Road. Some very large automobile parts remain embedded in the bank along the bluff above Pickles Marsh. The larger deposits would require mechanical equipment and considerable landscape disruption to remove. It is uncertain whether the removal of some of these deposits is desirable or warranted, considering the potentially harmful impacts of the removal process. Section 6.7.3 of this Plan outlines possible remediation actions for sites where materials have been dumped.

2.5.5 Acquisition for Conservation

The Lands are historically significant to DCA and the community at large. The parcels were acquired as part of the settlement of DCA's landmark legal case against 4064 Investments Ltd. In 2000, DCA sued 4064 for breach of a land purchase contract. DCA asserted that 4064 had been obliged by the contract to place covenants on Denman's Komas Bluff and Railway Grade Marsh and, having not done so, proceeded to aggressively log Railway Grade Marsh.

After six years the parties concluded this case on November 6, 2006. As a result of the subsequent settlement, DCA holds conservation covenants on these two large, ecologically significant areas on Denman Island (Railway Grade Marsh and Komas Bluff) as well as title to the Settlement Lands parcels, adding over 66 hectares (165 acres) to Denman Island's protected lands.

Not only is the expansion of Denman's protected lands important, but the legal case demonstrated one of the methods by which land trusts can acquire lands that are in harm's way. The willingness of a small organization such as DCA to challenge a corporate entity proved the resilience and determination of DCA, gave heart to conservation supporters and serves as an important chapter in DCA history.

The support of the Environmental Dispute Resolution Fund (EDRF) of West Coast Environmental Law Association since August 2000 was a major factor in sustaining DCA's volunteers through their years of struggle with the case. DCA is also grateful for representation provided by three law firms: Olstead & Holekamp; Arvay Findlay; and, Underhill, Falkner, Boies Parker.

2.6 Charges, Liens and Interests

2.6.1 Conservation Covenant and Statutory Right of Way

A conservation covenant under Section 219 of the BC Land Titles Act and held by TFB registered on the titles for both of the adjoining East and West SL lots outlines the intent (a) to protect, preserve, conserve, maintain, enhance and, if applicable from time to time restore, the natural state of the Lands and the Amenities as described in the Report; (b) to protect, preserve, conserve, maintain, enhance and, if applicable from time to time restore, habitat for the Taylor's Checkerspot butterfly (*Euphydryas editha taylori*) including the sedge wetlands that it uses for breeding; and (c) to prevent any occupation

or use of the Lands that will impair or interfere with the natural state of the Lands or the Amenities as described in the Baseline Report.

The covenant serves as the primary reference point for the ongoing management and monitoring of the Lands. A Statutory Right of Way under Section 218 of the BC Land Titles Act, for the conservation covenant held by the TFB is registered on both Lot 1 (East ½) and Lot 2 (West ½).

2.6.2 Water Licences and Tenancies

There are no water licenses or tenancies on either of the two lots.

2.6.3 Rights of Way

A title search revealed the following charge on Lot 1 (East ½), created in 1924 to provide “a right of way with or without horses and vehicles and for servants or agents” through to Central Road: “Right of Way 51870G 1924-01-28 14:25; Cuthbert Vivian Pickles; East 6 feet of North east ¼ section of Section 21; See DD55523I”

In the near future, a Statutory Right of Way under Section 218 of the BC Land Titles Act, for A BC Hydro power line which runs through the northeast corner of the property, may be registered on the title of Lot 1 (East ½).

2.6.4 Restrictive Covenants

There are no known Restrictive Covenants affecting either of the two lots.

2.6.5 Development Permit Areas (DPAs) & Riparian Areas Regulation (RAR)

Development Permit Area 4 (Streams, Lakes and Wetlands) under Denman Island's Land Use Bylaw, is applicable to Pickles Marsh and Homestead Marsh. Both are also both part of the Beadnell Creek Watershed and are subject to the Riparian Areas Regulation (RAR) of the provincial government, under the *Fish Protection Act*. Information about the location and extent of DPA4 and RAR areas is available from Islands Trust.

2.6.6 Species At Risk Act (SARA), Environment and Climate Change Canada

The Lands fall within an area classified as Critical Habitat for the Taylor's checkerspot and Dun Skipper butterflies under SARA. Since the Taylor's checkerspot was first discovered on the property in 2005, DCA has been granted funding from the federal Habitat Stewardship Program (HSP) to carry out management of this Critical Habitat, based on current best practices, especially within a designated Butterfly Reserve area (shown in Figure 5 and Figure 10; See also Sections 2.6.6; 3.1.2; 6.2.3; 6.4.8; 6.6.1; 6.7.1; 6.8; 7.0).

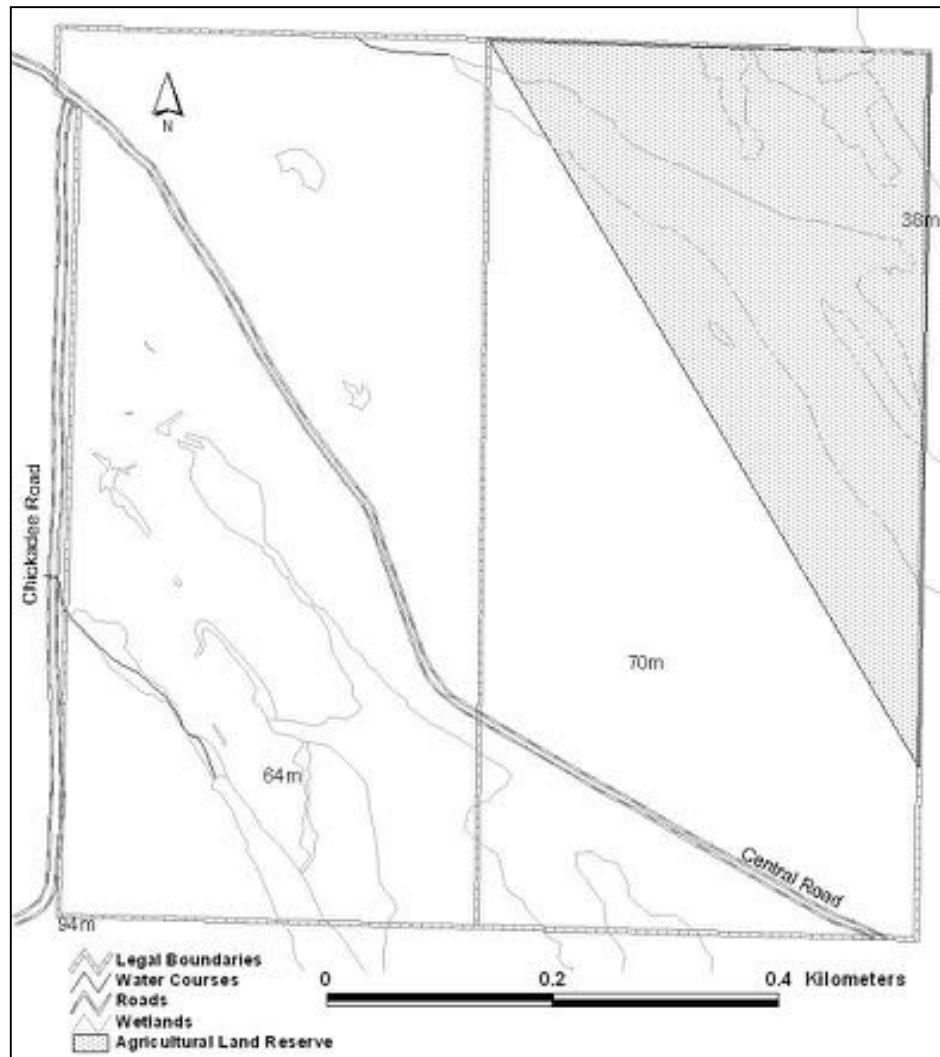
2.7 Governance and Official Community Plan

2.7.1 Zoning

Under the Denman Island Land Use Bylaw, the Lands are zoned Forestry (F), except for 12.97 hectares (32.05 acres) on the eastern parcel which are zoned Agriculture (A1)

and are in the Agricultural Land Reserve (ALR). Figure 4 shows the location of the ALR portion within the Lands. In the future, DCA intends to pursue a change of zoning from Forestry to Conservation Zoning for the portions of the Lands that are not in the ALR.

Figure 4. Portion of the Lands in the ALR (Source: Balke 2017)



2.7.2 Infrastructure and Amenities

Existing, planned, and proposed infrastructure on the Lands is shown in Figure 5 and includes:

- A wooden footbridge, recently restored, at the Pickles Creek crossing in the southwest corner of the Lands, along the Old Road Trail (Existing)
- A Butterfly Reserve Information Kiosk (Existing)
- Main Parking Area (Existing) and Main Information Kiosk (Planned)
- Cattle Exclusion Fencing (up to 500m along eastern boundary) (Planned) (see 4.1.2; 5.1; 6.2.4; 6.5.5; 7.0)
- Butterfly Demonstration Garden (~0.02ha including fence and water cistern) (Proposed) (See 6.4.8)

- Wildlife Viewing Platform (Proposed) (see 6.4.9)
- Up to 4 Memorial or Nature Viewing Benches (None yet proposed; locations TBD in consultation with ITF staff) (see 6.4.5)

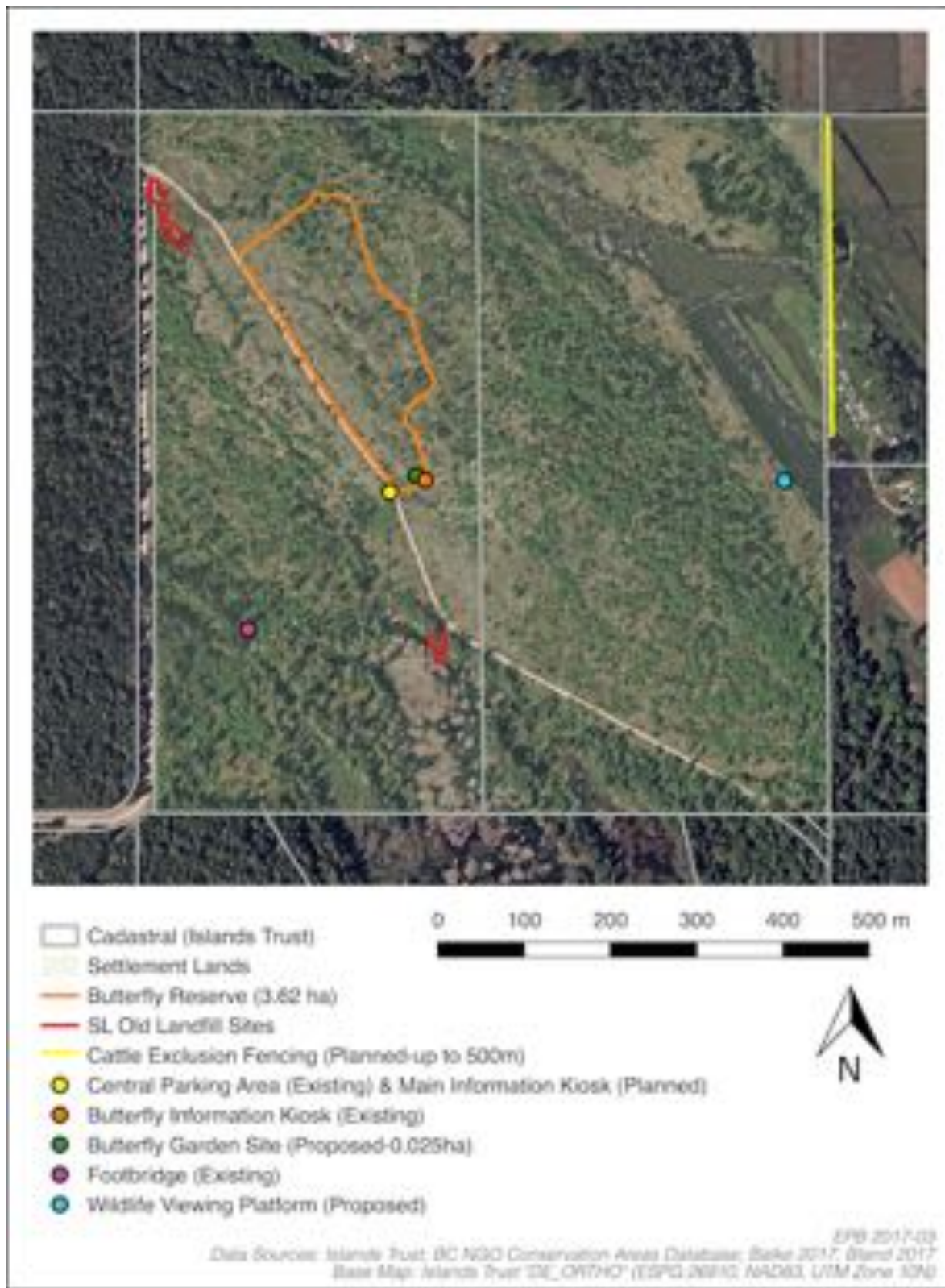
2.7.3 Utilities and Roads

Central Road is a non-gazetted Scenic/Heritage designated road that runs diagonally NW-SE through the Lands. Road maintenance is currently carried out by Emcon Services Inc. and governed within the jurisdiction of the British Columbia Ministry of Transportation and Infrastructure (MOTI⁴). This portion of Central Road is classified by MOTI as an “unsurveyed travelled road” (Islands Trust, 1998) and a consultative process between MOTI and Islands Trust is to be initiated before any upgrading activities, as noted in their memorandum of understanding (Ministry of Transportation and Highways and Islands Trust, 1992).

Chickadee Lake Road follows the west boundary and its road allowance is external to the property.

⁴ Formerly Ministry of Transportation and Highways (MOTH)

Figure 5. Property Amenities and Infrastructure



3.0 Ecological Inventory

The Settlement Lands is complex of diverse ecosystems including forest, wetland, rocky cliff and previously-farmed meadows. The Lands consists of three major forested slopes facing two different directions, three forested flat or undulating areas at different elevations, 2 major and six minor wetlands, two creeks, two riparian areas and the two farmed-meadows. The elevation of the terrain varies from 38 to 97m above sea level; the aspect ranges from NE to SW facing and the slope varies from flat to shear drop of up to 10m with more gradual slopes of over 30m. The terrain's surface includes dry rocky bluff, impenetrable rock flat, flowing creeks, isolated wetlands and inter-connected marsh systems. Occasional isolated rocks or erratics are reminders of the early impacts of glaciation that caused both erosion and deposition.

3.1 Species and Communities

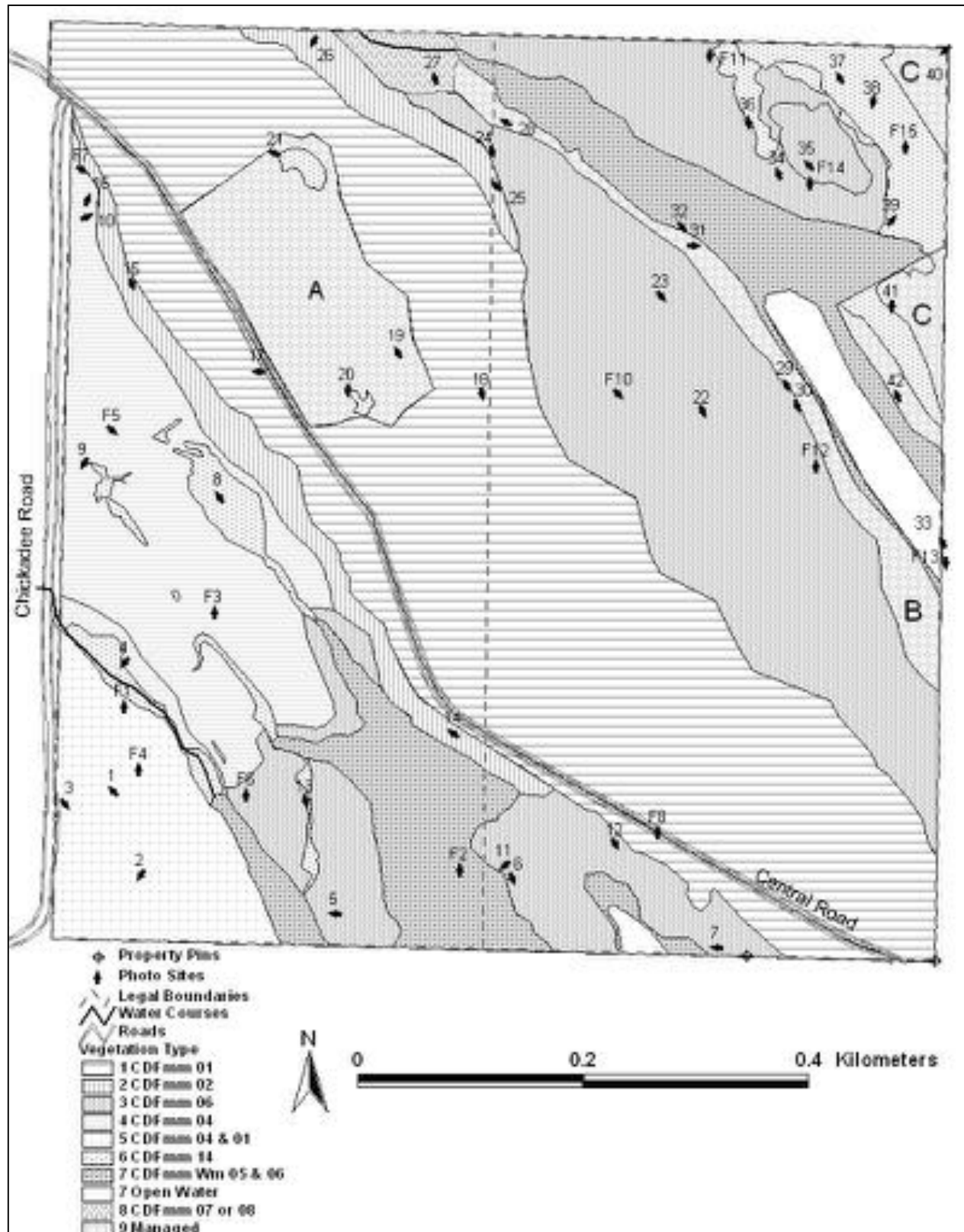
The Baseline describes the ecological characteristics of nine major vegetation types across nineteen different terrain zones. Six CDFmm site series or ecological communities were clearly identified and three areas were considered under a 'management-impacted' category including the Butterfly Reserve, a riparian area that is being heavily harvested by beaver and the previously-farmed meadows.

3.1.1 Vegetation Types

The major vegetation types (see Figure 6) and site series of the Lands are:

- **Type 1 CDFmm 01** Douglas-fir – dull Oregon-grape *Pseudotsuga menziesii* – *Mahonia nervosa*
- **Type 2 CDFmm 02** Douglas-fir – arbutus *Pseudotsuga manziesii* – *Arbutus menziesii*
- **Type 3 CDFmm 06** Western redcedar, Grand fir – Foam flower *Thuja plicata*, *Abies grandis* – *Tiarella trifoliata*
- **Type 4 CDFmm 04** grand fir / dull Oregon-grape *Abies grandis* / *Mahonia nervosa*
- **Type 5 Complex - CDFmm 01 & CDFmm 04**
- **Type 6 CDFmm/14** red alder / slough sedge *Alnus rubra* / *Carex obnupta*, equivalent to **CDFmm / Ws 52** red alder – skunk cabbage *Alnus rubra* – *Lysichiton americanus* Complex
- **Type 7 Complex - CDFmm / Wm 05** Common cattail *Typha latifolia* & **CDFmm / Wm 06** Great bulrush (here: Soft-stemmed bulrush *Schoenoplectus tabernaemontani*)
- **Type 8 Young riparian, possible - CDFmm / 07** western redcedar / common snowberry *Thuja plicata* / *Symphoricarpos albus* or **CDFmm / 08** red alder / salmonberry *Alnus rubra* / *Rubus spectabilis*
- **Type 9 Management-impacted** – A: Butterfly Reserve, B: Beaver Impact, C: Farm Management.

Figure 6. Settlement Lands Vegetation Types (Source: Balke 2017)



3.1.2 Rare Species

Sixteen rare species at risk recorded in the Lands since DCA acquisition include:

- Band-tailed pigeon (*Patagioenas fasciata*) is Blue-listed in BC and Special Concern under the Canadian *Species at Risk Act* (SARA).
- Barn owl (*Tyto alba*) is Blue-listed in BC and Special Concern for SARA.
- Barn swallow (*Hirundo rustica*) is Blue-listed ⁵in BC.
- Blue dasher dragonfly (*Pachydiplax longipennis*) is Blue-listed in BC.
- Common nighthawk (*Chordeiles minor*) is Threatened⁶ for SARA⁷.
- Common wood nymph butterfly (*Cercyonis pegala*) is Red-listed⁸ in BC.
- Cutthroat Trout, *clarkii* subspecies (*Oncorhynchus clarkii clarkia*) is Blue-listed in BC.
- Dun skipper butterfly (*Euphyes vestries*) is Red-listed in BC and Threatened for SARA.
- Great blue heron (*Ardea Herodias*) is Blue-listed in BC and Special Concern⁹ for SARA.
- Little brown bat (*Myotis lucifugus*) is Endangered¹⁰ for SARA
- Northern red-legged Frog (*Rana aurora*) is Blue-listed in BC and Special Concern for SARA.
- Olive-sided flycatcher (*Contopus borealis*) is Blue-listed in BC and Threatened for SARA.
- Taylor's checkerspot (*Euphydryas editha taylori*) is Red-listed in BC and Endangered for SARA.
- Western pine elfin butterfly (*Incisalia eryphon*) is Blue-listed in BC.
- Western pondhawk dragonfly (*Erythemis collocata*) is Blue-listed in BC.
- Western screech-owl (*Otus kennicottii*) is Blue-listed in BC and Special Concern for SARA.

3.1.3 Rare Ecological Communities

Probably due to the protection afforded by the extensive lobed wetlands, the Lands retain patches of original forest. More than 60 Douglas-firs, having a diameter at breast height (DBH) of greater than 900mm are dispersed throughout the property. These large trees, with the associated plant and animal species such as herbs, mosses, lichens and invertebrates may provide at least small refugia of original genetic material

⁵ **BC Blue-list** Includes any ecological community, and indigenous species and subspecies considered to be of special concern (formerly vulnerable) in British Columbia. Elements are of special concern because of characteristics that make them particularly sensitive to human activities or natural events. Blue-listed elements are at risk, but are not Extirpated, Endangered or Threatened.

⁶ **Threatened** is applied to a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

⁷ **SARA** refers to the Canadian Government's Species at Risk Act.

⁸ **BC Red-list** includes any ecological community, and indigenous species and subspecies that is extirpated, endangered, or threatened in British Columbia. Extirpated elements no longer exist in the wild in British Columbia, but do occur elsewhere. Endangered elements are facing imminent extirpation or extinction. Threatened elements are likely to become endangered if limiting factors are not reversed.

⁹ **Special Concern** is applied to a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

¹⁰ **Endangered** applies to a wildlife species that is facing imminent extirpation or extinction.

that may over time become dispersed throughout the recovering ecosystems of the Lands and the surrounding area.

Six rare ecological communities, defined by their vegetation components, were identified:

- CDFmm 01 Douglas-fir / dull Oregon-grape *Pseudotsuga menziesii* / *Mahonia nervosa* is Red-listed in BC.
- CDFmm 02 Douglas-fir – arbutus *Pseudotsuga manziesii* – *Arbutus menziesii* is Red-listed in BC.
- CDFmm 06 grand fir / three-leaved foamflower *Abies grandis* / *Tiarella trifoliata* is Red-listed in BC.
- CDFmm 04 grand fir / dull Oregon-grape *Abies grandis* / *Mahonia nervosa* is Red-listed in BC.
- CDFmm/14 red alder / slough sedge *Alnus rubra* / *Carex obnupta* or equivalent Ws 52 red alder – skunk cabbage *Alnus rubra* – *Lysichiton americanus* Blue-listed in BC.
- CDFmm / Wm 05 Common cattail *Typha latifolia* & CDFmm Wm 06 Great bulrush. The bulrush here is Soft-stemmed bulrush *Schoenoplectus tabernaemontani* Complex. Both Blue-listed in BC.

3.2 Major Influencing Factors

The complex vegetation patterns on the Lands are a reflection of the temperature/moisture gradient from the local climate and hydrology, the underlying soil, and the previously noted variation in terrain. The current vegetation also reflects the various human influences of logging and agricultural use.

3.2.1 Climate

The climate of the Lands, in central Denman, is buffered by the surrounding landscape from some of the coastal weather systems. Also, from local observations, the area tends to be slightly cooler and wetter than the southern end of Denman. Environment Canada records for 1981 to 2010 for the Comox weather station, approximately 20 km north of the Lands, indicate that 78% of precipitation falls from October through March and that there is a mean total precipitation of 1153.6 millimetres per year (Environment Canada 2016). The warmest period is July and August with long-term normal maximums of less than 22.7°C and 22.8°C, respectively. Long-term minimums from December through February are above 0.5°C.

Climate change has been identified as a potential risk that will affect the property in the future (see Section 4.5). Possibly related to climate change, a rare and unusual hurricane that swept Denman in 2006 affected some of the older trees on the Lands, in the open Uplands Zones. Several veteran old-growth Douglas-firs that were exposed above other vegetation were broken or toppled during the storm.

Denman Island is situated at the northern limit of the CDFmm biogeoclimatic zone and also tends to be a moisture-accumulating island with numerous shallow wetland

depressions. Thus, due to a more northerly and wet climate, forests on Denman, while demonstrating southern Douglas-fir forest characteristics, also show some transitional characteristics to the Coastal Western hemlock xm1 zone.

3.2.2 Underlying Geology and Effects of Glaciation

The underlying geology of the Lands is primarily rock of the De Courcy formation, with the Swale marsh edge likely over the upper Northumberland formation. The De Courcy formation consists of layered beds of sandstone and conglomerate (composed of well-rounded pebble and lesser cobble-sized volcanic, granitic and sedimentary rocks). Fragments and solid surfaces of sandstone are evident over much of the surface of the Lands. The soils are very shallow over most of the Lands; even the richer dark sandy loam of the Homestead area has coarse sandstone fragments.

Up to 14,000 years ago, glacial sheets, covered Denman Island to a depth of more than a kilometre. By moving rocks and gouging the conglomerate and sandstone bedrock they created the current tilted step-like backbone of Denman with only thin, patchy surficial deposits. This geological step-like exposure of tilted and alternating shelves/beds of sandstone and conglomerate and very little surface soil, that underlies the Lands, is easily seen in the rock-cut on the north side of the Chickadee Rd. Additionally, rock fragments, transported in the glacial ice, were deposited irregularly across the Lands as erratics—granitic or volcanic boulders, often at least 1m across.

3.2.3 Hydrology

The Lands have a variety of creek and wetland features resulting from slope drainage, impermeable surfaces, as well as beaver and human activities. The two major hydrologic features, Pickles Marsh and Homestead Marsh and their associated creeks are all part of the Beadnell Creek system; although the various sections are not connected on the Lands. The drainage from Pickles Marsh flows into the southern end of the Swale Marsh, and Homestead Marsh flows into the western side of the Swale. Ditches approximately 1m deep, created for agricultural land drainage, are located around Homestead Marsh and throughout the Swale. Beaver dams maintain the water level of both Pickles and Homestead Marshes. Beavers also continually attempt to dam ditches in the Swale, while local farmers thwart their efforts. The Beadnell Creek system is one of two major salmon spawning waterways on Denman and in addition, cutthroat trout occupy creek and marsh habitat on the Lands.

Isolated wetlands and wet pockets also occur in impermeable depressions, particularly in the Lowlands area. Some of the small wet depressions were deepened into linear ruts by logging equipment around 2000. Two small surface-isolated wetlands, also formerly important sites for breeding Taylor's checkerspot butterflies, are included in the Butterfly Reserve on the Uplands forest.

3.2.4 Land Use

Logging, both of the original timber and of the subsequent second growth in 2000, had major impacts on the vegetation and features of the Lands. Also, the various agricultural

activities have altered and left impacts, including the original homestead, the previous use of the Swale Marsh Meadow and the current cattle grazing in the Swale Farm Grazing Meadow.

3.3 Non-Vegetative Features

A variety of additional non-vegetative features are found within the Lands including:

- Beaver dams and lodges on Pickles and Homestead Marshes, and their drainage creeks. As noted, beavers maintain the hydrology of the major wetlands and creek flows. These beaver wetlands provide fresh water and habitat opportunities for numerous wildlife species. They also retain water, providing moisture for adjacent vegetation.
- Glacial erratics, isolated boulders often greater than 1m in diameter, are dispersed infrequently over the Lands.
- Old logging railway embankments remnants are in the Lowlands, Uplands and Homestead Forest terrain zones. The sections of these embankments are usually paired. At the time of the first logging, the area in which the Lands are situated was a central mill and logging camp where logs were processed.
- Cedar split-rail fences typical of Denman's early homesteads are present. An intact fence runs on the perimeter around the north and east sides of the old Home-site and Homestead Forest. Some portions of split rail are also along the southern border west of Homestead Marsh.
- Drainage ditches, about 1m deep, were part of earlier agricultural efforts to drain the prominent low-lying wetlands in the Homestead area, as well as in the Swale. More recently in 2015, the Swale farm neighbour built an earthen dam along the Homestead Marsh / Swale farm border to allow for fencing of this border. This dam currently runs almost across the marsh but does not block the drainage.
- Remains of previous dumping activities are present in several areas, particularly in the former Old Landfill Site and also along the Pickles Marsh Edge, where two vehicles remain partially buried and grown over by vegetation (locations shown in Figure 5).
- Skid roads, from the 2000 logging, often outlined by rows of red alder, occur throughout the Lands. A few of these roads are proposed as future walking trails. Also, the remains of an older forestry track runs from the south side of Chickadee Road just east of Pickles Creek and enters the Lands going south. The track then turns west and crosses Pickles Creek before going uphill and back to Chickadee Road. A footbridge over the crossing at Pickles Creek was recently restored to provide safe passage.

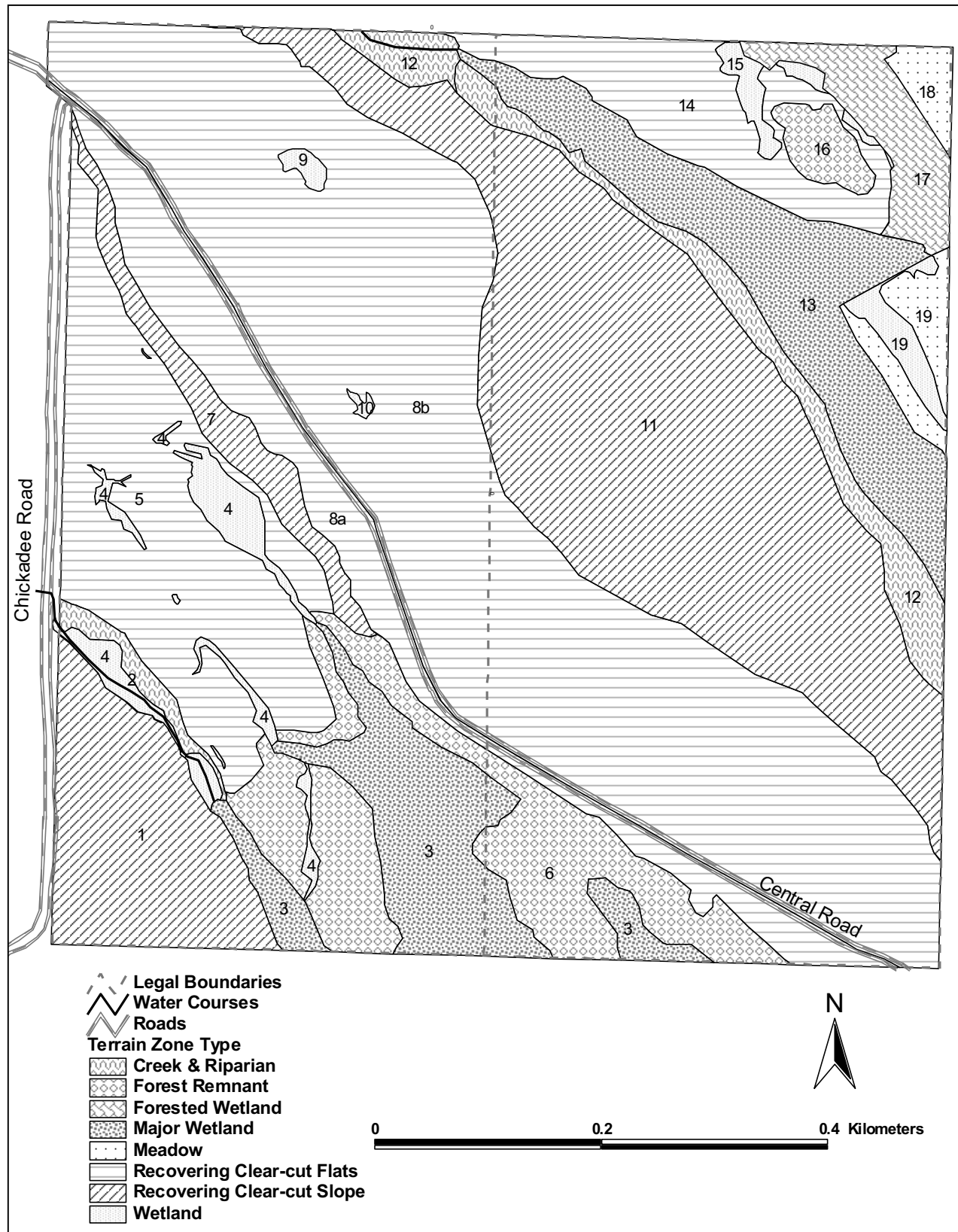
3.4 Terrain Zones

In the Baseline, eight major vegetation types are described across nineteen terrain zones (Figure 7). Among the terrain zones are three major benched-slopes facing two different directions and three extensive flat or undulating areas at different elevations. On the Lands there are four small pockets of residual forest within four large recovering messy clear-cuts and two previously farmed meadows. In addition, there are two small creeks, two major wetlands (one with three separate bays on the Lands) and six minor sedge wetlands. Refer to Appendix F for a list of Terrain Zones and corresponding Vegetation Types.

3.5 Wildlife

Sixteen rare at-risk species have been recorded in the Lands' diverse habitats since DCA acquisition. Nine rare animal species were seen or heard on the Lands during the 2016 Baseline inventory. A table of wildlife species found in each terrain zone, and complete plant and animal species lists for the Lands are found in Appendices G, H, I and J.

Figure 7. Settlement Lands Terrain Zones (Source: Balke 2017)



4.0 Threats and Risks to the Settlement Lands

4.1 Degradation of Riparian and Wetland Ecosystems

4.1.1 Harm to Beaver Population

Harm to the beaver population and the loss of beaver activities in maintaining dams and water levels would seriously damage the critical wetland features of the Lands. Principal threats to beavers on the Lands include: predation, disturbance and disease transfer from dogs; repeated human disturbance of normal beaver activities, or physical interference with critical habitat, such as pollutant contamination of water or aquatic nutrient loading from agricultural activities resulting in harmful ecological changes.

4.1.2 Cattle Grazing from Neighbouring Property

As described in the Baseline, cattle from Swale Farm have access to graze on a 0.9 ha area of partially-flooded pasture along the eastern border of the Lands. This practice has maintained an open grassland/shallow wetland habitat that supports accompanying wildlife species, such as breeding killdeer, rails, grassland-edge-loving songbirds and many invertebrate species. The potential risks to the wetland area from the presence of cattle include surface water contamination from deposition of manure, among other things. DCA actions for the exclusion of cattle are outlined in Sections 5.1 and 6.5.5.

4.1.3 Public Access

Public access to sensitive wetland sections of the Lands has the potential to negatively impact these ecosystems, for instance through damage to and disturbance of wildlife habitat and introduction of invasive and alien species. For this reason, trails are minimized throughout the property, with no trail access provided around the major Pickles and Homestead Marshes.

4.1.4 Pollutants

Agricultural activities on surrounding lands could have impacts on the Lands, depending on the practices used (such as the application of pesticides) by neighbouring landowners. Pollutants could poison wetland ecosystems or add to toxins that are accumulated through the food web.

4.1.5 Excessive nutrient loading

Excessive nutrient-loading or other pollutants in creeks and wetlands could be a concern, depending on the agricultural practices taking place on adjacent lands. Excessive nutrients could cause blooms that would choke out some species and lead to the growth of more nutrient-tolerant invasive species. These ecosystem changes would in turn impact Beaver and other wildlife.

4.2 Border encroachment

Since almost half of the Lands' borders are connected to other protected areas the risk of encroachment and associated impacts is reduced. However, unmarked long borders with private lands mean that inadvertent incursion into the Lands from these properties is possible. Different management goals on adjacent lands could pose some

challenges; for instance, an interconnected trails network linking with the nearby Provincial Park increase the likelihood that recreational uses permitted there, such as trail cycling, extend into the Lands.

Ensuring adequate boundary delineation (Section 6.5), and sufficiency and clarity of public information regarding the Purpose and Goals of the Lands (see 1.4; 6.4.7; 6.5), will help to prevent negative impacts due to border encroachment.

4.3 Accidental Wildfire

Accidental wildfire could result from natural causes such as lightning, or human causes including the use of cars on Central Road through the Lands (hot undercarriage on grass, tossed-cigarette butts); unlawful campers; or use of trails in summer by careless smokers. Widespread fire could compromise the regenerating forest. DCA approaches for fire hazard management are outlined in Section 6.9.

4.4 Invasive and Alien Species, and Disease

Invasive alien species, such as Scotch Broom, St. John's Wort, English Holly, Reed Canary Grass and European Black Slugs threaten the integrity of native species on the Lands. The above plant species tend to dominate the habitat in which they grow and encroach upon the surrounding area such that they retard the regeneration of native species or out-compete them. Bracken Fern is native, but is considered invasive in some areas of the Butterfly Reserve because of its tendency to shade out nectar plants used by pollinators. Black Slugs are increasingly seen in wild lands on Denman and on Vancouver Island. These slugs may out-compete and seriously reduce Banana Slug populations, with unknown effects on the web of native plant and animal species. Active farming of the surrounding lands may also expose the Lands to further invasive alien species. DCA approaches for the control of invasive plants and animals are outlined in Section 6.7.

Another concern is the possible introduction, by visitors to the Lands, of new and more virulent forms of root-rot, or other diseases. In addition, some farm practices such as spraying, or the introduction of new plant or animal species, could adversely affect the Lands' ecosystems and species at risk. Information about biosecurity on the Lands could be included in the Main Information Kiosk for the property.

4.5 Climate Change

Current and future climate change will impact forests, wetlands, rivers, and coastal areas, as well as the human communities that depend upon them. The protection and conservation of ecosystems and lands, including the Lands, will provide options for the DCA to implement adaptive strategies that address ongoing climate change.

Wetlands, and small isolated populations, are particularly at risk for instability and possible loss and there is an expected increase in risk of wildfire incidence and severity. Although the Lands have not been specifically assessed for sensitivity to climate change, the wetlands have connectivity value for species travel between adjacent protected areas. They also contain at least one small isolated population of the

endangered Taylor's checkerspot butterfly. There may be opportunity to develop climate change strategies for the Lands that complement those of the adjacent protected areas.

4.6 Wind

Wind, particularly on exposed sites, will continue to topple infirm or stressed trees, particularly as the regenerating forest canopy becomes crowded. This is an expected process of forest regeneration. Wind-throw along the borders with the private land could have more a severe impact on edge forests if the border trees on the private lands are cut. It may also have an impact on the ongoing maintenance of infrastructures such as power lines and fences on the Lands.

5.0 Community Consultation

DCA has a long history of engaging community members in efforts to conserve and protect lands in which the Society has an interest. Since acquiring the Lands, DCA has provided numerous opportunities for Denman Islanders to learn about the Lands and have input on DCA's plans for their conservation and management. Routine reviews of this Plan will ensure it remains relevant and effective in the context of changing ecological, political, climatic and other circumstances.

5.1 Adjacent Landowners

Neighbours from Chickadee Lake Farm and Swale Farm, as well as representatives from BC Parks, were invited to participate in two community information meetings about the Lands.

Consultations with a neighbouring property owner were undertaken regarding the construction of a fence intended to prevent cattle from Swale Farm from entering the sensitive wetland area at the northeast corner of the Lands (sections 4.1.2; 6.5.5).

5.2 Local First Nations

Letters were sent to the K'ómoks, Qualicum and Tla'amin Bands advising them of the preparation of this Management Plan and inviting their input and participation in a Community Information Open House prior to registering the Conservation Covenant. The Land Manager presented information about DCA and this Plan to the K'ómoks Chief and Council on 27 February 2017.

The K'ómoks Chief and Council agreed to review this plan and provide feedback on the sections of the Plan relevant to First Nations History and traditional use. To date, no such feedback has been received, but future contributions from the K'ómoks Chief and Council will be incorporated into an amendment to this Plan.

Ongoing Treaty negotiations and assertions of Aboriginal Rights and Title to traditional territories by First Nations in this region should be recognized throughout Plan implementation.

5.3 Denman Island Community

5.3.1 Public Consultation Meetings

The Denman Island Community has been invited to participate in two Public Open Houses about the Lands:

- A Community Information Open House about the Conservation Proposal to Islands Trust Fund to Hold a Conservation Covenant on the Lands
- A Community Information Open House about the Draft Management Plan and Conservation Covenant

5.3.2 DCA Outreach

Through DCA's Outreach program, in addition to Public Consultation meetings, the Denman Island community has been invited to learn about the Lands by various means including the DCA website; Facebook page; newsletters; events; Annual General Meetings, and personal communication. In February 2016, 44 people were guided through a section of the Butterfly Reserve and oriented to various ecological features of the Lands. A guided walk to the Lands also took place in June 2013.

6.0 Management Plan

Settlement Lands Purpose

The Purpose of the Lands is to protect, restore, maintain and enhance the ecological values identified in the Covenant, and to ensure ongoing stewardship of the diverse ecosystems and species represented therein.

Overarching Goals for the Settlement Lands

- (1) To conserve habitat for native wildlife and plant species;
- (2) To provide for the use, enjoyment and education of the residents of Denman Island through low-impact activities such as walking, hiking and nature viewing, where appropriate, in a manner that is consistent with the Conservation Covenant; and,
- (3) To undertake or endorse scientific research, monitoring and ecological restoration activities on the Lands that is consistent with the Conservation Covenant.

6.1 Sharing of Management and Protection Responsibilities

Management of the Lands will be undertaken by DCA. The ITF will be responsible for ensuring that the values identified in the Conservation Covenant are maintained.

6.2 Ecological Management Zones

Four Ecological Management Zones—groupings of terrain and vegetative features into larger areas—were identified for the Lands, using the Baseline and Ecological Inventory.

Zone-Specific Management Goals (outlined below) provide guidance for decision-making related to each Zone. A map outlining Zone boundaries will be created when capacity allows, with final Zone boundary mapping subject to ITF approval.

6.2.1 Goals for Management Zone 1: Pickles Marsh & Lowland Riparian

- Conserving and enhancing habitat for wildlife in Pickles Marsh wetland system, including populations of aquatic amphibian, invertebrate, mammal & bird species at risk: red-legged frog; beaver; cutthroat trout; common nighthawk; great blue heron; olive-sided flycatcher; band-tailed pigeon; barn owl; western screech owl; barn swallow; common wood nymph; blue dasher dragonfly; and many other aquatic-dependent species
- Monitoring of hydrological changes over time
- Protecting forested riparian ecosystems connected to headwaters of salmonid-bearing Beadnell watershed
- Protecting Coastal Douglas Fir-mm biogeoclimatic zone features, old and mature forest remnants, and veteran old trees as biodiversity refugia

6.2.2 Goals for Management Zone 2: Pickles Slope

- Regeneration of forest & woodland areas
- Maintenance of wildlife travel corridors central to DCA Protected Areas Network (PAN) Vision
- Preservation of native flora; Prevention of encroachment of invasive species

6.2.3 Goals for Management Zone 3: Uplands, Isolated Wetlands, & Butterfly Reserve

- Conservation and enhancement of woodland and wetland habitats for at-risk invertebrate species including: Taylor's checkerspot (TC) butterfly; Dun skipper butterfly; common wood nymph butterfly; western pine elfin; western pondhawk dragonfly; blue dasher dragonfly; and other aquatic-dependent species
- Control of invasive species
- Prevention of impacts from Central Road such as refuse dumping

6.2.4 Goals for Management Zone 4: Old Homestead & Swale

- Conservation and enhancement of habitat for, and protection of, beavers and aquatic-dependent species
- Monitoring of hydrological changes over time
- Monitoring of agriculturally-impacted ecotone over time

6.3 Prohibited Uses

Section 4 of the Conservation Covenant for the Lands sets out restrictions on the use of the Covenant Area (Appendix E). In addition, risks to the ecological values of the Lands have been identified within the Baseline and in Section 4 of this Plan.

Based on covenant restrictions and identified threats and risks, the following activities are prohibited within the Lands:

- Dumping of refuse
- Cutting or removal of any indigenous vegetation, except that which occurs within the Butterfly Reserve in accordance with this Plan.

- Domestic cultivation of any flora or fauna, with the exception of cultivation of native plant species within the Butterfly Reserve and Butterfly Demonstration Garden, in accordance with this Plan;
- Camping or overnight parking
- Smoking, or the creation of fires for any purpose
- Hunting, fishing, foraging, or grazing of domestic animals, or transport of domestic animals through or across the land or water surfaces of the Lands;
- Presence of domestic animals (including Dogs) in the Lands, except on Central Road. Due to the sensitive nature of the wetlands, the significant wildlife species and the neighbouring farms, the intent is to minimize disturbance on the Lands and species within the covenant area. Beaver are crucial for the ecology of the Lands, and very sensitive to disturbance from encounters with Dogs. Thus, all visitors with accompanying domestic animals are requested to use Central Road, which runs through the centre of the property. Human walkers are invited to use the trails through these critical wildlife and wetland habitats.

The above list is subject to change upon periodic revision of this Plan or identification of other activities deemed likely to violate the terms of the conservation covenant or negatively impact the values of the Lands. Any unanticipated activities which may violate the Conservation Covenant will be approved by the Islands Trust Fund Board as permitted in the Conservation Covenant.

6.4 Public Access and Amenities

Figure 5 shows the locations of planned infrastructure. Future installations of infrastructure and any alterations to the Lands made through the implementation of this Plan, will be documented with photographs and GPS locations.

6.4.1 Roads and Utilities Maintenance

Chickadee Road runs outside of the Lands along the length of the western property boundary and is a public road, managed by the Ministry of Transportation and Infrastructure (MOTI) and is currently maintained by Emcon Services Inc.

Central Road traverses the Lands from approximately the southeast corner to the northwest corner, and has been designated by MOTI and Islands Trust to be a Scenic/Heritage Road (see Section 2.7.3). Because the land under this road is owned by DCA, MOTI and Emcon only maintain the travelled way.

DCA is drafting a reference protocol to be shared with roads and utilities agencies, showing the mapped locations of DCA owned or managed lands and covenant areas. This protocol is expected to be adopted by the DCA Board of Directors in 2017 and distributed to relevant agencies thereafter. The protocol will outline DCA's expectations surrounding communication and reporting by roads or utilities agencies, when their associated works take place on or adjacent to DCA owned or managed lands or covenant areas. Once in place, this protocol will inform future DCA activities

surrounding Central and Chickadee Roads, especially as they relate to the protection of the values of the Lands and possible impacts of utilities and roads maintenance works.

Measures such as non-chemical dust suppression may be considered in future to mitigate impacts associated with road maintenance that may compromise the ecological values of the Lands.

6.4.2 Parking

A small Central Parking Area (11mx12.2m) has been designated for visitors. Midway along Central Road, at a nexus of walking trails extending to the northeast and western sections of the property, and adjacent to the site of the Main Information Kiosk, an area of compacted soil which was once a logging landing has been selected for the Central Parking Area that can accommodate 2-3 vehicles off the roadway. Vegetative barriers around its edges will ensure vehicles stay within the designated area, and the installation of wooden bollards along the western edge may be considered in future. Scotch broom removal was undertaken in this area in 2017.

Figure 8. Central Parking Area (From NE side of Central Road, looking 250° WSW)



Some visitors to the Lands park along Central and Chickadee Roads and this use is anticipated to continue. Parking along the roads is restricted to the roadside. If necessary due to observed disturbance to areas adjacent to the roadside, signage will be considered that encourages use of the designated Central Parking Area.

A bicycle rack may be provided in future, with its location and design approved by the Trust Fund Board, to provide a safe place for visitors to leave their bicycles while enjoying the Lands' pedestrian-only trails.

6.4.3 Trails

Several walking trails for nature appreciation have been designated, many of these along various skid roads created during recent logging. Designated trails are shown on Figure 8. A limited-access Butterfly Reserve access trail and a 600m monitoring transect are shown within the Butterfly Reserve boundary, but are not labelled.

Public trail routes were chosen to allow linkages between adjacent Provincial Park blocks and to leave wetland areas buffered from disturbance. Public trails may have signs to indicate prohibited uses.

Roughly cleared wilderness trails throughout the Lands are minimally maintained for the purpose of providing safe public passage with minimal impact on surrounding vegetation and ecology. Trail surfaces will be maintained to a maximum width of 1m and corridors cleared through vegetation will be brushed out to accommodate the height of a walking person. Some sections of trail, especially those located in open clear-cut where broom invasion is a problem, may be cleared with power tools.

A small footbridge provides a safe crossing across Pickles Creek on the Old Road Trail in the southwest portion of the Lands. The crossing was recently restored and will be annually monitored for necessary maintenance. Metal lath to reduce slipperiness will be installed on the restored deck surface.

From time to time, temporary trail closures may be needed throughout the Lands due to incidental concerns such as sensitive species or elevated fire risk. The need for trail closures will be determined by DCA through ongoing monitoring of the Lands and, where appropriate, will involve communications with the Denman Island Volunteer Fire Department. Signage may be posted at the Main Information Kiosk, and elsewhere if needed, to alert visitors about temporary trail closures.

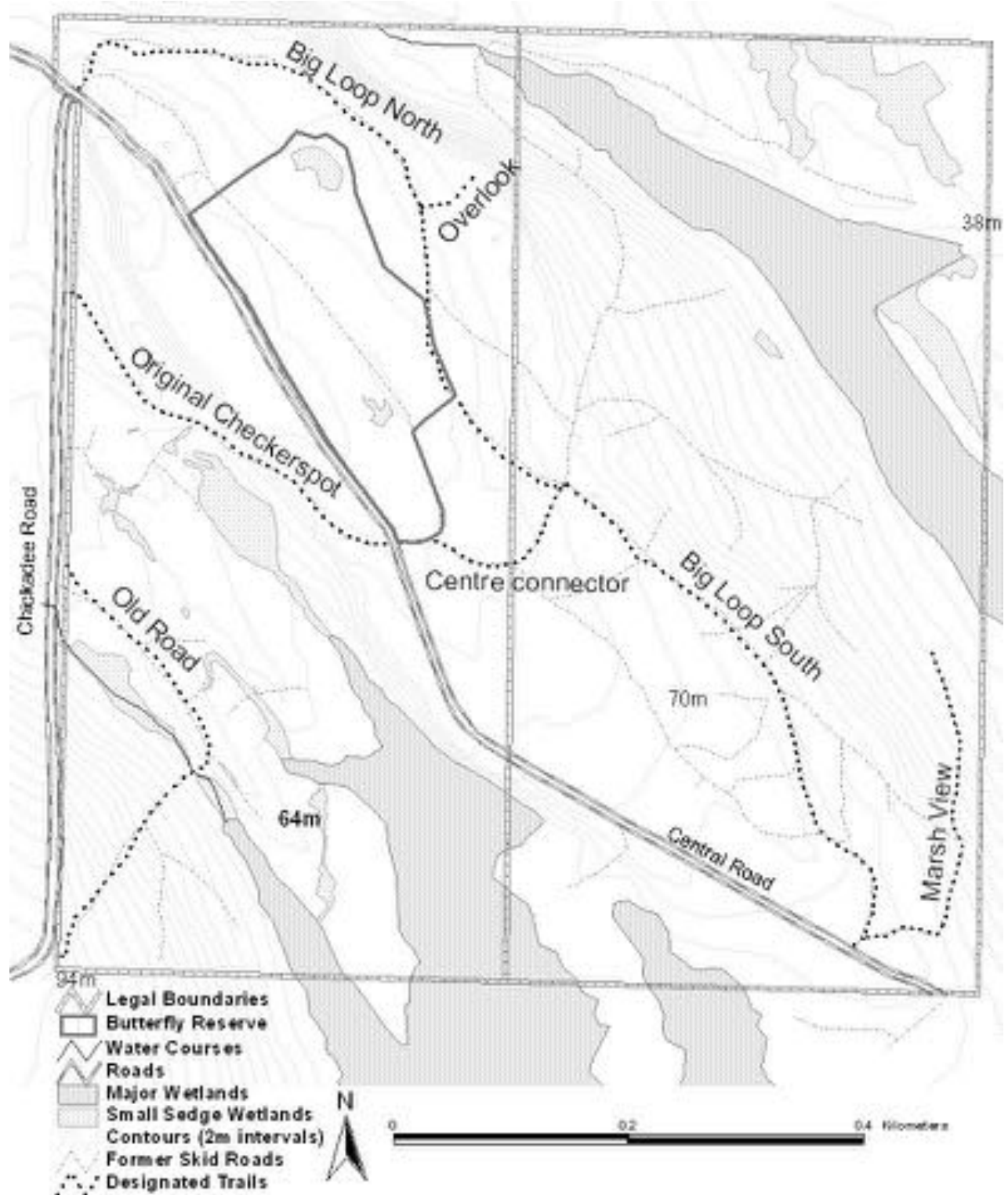
6.4.4 Domestic Animals

Equestrian traffic, bicycles and domestic animals including dogs are allowed only on Central Road. This is due to the great risk of disturbance presented to beaver populations by domestic animals, especially dogs. Because beaver are crucial for the ecological structure function of the wetland areas and other values of the Lands, their protection has been prioritized over the admittance of recreational access by visitors with dogs into areas where beaver are known to be present. Dog-walkers and equestrians can use Central Road, which links Denman Island Provincial Park (DIPP) and Central Park (owned by DCA) to the south, via Pickles Road, and the DIPP trails from Chickadee Lake to the northwest, via Lake Road.

The Denman Public will be alerted of the policy around limited access for dogs and domestic animals through signage at the Main Information Kiosk and along trails, and through a public outreach campaign outlining the importance of beaver and the threat that dogs pose to them on the Lands. Regular monitoring of trails to assess the

effectiveness of this public information will occur throughout the initial implementation phase for this Plan (5 years).

Figure 9. Settlement Lands Designated Trails (Source: Balke 2017)



6.4.5 Benches

DCA's Memorial Bench Policy shall guide the approval, design, siting and installation of Memorial Benches on the Lands. In consultation with ITF staff, a maximum of 4 benches may be installed for the purpose of resting and nature viewing, where and when appropriate, so long as they comply with the Conservation Covenant and this Plan.

6.4.6 Public Safety

DCA carries general public liability insurance covering Board members, contractors, volunteers and visitors within DCA lands.

Because trails throughout the Lands are minimally maintained they may not be universally accessible. For the purposes of public safety, main access trails are routinely inspected and cleared under the direction of the DCA Land Manager. Some signage to ensure public safety may be needed (see 6.5).

6.4.7 Kiosks

Two Information Kiosks provide interpretive and wayfinding information to visitors as well as facilitate public outreach through provision of educational resources, maps, photographs and other materials. Kiosk locations are shown in Figure 5.

Main Information Kiosk (Planned):

- Located at the main entrance to & Parking Area for the Lands on Central Road;
- Wooden construction with a small awning for protection against the elements, positioned on a concrete pad;
- Sign area maximum 1.5x1.5m per side.
- Information to be displayed may include: (i) maps and interpretive information; (ii) permitted and prohibited uses; (iii) covenant information; (iv) site history and acknowledgements; (v) DCA contact information; (vi) occasional notices, etc.

Butterfly Reserve Kiosk (Existing):

- Located south of the Butterfly Reserve, at the junction of the Centre Connector and Butterfly Access trails;
- Wooden construction with a small awning for protection against the elements, positioned on a concrete pad;
- Sign area max 1x1m per side;
- Information to be displayed may include: (i) maps and interpretive information; (ii) descriptions of butterfly/pollinator species and habitat; (iii) land use restrictions; etc.
- Minor adjustments to the structure and information display area remain to be completed as of April 2017.

Figure 10. Butterfly Reserve Kiosk (March 2017; Location shown in Figures 5 & 11)



6.4.8 Demonstration Butterfly Garden (Proposed)

Design, installation and maintenance of a small (<0.025 hectares) Butterfly Garden, near the main entrance to the Lands and the Butterfly Reserve, may be undertaken if capacity allows (Proposed location shown in Figure 5). This fenced garden would be planted with indigenous flora attractive to butterflies. An above ground water cistern to provide, for irrigation, would be located in or near the garden area. The cistern would be located close enough to Central Road to allow filling by a mobile water delivery service, and may be designed to capture rainwater from the roof of the Butterfly Reserve Kiosk. Plants would have identification signs, and information would be provided on how to establish such a garden. Design and location will minimize the disturbance to the Lands and the values identified in the Covenant, and the ITF will be advised before construction begins and when construction is completed.

6.4.9 Wildlife Viewing Platform (Proposed)

Because the Lands have significant opportunities for wildlife and bird viewing, especially in the wetland areas, a simple wildlife viewing platform may be considered by DCA in future. Such a structure would have a total footprint of no more than 6 square metres and a maximum height of 3 metres, and could include interpretive and wayfinding signage. The approximate proposed location for the platform is shown in Figure 5. Work done to build the platform will minimize the disturbance to the Lands and the values identified in the Covenant and the ITF will be advised before construction begins and when construction is completed.

6.5 Signage and Boundary Delineation

Signage and boundary markers are required for a variety of purposes including those outlined below. Care will be taken to ensure that signs and boundary markers are as unobtrusive as possible, and based on clearly defined needs. The creation and installation of signage on the Lands will comply with the Denman Island Land Use Bylaw, which guides the use of signs in accordance with property zoning.

6.5.1 Directional Signs

Trails may have directional or wayfinding signage as needed to provide safe public access and protect sensitive areas from disturbance. Consideration will be given to installation of “You are Here” map signs in a few locations.

6.5.2 Signage Denoting Permitted and Prohibited Uses

“No Hunting” signs may be posted in various locations along Central Road and Chickadee Road, and on property boundaries. These may be removed outside of hunting season.

“No Smoking/No Fires” signs may be placed at trail heads and on Central Road and Chickadee Road. Postings to warn the public of trail closures due to high fire risk will be undertaken in cooperation with the Denman Island Volunteer Fire Department.

“No Dumping” signs may be placed at various points along Central and Chickadee Roads to discourage dumping of refuse within the Lands.

6.5.3 Warning/Alert signs

From time to time, signage may be needed to alert visitors of various hazards or danger areas, including steep slopes, remnants from the old landfill sites, or sensitive ecosystems or wildlife habitats.

6.5.4 Boundary Markers and Survey Pins

Survey pins, boundary markers, and flagging may be used to delineate property boundaries, as well as the boundaries of smaller specified land use areas within the Lands, such as the Butterfly Reserve and the Wetland and Beaver Reserve.

6.5.5 Fencing

Fencing will be installed in collaboration with the neighbour, sited along up to 500m of the Lands’ eastern boundary, to restrict cattle from accessing the Homestead Marsh area. This fencing will be a combination of wire mesh (4’) and barbed wire (strung above wire mesh) hung on wooden posts. Figure 5 shows the approximate location of this planned fencing.

Given that the property lies adjacent to various farmed and other private lands, it may be necessary in future to install additional fencing. Such fencing would require approval of the covenant holder. Where possible, this fencing will be designed to allow the uninhibited movement of wild animals.

6.6 Protection of Sensitive Ecosystems and Species at Risk

6.6.1 Butterfly Reserve

Because suitable protected butterfly habitat is scarce and the endangered Taylor’s checkerspot butterfly (TC) is found on the site, management of a small portion of the Lands began in 2014 with a grant from the Habitat Stewardship Program (HSP).

Initial management efforts in January 2015, included removal of young trees to retain low vegetation around the small wetlands and along a linking travel corridor that was an old logging road. In addition, encroaching Scotch broom was removed. Work in the Reserve continued through 2015 and 2016, and signage has been installed to alert the public to the Reserve boundaries.

Figure 11. Butterfly Reserve Existing Boundary Signage



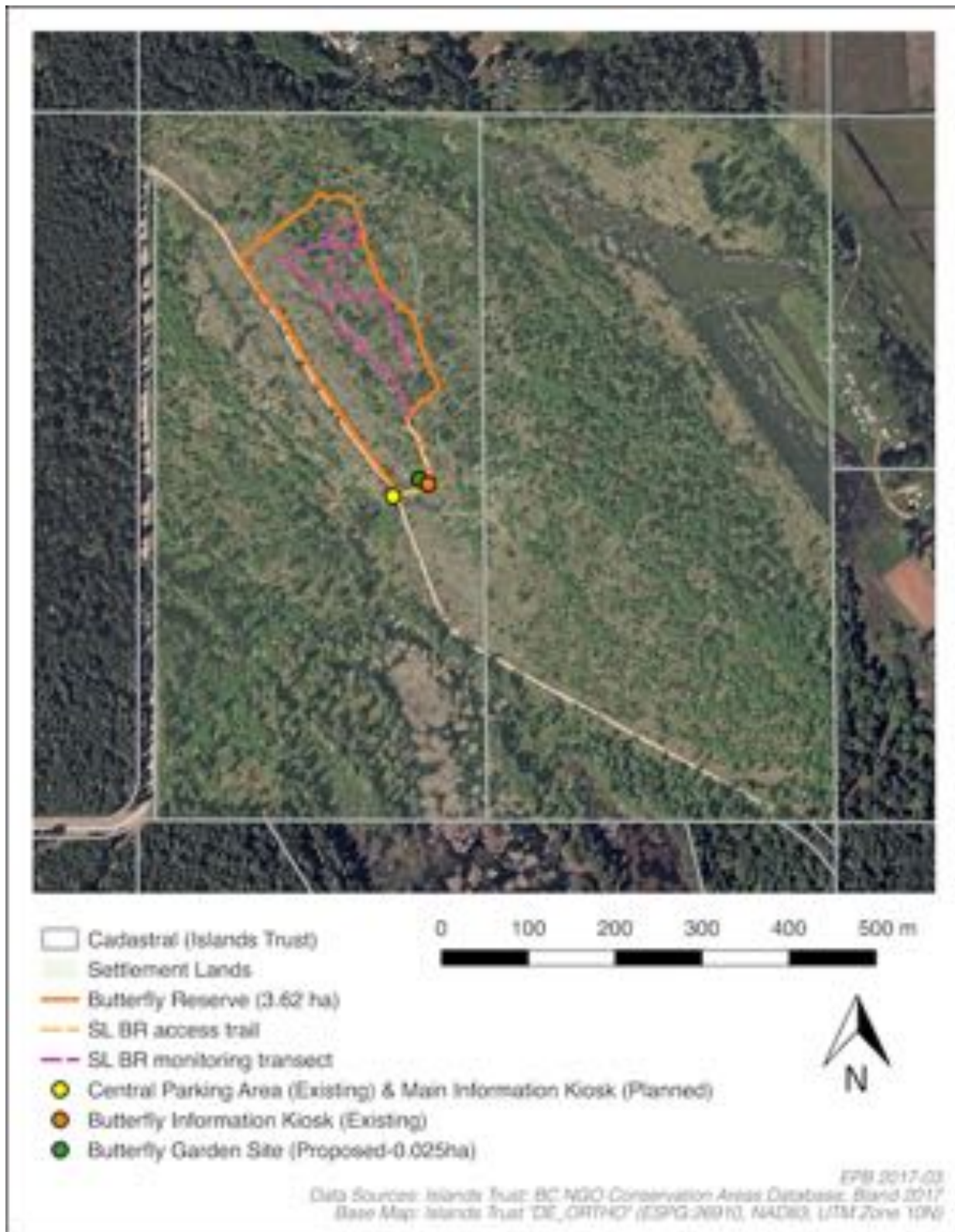
Initially, the Butterfly Reserve encompassed 3.12 hectares. In 2017, the boundary was extended to include an additional 0.5 hectares at its south end where a kiosk is built and a Demonstration Butterfly Garden is proposed. The boundary of the 3.62 hectare Reserve is shown in Figures 5 and 10. Additional boundary markers (designed to coordinate with existing boundary signage) will be installed around the perimeter of the Reserve to facilitate Covenant monitoring. A map will be produced that shows the boundary marker locations, and records will be taken of: (a) The location (GPS coordinates) of each marker; (b) The direction (Compass bearing and angle) toward directly-adjacent markers; and, (c) The distances to directly-adjacent markers.

In addition to habitat maintenance efforts, a 600m monitoring transect was established to systematically record sightings of TC and other species within the Reserve, and distance markers are placed along this transect at 50m intervals. Monitoring along this transect began in spring 2016 and continues annually during the breeding season of TC (late March-late June). Butterfly Reserve features are shown in Figure 10.

Ongoing data collection about various host plants and other species along this transect route is anticipated. Funding has been secured for habitat work in 2017, and additional funds will be sought to continue habitat maintenance and restoration work over the long term.

DCA may consider in future efforts to protect the Dun skipper (*Euphyes vestris*), another at-risk species found on Denman Island and associated with the habitat types found within the Butterfly Reserve.

Figure 12. Settlement Lands Butterfly Reserve



6.6.2 Wetlands and Beaver

Significant beaver activity has been observed within the Lands. The dams built and maintained by beaver are integral to both of the major wetlands on the Lands, Pickles Marsh and Homestead Marsh. Therefore, management efforts focused on the protection of beaver and their habitat will be considered by DCA on an ongoing basis, as capacity allows.

6.7 Ecological Restoration and Management of Ecological Changes

6.7.1 Control of Invasive Plants

A number of introduced species are present on the Lands (Appendix J). Of these, the most serious concerns are Scotch Broom, English Holly and Reed Canary Grass. Efforts to date for the removal of Scotch Broom (*Cytisus scoparius*) on the Lands include volunteer 'work bees' plus contracted labour to maintain and enhance habitat within the Butterfly Reserve. The preferred methods for Scotch Broom control are pulling young plants or cutting at the base (root tissue) of large plants, from areas which will remain open (particularly the Butterfly Reserve and landing areas) or are likely sources of further spread (e.g. along the roads and trails). Scotch Broom control should be carried out at flowering time or in late autumn to spring. Cut plants can be removed from the Lands if capacity allows, or left on-site, placed in small, scattered low piles to avoid the creation of fire hazards.

English Holly (*Ilex aquifolium*) spreads quickly and is difficult to control once established. Annual monitoring for and documentation of Holly plants across the property should be carried out by the Land Manager. Small plants should be removed by pulling or digging up from the roots immediately, and larger plants should be cut, or dug out if possible, as soon as labour is available to do so. Cut plants should be monitored for re-growth, and any new shoots removed immediately.

Reed Canary Grass (RCG) (*Phalaris arundinacea*) is highly invasive and nearly impossible to remove completely without significant impacts on surrounding ecology. No actions are planned for the removal of RCG on the Lands at present. However, monitoring over time may prompt the consideration of future control actions for RCG, especially in areas where it is not yet well established and where preventing further spread may be possible through manual digging of isolated patches.

Bracken fern (*Pteridium*) is native, but is invading herbaceous areas within the Butterfly Reserve and as such is detrimental to nectar source species. Bracken should be controlled in the Butterfly Reserve by pulling fronds or cutting near to the base during the growing period (June-September). Some bracken management occurred in early 2016, and this will continue if funding for this effort can be secured at the appropriate time of year.

Narrow-leaved everlasting (flat) pea (*Lathyrus sp.*) is an introduced species becoming a serious issue on Denman Island, particularly in southwest coastal areas, and has appeared on the Lands in recent years. It is found at the designated parking spot on

Central Road and along the east side of Chickadee Road. Control of this species requires at least removal of any obvious pea stems and flowers, or at best digging out the deep roots. Surveys for occurrences of the plant will be carried out and control measures instituted as soon as possible.

English Hawthorne is highly invasive and will be controlled by pulling small plants or cutting larger plants to ground level.

Three garden-escapees likely from the former dumping of garden waste are also a concern on the Lands:

- Lesser Periwinkle (*Vinca* sp.)
- St. John's-wort (non-native varieties) (*Hypericum* sp.)
- Daffodil (*Narcissus pseudonarcissus*)

The Lesser Periwinkle and St. John's-wort are currently growing intermingled in a dense patch, covering an area of ~715 square metres, along the upland ridge about 25 to 50 metres southeast of the junction of Central and Chickadee Roads, at the edge of the old landfill site. At present, this is the only known location of either plant, and monitoring will be undertaken to identify future infestations and any further spread in existing sites. Control methods and their associated impacts should be investigated.

In the light of climate change, and associated alterations to vegetation on the Lands, invasive species of concern are likely to change over time. Shade-tolerant Daphne and English holly may become more problematic. Monitoring will include recording occurrences of such species and, if possible, physical removal will be carried out when the plants are still small and non-seedbearing. As the forest regenerates on the Lands, there will likely be a reduction in the number of invasive species because most of them prefer open land, being intolerant of deep shade.

6.7.2 Control of Invasive Animals

Non-native animal species present on the Lands include the Cabbage white butterfly and the European black slug. It is not clear what effect such species have on native species and because control will be difficult no control actions are planned. These and other non-native and potentially invasive species of concern, including the American bullfrog (*Lithobates catesbeianus*), Virginia opossum (*Didelphis virginiana*) and the European rabbit (*Oryctolagus cuniculus*), will be the focus of monitoring efforts in the future. Bullfrog, opossum and rabbit are not known on the Lands at present.

6.7.3 Restoration of Old Landfill and Dumping Sites

As noted above (Section 2.5.4) and in Appendix B and C, a number of areas on the Lands have been subject to dumping of refuse. In 2016 volunteers successfully removed many of the remaining foreign materials from previous dumping, though some larger or buried items remain. Further ecological restoration of old dump sites will be considered. Efforts to remove smaller items may be continued as capacity allows.

Removal of larger debris would require machinery and is likely to cause significant erosion of the slopes into which it is embedded.

An assessment of the impacts of larger scale remediation activities should be carried out to inform possible future management of areas where dumping has occurred. Additional signage will be posted and public awareness efforts undertaken if it is found that unauthorized dumping on the Lands continues.

6.8 Scientific Research and Education

The Lands will be considered for the hosting of educational and scientific research activities on a case-by-case basis. The Baseline describes its unique and varied ecological values and features and can provide direction for research and educational activities. Educational and scientific research activities must be in accordance with this Plan and comply with the terms of the ITF Covenant, and are subject to approval by the DCA Board of Directors and, depending on the activity, may require TFB approval.

A principal part of DCA community outreach is the organization of presentations and outings relevant to land conservation and stewardship on Denman Island and the surrounding region. Given the significant conservation values of the Lands it is anticipated that some of the DCA 'Walks and Talks' will take place there. To date, two 'Walks and Talks' have occurred: a tour of the Butterfly Reserve in February 2016, and a property walk in June 2013.

6.9 Fire Hazard Management

Although wildfire has been a rare occurrence in this ecosystem, it could still pose a risk to the Lands (Section 4.3), especially given that fire incidence and severity across the province is increasing. If accumulations of combustible material are found along human travel routes in the Lands, they will be scattered away from the travel area to reduce the risk of fire. Debris from the clearing of invasive species such as Scotch broom will be removed from the Lands, or placed in small, scattered piles.

Users of the Lands will be encouraged, through signage and other means of public information as needed, to extinguish any fire they see or to report the fire to the Denman Island Volunteer Fire Department (DIVFD). If necessary, DCA will assist DIVFD with restricting public access through the closure of trails during times of extreme fire hazard.

7.0 Action Items

Priority Level	Action ID	Action Description	Goal(s) Addressed	Relevant Section(s)	Threat/Risk Addressed	Specific Location(s)	Target Date	Budget or Other Considerations
Immediate (1-2 years)	I-1	Install non-slip surface on footbridge on Old Road trail	2	6.4.3; 6.4.5	Safe and Appropriate Public Access while buffering sensitive areas from disturbance	Old Road Trail Pickles Creek crossing	2017	Metal diamond mesh (lath) is best suited for this purpose.
Immediate (1-2 years)	I-2	Install barriers or otherwise restrict vehicle access beyond Central Parking Area	2	6.4.2	Safe and Appropriate Public Access while buffering sensitive areas from disturbance	Central Parking Area	2017	\$50 previously approved by DCA for materials
Immediate (1-2 years)	I-3	Install Main Information Kiosk; Install boundary markers, trail markers as needed	2	6.4.6	Public Information; Safe and Appropriate Public Access while buffering sensitive areas from disturbance	Northeast corner; Wetland Beaver Reserve	2017	
Immediate (1-2 years)	I-4	Install new/maintain existing signage: -no hunting -no dumping -no smoking/fires- extinguish fires seen or report to DIVFD -no dogs on trails -danger areas -user liability -Reserve areas – Butterfly Reserve boundary markers	2	6.5	All	Various locations according to MP	2017-2018	
Immediate (1-2 years)	I-5	Provide interpretive information on Kiosks	2	6.4.6		Main Information Kiosk; Central Parking Area	2017	
Immediate (1-2 years)	I-6	Initial monitoring of trails for presence of dogs; Creation of public awareness information and/or signage as needed re: trails policies	1, 2	6.5;	Degradation of Riparian and Wetland Ecosystems	All trails	2017-2018	
Immediate (1-2 years)	I-7	Assess need for signage at overlook trail, and install if needed	2	6.5.3	Public access	Overlook Trail eastern end	2018	
Immediate (1-2 years)	I-8	Control/remove Scotch broom: cut or pull plants and place in small, scattered piles or remove from site, to minimize fire hazard	1, 3	4.4	Invasive Alien Species		2017-2018 May/June or late autumn to early spring	

Immediate (1-2 years)	I-9	English holly: annual monitoring by DCA Land Manager; cut observed plants	1, 3	4.4	Invasive Alien Species		2017-2018	
Immediate (1-2 years)	I-10	St. John's Wort/Periwinkle: Investigate possible control methods and their associated impacts.	1, 3	4.4	Invasive Alien Species		2017-2018	
Immediate (1-2 years)	I-11	Everlasting pea: Remove pea stems and flowers, or manually dig and remove plants along Chickadee Rd and at Central Parking Area.; Survey for additional plants and remove as capacity allows.	1, 3	4.4	Invasive Alien Species		2017, as soon as possible Spring (April-June)	
Immediate (1-2 years)	I-12	Work with neighbour to install up to 500 metres of cattle fencing along eastern boundary with Swale Farm	1, 3	4.1; 4.1.1	Degradation of Riparian and Wetland Ecosystems - cattle grazing; Boundary encroachment	Along northernmost ~500m of eastern property boundary	2017 Post installation in spring 2017	Grant funding sought from NWCF and HCTF; cost sharing with Alan Schmidt
Priority Level	Action ID	Action Description	Goal(s) Addressed	Relevant Section(s)	Threat/Risk Addressed	Specific Location(s)	Target Date	Budget or Other Considerations
Short-Term (3-4 years)	S-1	Assess impacts of further restoration of old landfill and dumping sites: Continue removal of surface debris as capacity allows.	1	2.5.4; 6.9.3	Degradation of Riparian and Wetland Ecosystems; pollution	Old Landfill and Pickles Marsh Edge		
Short-Term (3-4 years)	S-2	Consider installation of a bicycle rack	2	6.4.2	Public access; pollution	Central Parking Area		
Short-Term (3-4 years)	S-3	Install water depth gauges and purchase h20 testing instrumentation; Begin monitoring program and data collection for water levels and quality	1, 3	4.5; 6.8	Degradation of Riparian and Wetland Ecosystems; Potential threats: pollutants, excessive nutrient loading and climate change)	Pickles Marsh; Homestead Marsh; Transect Marsh; Big Tree Marsh	2017-19	Grant funding sought - NWCF, 2017-2019
Short-Term (3-4 years)	S-4	Bracken fern: Remove from Butterfly Reserve areas as warranted	1, 3	4.4	Shading of Nectar Species	Butterfly Reserve	Pull plants from June to September	Funding must be secured at appropriate time of year to undertake this action

Priority Level	Action ID	Action Description	Goal(s) Addressed	Relevant Section(s)	Threat/Risk Addressed	Specific Location(s)	Target Date	Budget or Other Considerations
Mid- to Long-Term (5+ years)	ML-1	Consider creation of biosecurity plan for the Lands	1, 2, 3	4.4	Invasive Alien Species - Root Rot etc.			
Mid- to Long-Term (5+ years)	ML-2	English Hawthorne: survey Lands and pull or cut plants to ground level	1, 3	4.4	Invasive Alien Species			
Mid- to Long-Term (5+ years)	ML-3	Asses Reed Canary Grass; Create plan for remediation of invaded sites;	1, 3	4.4	Invasive Alien Species			Grant funding sought - NWCF 2017-2019
Mid- to Long-Term (5+ years)	ML-4	Monitor Lands for signs of regeneration of invasive species where previously removed; removal of and regenerating plants	1, 3	4.4	Invasive Alien Species			
Mid- to Long-Term (5+ years)	ML-5	Monitor Lands for occurrence of previously undocumented invasive species (i.e. daffodils, American bullfrog, opossum, European rabbit); GPS record new instances; Consider future controls if species observed	1, 3	4.4	Invasive Alien Species			
Mid- to Long-Term (5+ years)	ML-6	Consider design and installation of 'you are here' maps	2	6.5.1; 6.4.3; 6.4.5	Public access; boundary encroachment			
Mid- to Long-Term (5+ years)	ML-7	Monitor and mitigate impacts (i.e. dust) of road use on adjacent vegetation	1, 3	6.4.1	Pollution			
Mid- to Long-Term (5+ years)	ML-8	Assess need for additional boundary fencing	1, 2, 3	6.5.5	Boundary encroachment			
Priority Level	Action ID	Action Description	Goal(s) Addressed	Relevant Section(s)	Threat/Risk Addressed	Specific Location(s)	Target Date	Budget or Other Considerations
Ongoing	O-1	Scatter or pile in only small, low piles combustible debris found near trails to reduce fire risk	1, 2	4.3	Fire Hazard		n/a	
Ongoing	O-2	Consider installation of signage to encourage use of Central Parking Area	2	6.6.2	Public access; Pollution	Central Rd, Chickadee Rd	n/a	material cost of signage ~\$15 per square foot for alupanel signs
Ongoing	O-3	Habitat stewardship work in Butterfly Reserve: -habitat enhancement for Species at Risk in consultation with appropriate Recovery Team(s); -transect monitoring; -education and scientific research;	1, 3	6.6.1; 6.4.7; 6.8	Degradation of wetland ecosystems	Butterfly Reserve		Possible continued HSP funding through Environment and Climate Change Canada

		-consider creation of butterfly demonstration garden						
Ongoing	O-4	Refer to DCA protocol regarding any roads/utilities works	1	6.4.1	Public access; pollution; wind-throw	Central Road		
Ongoing	O-5	Maintain designated trails (trail surface max 1m wide and brushed out to height of walking person) to ensure public safety;	2	6.4.3	Public access	Trails		
Ongoing	O-6	Monitor existing infrastructure to ensure public safety	2	6.4	Public access	See Figure 5	Annual	
Ongoing	O-7	Asses need for trail closure due to extreme fire risk, in collaboration with DIVFD; Post trail closure signage, if warranted	2	4.3	Fire Hazard	Trails, Central Road; Chickadee Place		
Ongoing	O-8	Accompany ITF staff or covenant monitors on site visits; Limit monitoring access to Butterfly Reserve from Feb-April	1, 3	6.6.1; 8.1				
Ongoing	O-9	Consider educational and scientific research activities on a case-by-case basis, using Baseline for direction	3	6.8				
Ongoing	O-10	Control and remove invasive species as warranted.	1, 3	4.4	Invasive Alien Species			
Priority Level	Action ID	Action Description	Goal(s) Addressed	Relevant Section(s)	Threat/Risk Addressed	Specific Location(s)	Target Date	Budget or Other Considerations
Un-prioritized (Implement as capacity allows)	U-1	Pursue change of zoning to conservation	1, 2, 3	2.7.1		All		
Un-prioritized (Implement as capacity allows)	U-2	Develop climate change strategies for the Lands	1, 3	3.2.1; 4.5	Climate change	All		
Un-prioritized (Implement as capacity allows)	U-3	Consultation with First Nations about traditional use of Lands		2.5.1;				
Un-prioritized (Implement as capacity allows)	U-4	Consider creation of Butterfly Demonstration Garden	1, 3	6.4.7		Butterfly Reserve		grant funding sought - HCTF 2017-2020

Un-prioritized (Implement as capacity allows)	U-5	Install a limited number of Memorial and Nature Viewing benches	2	6.4.4	Public access	Locations TBD		
Un-prioritized (Implement as capacity allows)	U-6	Consider construction of a wildlife viewing platform	2	6.4.8	Public access;	South edge of Homestead Marsh, just outside boundary of Wetland and Beaver Reserve		grant funding sought - HCTF 2017-2020
Un-prioritized (Implement as capacity allows)	U-7	Monitor beaver populations	1, 3	6.4; 3.1; 3.2.3; 3.3; 4.1.1; 6.8	Harm to beaver population; Cattle grazing from neighbouring property; Public access; Pollutants; Excessive nutrient loading; Border encroachment	Homestead Marsh; Pickles Marsh		grant funding sought - NWCF
Un-prioritized (Implement as capacity allows)	U-8	Create map of Management Zones	1, 2, 3	6.2	All	All		Some HCTF funding 2017-2020

8.0 Monitoring Program

DCA carries out monitoring to ensure ongoing preservation of the natural values of the Lands, and to ensure that public access and activities are in compliance with the Covenant and Management Plan.

At present, DCA monitoring includes:

- Scientific observation along a 600m Butterfly Transect within the Butterfly Reserve
- Monitoring of the Lands for the presence and extent of invasive species
- Monitoring of amenities and infrastructure including signage, parking areas, barriers, trails and boundary markers, etc. to ensure public safety and visitor compliance with permitted and prohibited uses within the Lands, and that ongoing routine maintenance is carried out as needed.

Future DCA monitoring could include:

- Monitoring for occurrences of previously unrecorded introduced or invasive alien species
- Observation of impacts of traffic on roadside vegetation
- Observation of climate change impacts over time

8.1 Covenant Area Monitoring

The Islands Trust Fund Board holds a Conservation Covenant on the Lands and conducts monitoring of the property to ensure owner compliance with the covenant terms. Where possible, DCA personnel will accompany monitors when they conduct this monitoring. Monitoring within the Butterfly Reserve should not be scheduled between February and April, when the post-diapause larvae of Taylor's checkerspot butterfly are active.

9.0 References

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APPENDICES

APPENDIX A. Community and Public Consultation Meetings

Community Information Open House: Settlement Lands Conservation Proposal to ITF

In September 2015, an open house was held by DCA for the purpose of showcasing and garnering community feedback about a draft Conservation Proposal for the Lands. Visual displays, photographs, and reports outlined historical, cultural and ecological attributes. Copies of the draft Proposal were made available online in advance of the open house, which was publicized in the *Island Grapevine* and *Flagstone*; on the DCA website and Facebook page; by direct communication between the Land Manager and relevant agencies and neighbours (email/phone/in-person); and by word of mouth.

Approximately 60 people attended. A feedback form was provided and attendees were encouraged to provide comments in paper format or via email. 13 feedback forms were submitted and the comments from these provided valuable community input for the Proposal, especially with regards to the desire for public trails through the Lands. Following the open house, the Settlement Lands Committee presented the revised Proposal to the DCA Board and, once approved, submitted to the Islands Trust Fund Board (TFB). This proposal to TFB was approved in early 2016.

Public Information Open House: Management Plan and Conservation Covenant Drafts

A Public Information Open House on March 4, 2017, showcased drafts of the Management Plan and Conservation Covenant. The Draft Management Plan was posted on the DCA website a week in advance of the Open House and the event was advertised through the local *Island Grapevine* and DCA Newsletter, and through personal and written communication with relevant community members, neighbours and the K'ômoks, Qualicum and Tla'amin First Nations. Approximately 40 community members attended over the course of 4 hours.

APPENDIX B. Settlement Lands old dumps

Report by John Millen

On 24 July 2015, I inspected the two former 'dump' sites on the Settlement Lands. Site 1 is located alongside Central Road, west from the centre of the southern bend. Within 10 meters of the roadside there is a steep bank dropping right down to the edge of the water in the adjacent Pickles Marsh. The most recent dumping appears to be several tree stumps dating from about 15 years ago. There is only a single access point so debris is scattered in a cone shape down the slope. Salal extending 3 meters from the water's edge obscures any material that might have reached that far. A truck, perhaps a 1940s vintage, is stopped against a mature Fir tree near the bottom of the slope. Parts of other vehicles and a cook stove were observed. Despite careful observation, no clear evidence was found of oil seeping into the adjacent waters.



Site 1. Truck carcass lower right.



Site 1. Looking downslope, note water at foot of slope.



Site 1. Truck body from below

Site 2 is located at the junction of Central and Chickadee Roads. A long gulley bounded by a rocky bluff to the east about 8 metres high was used as a dump site by the community up to about 20 years ago. Garbage items are scattered along the gulley for about 60 meters. The largest item observed was a Moffat electric range. A colony of Saint John's wort occupies the top of the bluff and a steep slope into the gulley extending 30 meters along the crest and about 10 meters down the slope. The bottom of the gulley was dry though it appears that water ponds form just a little further southeast than the garbage extends.



Site 2 looking Southeast. Chickadee Road, to the right had not been built when this site was in use.



Site 2. St. John's wort patch at crest of slope



Site 2. Debris visible on lower slopes below St. John's wort.

APPENDIX C. Settlement Lands Old Dump Sites Cleanup 2016

Report by Erika Bland for DCA

October 4, 2016

Background

The Settlement Lands contains a number of sites that were previous dumping areas for Denman residents, prior to the initiation of garbage pickup and transfer services to the Cumberland landfill, beginning in the 1990s, according to local knowledge. In 2015, the sites were investigated and documented (Millen 2015) and in 2016 as part of the baseline documentation study for the Settlement Lands, refuse sites across the property were gps-referenced (Balke 2016). A map of the various deposit locations is shown in Map 1 below.



Map 1. Locations of Refuse on Settlement Lands

Garbage Cleanup Volunteer Work Bees

On 26 August, 3 September and 7 September, 2016, DCA sponsored a cleanup of surficial deposits in these areas with the assistance of 10 volunteers under the direction of the Land Manager. The following sites, shown in map above, were the focus of these work bees: H,N,G,F,Q,J,K,L.



Helpful volunteers sorting refuse from Old Landfill Site

Other sites contained either small deposits which can be removed fairly easily at a later date, or large deposits which would require mechanical help to remove. The majority of surface garbage was removed from the above sites. Where garbage was largely embedded in surface material or was unsafe to remove, it was left in place. An assessment of how to undertake further remediation of the two major Old Landfill and Pickles Marsh Edge Dumping Sites (see Management Plan for the Settlement Lands, Figure 5) could be undertaken in future.

More than 100 buckets of refuse were removed by hand, sorted and transported from the Settlement Lands as a result of this effort. The total refuse removed equaled approximately a quarter-tonne, not including recycled non-metal materials. In addition to this, the vast majority of debris removed was diverted to the Denman Recycling Centre with the dedicated assistance of Recycling centre staff. A special 'thank you' goes to Mike Nestor, who volunteered over 12 hours to sort and transport these diverted recyclables. Thank you, also to Dave Lang, who transported the non-recyclable items to Cumberland landfill, voluntarily offering a 50% discount on his rate for hauling.



Scrap metal retrieved from the Old Landfill site, in the recycling bin



Mike Nestor (recycling) and Dave Lang (hauling), post cleanup

APPENDIX D. Trails – Representative Photographs (Corresponding Map: Figure 8)

Big Loop North Trail



Big Loop South Trail



Central Road (from Main Parking Area, looking NW and SE)



Centre Connector Trail



Marsh View Trail



Old Road Trail (with footbridge)



Original Checkerspot Trail



Overlook Trail



APPENDIX E. Conservation Covenant Sections 4.1 & 4.2 (Excerpt from Section 4)

4. RESTRICTIONS ON USE OF THE LANDS

- 4.1 Except as expressly permitted in this Agreement, the Owner must not do anything, omit to do anything, allow anything to be done or allow the omission of anything, that does or could reasonably be expected to destroy, impair, diminish, negatively affect or alter the Lands or the Amenities from the condition described in the Report.
- 4.2 Without restricting the generality of section 0, the Owner must not, except as authorized by the Management Plan and in accordance with that Plan, or with the prior written approval of the Covenant Holder in the Covenant Holder's sole discretion:
- (a) use or permit the use of the Lands for an activity or use which:
 - (i) causes or allows silts, leachates, fills or other deleterious substances to be released into any watercourse on the Lands;
 - (ii) causes the erosion of the Lands to occur;
 - (iii) causes or facilitates the loss of soil on the Lands;
 - (iv) alters or interferes with the hydrology of the Lands, including by the diversion of natural drainage or flow of water in, on or through the Lands;
 - (v) causes or allows fill, rubbish, ashes, garbage, waste or other material foreign to the Lands to be deposited in, on or under the Lands;
 - (vi) causes or allows any component of the Lands, including soil, gravel or rock, to be disturbed, explored for, moved, removed from or deposited in or on the Lands;
 - (vii) causes or allows pesticides, including but not limited to herbicides, insecticides or fungicides, to be applied to or introduced onto the Lands; or
 - (viii) causes or allows any indigenous flora on the Lands to be cut down, removed, defoliated or in any way tampered with;
 - (b) use or permit the use of the Lands for hunting, fishing, or gathering, or for the grazing of domestic animals;
 - (c) construct, build, affix or place on the Lands any buildings, structures, fixtures or improvements of any kind;
 - (d) lay out or construct any new roads or paths on the Lands; and
 - (e) lease or license the Lands or any part thereof unless the lease or license is expressly made subject to the provisions of this Agreement and expressly entitles the Owner to terminate the lease or license if the tenant or licensee breaches any of the provisions of this Agreement.

Appendix F. Terrain Zones List and Corresponding Vegetation Types (VT)*

- 1-Pickles Slope (East-facing); VT 5
- 2-Pickles Creek & Forest (East side); VT 4, 6
- 3-Pickles Marsh; VT 7, 9
- 4-Lowlands Marshes; VT 6
- 5-Lowlands Forest; VT 4
- 6-Pickles Marsh Buffer Forest; VT 2, 3, 6
- 7-Lowlands Slope (West-facing); VT 2, 4
- 8-a) Uplands Forest (West); VT 1
- 8-b) Uplands Forest (East); VT 1, 10
- 9-Big Tree Marsh (Uplands East South); VT 6
- 10-Transect Marsh (Uplands East North); VT 6
- 11-Homestead Slope (East-facing); VT 1, 2, 3
- 12-Homestead Riparian (West Edge); VT 8, 10
- 13-Homestead Marsh; VT 7, 9
- 14-Homestead Forest; VT 3
- 15-NE Marsh; VT 6
- 16-Home-site Forest; VT 3
- 17-Swale Woods; VT 3, 6
- 18-Former Swale Marsh Meadow; VT 10
- 19-Swale Farm Grazing Meadow; VT 10

* For Representative Photographs of Vegetation Types, refer to Baseline Documentation Report (Balke 2017)

APPENDIX G. Overall Wildlife List for Settlement Lands (from Balke 2017)

Common Name	Scientific Name	Rarity	Code
Mammals			
beaver	Castor canadensis		CACA
black-tailed deer	Odocoileus hemionus		ODVI
deer mouse	Peromyscus maniculatus		PEMA
hoary bat*	Lasiurus cinereus		LACI
little brown bat*	Myotis lucifugus	SARA Endangered	MYLU
mink	Mustela vison		MUVI
raccoon	Procyon lotor		RACC
red squirrel	Tamiasciurus hudsonicus		TAHU
river otter	Lontra canadensis		LOCA
western long-eared bat*	Myotis evotis		MYEV
*Bat species identified from Anabat Walkabout's echolocation call record.			
Birds			
American goldfinch	Carduelis tristis		AMGO
American robin	Turdus migratorius		AMRO
bald eagle	Haliaeetus leucocephalus		BAEA
band-tailed pigeon	Patagioenas fasciata	SARA SP; BC BLUE	BTPI
barn owl	Tyto alba	SARA SP; BC BLUE	BAOW
barn swallow	Hirundo rustica	BC BLUE	BASW
barred owl	Strix varia		BAOW
Bewick's Wren	Thryomanes bewickii		BEWR
black-throated gray warbler	Dendroica nigrescens		BTGW
brown creeper	Certhia americana		BRCR
brown-headed cowbird	Molothrus ater		BRCO
bushtit	Psaltiriparus minimus		BUSH
Canada goose	Branta canadensis		CAGO
Cassin's vireo	Vireo cassinii		CAVI
cedar waxwing	Bombycilla cedrorum		CEWA
chestnut-backed chickadee	Parus rufescens		CBCH
chipping sparrow	Spizella passerina		CHSP
common nighthawk	Chordeiles minor	SARA TH	CONI
common raven	Corvus corax		CORA
common yellowthroat	Geothlypis trichas		COYE

cooper's hawk	Accipiter cooperii		COHA
dark-eyed junco	Junco hyemalis		DEJU
downy woodpecker	Picoides pubescens		DOWO
European starling	Sturnus vulgaris (Intro)		EUST
fox sparrow	Passerella iliaca		FOSP
golden-crowned kinglet	Regulus satrapa		GCKI
great blue heron	Ardea herodias	SARA SP; BC BLUE	GBHE
hairy woodpecker	Picoides villosus		HAWO
hammond's flycatcher	Empidonax hammondii		HAFL
hermit thrush	Catharus guttatus		HETH
hooded merganser	Lophodytes cucullatus		HOME
house finch	Carpodacus mexicanus		HOFI
house wren	Troglodytes aedon		HOWR
hutton's vireo	Vireo huttoni		HUVI
killdeer	Charadrius vociferus		KILL
MacGillivray's warbler	Oporonis tolmiei		MAWA
mallard	Anas platyrhynchos		MALL
marsh wren	Cistothorus palustris		MAWR
northern flicker	Colaptes auratus		NOFL
northern harrier	Circus cyaneus		NOHA
northern harrier	Circus cyaneus		NOHA
northern saw-whet owl	Aegolius acadicus		NSOW
northwestern crow	Corvus caurinus		NOCR
olive-sided flycatcher	Contopus borealis	SARA TH; BC BLUE	OSFL
orange-crowned warbler	Oreothlypis celata		OCWA
Pacific-slope flycatcher	Empidonax difficilis		PSFL
Pacific (winter) wren	Troglodytes pacificus		PAWR
pied-billed grebe	Podilymbus podiceps		PBGR
pileated woodpecker	Dryocopus pileatus		PIWO
pine siskin	Carduelis pinus		PISI
purple finch	Carpodacus purpureus		PUFI
red crossbill	Loxia curvirostra		RECR
red-breasted nuthatch	Sitta canadensis		RBNU
red-breasted sapsucker	Sphyrapicus ruber		RBSA
red-tailed hawk	Buteo jamaicensis		RTHA
red-winged blackbird	Agelaius phoeniceus		RWBL

ring-necked pheasant	Phasianus colchicus (Intro)		RNPH
ruby-crowned kinglet	Regulus calendula		RCKI
rufous hummingbird	Selasphorus rufus		RUHU
song sparrow	Melospiza melodia		SOSP
sora	Porzana carolina		SORA
sooty grouse	Dendragapus obscurus		SOGR
spotted towhee	Pipilo erythrophthalmus		SPTO
Swainson's thrush	Catharus ustulatus		SWTH
Townsend's warbler	Setophaga townsendi		TOWA
tree swallow	Tachycineta bicolor		TRSW
trumpeter swan	Cygnus buccinator		TRSW
turkey vulture	Cathartes aura		TUVU
varied thrush	Ixoreus naevius		VATH
violet-green swallow	Tachycineta thalassina		VGSW
Virginia rail	Rallus limicola		VIRA
warbling vireo	Vireo gilvus		WAVI
western screech-owl	Otus kennicottii	SARA SP; BC Blue	WESO
western tanager	Piranga ludoviciana		WETA
western wood-pewee	Contopus sordidulus		WWPE
white-crowned sparrow	Zonotrichia leucophrys		WCSP
willow flycatcher	Empidonax traillii		WIFL
Wilson's warbler	Wilsonia pusilla		WIWA
wood duck	Aix sponsa		WODU
yellow warbler	Dendroica petechia		YEWA
yellow-rumped warbler	Dendroica coronata		YRWA
Amphibians & Reptiles			
common garter snake	Thamnopsis sirtalis		THSI
northern alligator lizard	Elgaria coerulea		ELCO
northwestern garter snake	Thamnopsis ordinoides		THOR
northern red-legged frog	Rana aurora	SARA SP; BC BLUE	RLFR
Pacific chorus frog	Pseudacris regilla		PSRE
Invertebrates			
Butterflies			
arctic skipper	Carterocephalus palaemon		ARSK
anise swallowtail	Papilio zelicaon		ANSW
cedar hairstreak	Mitoura rosneri		

common wood nymph	Cercyonis pegala	BC RED	COWO
dun skipper	Euphyes vestries	SARA TH; BC RED	
grey hairstreak	Strymon melinus		
hydaspe fritillary	Speyeria hydaspe		HYFR
Lorquin's admiral	Limenitis lorquini		
marginated white	Pieris marginalis		
mourning cloak	Nymphalis antiopa		MOCL
mylitta crescent	Phyciodes mylitta		MYCR
pale tiger swallowtail	Papilio eurymedon		PTSW
roadside skipper	Amblyscrites vialis		ROSK
satyr anglewing	Polygonia satyrus		SAAN
silvery blue	Glaucopsyche lygdamus		
Taylor's checkerspot	Euphydryas editha taylori	SARA EN; BC RED	TACH
two banded checkered skipper	Pyrgus ruralis		TBCS
western elfin	Incisalia iroides		WEEL
western pine elfin	Incisalia eryphon	BC BLUE	WPEL
western spring azure	Celastrina echo		WSAZ
western tiger swallowtail	Papilio rutulus		WTSW
woodland skipper	Ochlodes sylvanoides		WOSK
Damselflies			
Pacific forktail	Ischnura cervula		PAFO
Dragonflies			
cardinal meadowhawk	Sympetrum illotum		CAME
common green darner	Anax junius		CGDA
American emerald	Cordulia shurtleffi		AMEM
blue dasher	Pachydiplax longipennis	BC BLUE	BLDA
eight-spotted skimmer	Libellula forensis		8 spot
four-spotted skimmer	Libellula quadrimaculata		FSSK
hudsonian whiteface	Leucorrhinia hudsonica		HUWH
striped meadowhawk	Sympetrum pallipes		STME
western pondhawk	Erythemis collocata	BC BLUE	WEPO
Slugs & Snails			
banana slug	Ariolimax maximus		
Pacific sideband snail	Monadenia fidelis		

APPENDIX H. Overall Plants List for Settlement Lands (from Balke 2017)

Scientific Name	Common Name
<i>Abies grandis</i>	grand fir
<i>Acer macrophyllum</i>	big-leaf maple
<i>Achillea millifolium</i>	yarrow
<i>Achlys triphylla</i>	vanilla leaf
<i>Adenocaulon bicolor</i>	pathfinder
* <i>Agrostis stolonifera</i>	creeping bentgrass
* <i>Aira caryophyllea</i>	silver hair grass
* <i>Aira praecox</i>	spring hair grass
<i>Alnus rubra</i>	red alder
<i>Anaphalis margaritacea</i>	pearly everlasting
<i>Anemone lyallii</i>	Lyall's anemone
* <i>Anthoxanthum odoratum</i>	sweet vernal grass
<i>Aquilegia formosa</i>	Sitka columbine
<i>Arbutus menziesii</i>	arbutus
<i>Asarum caudatum</i>	wild ginger
<i>Athyrium filix-femina</i>	lady fern
<i>Boschniakia hookeri</i>	Vancouver groundcone
<i>Bothrychium multifidum</i>	leathery grape fern
* <i>Bromus inermis</i>	smooth brome
* <i>Bromus hordeaceus</i>	soft brome
<i>Bromus vulgaris</i>	Columbia brome
<i>Bromus sitchensis</i>	Alaska brome
<i>Campanula scouleri</i>	Scouler's harebell
<i>Cardamine oligosperma</i>	little western bitter-cress
<i>Carex deweyana</i>	Dewey's sedge
<i>Carex exsiccata</i>	inflated sedge
<i>Carex hendersonii</i>	Henderson's sedge
<i>Carex lasiocarpa</i>	slender sedge
<i>Carex obnupta</i>	slough sedge
<i>Carex polystachya</i>	thick-headed sedge
<i>Carex scoparia</i>	pointed broom sedge
<i>Carex stipata</i>	sawbeak sedge
<i>Carex viridula</i>	green sedge
<i>Cerastium fontanum</i>	mouse-ear chickweed
<i>Chimaphila umbellata</i>	pipsissewa/ Prince's pine
* <i>Cirsium arvense</i>	Canada thistle
<i>Cirsium brevistylum</i>	short-styled thistle
* <i>Cirsium vulgare</i>	bull thistle

Claytonia perfoliata	miner's lettuce
Claytonia sibirica	Siberian miner's lettuce
*Digitalis purpurea	foxglove
Collomia heterophylla	vari-leaved collomia
Cornus nuttallii	Pacific dogwood
*Crataegus monogyna	hawthorn
*Crepis capillaris	smooth hawksbeard
*Cynosurus cristatus	crested dogstail
*Cytisus scoparius	Scotch broom
*Dactylis glomerata	cock'sfoot grass
*Digitalis purpurea	foxglove
Dicentra formosa	Pacific bleeding-heart
Dryopteris expansa	spiny wood fern
Eleocharis palustris	common spike-rush
Elymus glaucus	blue wildrye
Epilobium angustifolium	fireweed
Epilobium ciliatum	purple-leaved willowherb
Epilobium sp.	willowherb
Equisetum arvense	common horsetail
Equisetum telmateia	giant horsetail
Festuca pratensis	meadow fescue
Festuca rubra	red fescue
Fragaria vesca	wild strawberry
Galium aparine	cleavers
Galium triflorum	sweet-scented bedstraw
Gaultheria shallon	salal
*Geranium molle	dove's foot cranesbill
*Geranium robertianum	herb robert
Geum macrophyllum	large-leaved avens
Glyceria borealis	northern mannagrass
Glyceria striata	fowl mannagrass
Gnaphalium palustre	lowland cudweed
Gnaphalium uliginosum	marsh cudweed
Heuchera micrantha	small-flowered alumroot
Hieracium albiflorum	white hawkweed
*Holcus lanatus	Yorkshire fog
Holodiscus discolor	oceanspray
Hypericum anagalloides	bog St. John's-wort
*Hypericum androsaemum	tutsan
*Hypochaeris radicata	hairy cat's ear
*Ilex aquifolium	English Holly

Juncus acuminatus	tapered rush
Juncus effusus	common rush
Juncus ensifolius	dagger-leaf rush
Juncus tenuis	slender rush
*Lactuca muralis	wall lettuce
*Lathyrus sylvestris	everlasting pea
Ledum groenlandicum	Labrador tea
Lemna minor	common duckweed
*Leucanthemum vulgare	oxeye daisy
Linnaea borealis	twinline
Lonicera ciliosa	orange honeysuckle
Lonicera hispidula	hairy honeysuckle
*Lapsana communis	nipplewort
Luzula multiflora	many-flowered woodrush
Luzula parviflora	small-flowered woodrush
Lysichiton americanum	skunk cabbage
Mahonia aquifolium	tall Oregon grape
Mahonia nervosa	dull Oregon grape
Malus fusca	Pacific crab apple
*Malus pumila	domestic apple
*Matricaria matricarioides	pineapple weed
Melica subulata	Alaska oniongrass
*Mentha arvensis	field mint
Microsteris gracilis	pink twink
Mimulus moschatus	monkey flower
Moehringia macrophylla	big-leaved sandwort
*Myosotis discolor	common forget-me-not
*Myosotis scorpioides	marsh forget-me-not
Nemophila parviflora	grove-lover (small-flowered nemophila)
Nuphar polysepalum	yellow water lily
Oenanthe sarmentosa	Pacific water parsley
Osmorhiza berteroi	mountain sweet cicely
Paxistima myrsinites	falsebox
Persicaria amphibia	water smartweed
*Phalaris arundinacea	reed canary grass
Pinus monticola	western white pine
Pinus contorta	lodgepole pine
*Plantago lanceolata	ribwort plantain

* <i>Plantago major</i>	broad-leaved plantain
<i>Poa palustris</i>	fowl bluegrass
* <i>Poa pratensis</i>	Kentucky bluegrass
<i>Polystichum munitum</i>	sword fern
<i>Potamogeton natans</i>	floating pondweed
<i>Potamogeton richardsonii</i>	Richardson's pondweed
<i>Prunella vulgaris</i>	self-heal
<i>Prunus</i> sp.	plum
<i>Pseudotsuga menziesii</i>	Douglas-fir
<i>Pteridium aquifolium</i>	bracken
* <i>Ranunculus acris</i>	field buttercup
<i>Ranunculus flammula</i>	lesser spearwort
* <i>Ranunculus repens</i>	creeping buttercup
<i>Ranunculus uncinatus</i>	small-flowered buttercup
<i>Ribes divaricatum</i>	coastal black gooseberry
<i>Ribes lacustre</i>	black gooseberry
<i>Ribes lobbbii</i>	gummy gooseberry
<i>Ribes sanguineum</i>	red flowering current
<i>Rosa gymnocarpa</i>	baldhip rose
<i>Rosa nutkana</i>	Nootka rose
* <i>Rubus armeniacus</i>	Himalayan blackberry
* <i>Rubus laciniata</i>	evergreen blackberry
<i>Rubus leucodermis</i>	black raspberry
<i>Rubus parviflorum</i>	thimbleberry
<i>Rubus spectabilis</i>	salmonberry
<i>Rubus ursinus</i>	trailing blackberry
* <i>Rumex acetosella</i>	sheep's sorrel
<i>Rumex aquaticus</i>	western dock
<i>Salix</i> sp.	willow
<i>Sambucus racemosa</i>	red elderberry
<i>Sanicula crassicaulis</i>	Pacific sanicle
<i>Satureja douglasii</i>	yerba buena
<i>Scirpus microcarpus</i>	small-flowered bulrush
<i>Schoenoplectus tabernaemontani</i>	soft-stemmed bulrush
<i>Scutellaria galericulata</i>	marsh skullcap
<i>Scutellaria lateriflora</i>	blue skullcap
* <i>Senecio sylvaticus</i>	wood groundsel
<i>Solidago canadensis</i>	Canada goldenrod

*Sonchus asper	prickly sow-thistle
Sparganium angustifolium	narrow-leaved bur-reed
Spiraea douglasii	hardhack
Stachys chamissonis	Cooley's hedgenettle
Stellaria calycantha	northern starwort
Stellaria crispa	crisp starwort
Symphoricarpos mollis	common snowberry
Symphoricarpos hesperius	creeping snowberry
*Tanacetum vulgare	tansy
*Taraxacum officinale	dandelion
Thuja plicata	western red cedar
Tiarella trifoliata	three-leaved foamflower
Trientalis latifolia	northern starflower
*Trifolium dubium	small hop-clover
*Trifolium repens	white clover
Tsuga heterophylla	western hemlock
Typha latifolia	cat-tail
Urtica dioica	stinging nettle
Utricularia macrorhiza	greater bladderwort
Vaccinium parviflorum	red huckleberry
Vaccinium ovatum	evergreen huckleberry
Veronica beccabunga	American brooklime
*Veronica officinalis	common speedwell
Veronica scutellata	marsh speedwell
Veronica serpyllifolia	thyme-leaved speedwell
*Vicia hirsuta	hairy vetch
*Vicia lathyroides	spring vetch
*Vicia sativa	common vetch
*Vinca major	greater periwinkle
Viola sempervirens	trailing yellow violet

APPENDIX I. Wildlife Species in Each Terrain Zone (from Balke 2017)

Zone	Type & Name	Wildlife Noted During Baseline Survey (Mammals/ Birds/ Reptiles & Amphibians/ Invertebrates - on alternate lines)
1	Pickles Slope	black-tailed deer, red squirrel AMRO BAEA BGWA CBCH CORA COYE DEJU HOWR HUVI MAWA OCWA PAWR PIWO PSFL RBNU RECR RUHU SOSP SPTOSWTH TUVU WAVI WCSP WETA WIFL YRWA Pacific chorus frog banana slug, BF-PASW, BF-READ, DF-4 Spot, Pacific sideband snail

2	Pickles Creek & Riparian Forest East	black-tailed deer AMRO GBHE RBNU RECR SOSP Pacific chorus frog BF- COWO, pacific sideband snail
3	Pickles Marsh	beaver, hoary bat BEKI CEWA CONI COYE MALL MAWR NOHA PSFL RWBL SORA SOSP WODU BF- ANSW, DF-BLDA, DF-darner sp.
4	Lowlands Marshes	see Pickles Marsh & Pickles Marsh Buffer Forest
5	Lowlands Forest	black-tailed deer, red squirrel AMRO CONI CORA GBHE OCWA PIWO PSFL PUFU RUHU SOSP SWTH WAVI WIFL Pacific chorus frog banana slug
6	Pickles Marsh Buffer Forest	black-tailed deer, mink CBCH COYE MAWA NOFL RBNU SOSP SPTO Pacific chorus frog banana slug, Pacific sideband snail, BF-WOSK, DF-AMER
7	Lowlands Slope	black-tailed deer AMRO DEJU OCWA PSFL SPTO SWTH banana slug, BF-WOSK, DF darner sp.
8a	Uplands (West)	black-tailed deer AMRO CBCH CONI & eggs/nest, CORA MAWA NOFL OSFL PAWR PISI RBNU SOSP SPTO SWTH WCSP WIFL common garter snake ant (red & black) hill, DF-BLDA, DF-darner sp., DF-WEPO
8b	Uplands (East)	black-tailed deer, red squirrel AMRO BEWR CBCH CEWA CHSP CONI CORA DEJU GCKI HAWO MAWA OCWA PUFU RCKI RECR RBNU RBSA SOSP SPTO SWTH TUVU WAVI WCSP WETA WIFL WIWA YRWA common garter snake, northern alligator lizard ant hills, banana slug. BF-ANSW, BF-COWO, BF-GRHA, BF-PASW, BF-WEEL, BF-WOSK BF-WPEL. DF-BLDA, DF-CGDA, DF-WEPO, DF-8spot, DF-darner sp.
9	Big Tree Marsh	see Uplands Forest East
10	Transect Marsh	black-tailed deer, mink Pacific chorus frog DM-PAFO, bee sp.
11	Homestead Slope	black-tailed deer, red squirrel AMRO CONI CORA MAWA NOFL PIWO PSFL RBSA SOSP SWTH TUVU northern red-legged frog banana slug, Pacific sideband snail. BF-COWO, BF-WOSK. DF-CGDA
12	Homestead Riparian West	beaver, black-tailed deer AMRO BUSH CONI COYE GCKI MAWA OCWA PUFU RBSA RUHU RWBL SOSP SWTH TUVU WAVI WIFL northern red-legged frog, Pacific chorus frog
13	Homestead Marsh	beaver, little brown bat, western long-eared bat AMRO BASW BEKI COHA CORA COYE GBHE KILL MALL MAWR NOFL PBGR PIWO RBSA RECR RUHU RWBL SOSP STAR SWTH TRSW TUVU VGSW VIRA WODU YRWA Pacific chorus frog DF-darner, water-strider

14	Homestead Forest	black-tailed deer AMRO BEWR BUSH CBCH CEWA CORA COYE HAFL NOFL OCWA PSFL RECR SOSP SWTH WAVI WCSP WIFI BF- MOCL, BF-PASW. DF-AMEM, DF-STME, DF-WEPO
15	NE Marsh	
16	Home-site Forest	
17	Swale Woods	red squirrel AMRO BAEA BEWR CAVI CBCH OCWA PAWR PSFL SOSP SWTH WAVI WCSP WETA WIFL
18	Former Swale Marsh Meadow	river otter CONI COYE MAWR empty unknown nest Pacific chorus frog
19	Swale Farm Grazing Meadow	beaver, black-tailed deer AMGO BASW CAGO CEWA CONI CORA COYE KILL MALL PUFI RWBL SOSP TUVU VGSW WODU DM-PAFO
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3	Pickles Marsh	beaver, hoary bat BEKI CEWA CONI COYE MALL MAWR NOHA PSFL RWBL SORA SOSP WODU BF- ANSW, DF-BLDA, DF-darner sp.
4	Lowlands Marshes	<i>see Pickles Marsh & Pickles Marsh Buffer Forest</i>
5	Lowlands Forest	black-tailed deer, red squirrel AMRO CONI CORA GBHE OCWA PIWO PSFL PUFI RUHU SOSP SWTH WAVI WIFL Pacific chorus frog banana slug
6	Pickles Marsh Buffer Forest	black-tailed deer, mink CBCH COYE MAWA NOFL RBNU SOSP SPTO Pacific chorus frog banana slug, Pacific sideband snail, BF-WOSK, DF-AMER
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8b	Uplands (East)	black-tailed deer, red squirrel AMRO BEWR CBCH CEWA CHSP CONI CORA DEJU GCKI HAWO MAWA OCWA PUFi RCKI RECR RBNU RBSA SOSP SPTO SWTH TUVU WAVI WCSP WETA WIFL WIWA YRWA common garter snake, northern alligator lizard ant hills, banana slug. BF-ANSW, BF-COWO, BF-GRHA, BF-PASW, BF-WEEL, BF-WOSK BF-WPEL. DF-BLDA, DF-CGDA, DF-WEPO, DF-8spot, DF-darner sp.
9	Big Tree Marsh	<i>see Uplands Forest East</i>
10	Transect Marsh	black-tailed deer, mink Pacific chorus frog DM-PAFO, bee sp.
11	Homestead Slope	black-tailed deer, red squirrel AMRO CONI CORA MAWA NOFL PIWO PSFL RBSA SOSP SWTH TUVU northern red-legged frog banana slug, Pacific sideband snail. BF-COWO, BF-WOSK. DF-CGDA
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18	Former Swale Marsh Meadow	river otter CONI COYE MAWR empty unknown nest Pacific chorus frog
19	Swale Farm Grazing Meadow	beaver, black-tailed deer AMGO BASW CAGO CEWA CONI CORA COYE KILL MALL PUFi RWBL SOSP TUVU VGSW WODU DM-PAFO

APPENDIX J. Introduced Species Present on the Settlement Lands

<i>Cirsium arvense</i>	Canada thistle
<i>Cirsium vulgare</i>	Bull thistle
<i>Crataegus monogyna</i>	English hawthorn
<i>Cytisus scoparius</i>	Scotch broom
<i>Digitalis purpurea</i>	Foxglove
<i>Galium aparine</i>	Cleavers
<i>Geranium robertianum</i>	Herb Robert
<i>Gnaphalium uliginosum</i>	Marsh cudweed
<i>Hypochaeris radicata</i>	Hairy cat's ear
<i>Ilex aquifolium</i>	English holly
<i>Leucanthemum vulgare</i>	Ox-eye daisy
<i>Phalaris arundinacea</i>	Reed canary grass
<i>Ranunculus repens</i>	Creeping buttercup
<i>Rubus armeniacus</i>	Himalayan blackberry
<i>Rumex acetosella</i>	Sheep's sorrel
<i>Sonchus asper</i>	Prickly sow-thistle
<i>Tanacetum vulgare</i>	Tansy