

Your electronic signature is a representation that you are a subscriber as defined by the Land Title Act, RSBC 1996 c.250, and that you have applied your electronic signature in accordance with Section 168.3, and a true copy, or a copy of that true copy, is in your possession.

1. APPLICATION: (Name, address, phone number of applicant, applicant's solicitor or agent)

Deduct LTSA Fees? Yes

2. PARCEL IDENTIFIER AND LEGAL DESCRIPTION OF LAND:
[PID] [LEGAL DESCRIPTION]

STC? YES

3. NATURE OF INTEREST	CHARGE NO.	ADDITIONAL INFORMATION
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4. TERMS: Part 2 of this instrument consists of (select one only)
(a) Filed Standard Charge Terms D.F. No. (b) Express Charge Terms Annexed as Part 2
A selection of (a) includes any additional or modified terms referred to in Item 7 or in a schedule annexed to this instrument.

5. TRANSFEROR(S):

6. TRANSFEREE(S): (including postal address(es) and postal code(s))

7. ADDITIONAL OR MODIFIED TERMS:

8. EXECUTION(S): This instrument creates, assigns, modifies, enlarges, discharges or governs the priority of the interest(s) described in Item 3 and the Transferor(s) and every other signatory agree to be bound by this instrument, and acknowledge(s) receipt of a true copy of the filed standard charge terms, if any.

Officer Signature(s)

Execution Date		
Y	M	D

Transferor(s) Signature(s)

OFFICER CERTIFICATION:
Your signature constitutes a representation that you are a solicitor, notary public or other person authorized by the Evidence Act, R.S.B.C. 1996, c.124, to take affidavits for use in British Columbia and certifies the matters set out in Part 5 of the Land Title Act as they pertain to the execution of this instrument.

EXECUTIONS CONTINUED

PAGE
of
PAGES

Execution Date

Y	M	D
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LAND TITLE ACT
FORM E

2. PARCEL IDENTIFIER AND LEGAL DESCRIPTION OF LAND:
[PID] [LEGAL DESCRIPTION]

STC? YES

2. PARCEL IDENTIFIER AND LEGAL DESCRIPTION OF LAND:
[PID] [LEGAL DESCRIPTION]

STC? YES

2. PARCEL IDENTIFIER AND LEGAL DESCRIPTION OF LAND:
[PID] [LEGAL DESCRIPTION]

STC? YES

LAND TITLE ACT
FORM E

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TERMS OF INSTRUMENT – PART 2

**Section 219 Conservation Covenant and
Section 218 Statutory Right of Way**

This Agreement dated for reference May 23, 2017 is

BETWEEN:

Denman Conservancy Association, a society registered in British Columbia (Inc. No. S-27585), with its registered office at 5901 Denman Road, Denman Island, B.C., V0R 1T0, and a mailing address of Box 60, Denman Island, B.C. V0R 1T0

(the "Owner")

AND:

Trust Fund Board, a corporation under the *Islands Trust Act* (British Columbia) with its office at 200-1627 Fort Street, Victoria, B.C. V8R 1H8

(the "Board")

(collectively, the "parties")

WHEREAS:

- A. The Owner is the registered owner in fee simple of the Lands;
- B. The Lands contains significant natural area values and amenities including critical habitat for the Taylor's Checkerspot butterfly (*Euphydryas editha taylori*), listed in Schedule 1 of the *Species at Risk Act* (Canada) and other flora, fauna and natural features of great importance to the Owner, the Covenant Holder and the public;
- C. The Owner wishes and has agreed to grant to the Covenant Holder a covenant pursuant to section 219 of the *Lands Title Act*, to restrict the use of the Lands, and a statutory right of way pursuant to section 218 of the *Lands Title Act*;
- D. A statutory right of way in favour of the Covenant Holder is necessary for the operation and maintenance of the undertakings of the Covenant Holder; and
- E. The Board is a Crown agent and is authorized to accept covenants and statutory rights of way under sections 219 and 218 of the *Lands Title Act*, respectively.

In consideration of the payment of \$2.00 now paid by the Covenant Holder to the Owner, the receipt and sufficiency of which is acknowledged by the Owner, and in consideration of the promises exchanged below, the parties covenant and agree as follows, in accordance with sections 218 and 219 of the *Lands Title Act*.

1. INTERPRETATION

1.1 In this Agreement, in addition to the words defined above:

- (a) "Administration Fee" means a fee of \$150.00 adjusted in each year as provided in section 13.2, charged by the Covenant Holder in accordance with section 13.1;
- (b) "Amenities" includes those natural, scientific, environmental, wildlife, plant and cultural values relating to the Lands as identified in the Report;
- (c) "Business Day" means any day other than Saturday, Sunday or British Columbia statutory holidays;
- (d) "Central Road" means that area identified in the Report as an undedicated road allowance on the Lands, which road has been designated as a Scenic Heritage Road by the Islands Trust with approval of the Ministry of Transportation;
- (e) "Certificate" means a certificate issued by the Covenant Holder under section 15.2;
- (f) "Covenant Holder" means, unless the context otherwise requires, the Board;
- (g) "CPI" means the All-Items Consumer Price Index published by Statistics Canada, or its successor in function, for Vancouver, BC, where 2017 equals 100;
- (h) "Eastern Lot" means the parcel of land legally described as Parcel Identifier 006-639-771, the east ½ of the north east ¼ of Section 21, Denman Island, Nanaimo District;
- (i) "Existing Hydro Line" means the power line owned and operated by BC Hydro located on the northeasterly corner of the Eastern Lot on the registration date of this Agreement as indicated in the Report;
- (j) "Lands" means the Eastern Lot and the Western Lot;
- (k) "Management Plan" means the management plan for the Land approved by the Owner and the Covenant Holder in accordance with Article 5, a copy of which is on file with each of the parties;
- (l) "Ministry of Transportation" means the British Columbia Ministry of Transportation and Infrastructure, its agents and contractors, and any successor ministry responsible for Central Road;
- (m) "Notice of Enforcement of Rent Charge" means a Notice of Enforcement of Rent Charge given under section 12.6;
- (n) "Notice of Breach" means a notice of breach given under section 11.1;
- (o) "Rent Charge" means the rent charge granted by the Owner under section 12.1;
- (p) "Rent Charge Amount" means the amount determined in accordance with Article 12, the payment of which is secured by the Rent Charge;
- (q) "Report" means the baseline documentation report that describes the Lands and the Amenities in the form of text, maps, and other records of the Lands

for the purposes of this Agreement, a copy of which is on file with each of the parties, and a condensed version of which is attached as Schedule A; and

- (r) "Western Lot" means the parcel of land legally described as Parcel Identifier 006-657-656, the west ½ of the north east ¼ of Section 21, Denman Island, Nanaimo District except that part in Plan VIP78186.
- 1.2 Where this Agreement provides that something is in the "sole discretion" of a party, that thing is within the sole, absolute and unfettered discretion of that party.
- 1.3 This Agreement must be interpreted in accordance with the laws of British Columbia and the laws of Canada applicable in British Columbia, and the parties agree that the courts of British Columbia have exclusive jurisdiction over any proceeding concerning this Agreement and to attorn to the jurisdiction of such courts.
- 1.4 This Agreement is comprised of the recitation of the parties, the recitals to this Agreement, the Schedule to this Agreement, Part 1 of the *Lands Title Act* Form C to which this Agreement is attached, and these Terms of Instrument.
- 1.5 In this Agreement:
- (a) reference to the singular includes a reference to the plural, and vice versa, unless the context otherwise requires;
 - (b) where a word or expression is defined in this Agreement, other grammatical forms of the same word or expression have corresponding meanings;
 - (c) reference to a particular numbered Article or section, or to a particular lettered Schedule, is a reference to the correspondingly numbered or lettered Article, section or Schedule of this Agreement, except where otherwise provided;
 - (d) Article headings have been inserted for ease of reference only and are not to be used in interpreting this Agreement;
 - (e) the word "enactment" has the meaning given to it in the *Interpretation Act* on the reference date of this Agreement;
 - (f) reference to any enactment is a reference to that enactment as consolidated, revised, amended, re-enacted or replaced, unless otherwise expressly provided;
 - (g) reference to an enactment is to an enactment of the province of British Columbia except where otherwise provided;
 - (h) reference to a "party" or the "parties" is a reference to a party or the parties to this Agreement and their respective successors, assigns, trustees, administrators and receivers; and
 - (i) reference to a "day", "month" or "year" is a reference to a calendar day, calendar month or calendar year, as the case may be, unless otherwise expressly provided.

2. REPRESENTATIONS AND WARRANTIES

- 2.1 The Owner represents and warrants to the Covenant Holder that the facts set out in Recitals A and C are true as of the date of this Agreement.
- 2.2 The Board represents and warrants to the Owner that the facts set out in Recitals D and E are true as of the date of this Agreement.
- 2.3 Each party represents and warrants to each other party that the facts set out in Recital B are true as of the date of this Agreement.

3. INTENT OF AGREEMENT

- 3.1 The parties agree that the intent of this Agreement is:
 - (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 Report,

and the parties agree that this Agreement is to be interpreted, performed and applied in that context.

- 3.2 This Agreement shall be perpetual to reflect the public interest in the protection, preservation, conservation, maintenance and enhancement of the Lands and the Amenities.

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 4.1, 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.
- 4.3 Despite any other provisions in this Agreement, nothing in this Agreement prohibits the use of any portion of the Eastern Lot that is within the Agricultural Land Reserve from farm uses permitted under s. 2 of BC Regulation #171/2002 Agricultural Land Reserve Use, Subdivision and Procedure Regulation.
- 4.4 Despite sections 4.1 and 4.2, the Owner may
- (a) install, maintain and replace a fence to exclude farm animals from the Lands along the eastern boundary of the Eastern Lot, subject to approval of the Covenant Holder with respect to the exact location and size of the fence, such approval not to be unreasonably withheld,
 - (b) install, maintain and replace a "Wildlife Viewing Platform" at the location identified in the Report, subject to the approval of the Covenant Holder with respect to the design and construction of these structures, such approval at the Covenant Holder's sole discretion,
 - (c) install, maintain and replace a Main Information Kiosk at the location identified in the Report, provided the structure is no more than 3 metres by 2 metres in size as defined by the dripline of the roof, and
 - (d) install, maintain and replace signs in the locations indicated in the Management Plan for the purposes of public safety or informing the public about the Lands and the Amenities, so long as each sign is not larger than 1 metre by 1 metre in size,

provided that in undertaking any of the activities described above the Owner must use best efforts to minimize any impact on the Lands and the Amenities contrary to sections 4.1 and 4.2, and must advise the Covenant Holder of any impacts on the Lands or Amenities arising out of the activities.

- 4.5 Despite sections 4.1 and 4.2, the Owner may conduct or permit research activities on the Lands for archeological purposes, provided the Owner
 - (a) gives at least 30 days' prior written notice to the Covenant Holder, describing in reasonable detail the intended research activities and its likely effect on the Lands and the Amenities;
 - (b) takes into consideration any comments on the proposed research provided by the Covenant Holder to the Owner during the 30- day period, before taking or permitting the proposed research activity;
 - (c) uses best efforts to minimize any impact on the Lands and the Amenities contrary to sections 4.1 and 4.2; and
 - (d) advises the Covenant Holder of any impacts on the Lands or Amenities arising out of the research activities.
- 4.6 The Covenant Holder:
 - (a) acknowledges that the maintenance and repair of Central Road falls under the direction and control of the Ministry of Transportation; and
 - (b) agrees that the restrictions in sections 4.1 and 4.2 do not apply to Central Road.
- 4.7 The Covenant Holder agrees that the restrictions in sections 4.1 and 4.2 do not apply to the maintenance of the Existing Hydro Line

5. MANAGEMENT PLAN

- 5.1 The management of the Lands shall be governed by the Management Plan.
- 5.2 The Owner must review and revise, at least every 10 years, a Management Plan for the Lands and submit the Management Plan to the Covenant Holder for approval. The Covenant Holder must, within 60 Business Days of receipt of the proposed Management Plan, notify the Owner in writing whether or not the Covenant Holder, acting reasonably, approves the proposed Management Plan.
- 5.3 If the Covenant Holder does not approve the revised Management Plan, the Covenant Holder will, in its notification to the Owner, provide written reasons for not approving the Management Plan and a description of changes to the Management Plan that are necessary for the Covenant Holder to approve the Management Plan.
- 5.4 The Owner must, within 25 Business Days of receipt of the Covenant Holder's requested changes to the Management Plan, notify the Covenant Holder in writing whether or not it accepts the requested changes. If the Owner does not accept the requested changes, the Owner and the Covenant Holder must, within 30 Business Days of receipt of the notice, meet and attempt to resolve the outstanding issues, acting reasonably and in good faith.

- 5.5 If the parties are unable to resolve all outstanding issues under section 5.4, the Owner may notify the Covenant Holder that it elects to withdraw the Management Plan submission and the existing Management Plan will continue to apply to the management of the Lands.

6. BASELINE DOCUMENTATION REPORT

- 6.1 The parties each agree that the Lands and the Amenities are described in the Report and that the Report provides an accurate description of the Lands and its Amenities as of the date of registration of this Agreement.
- 6.2 The parties agree that the Report is intended to serve as an objective information baseline for monitoring compliance with the terms of this Agreement.
- 6.3 The Covenant Holder will provide a copy of the full Report to the Owner upon request from the Owner from time to time.
- 6.4 The parties each acknowledge that the flora and fauna on the Lands will evolve through natural succession over time and, unless otherwise expressly stated, references to the Report in this Agreement are intended to take into account the natural succession of the flora and fauna over time, without human intervention other than as expressly permitted by this Agreement.

7. DISPUTE RESOLUTION

- 7.1 If a breach of this Agreement occurs or is threatened, or if there is disagreement as to the meaning of this Agreement, the Covenant Holder or the Owner may give notice to the other party requiring a meeting of both parties within 10 Business Days of receipt of the notice.
- 7.2 Upon receipt of a notice under section 7.1, both parties must immediately cease any activity giving rise to a breach or threatened breach of this Agreement, and any activity giving rise to a disagreement as to the meaning of this Agreement.
- 7.3 The parties must attempt to resolve the matter, acting reasonably and in good faith, within 20 Business Days of receipt of the notice under section 7.1.
- 7.4 If the parties are not able to resolve the matter within the time set out in section 7.3, the parties may agree to mediate the matter. If the parties agree to participate in mediation, they will appoint a mediator acceptable to both parties within 20 Business Days. If the parties are not able to agree on a mediator within 20 Business Days, the parties will use a mediator recommended by the Mediate BC Society or its successor.
- 7.5 The costs of the mediator and of the mediation facilities will be shared equally by the parties.
- 7.6 This Article does not affect the right of the Covenant Holder to pursue any other legal or equitable remedy in relation to a breach or a threatened breach of this Agreement, including without limitation under Articles 11 and 12, and the Covenant Holder may pursue other remedies concurrently with any dispute resolution under this Article.

8. OWNER'S RESERVED RIGHTS

- 8.1 Subject to Article 4, the Owner reserves all of its rights as owner of the Lands, including the right to use, occupy and maintain the Lands in any way that is not expressly restricted or prohibited by this Agreement, so long as the use, occupation or maintenance is consistent with the intent of this Agreement.
- 8.2 Without limiting the generality of section 8.1 the following rights are, subject to Article 4, expressly reserved to the Owner:
 - (a) to maintain, replace or restore the trails existing within the Lands at the time of registration of this Agreement (the location of which are identified in the Report and labelled "Designated Trails"), so long as the location of each trail remains the same, the materials used are permeable and the size is the same or smaller;
 - (b) to maintain, replace or restore the parking areas existing on the Lands at the time of registration of this Agreement (the location of which are identified in the Report), so long as the location of each parking area remains the same and the size is the same or smaller; and
 - (c) to maintain and replace the existing Butterfly Reserve Kiosk (the location of which is identified in the Report), so long as the location remains the same and the size is the same or smaller.
- 8.3 Subject to section 8.4, nothing in this Agreement restricts or affects the right of the Owner to do anything reasonably necessary to:
 - (a) prevent potential injury or death to any individual; or
 - (b) prevent, abate or mitigate any damage or loss to any real or personal property.
- 8.4 If the Owner intends to do, or permit to be done, anything described in section 8.3, the Owner must give at least 30 days' prior written notice to the Covenant Holder, describing in reasonable detail the intended action, the reason for it and its likely effect on the Lands and the Amenities. Where the Owner gives notice under this section, the Owner must permit the Covenant Holder to enter upon the Lands and inspect the Lands. The Covenant Holder may comment on the proposed action and the Owner must take those comments into consideration before taking or permitting the proposed action to be taken under section 8.3.
- 8.5 Despite section 8.4, in the case of an emergency situation where the Owner must take immediate action under section 8.3, the Owner may take such necessary action without first notifying the Covenant Holder. As soon as possible after the action is taken, the Owner must notify the Covenant Holder of the circumstances of the action taken, including the actual or likely effect of the action on the Lands and the Amenities. Where such emergency action is taken, the Owner must permit the Covenant Holder to enter upon the Lands and inspect the Lands.

9. OWNER'S OBLIGATIONS

- 9.1 The Owner retains all responsibilities and bears all costs and liabilities related to the ownership, use, occupation and maintenance of the Lands.
- 9.2 The Owner will take all reasonable steps to:

- (a) communicate to the Ministry of Transportation the restrictions imposed by this Agreement; and
 - (b) provide guidance to the Ministry of Transportation on how best to engage in maintenance and repairs of Central Road in a manner that is in keeping with the intent of this Agreement.
- 9.3 The Owner must indemnify the Covenant Holder, its directors, officers, employees, agents and contractors, from and against any and all liabilities, damages, losses, personal injury or death, causes of action, actions, claims, and demands made, suffered or incurred by or on behalf of any person, arising out of any act or omission, negligent or otherwise, in the use, occupation and maintenance of the Lands or its Amenities by the Owner or its officers, employees, contractors, invitees, licensees or agents.
- 9.4 The Owner is liable for any and all breaches of this Agreement, but the Owner is not liable for:
 - (a) breaches of this Agreement which occurred prior to the Owner becoming the registered owner of any interest in the Lands, provided the previous owner has received a Certificate issued by the Covenant Holder under section 15.2 immediately before or at the time of the transfer of the Lands to the Owner, or the Owner received a Certificate issued by the Covenant Holders under section 15.2 immediately after or at the time of the transfer of the Land to the Owner, certifying that there were no violations of this Agreement as of the date of issuance of the Certificate;
 - (b) injury or alteration to the Lands or the Amenities resulting from natural causes, or causes beyond the Owner's reasonable control, other than as referenced in subsection (d), including accidental fire, flood, storm and earth movement, but excluding injury or alteration resulting from actions of the Owner or any other person with the actual or constructive knowledge of the Owner;
 - (c) injury or alteration to the Lands or the Amenities resulting from maintenance and repairs to Central Road undertaken by the Ministry of Transportation;
 - (d) injury or alteration to the Lands or the Amenities resulting from the actions of any person without the actual or constructive consent or knowledge of the Owner, including from trespass, vandalism, nuisance or negligence, provided the Owner acts in accordance with sections 9.6 and 9.7;
 - (e) any prudent action taken by the Owner under emergency conditions to prevent, abate, or mitigate significant injury to the Lands (including improvements) or the Amenities, resulting from natural causes, including accidental fire, flood, storm and earth movement; or
 - (f) injury or alteration to the Lands caused by the Covenant Holder exercising its rights under this Agreement.
- 9.5 Without limiting the generality of sections 9.1, 9.3 and 9.4, the Owner:
 - (a) is solely responsible and liable for any loss or damage, or liability of any kind (whether civil, criminal or regulatory), in any way connected with the existence in, on, from, to or under the Lands (whether through spill, emission,

migration, deposit, storage or otherwise) of any pollutant, contaminant, waste, hazardous waste, or any matter that harms the environment; and

- (b) must indemnify the Covenant Holder from and against any loss, fine, penalty, damage, liability, cause of action, action, proceeding, regulatory action, order, directive, notice or requirement, including those of any government agency, incurred, suffered or brought against the Covenant Holder in any way associated with anything described in subsection (a).

9.6 Where, as provided in subsection 9.4(b), injury or alteration is caused to the Lands or the Amenities by a person without the actual or constructive consent or knowledge of the Owner, the Owner will not be responsible for the resulting breach of this Agreement provided the Owner takes all reasonable steps to identify the person responsible and

- (a) pursues and obtains compensation from that person for damage caused to the Lands and the Amenities in an amount that reasonably reflects the amount of compensation the Owner is likely to receive if the Owner pursued a civil action under paragraph (b) or a prosecution and restitution under paragraph (c);
- (b) pursues a civil action against that person for damage caused to the Lands and the Amenities; or
- (c) seeks a prosecution of that person under the *Trespass Act*, R.S.B.C. 1996, c. 462, including a claim for restitution for damage caused to the Lands and the Amenities.

9.7 If the Owner does not obtain compensation under section 9.6(a), and chooses to not take action under section 9.6(b) or 9.6(c), or if the Owner is unsuccessful in seeking a prosecution under section 9.6(c), the Owner will not be responsible for the resulting breach of this Agreement provided the Owner, at the Covenant Holder's option and with the Covenant Holder's approval

- (a) irrevocably and in writing assigns to the Covenant Holder the Owner's right to bring a civil action against that person and the right to any damages awarded should the action be successful; or
- (b) commences a civil action against that person and irrevocably and in writing assigns the action, or the conduct of the action in the Owner's name, to the Covenant Holder, and the right to any damages awarded should the action be successful.

9.8 Where the Owner makes an assignment under section 9.7, the Owner must execute such agreements, and provide such documents and information, as requested by the Covenant Holder from time to time to give effect to the assignment.

9.9 Where the Owner, under section 9.6, receives compensation for damage caused to the Lands or the Amenities, the Owner agrees to use that compensation to restore or rehabilitate the Lands and the Amenities to as near the condition described in the Report as is possible, in a manner consistent with this Agreement and in consultation with the Covenant Holder.

9.10 Where the Covenant Holder, under section 9.7, receives compensation for damage caused to the Lands or the Amenities, the Covenant Holder agrees to use

that compensation to restore or rehabilitate the Lands and the Amenities to as near the condition described in the Report as is possible, in a manner consistent with this Agreement and in consultation with the Owner.

- 9.11 The Owner must pay when due all taxes, assessments, levies, fees and charges of whatever description which may be levied on or assessed against the Lands and must pay any arrears, penalties and interest in respect of any such unpaid amounts.
- 9.12 The Owner must indemnify the Covenant Holder from and against any fee, tax or other charge which may be assessed or levied against the Owner or the Covenant Holder pursuant to any enactment, including the *Income Tax Act* (Canada), with respect to the Lands or this Agreement, including any fee, tax or other charge which may be assessed or levied against the Owner or Covenant Holder as a result of the amendment or termination of this Agreement.
- 9.13 Any debts or other amounts due from the Owner to the Covenant Holder under this Agreement, if not paid within 30 days after notice, will bear interest at the annual interest rate that is 1 per cent greater than the prime rate of interest. For the purposes of this section, the "prime rate of interest" is the annual rate of interest charged from time to time by the Bank of Montreal, at its main branch in Vancouver, BC, for demand Canadian dollar commercial loans and designated from time to time by the Bank of Montreal as its prime rate.
- 9.14 The indemnities granted by the Owner to the Covenant Holder under this Article are indemnities granted as an integral part of the section 219 *Lands Title Act* covenant created by this Agreement.

10. STATUTORY RIGHT OF WAY

10.1 The Owner grants to the Covenant Holder a licence, and a statutory right of way pursuant to section 218 of the *Lands Title Act*, permitting the Covenant Holder to do the following:

- (a) enter upon the Lands to access and inspect the Lands for the purposes of monitoring compliance with this Agreement, on prior written notice by the Covenant Holder to the Owner of at least 24 hours;
- (b) for purposes other than monitoring under subsection (a), enter upon the Lands to access and inspect the Lands at all reasonable times upon prior written notice by the Covenant Holder to the Owner of at least 24 hours, unless, in the opinion of the Covenant Holder, there is an emergency or other circumstance which makes giving such notice impractical;
- (c) as part of inspection of the Lands under subsection (a) or (b), take soil, water or other samples, photographs, and video and sound recordings as may be necessary to monitor compliance with and enforce the terms of this Agreement;
- (d) enter upon and protect, preserve, conserve, maintain, enhance, rehabilitate or restore, in the Covenant Holder's sole discretion and at the Covenant Holder's expense, the Lands or the Amenities to as near the condition described in the Report as the Covenant Holder considers is practicable or desirable, if an act of nature or of any person other than as described in subsection (e) destroys, impairs, diminishes or negatively affects or alters the Lands or the Amenities from the condition described in the Report;

- (e) in accordance with Article 11, enter upon and protect, preserve, conserve, maintain, enhance, rehabilitate or restore, in the Covenant Holder's sole discretion and at the Owner's expense, the Lands or the Amenities to as near the condition described in the Report as in the Covenant Holder's sole discretion is practicable or desirable, if an action of the Owner or any other person acting with the actual or constructive knowledge of the Owner contravenes any term of this Agreement;
 - (f) carry out or evaluate any program agreed upon by the parties for the protection, preservation, conservation, maintenance, restoration or enhancement of all or any portion of the Lands or the Amenities;
 - (g) place survey pegs or other markings on the Lands to clearly identify the Lands or access to the Lands, or to increase the visibility of existing survey pegs or other markings; and
 - (h) erect a plaque or other sign on the Lands, in a tasteful manner and at the expense of the Covenant Holder, indicating that the Covenant Holder holds a covenant on the Lands, provided that the size, style and location of the plaque or sign must be approved by the Owner prior to its placement, such approval not to be unreasonably withheld.
- 10.2 The Covenant Holder may bring workers, contractors and employees, and vehicles, equipment and other personal property, onto the Lands when exercising its rights under this Article.

11. ENFORCEMENT REMEDIES OF THE COVENANT HOLDER

- 11.1 If the Covenant Holder, in its sole discretion, believes that the Owner has failed to perform any of its obligations under this Agreement, or is otherwise in breach of any term of this Agreement, the Covenant Holder may give a Notice of Breach to the Owner setting out particulars of the breach, including the Covenant Holder's estimated maximum costs of remedying the breach.
- 11.2 On receipt of a Notice of Breach, the Owner must
- (a) immediately cease all activities giving rise to the breach; and
 - (b) within 60 days remedy the breach or make arrangements satisfactory to the Covenant Holder to remedy the breach, including with respect to the time within which the breach must be remedied.
- 11.3 For clarity, the requirement in subsection 11.2(b) to remedy a breach requires the Owner to undertake such rehabilitation or restoration necessary to remedy any damage done to the Lands contrary to this Agreement, at the Owner's sole expense.
- 11.4 If the Owner does not comply with the requirements of section 11.2 within the time required or agreed upon, the Covenant Holder may enter upon the Lands and take any required actions to cease any activities giving rise to the breach, and to remedy the breach or carry out the arrangements referred to in section 11.2. The Owner must reimburse the Covenant Holder for any expenses incurred in taking any action under this section, up to the estimated maximum costs of remedying the breach as set out in the Notice of Breach.

- 11.5 Expenses incurred by the Covenant Holder under this Article, until paid, are a debt owed by the Owner to the Covenant Holder and the Owner agrees to indemnify the Covenant Holder for such expenses, which indemnity forms an integral part of the covenant under section 219 of the *Lands Title Act* created by this Agreement.

12. RENT CHARGE AND ITS ENFORCEMENT

- 12.1 As security for the performance of the Owner's obligations under this Agreement, the Owner grants to the Covenant Holder a perpetual rent charge against the Lands. The Rent Charge is granted both under section 219 of the *Land Title Act* as an integral part of the statutory covenant created by this Agreement and as a fee simple rent charge at common law.
- 12.2 The Rent Charge secures payment to the Covenant Holder by the Owner of the sum of \$6,065 per year, subject to adjustment under section 12.3.
- 12.3 The Rent Charge Amount will be adjusted on January 1 of each year by increasing or decreasing, as the case may be, the Rent Charge Amount by the amount determined by multiplying the Rent Charge Amount on December 31 immediately preceding by the percentage increase or decrease, as the case may be, in the CPI between the previous January 1 and that December 31, and adding the amount so determined to the Rent Charge Amount as it stands on that December 31. If Statistics Canada, or its successor in function, ceases to publish a CPI or comparable indicator as determined by the Covenant Holder in its sole discretion, the parties agree that the factor to be used in determining the annual increase in the Rent Charge Amount for each year is 3%.
- 12.4 For each breach of this Agreement, the Rent Charge Amount will be increased by a sum equal to 110% of the market value at the date of the breach of any flora or fauna, soil, rock, gravel or minerals which have been altered, damaged, destroyed, moved, harvested or removed in connection with the breach.
- 12.5 The Rent Charge is suspended unless and until the Owner is in breach of any provision of this Agreement.
- 12.6 A Covenant Holder that wishes to enforce the Rent Charge must give a Notice of Enforcement of Rent Charge to the Owner stating the intention to enforce the Rent Charge and demanding immediate payment of the Rent Charge Amount. The Notice of Enforcement of Rent Charge may be given at any time after a Notice of Breach is given under section 11.1.
- 12.7 The Owner must, within 10 days of receipt of the Notice of Enforcement of Rent Charge, pay the full Rent Charge Amount to the Covenant Holder.
- 12.8 The Covenant Holder may enforce the Rent Charge by any of the following:
- (a) an action against the Owner for the Rent Charge Amount;
 - (b) distraint against the Lands to the extent of the Rent Charge Amount;
 - (c) an action for appointment of a receiver in respect of the Lands; or
 - (d) an order for sale of the Lands.
- 12.9 The Covenant Holder is entitled to recover from the Owner all reasonable expenses incurred as a result of enforcement of the Rent Charge.

13. ADMINISTRATION FEE

- 13.1 The Owner agrees that the Covenant Holder may charge the Owner an Administration Fee to cover the Covenant Holder's administrative costs in each and any case where the Covenant Holder is requested by the Owner to provide an approval or Certificate, or to take any other action, or where a Covenant Holder visits the Lands under section 8.4 or 8.5. This Administration Fee applies whether or not the Covenant Holder grants the approval or Certificate requested.
- 13.2 The Administration Fee will be adjusted on January 1 of each year by increasing or decreasing, as the case may be, the Administration Fee by the amount determined by multiplying the Administration Fee on December 31 immediately preceding by the percentage increase or decrease, as the case may be, in the CPI between the previous January 1 and that December 31, and adjusting accordingly the Administration Fee as it stands on that December 31. If Statistics Canada, or its successor in function, ceases to publish a CPI or comparable indicator as determined by the Covenant Holder in its sole discretion, the parties agree that the factor to be used in determining the annual increase in the Administration Fee for each year is 3%.

14. ASSIGNMENT OF AGREEMENT OR DISSOLUTION OF THE COVENANT HOLDER

- 14.1 This Agreement is assignable by the Covenant Holder, but the Covenant Holder may only assign its rights and obligations under this Agreement to a person or entity authorized to hold statutory rights of way under section 218 of the *Land Title Act* and covenants under section 219 of the *Land Title Act*.
- 14.2 The Covenant Holder agrees that before it assigns this Agreement under this Article, it must notify the Owner with respect to the proposed assignee and must consider any comments received from the Owner in accordance with section 14.3 respecting the proposed assignee. For clarity, the Covenant Holder is entitled to assign its rights and obligations under this Agreement provided it has complied with the requirements in this section and sections 14.1 and 14.3.
- 14.3 The Owner may, within 10 Business Days of receipt of notice under section 14.2, provide comments to the Covenant Holder regarding the proposed assignee. If the Owner does not provide comments to the Covenant Holder regarding the proposed assignee within that timeframe, the Owner is conclusively deemed to have declined to comment on the proposed assignee.
- 14.4 In the event of a pending winding-up or dissolution of the Covenant Holder, the Covenant Holder must use its best efforts to assign and transfer all of its interest under this Agreement to a person or entity authorized to accept statutory rights of way under section 218 of the *Land Title Act* and covenants under section 219 of the *Land Title Act*.

15. NOTICE OF CHANGE IN OWNERSHIP BY OWNER

- 15.1 The Owner must notify the Covenant Holder of any change of ownership prior to the registration of any such change in the land title office.
- 15.2 The Owner may request that the Covenant Holder visit the Lands and issue a Certificate indicating whether or not there are any violations of this Agreement as of the date of the Certificate.

- 15.3 Failure by the Owner to comply with section 15.1 does not affect the enforceability of this Agreement against the Owner or its successors in title to the Lands.

16. NOTICE

- 16.1 A notice or other communication (collectively a "notice") required or permitted under this Agreement must be in writing and must be:
- (a) delivered in person;
 - (b) sent by electronic means to such electronic address as the parties may have provided; or
 - (c) sent by pre-paid registered mail addressed to the parties at their respective addresses set out in section 16.4.
- 16.2 A notice given by electronic means under subsection 16.1(b), must be followed by a copy sent by ordinary mail, except that a notice given under subsection 10.1(a) may be given by electronic means without the requirement to send a copy by ordinary mail.
- 16.3 Unless otherwise provided, a notice
- (a) delivered in person is deemed received on delivery;
 - (b) sent by electronic means:
 - (i) if the notice is transmitted before 3:00 pm on a Business Day, the document is deemed to be received on the day of transmission;
 - (ii) if the notice is transmitted after 3:00 pm on a Business Day or is transmitted on a day that is not a Business Day, the notice is deemed to be received on the next day that is a Business Day; and
 - (c) sent by pre-paid registered mail is deemed received on the fourth Business Day following the day on which the notice was sent.
- 16.4 The addresses of the parties for notices under this Article are as follows:
- (a) The Owner:
Denman Conservancy Association
5901 Denman Road
Denman Island, B.C., V0R 1T0
And a mailing address of:
Box 60,
Denman Island, BC V0R 1T0
Email: info@denmanconservancy.org
 - (b) The Board:
Trust Fund Board
200-1627 Fort Street
Victoria, BC V8R 1H8

Email: itfmail@islandstrust.bc.ca

- 16.5 Each party agrees to give written notice immediately to the other parties of any change in its address from those set out in section 16.4, and to keep the other party apprised of any changes to the party's electronic address if one is provided.

17. DISCHARGE WHERE DEDICATION OF CENTRAL ROAD AS PUBLIC HIGHWAY

- 17.1 If at any time the Owner wishes to dedicate or enable the dedication of Central Road as a public highway, the Covenant Holder agrees to consent to the release of this Covenant and Statutory Right of Way from that area of the Lands, without compensation, and to execute such instruments as are necessary to give effect to such release on receipt of a request from the Owner. For clarity, the preparation, delivery and registration of the required instruments and all associated costs will be the responsibility of the Owner.

18. GRANT OF STATUTORY RIGHT OF WAY

- 18.1 If at any time the Owner wishes to grant a statutory right of way to BC Hydro for the Existing BC Hydro Line, the Covenant Holder agrees to consent to granting a priority for that statutory right of way over this Covenant, provided the grant is defined by a survey plan and is limited to the Existing Hydro Line and a reasonable area on each side of that line. For clarity, the preparation, delivery and registration of the required instruments and all associated costs will be the responsibility of the Owner.

19. ACCESS

- 19.1 Except if expressly provided in this Agreement, no right of access by the general public to any portion of the Lands is conveyed by this Agreement.

20. NOTICE OF COVENANT

- 20.1 The Owner agrees that the Covenant Holder may publicize the existence of this Agreement in a tasteful manner.

21. NO LIABILITY IN TORT

- 21.1 The parties agree that this Agreement creates only contractual obligations and obligations arising out of the nature of this Agreement as a covenant under seal. Without limitation, the parties agree that no tort or fiduciary obligations or liabilities of any kind are created or exist between the parties in respect of this Agreement, and nothing in this Agreement creates any duty of care or other duty on any of the parties to anyone else. For clarity, the intent of this section is to, among other things, exclude tort liability of any kind and to limit the parties to their rights and remedies under the law of contract and the law pertaining to covenants under seal.

22. WAIVER

- 22.1 An alleged waiver of any breach of this Agreement is effective only if it is an express written waiver signed by the Covenant Holder, and is only effective to the extent of that express waiver and does not operate as a waiver of any other breach.
- 22.2 The failure for any reason of the Covenant Holder to require performance by the Owner at any time of any obligation under this Agreement does not affect the Covenant Holder's right to subsequently enforce that obligation.

23. JOINT AND SEVERAL OBLIGATIONS

- 23.1 Where at any time there is more than one Owner in this Agreement, the obligations of those Owners are joint and several.

24. REMEDIES NOT EXHAUSTIVE

- 24.1 Exercise or enforcement by a party of any remedy or right under or in respect of this Agreement does not limit or affect any other remedy or right that party may have against the other parties in respect of or under this Agreement or its performance or breach.

25. COVENANT RUNS WITH THE LANDS

- 25.1 Every obligation and covenant of the Owner in this Agreement constitutes both a personal covenant and a covenant granted under section 219 of the *Lands Title Act* in respect of the Lands, and the provisions of Article 10 constitute a statutory right of way granted under section 218 of the *Lands Title Act*. This Agreement burdens the Lands and runs with it and binds the successors in title to the Lands and each and every part into which the Lands may be subdivided by any means and any parcel with which the Lands or any part of it is consolidated.

26. REGISTRATION

- 26.1 The Owner agrees to do everything necessary, at the Owner's expense, to ensure that this Agreement, and the interests it creates, are registered against title to the Lands, with priority over all financial charges, liens and encumbrances, including options to purchase, rights to purchase and rights of first refusal, registered or pending registration in the applicable provincial Lands title office at the time of application for registration of this Agreement.

27. SEVERANCE

- 27.1 If any part of this Agreement is held by a court to be invalid, illegal or unenforceable, that part is to be considered to have been severed from the rest of this Agreement and the rest of this Agreement is to remain in force unaffected by that holding or by the severance of that part as if the part was never part of this Agreement.

28. NO OTHER AGREEMENTS

- 28.1 This Agreement is the entire agreement between the parties and it terminates and supersedes all other agreements and arrangements regarding its subject.

29. INDEPENDENT ADVICE

- 29.1 The Owner acknowledges and agrees that the Owner has had an opportunity to seek and obtain, to the Owner's satisfaction, independent advice from an accountant or other tax expert with respect to the income tax and other tax implications of this Agreement and acknowledges that it does not rely and has not relied on the Covenant Holder for advice in this regard and that the Covenant Holder has given no representation or warranty in that regard.
- 29.2 The Owner acknowledges and agrees that the Owner has been advised by the Covenant Holder that the Owner should seek independent legal advice as to the meaning and effect of this Agreement, and the Owner further acknowledges and

agrees that no legal advisor of the Covenant Holder has advised the Owner on the meaning or effect of this Agreement or in connection with this Agreement.

30. AMENDMENTS

- 30.1 This Agreement is intended to be perpetual and may only be changed by a written instrument signed by all the parties.

31. DEED AND CONTRACT

- 31.1 By executing and delivering this Agreement, each of the parties intends to create both a contract and a deed and covenant executed and delivered under seal.

32. RIGHTS OF COVENANT HOLDER

- 32.1 The Covenant Holder may exercise its rights under this Agreement through its directors, officers, employees, agents or contractors.

As evidence of their agreement to be bound by the above terms, the parties each have executed this Agreement under seal by signing Part 1 of the *Lands Title Act* Form C to which this agreement is attached.

The schedule referred to in this document is attached after this page.

SCHEDULE A

BASELINE REPORT

(Note: This is a condensed version of the full Baseline Report)

Attached to and forming part of the Covenant Agreement between the Owner and the Covenant Holder dated for reference April 16, 2017.

1.0 ACKNOWLEDGEMENT

The Owner and Jennifer Balke, Ecofocus Environmental Consultants 250-335-2151 hereby acknowledge and agree that the following is an accurate description of the Lands as of the reference date of this Agreement.

2.0 LOCATION AND DESCRIPTION

2.1 Location

The Lands are located near the middle of Denman Island, British Columbia, north of Denman Road, and 4 km from B.C. Ferries' Denman west terminal. Travel from the ferry on Denman Road, come up the ferry hill, then along and up the big hill. At the crest of this hill, 1.6 km from the ferry, turn sharp left onto Pickles Road. Across from this turn, at the Pickles Road junction is a large painted fence on the south side of Denman Road. Continue northwest on Pickles Road and cross Pickles Marsh bridge at 2.7 km from the ferry. At the next corner, at 3.1 km, turn left onto Central Road. Central Road crosses into the Lands' eastern parcel at its southeast border and the main entrance to the Settlement Lands is at 4.0 km from the ferry. Central Road continues at a diagonal across both Settlement Lands parcels and emerges near the northwest corner of the western parcel.

2.2 Legal Description

The "Lands" means two parcels of land:

The western parcel is legally described as

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

The eastern parcel is legally described as

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

2.3 Property Size

The total size of the Lands is 63.14 ha consisting of 30.69 ha for the western parcel and 32.45 ha for the eastern parcel. The Lands is nearly square and is most of a quarter section.

3.0 SITE HISTORY

3.1 Background History of the Area

First Nations use of the Denman shoreline dates from least 3500 yrs, as documented in an archeological study of a site on Denman's southwest coastline (Eldridge 1987). This study includes an account of the local area being originally occupied by the Pentlatch, an extinct linguistic subgroup of the Coast Salish. Denman was known to be the location of a Pentlatch winter village, which was unusual as the spring use of many of the Gulf Islands was more common. The Pentlatch occupation

changed in the early 1800's, as the northern Kwakiutl peoples expanded southward pushing the Comox of the Johnstone Strait area into the Pentlatch territory. The Comox intermarried with the Pentlatch and the Pentlatch dialect disappeared. Elridge's study records the sequence of the area's continuous occupation by early cultural groups:

- Old Cordilleran (ca. 9,000-6,000 B.P.);
- Charles (ca. 5,500-3,300 B.P.)
- Locarno (ca. 3,200-2,200 B.P.)
- Marpole (ca. 2,400-1,500 B.P.)
- Gulf of Georgia (ca. 1,500-200 B.P.).

Unfortunately, information about the use of the interior Denman lands by First Nations peoples is scarce and this biologist has not found any record of First Nations' historic use of the Lands.

European settlement in this area of Denman, as described in historical records, began in 1876 when David Pickles, a Yorkshire surveyor from England, pre-empted two 160 acre tracts around the Pickles marsh area, known as the Swale Farm, adjacent to the Lands (Kirk 2007). In the same year, a parcel bordering Chickadee Lake, also adjacent to the Lands, called the Lake Farm, was pre-empted by Abraham Pickles, brother of David. Produce from the farms was sold in Union Bay and occasionally Nanaimo.

The Swale farm, east of the Lands, was later purchased by the Schmidt family whose descendents still farm there today. The Lake Farm, north of the Lands, was in the estate of Henry Francis Pickles who was born on Denman in 1890. The farm was purchased in 1951 by Neil McKay. Then in 1970, a group of individuals bought, settled and farmed the Lake Farm, and many of the same individuals still reside there.

3.2 Ownership and Use of the Lands

3.2.1 Ownership

The Lands were originally pre-empted in the late 1800's, probably by members of the Pickles family. In January 1924, the eastern property of the Lands was owned by Arthur Laurence Pickles. Subsequently the Lands belonged to a series of logging companies, in the latter years: Weldwood of Canada, then Hancock Timber Resources Group out of Boston, USA, Comox Timber Ltd. and finally 4064 Investments Ltd.

Chickadee Rd was surveyed out of the western parcel of the Lands in the early 2000's, to access the subdivision of properties further to the west. (Plan VIP 78186).

Denman Conservancy Association acquired title to the Lands in November, 2006 after a long legal dispute and settlement.

3.2.2 Logging Use

The first logging occurred in the early 1900's, and most of the first-growth timber was cut, although small pockets of the Lands remained un-logged, particularly on the northern border of Pickles Marsh. The early logging on Denman began with the best timber being cut using hand-saws from springboard-platforms and hauled out using horses (Isbister 1976, Kirk 2007). Logs were then pulled by oxen teams along skid roads of partially embedded small logs that were helpfully greased by a "skid greaser". Before 1906, as timber prices rose, the first steam donkey engine was brought to Denman for hauling logs out of the woods. Soon the era of railway-logging began and before World War 1, the Squamish Logging Company of Vancouver located a major logging camp in the area of

Pickles Marsh, adjacent to the Lands. In 1907, Tom and Bob Graham began operating a sawmill at Pickles Marsh. A logging-railroad was cleared with Chinese labour that ran nearly 5 km, over several trestles, from the School claim (likely at the Old School site), past the Pickles Farm, across the Lands and out to the coast at Village Point. By the 1930's on Denman, the majority of large commercially valuable trees had been logged. Portions of the early railway-embankments, created through low-lying land, are still visible on the Lands.

A second widespread logging occurred on the Lands from 1999 to 2000, when much of the maturing second-growth timber was cut. These trees were around 100 years of age, based on counting tree rings on preserved-cut-stumps. Once again, some individual trees and small pockets of the original old-growth timber remained un-logged. This recent logging was a high-grade removal of the major timber-value trees, leaving a messy collection of assorted vegetation and debris. Three types of trees were left during this logging. First, pockets of original old-growth were protected along water bodies or were too large or too irregularly-shaped to be worthwhile logging. Second, some mature second-growth trees were damaged or deemed inaccessible along cliffs, water bodies or bordering lands. Third, young trees less than 20-30 years were too small to market. Trees were removed along newly constructed, small access roads (skid roads) by heavy equipment (skidders) and piled in log-landings to be trucked to the ferry.

3.2.3 Agriculture Use

An old Home-site was located near Homestead Marsh in the northeast corner of the Lands. This site was cleared and farmed. Orchard trees were planted, including at least ten apple trees that are still present. Other signs of this Home-site include: a ring of conifers that are twenty-plus years older than the rest of the regenerating clear-cut; a few holes and hummocks that were possibly part of water supply networks or other uses; a variety of field-type invasive species; a split rail fence on the north and east sides of the Home-site; and two small pieces of rusted metal equipment embedded in recovering trees.

A triangular portion in the northeast corner of the Lands, approximately 13 ha, is in the Agricultural Lands Reserve (ALR) (Figure 1), as is the neighbouring Swale Farm property. As part of the early pioneer agricultural activities in this area, an extensive network of ditches was constructed, adjacent to the Lands, to drain the large Swale Marsh on the Swale Farm. Two small "meadows", approximately 0.3 and 0.9 ha, on the Lands, were farmed until recently as part of the Swale Farm.

The Lands' 0.3 ha meadow, in the northeast corner, is now fenced off from the rest of the Swale farm and is referred to as the "Former Swale Marsh Meadow". Further south, the 0.9 ha wet-meadow along the eastern border of the Lands is referred to as the "Swale Farm Grazing Meadow". This meadow was open to grazing by the neighbour's cattle during this inventory, but the construction of a fence that will prevent cattle access to the Lands is planned for the summer of 2017. This Swale Farm Grazing Meadow had also been ditched to acquire more useable agricultural area from the Lands' Homestead Marsh. Currently, beaver dams, in the main drainage ditch through this meadow, are re-flooding the lower-lying portions and adding to the area of the current Homestead Marsh.

Previously, a power line was constructed across the Lands to connect the Swale Farm with electricity from the Lake Farm. At least one and possibly two power poles, on the Lands, carry a short section of this power line across the northeast corner of the Lands, along the western edge of the Former Swale Marsh Meadow. Along the east side of this power line an old farm track, crosses the meadow and connected the Lake and Swale farms for shared agricultural activities. BC Hydro and the Denman Conservancy Association are currently developing a legal Statutory Right of Way agreement for the power line that crosses the Lands.

3.2.4 Other Uses

Central Road, a non-gazetted dirt road, is in regular use by the community and crosses both parcels of the Lands. It is maintained by BC Ministry of Transportation and Infrastructure as a heritage road. Central Road connects Pickles and Lake roads and crosses the Lands on the diagonal from the southeast corner to northwest corner.

Dumping on the Lands has been both official and unofficial. As Denman's population increased, the Residents and Ratepayers Association made an agreement with the logging company, Weldwood of Canada, who owned much of the north end of Denman, to use a small piece of the Lands as a 'land fill' (Kirk 2007). Thus, a gully in the northwest corner of the Lands was used as an official community landfill. After several years it was closed and arrangements were made for garbage disposal at the Regional District landfill near Cumberland. The official landfill area was covered over with earth when the landfill was official closed and additional soil was dumped in that area during the building of Chickadee Rd. Further dumping of miscellaneous items occurred in a few other sites on the Lands. The rusting remains of two trucks and other items were dumped down the steep eastern bank beside Pickles Marsh, immediately adjacent to Central Rd. Piles of shakes and other building materials or garden waste were left in the log-landings along Central Rd. The easily removable remaining garbage debris that was not embedded in the substrate (other than decomposing woody debris) was removed during land clean-up sessions in the summer of 2016.

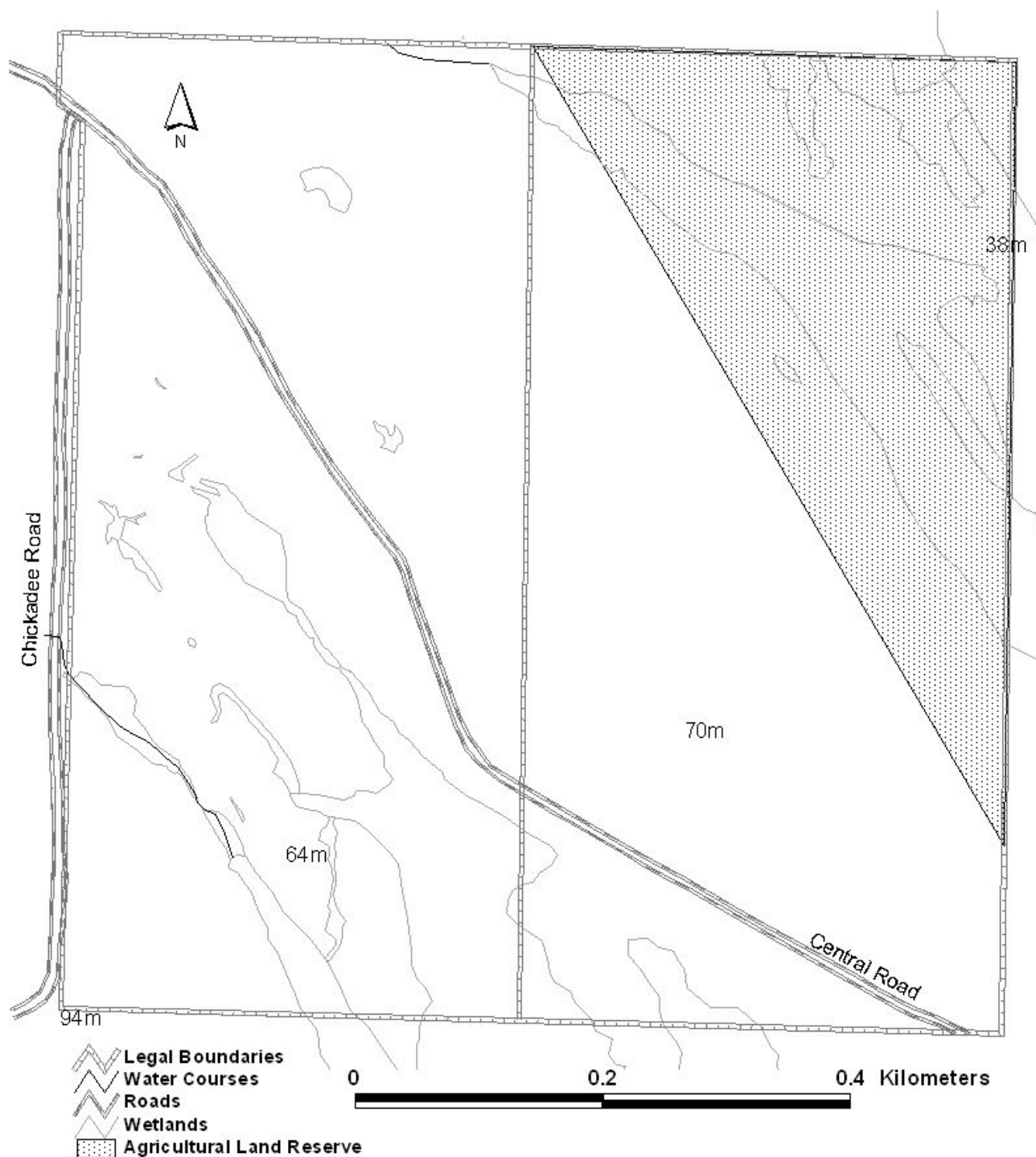


Figure 1. Agricultural Land Reserve.

4.0 BUILDINGS, STRUCTURES AND OTHER IMPROVEMENTS

4.1 Buildings

There are no buildings or other structures on the Lands, except for a small restored bridge over the creek flowing into Pickles Marsh in the southwest corner of the Lands and two small kiosks, each covering less than 1.5 by 1.5m, adjacent to Central Road (see section 8.3 Man-made Features map).

While a portion of the Lands is known to have been an early homestead, nothing remains of any buildings or structures in this area. An old cedar split-rail fence runs through the Swale Woods terrain zone and then along the northern border with the Lake Farm.

4.2 Land Improvements or Alterations

The Lands is recovering well from the previous alterations caused by logging, homesteading and farming.

4.2.1 Butterfly Reserve

Near the northwest corner of the Lands, a 3.62 ha Butterfly Reserve along Central Road was established for the maintenance and enhancement of butterfly habitat (see section 8.3 Map of the Lands – Features). The reserve contains two small sedge wetlands that until 2010 were breeding sites for the endangered Taylor’s checkerspot butterfly. Forest regeneration and the growth of Scotch broom were considered to be at least partially responsible for the apparent loss of these Taylor’s checkerspots from the reserve area. No adult Taylor’s checkerspots or larvae had been observed since 2010, except for the sighting, without photographic confirmation, of an adult in 2016.

In 2015, the first management activity in the butterfly reserve was the removal of Scotch broom and of many young regenerating trees. The aim was to reduce the shading of both the Taylor’s checkerspot breeding habitat and their travel corridors. The few residual second-growth trees, as well as all of the western redcedar and arbutus trees were retained, to create an open woodland habitat (Fyson 2015). A former skid road, now the “Butterfly Reserve Access” trail, traverses the length of the reserve near the west side and a designated public walking trail runs along the eastern border. In 2016, members of the Denman Conservancy Association established and used a 600m butterfly monitoring transect along the Access trail and around through Transect Marsh. The results of the 2016 butterfly monitoring are included in Appendix IV.

There is a Butterfly Reserve Kiosk near the southern end of the Butterfly Reserve, near Central Road. It is shown on the map in Section 8.3 Map of the Lands – Man-made Features (see photo F 16).

4.2.2 Designated Trails

Several walking trails for nature appreciation were chosen from the various skid roads, created during the recent logging. Many of these selected trails are situated on rocky terrain that will limit vegetation growth and this will facilitate continued trail maintenance. These designated public walking trails, as well as many former skid roads used in the 2000 logging, are shown in Figure 2. The Old Road trail includes a footbridge over a small watercourse (see map in Section 8.3 and photo F16).

4.2.3 Cattle Grazing

As described previously, during this inventory beef cattle from the Swale Farm had access to graze on a 0.9 ha area of partially flooded pasture, the Swale Farm Grazing Meadow, on the eastern border of the Lands. This practice has maintained an open grassland/ shallow wetland habitat that supports wildlife species, such as breeding killdeer, rails, grassland-edge-loving songbirds and many invertebrate species. In 2017, the neighbour plans to construct a fence, along his border with this meadow, to prevent cattle access to the Lands.

4.2.4 Ditches

Drainage ditches, approximately 1m deep, run along both sides of the southern portion of Homestead Marsh and these connect to a main perpendicular ditch draining out to the Swale Marsh drainage system (see section 8.3 Map of the Lands – Man-made Features). Similar ditches cross the Lands in the northeast corner. Beavers have dammed the main Homestead Marsh drainage ditch, causing

flooding and enhancement of the marsh. All of the ditches are well used as wetland travel corridors and breeding habitat for a variety of wildlife species.

4.2.5 Railway-logging Embankments

Remains of portions of what are thought to be old railway logging-grade embankments can be seen on the Lands (see section 8.3 Map of the Lands – Man-made Features). These embankments consist of two parallel mounds, up to 2m high, separated by about a 3-4m wide depression. One of the embankments ran north along the Uplands zone, near the current Central Road, then down the Pickles Slope and across the Lowlands, another ran across the Homestead Forest and into the Lake Farm. In some areas, the mounds disappear, perhaps flattened at a later time or possibly cut by skid roads during the recent logging. In most areas the mounds are disguised by thick regenerating forest or they are covered with logging debris and travelling along them is not possible.

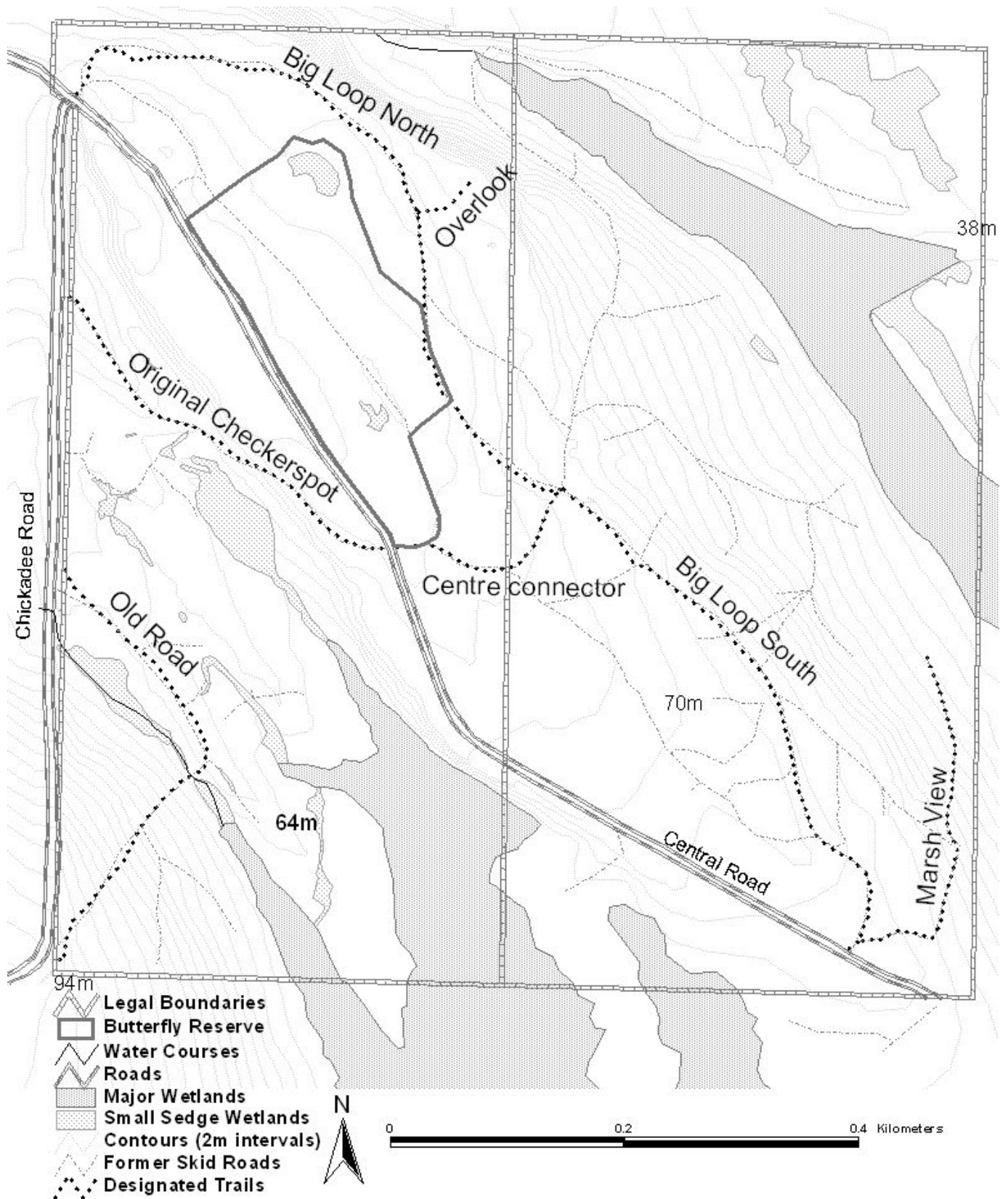


Figure 2. Designated Trails on the Lands

4.2.6 Former Dump

As noted in 3.2.4 “Other Uses of the Lands”, the site of the former official landfill, near the northwest corner of the Lands (see section 8.3 Map of the Lands – Man-made Features), is no longer used. This site is 90m by 20m, within an area covering 0.12ha. The site is now a sand / dirt-floored gully that has large trees along the edges and considerable forest regeneration throughout, as well as many invasive species.

A review of possible removal techniques and options is being undertaken with respect to the very large metal pieces of vehicles remaining embedded in the bank along the bluff above Pickles Marsh, where un-official dumping occurred. This dumping was on a steep slope, over an area 20m by 40m or 0.037ha. Any action proposed for this site will be sensitive to the wetland environment and to species using and growing in this area.

4.2.7 Hydro Power Line

One power pole of the power line crosses the northeast corner of the Lands is definitely on the Lands: Power pole #2320922 DL 45 LP 01 SKET (see section 8.3 Map of the Lands – Man-made Features). A second power pole, #2309924 SJI LPS ET 445 PG01, is at the Lands’ northeast corner, just outside the split rail fence. The anchor cable for this second pole is secured to the ground inside the fence and thus is likely on the Lands. This area of the Lands will have a legal Statutory Right of Way (SWR) agreement with BC Hydro, as the establishment of the legal SRW and documentation is in progress.

4.2.8 Proposed Infrastructure

As mentioned in the Covenant to which this Report is attached, the landowner intends to develop the following infrastructure on the Lands:

- small off-road parking area , on the west side of Central Road on the western parcel (see section 8.3).
- Main information kiosk beside a small off-road pull-in parking area,
- wildlife viewing platform.

The location of these proposed infrastructure items is shown in section 8.3 on the Man-made Features map.

In 2017, a fence, on the neighbouring property, is planned for the eastern boundary of the Lands to exclude farm animals from the Lands.

5.0 SIGNIFICANCE OF LAND AND AMENITIES

5.1 Biodiversity and Conservation Significance

The Lands is a very diverse complex of extensive forested, wetland and cliff ecosystems. For this inventory, the vegetative data was divided into 19 terrain zones. These zones consist of pockets of residual forest, regenerating clear-cuts, rocky cliffs, meadows, creeks and major and minor wetlands. This variety of habitats supports an impressive array of at least 125 wildlife species and many rarities, including at least sixteen species and six vegetation communities at risk.

The species and communities comprising these ecosystems are additionally significant as the Lands is situated in the moist-maritime coastal Douglas-fir biogeoclimatic zone (CDFmm). Due to both growing human populations and the accompanying land development pressures, the CDFmm zone is the least protected and most at risk zone in British Columbia. The Lands retained dispersed patches of

original forest with over 60 Douglas-firs, having a diameter at breast height (DBH) of greater than 900mm. These large old trees were probably protected by their proximity to the extensive lobed wetlands on the Lands. These large trees, with the associated plant and animal species such as herbs, mosses, lichens and invertebrates that surround them, provide at least a small refugia of original genetic material that may over time become dispersed throughout the recovering ecosystems of the Lands and the surrounding area.

5.2 Protected Lands Corridor

The Lands' strategic position, located in the centre of a large area of protected lands is highly significant. The Lands is bordered by a combination of conserved natural areas, provincial park and private land. Provincial parkland borders three of the four corners, plus the west side next to Chickadee Rd, as well as approximately 60% in the centre of the southern border. The Islands Trust Fund's Inner Island Nature Reserve is adjacent to 20% of the southern border. Thus, the Owner's protection of the Lands' diverse features completes major terrestrial and aquatic corridors between the other protected parcels as shown in Figure 3.

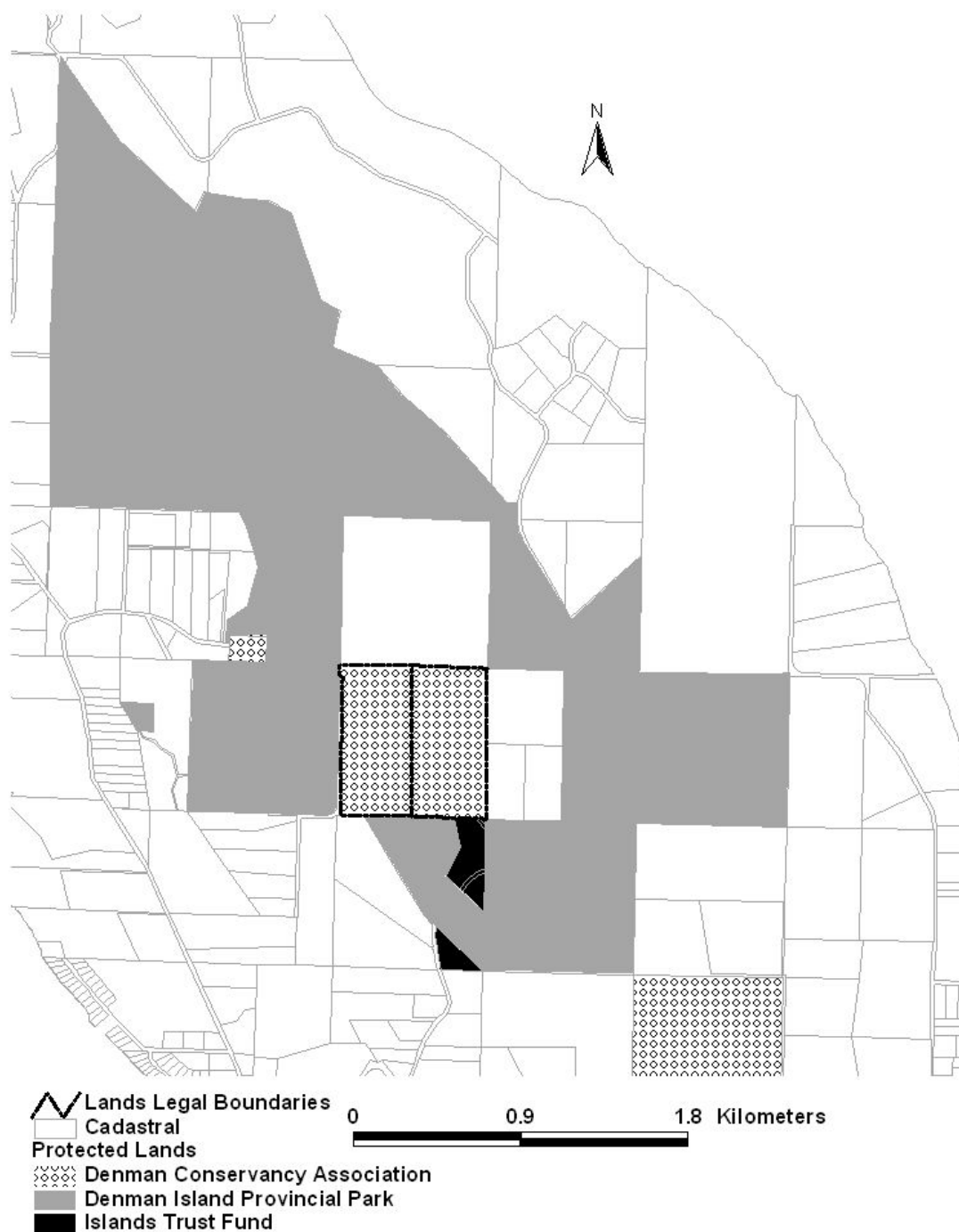


Figure 3. Protected areas adjacent to the Lands

Four large private lots that border the Lands are either agricultural or largely undeveloped at this time (Figure 4). The eastern and northern borders of the Lands are adjacent to two large farms, the 60ac Swale Farm and the 160ac Lake Farm, respectively. To the southwest, two single-density lots include a 40ac lot at the corner, and a 16ha lot along about 20% of the southern border. The Lands provide a protected linkage among these private holdings. Also, for the rare native wildlife and plant species on the Lands, these large private lots may contribute some additional habitat opportunities.

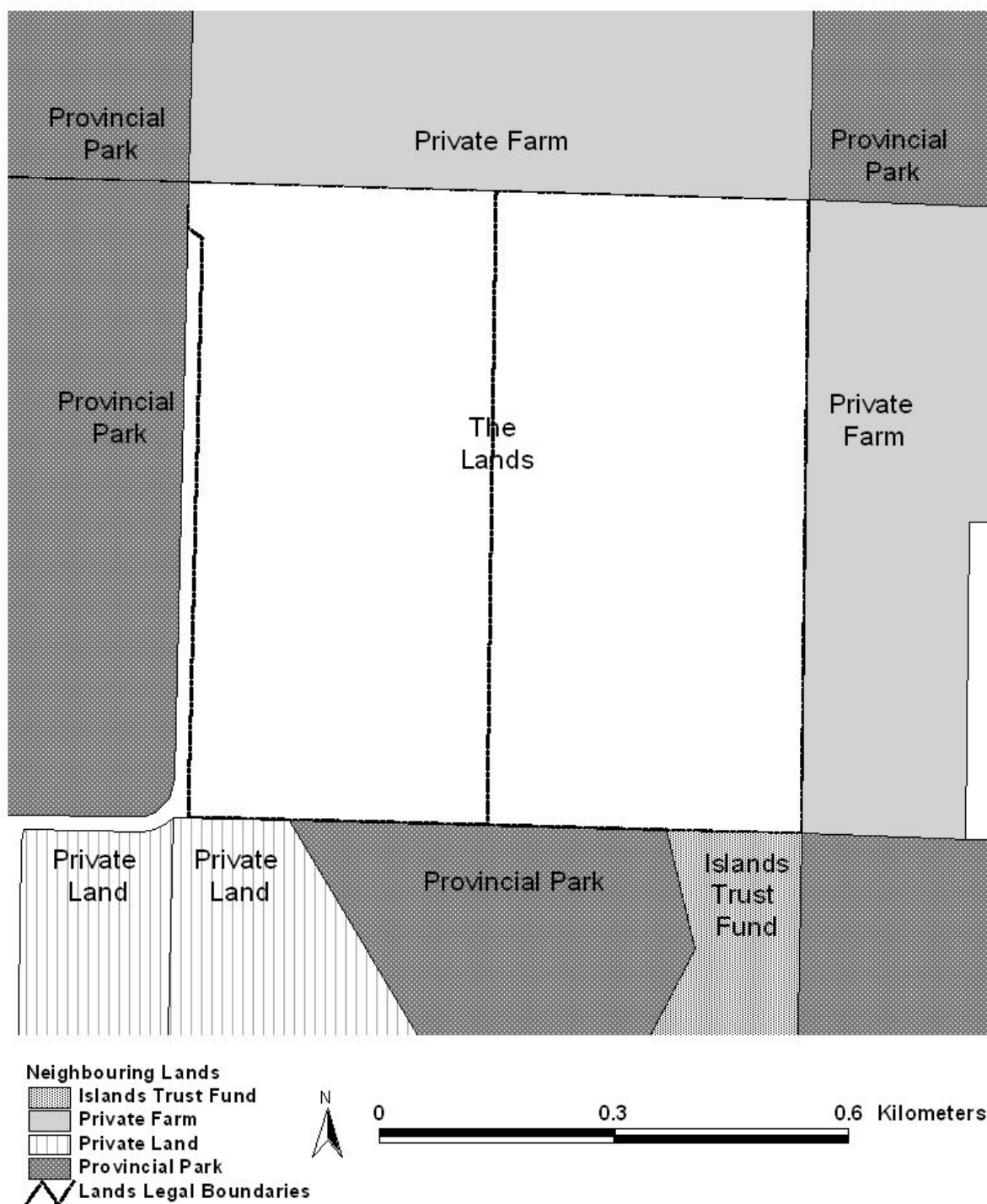


Figure 4. Properties bordering the Lands.

5.3 Rare species and Communities

Sixteen rare species at risk were recorded in the Lands' diverse habitats, since the Denman Conservancy Association's acquisition of the Lands. Ten rare animal species were seen or heard on the Lands during the 2016 Baseline inventory:

- Barn swallow *Hirundo rustica* is Blue-listed¹ in BC.
- Blue dasher dragonfly *Pachydiplax longipennis* is Blue-listed in BC.
- Common nighthawk *Chordeiles minor* is Threatened² for SARA³.
- Common wood nymph butterfly *Cercyonis pegala* is Red-listed⁴ in BC.
- Great blue heron *Ardea herodias* is Blue-listed in BC and Special Concern⁵ for SARA.
- Little brown bat *Myotis lucifugus* is Endangered⁶ for SARA
- Olive-sided flycatcher *Contopus borealis* is Blue-listed in BC and Threatened for SARA.
- Northern red-legged Frog *Rana aurora* is Blue-listed in BC and Special Concern for SARA.
- Western pine elfin butterfly *Incisalia eryphon* is Blue-listed in BC.
- Western pondhawk dragonfly *Erythemis collocata* is Blue-listed in BC.

Six rare animal species were recorded on the Lands during previous surveys or naturalist observations:

- Band-tailed pigeon *Patagioenas fasciata* is Blue-listed in BC and Special Concern for SARA.
- Barn owl *Tyto alba* is Blue-listed in BC and Special Concern for SARA.
- Western screech-owl *Otus kennicottii* is Blue-listed in BC and Special Concern for SARA.
- Dun skipper butterfly *Euphyes vestries* is Red-listed in BC and Threatened for SARA.
- Taylor's checkerspot *Euphydryas editha taylori* is Red-listed in BC and Endangered for SARA.
- Cutthroat Trout, *clarkii* subspecies *Oncorhynchus clarkii clarkii* is Blue-listed in BC.

Cutthroat trout were found during previous Urban Salmon Habitat Program surveys of the water-courses and water bodies on the Lands (Balke 1999, 2000). In 2005, the Lands were found to have the first known breeding site for Taylor's checkerspot butterflies, after this endangered species was considered extirpated from Canada. These butterflies continued to thrive on the Land until 2009, when young forest regeneration may have caused the butterfly to seek more suitable open habitats. The Denman Conservancy's land manager observed a Taylor's checkerspot butterfly in the Lands' new Butterfly Reserve during the summer of 2016, but photographic confirmation was not obtained. Dun skipper butterflies were seen during 2007 checkerspot surveys (Guppy 2007).

Six rare ecosystem communities, defined by their vegetation components, were identified on the Lands:

- 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.

¹ **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.

² **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.

³ **SARA** refers to the Canadian Government's Species at Risk Act.

⁴ **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.

⁵ **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.

⁶ **Endangered** applies to a wildlife species that is facing imminent extirpation or extinction.

- 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.

The forests on the Lands retain considerable conservation value as coastal Douglas-fir forest remnants, and the abundance of wetlands is significant in the Islands Trust area of BC. Although the majority of trees on the Lands are immature, the over 60 original Douglas-fir veteran trees demonstrates the potential reservoir of genetic diversity on the Lands. In addition, many of the limited number of residual second-growth forest trees were shown to be at least 116 years old.

6.0 INVENTORY

A formal inventory of the biological and terrain features of the Lands was conducted from May 25 to Nov 15, 2016, but the biologist is very familiar with the property and has observed the Lands since 1990. Data in this report are from the formal inventory period, unless stated. The biological inventory data is presented in two ways: by site series classification and by detailed terrain zone inventory.

6.1 Major Factors Influencing Current Vegetation

The complex vegetation patterns on the Lands are a reflection of the underlying soil, terrain, and moisture gradient. The current vegetation also reflects the various human influences, most recently the logging in 1999-2001. As the majority of the recovering forest vegetation is now at the pole-sapling stage, with the effects of logging still evident, interpretation of the climax vegetation site series is an approximation with respect to identifying both the future dominant species or community, as well as the actual borders of the different communities within the Lands. The underlying geology, described below, is a complex pattern, and the borders of small pockets of distinctive vegetation types that are governed by the underlying bench-terrain will become more evident as the vegetation matures.

In this inventory, eight major vegetation types are described across 19 terrain zones. Among the terrain zones are three major benched-slopes facing two different directions and three extensive flat or undulating areas at different elevations. Among the vegetation stages, there are four small pockets of residual forest, 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.

As noted, Denman Island is situated at the northern limit of the Coastal Douglas-fir biogeoclimatic zone and also tends to be a moisture-accumulating island with numerous shallow wetland depressions. Thus, forests on Denman, while demonstrating considerable Douglas-fir forest characteristics, also show some transitional characteristics to the Coastal Western hemlock xml zone. For example, the combination of northern latitude and available moisture may increase the early regeneration of western hemlock trees and lead to the presence of some western hemlock in the maturing second-growth forests.

6.1.1 Logging

As described previously much of the Lands has been logged twice. Some of the consequences and reminders of the logging are obvious, such as the presence of springboard stumps from the original logging, or the extensive regeneration of young trees after the recent logging. Other indirect consequences of this logging are also present, such as the widespread growth of red alder on the

compacted thin soils, particularly on roads and slopes, or the growth of wetland sedges in flooded/compacted road-ruts left by logging equipment.

The majority of the Lands' current vegetation is young regenerating forest at the pole-sapling stage, 16 years after the most recent logging. In addition, individual residual first and second-growth trees of various species remain, as well as small patches of residual forest. Also, there remain small and large non-treed openings of shrubs and grasses on dry rocky sites or compacted log-landings where the vegetation is slowly recovering.

While the original genetic diversity of the vegetation has been reduced by the logging, the presence of many large original Douglas-fir trees suggests that some of the original genetic reservoir remains. Also, while logging the Lands altered the mature forests, it also created habitats that resulted in the conservation of at least one endangered species (Taylor's checkerspot) and overall increased the diversity of major habitat types.

6.1.2 Agriculture

An observable impact of the early homestead settlement, in the northeast portion of the Lands, is a remaining row of ten domestic apple trees, eight of which are still at least partially alive and productive. In addition, a ring of conifer forest around the old Home-site has trees at least twenty years older than those of the adjacent regenerating clear-cut. These trees were probably too young for cutting during the most recent logging and now they appear distinct beside the clear-cut. Lastly, many introduced pasture species, such as herb robert, are present around this Home-site.

Also in the northeast corner, the present and former meadow and the considerable ditching indicate obvious major impacts on the local vegetation. All of this area was likely beaver-flooded marsh habitat prior to the Lands' settlement and agricultural use by humans. The beavers are actively increasing the size of a dam in the ditch perpendicular to, and draining into, the Swale marsh. This has resulted in rising water levels in Homestead Marsh and extensive flooding of the meadow on the Lands that is currently being grazed by cattle. The other meadow, Former Swale Marsh Meadow, remains dominated by non-harvested reed canary grass.

6.1.3 Climate

The climate of central Denman is buffered by the surrounding landscape from coastal systems. The Lands tend to get a slightly cooler and wetter climate than the southern end of Denman as noted by Lake Farm residents. A hurricane that swept Denman in 2006, particularly affected some of the Lands' older trees in the wide-open Uplands Zones. These old Douglas-firs were exposed above other vegetation and some were broken or toppled during the storm.

Environment Canada records for 1981 to 2010 for the Comox weather station, approximately 20 km north of the Lands, indicate that most precipitation falls from October through March and that there is usually a little over one metre of rain per year (Environment Canada 2016). The warmest period is July and August with long-term normal maximums of less than 23 °C. Long-term minimums from December through February are above 0.5°C.

6.1.4 Physical: Terrain – Geology – Soil – Hydrology

The Lands is square but the significant landforms and Central Road cross the Lands diagonally. Despite being slightly less than a quarter section, the terrain of the Lands is complex. The elevation varies from 38 to 97m; the slope from flat to shear drop; the aspect from NE to SW facing, and the surface character from dry rocky bluff and impenetrable rock flats to wet creeks, isolated wetlands and inter-connected marsh systems. Occasional isolated rocks or erratics on the Lands are reminders of the early impacts of glaciation that caused both erosion and deposition.

The two major hydrologic features, Pickles Marsh and Homestead Marsh are part of the Beadnell Creek drainage system, a major salmon-spawning creek. Although the two marshes are not connected on the Lands, they both drain into the Swale Marsh. Pickles Marsh flows into the southern end of the Swale Marsh and Homestead Marsh flows into the western side.

The topography of the Lands, particularly the slopes, is explained by the underlying geology that is visible along the western border, where the construction of Chickadee Road opened up and exposed the adjacent slope (Figure 5). This road-cut reveals a continuous exposure of the sedimentary sequence of alternating shelves/beds of sandstone and conglomerate with very little soil.

What is exposed on Chickadee Rd is a bedrock profile that resembles a staircase of uneven steps lying on its side or tipped slightly. Resistant beds of conglomerate or sandstone are the stair treads and the stair risers are the erosional edge of the next bed of rock or package of beds. Drainage initially flows into the valleys where these treads meet the risers. From these dips, the water may form isolated pool networks or may flow along the dips and join other flows if there are notches across the rock steps.

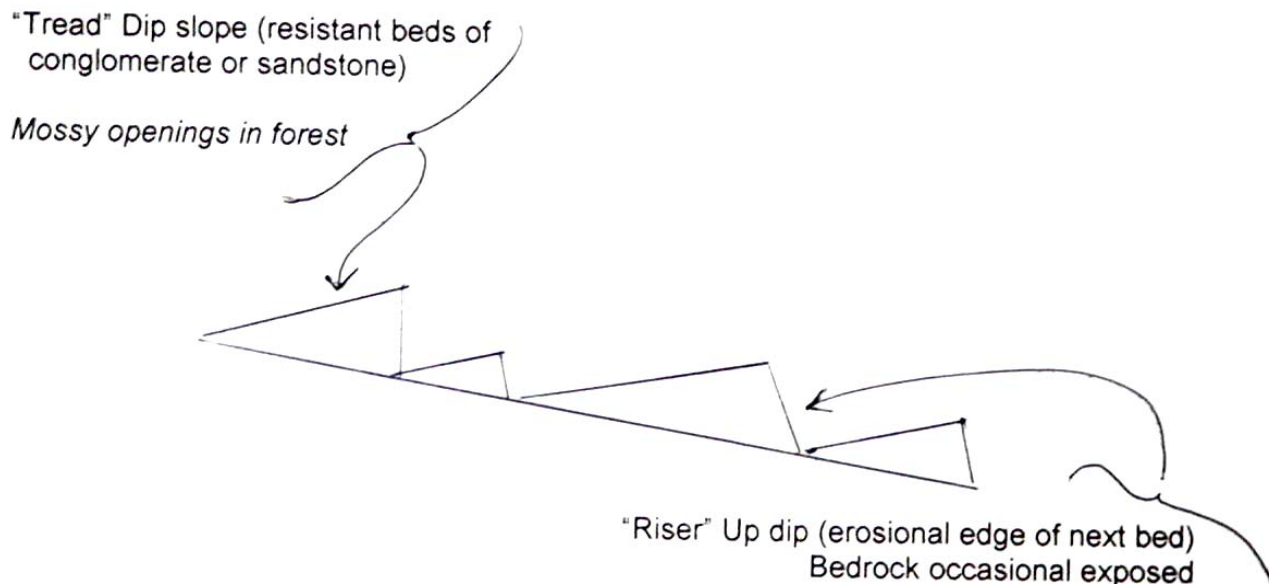


Figure 5. Geology → topography: A NE-SW profile.

Glacial sheets, that up to 14,000 years ago covered Denman Island to a depth of more than a kilometre, created this stepped profile by moving and gouging the conglomerate and sandstone bedrock. The glaciers removed rock and left only thin and patchy surficial deposits. Soils on the treads of this profile are thin, particularly at the edges but may be slightly thicker on lower slopes or in pockets. Rock fragments were transported in the glacial ice and some were deposited as erratics, often rounded, granitic or volcanic boulders on the Lands. These erratics are derived from mainland Coast Mountains or from Vancouver Island and are found occasionally across the Lands.

The underlying beds of sandstone and conglomerate are sediments of the Nanaimo Group, particularly of the De Courcy formation of the late Cretaceous age, deposited between about 87 and 55 million years ago. Most of the Lands is on rock of the De Courcy formation, with the Swale Marsh edge likely over the upper Northumberland formation. The De Courcy sandstone beds are composed of

grains of quartz, feldspar and, mafic minerals and rock fragments, while the conglomerate is 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 as shown in Photo site F9. The soils are very shallow over most of the Lands, even the richer dark sandy loam of the Homestead area has coarse sandstone fragments.

The overall topography was divided into 19 distinct terrain zones based on slope, aspect and aquatic features. The terrain zones and overall inventory classifications are shown in Figure 6 and Table 1. The vegetation in each zone is described in the biological inventory.

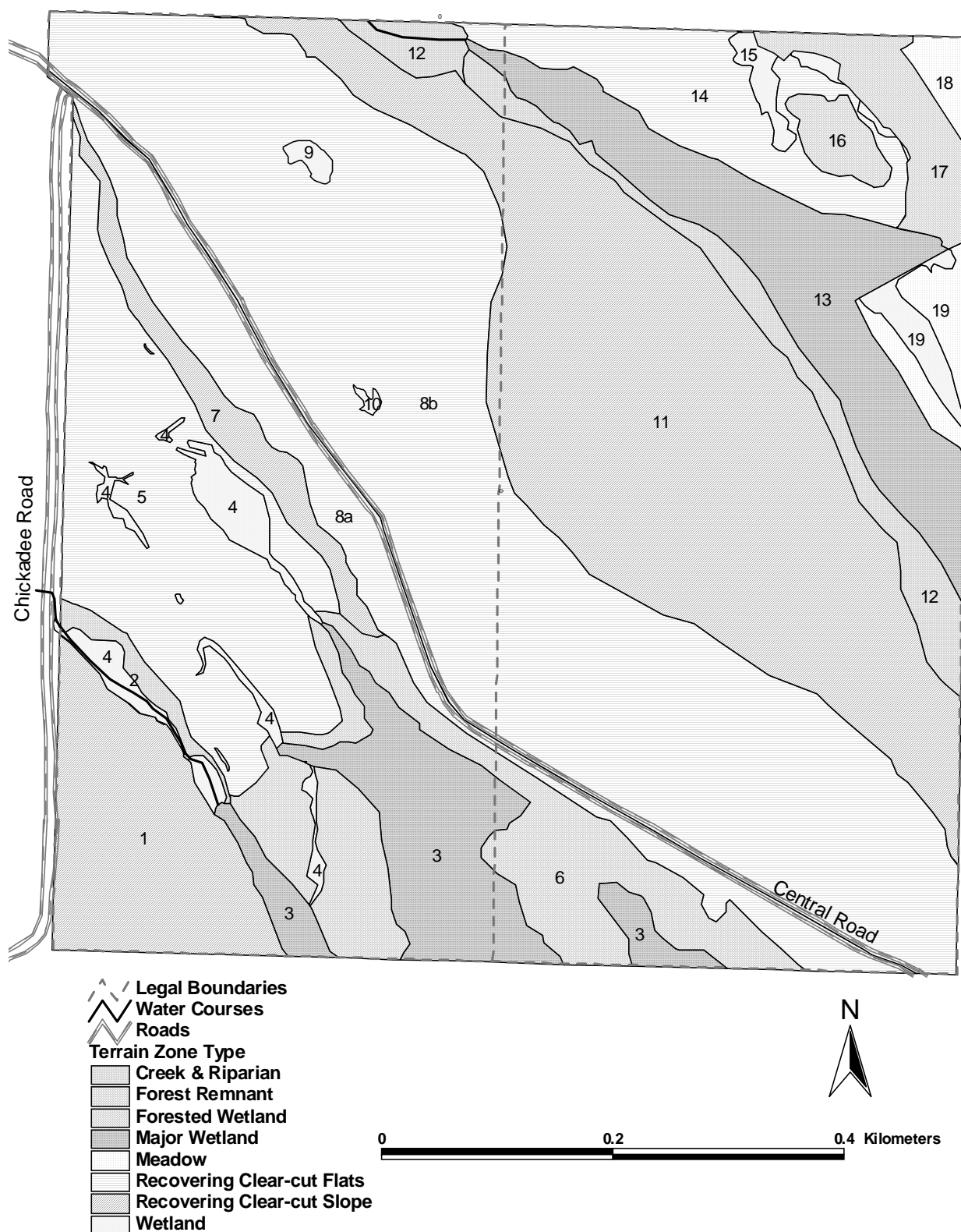


FIGURE 6. Terrain Zones - The Lands (Numbered terrain zones identified in Table 1).

TABLE 1. Terrain Zones and Inventory Classification.

Terrain Name	Terrain Zone	Vegetation Types	Vegetation Name	Type	Additional
Pickles Slope (East-facing)	1	5	CDFmm 01 & CDFmm 04	Recovering Clear-cut Slope	
Pickles Creek & Forest (East-side)	2	4, 6	CDFmm 04, CDFmm/14-Ws 52	Creek, Sedge Wetland & Forest Remnant	
Pickles Marsh	3	7, 9	CDFmm / Wm 05, CDFmm / Wm 06	Major Wetland	
Lowlands Marshes	4	6	CDFmm/14-Ws 52	Sedge Wetlands	
Lowlands Forest	5	4	CDFmm 04	Recovering Clear-cut Flats	
Pickles Marsh Buffer Forest	6	2, 3, 6	CDFmm 02, CDFmm 06, CDFmm/14-Ws 52	Forest Remnant	
Lowlands Slope (West-facing)	7	2, 4	CDFmm 02, CDFmm 04	Recovering Clear-cut Slope	
Uplands Forest (West)	8a	1	CDFmm 01	Recovering Clear-cut Flats	
Uplands Forest (East)	8b	1, 10	CDFmm 01, Managed	Recovering Clear-cut Flats	Butterfly Reserve
Big Tree Marsh (Uplands East South)	9	6	CDFmm/14-Ws 52	Sedge Wetland	
Transect Marsh (Uplands East North)	10	6	CDFmm/14-Ws 52	Sedge Wetland	
Homestead Slope (East-facing)	11	1, 2, 3	CDFmm 01, CDFmm 02, CDFmm 06	Recovering Clear-cut Slope	
Homestead Riparian (West Edge)	12	8, 10	CDFmm / 07 or CDFmm / 08, Managed	Creek & Riparian Clearing	
Homestead Marsh	13	7, 9	CDFmm / Wm 05 & CDFmm / Wm 06	Major Wetland	
Homestead Forest	14	3	CDFmm 06	Recovering Clear-cut Flats	
NE Marsh	15	6	CDFmm/14-Ws 52	Sedge Wetland	
Home-site Forest	16	3	CDFmm 06	Forest Remnant	
Swale Woods	17	3, 6	CDFmm 06, CDFmm/14-Ws 52	Forest Remnant	
Former Swale Marsh Meadow	18	10	Managed	Meadow	Former Farming

Swale Farm Grazing Meadow	19	10	Managed	Meadow & Wetland Extension	Cattle-exclusion fencing project in progress.
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6.2 Biological Inventory by Vegetation Type / Site series

The biological data that follows is presented in two ways. First, nine major vegetation types, both terrestrial and aquatic are classified by overall site series. Second, the vegetation and terrain characteristics for 19 terrain zones across the Lands are described in detail in Tables 2A – 2E. An overall wildlife species list for the Lands is included in Appendix 2, a wildlife species list for each terrain zone is in Table 3, and an overall plant species list for the Lands is in Appendix 3. The overall wildlife species lists give both common and scientific species names, as well as rarity classification and the code symbols used in other Tables for birds, butterflies, dragonflies and trees. Slope and aspect descriptions of the Lands are found in the terrain zone chart. The managed Butterfly Reserve on the Uplands and the terrestrial vegetation areas significantly impacted by either beaver activities or farming are included in the “managed” vegetation type 9.

Notes: DBH = diameter at breast height measurements. **Slopes** are measured in degrees. **Heights** in metres and **cover percentages** are estimates. The term old-growth refers to trees present before the first logging, and second-growth refers to trees that grew immediately after the first logging.

The major vegetation types and site series, present on 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 Mangement.

6.2.1 Vegetation Type 1

CDFmm 01 Douglas-fir – dull Oregon-grape *Pseudotsuga menziesii* – *Mahonia nervosa*
Terrain Zones: Uplands West - zone 8a, Uplands East - zone 8b, and Homestead Slope - zone 11.

The CDFmm 01 site series describes the Uplands bench on either side of Central Road and the adjacent upper low gradient edge of northeast-facing Homestead Slope. This flat and slightly sloped terrain was among the most heavily cut in the recent logging. Few residual second-growth trees remain and about half the remnant old-growth Douglas-firs subsequently toppled or were broken in various storms since 2000. Expanses of sandstone fragments, as well as solid sandstone surfaces are exposed frequently on the ground-surface. The exposed sandstone reflects the tread-profile of the

underlying geology and occasionally tread edges can be seen, but more noticeably in the Vegetation Type 2 area.

The current vegetation is primarily patches of regenerating conifers of mixed species, primarily Douglas-fir, many now close to 10m high, intermixed with expanding patches of shrubs, primarily salal and dull Oregon-grape that are slowly filling in large open herbaceous and moss areas. Occasional moist pockets are present. Small patches of more advanced regenerating trees are already creating closed canopy at the pole-sapling stage that is reducing the understory in these areas. Due to the different stages of regeneration occurring, the vegetation is likely to remain a patchy, multi-layered ecosystem for some time. Old skid roads, lined by young red alder trees, crisscross this bench-land and a public trail in this area will use the old roads. The Butterfly Reserve in Uplands East is a modified vegetation area and is described in the “Managed” Vegetation Type 10.

Vegetation Type 1

Main Canopy & Above	
Species, percent cover & DBH	Above: Cover 1% mainly Douglas-fir (Fd) DBH to 1320mm, occasional western redcedar (Cw) DBH to 1160mm. Main canopy: Cover <5%. Mixture of Cw DBH 310-540mm, red alder (Dr) DBH to 480mm, Fd DBH 225-335mm, western Hemlock (Hw) DBH to 300mm & western white pine (Pw) DBH to 395mm.
Age (estimated)	Fd & Cw old-growth >150yr. Second-growth up to 115 yr based on cut stumps on the Lands.
Height	Above >30m. Main 20-30m
Secondary Canopy	
Species, percent cover & DBH	Cover 5-10% Both damaged second-growth and mixed species of young regeneration: Cw DBH to 300mm, Dr DBH 200-240mm, Fd DBH 195-200mm, Hw DBH to 240mm & occasional Pw.
Height	10-20m
Understory	
Shrubs & trees <10 m	Patches of young trees, arbutus, grand fir (Bg), Cw, Dr, primarily Fd, Hw, Pl, Pw with overall cover 30-40%. Scotch broom covers up to 5% overall, in old log landing and other openings. Also a 40m long by 1-10m wide patch of St. John's wort is on the crest at the old dump-site. Dull Oregon-grape and salal are dominant, cover for each 20-30%. Other shrubs: cover 15-20% & include a mix of baldhip rose, black gooseberry, cascara, English holly, evergreen blackberry, gummy gooseberry, Himalayan blackberry, Nootka rose, oceanspray, red huckleberry, tall Oregon-grape, trailing blackberry, twin flower.
Herbs	Patches of grass species including reed canary grass cover 10% overall. Most of the herb species are in current dry openings, cover 10-20% & include a mixture of: bracken, bull & Canada thistle, cleavers, common tansy, Dewey's sedge, English daisy, foxglove, hairy cat's ear, herb robert, many-flowered (& small-flowered) wood-rush, pearly everlasting, prince's pine, rush sp., Scouler's harebell, sedge sp., sheep sorrel, Siberian miner's lettuce, small-flowered bulrush, sword fern, star flower, vanilla leaf, wall flower & yerba buena.
Mosses	Cover 5-10% include a mixture of <i>Dicranum</i> sp., electrified cat's tail, Oregon & slender beaked, as well as many others on trees trunks & rocks.
Rare species	This vegetation community is Red-listed in BC.
Special Features	The remaining old-growth Douglas-firs are dramatic in the current landscape and provide both a genetic refugia, as well as some elements of older forest habitat. The current open areas support wider shrub, herb and rock-moss communities than will likely exist as the forest grows.

Expected Changes	As the forest regenerates, larger pockets will undergo canopy closure at the dense pole-sapling stage; however, on this dry site, many young trees are likely to undergo early stress and be suppressed or easily subject to windthrow, thus opening up the canopy. Patches of salal are likely to dominate for some time thus retaining openings in the forest cover.
Disturbance History	First logging occurred prior to 1930 and many old-growth trees were left; although the Lands was a central site for log milling and transport and the remains of a logging railway embankment are present running across the south-western portion of this vegetation type. Other signs of the original forest, such as springboard stumps, are largely absent here. Re-growth appears to have occurred without major disturbance in this area for around 100 years, when a second logging took place. Prior to this logging, the second-growth was observed to be of small diameter for its age on Denman, likely due to the dry rocky site, and multiple snags were present. Since the “messy” clear-cut logging around 2000, this area has been un-disturbed. Note: The managed Butterfly Reserve on the Uplands is included in Vegetation Type 10A.

FAUNA

Wildlife Habitat / Features	<ul style="list-style-type: none"> • Old-growth trees provide thick bark and large limb habitat for foraging, nesting and perching. • Patches of open woodland-type habitat still remain in the slowly regenerating areas and these support open land, edge, ground-nesting and foraging species. Common nighthawk were seen nesting & foraging in this area. • The well-developed shrub patches, small dense thickets and herbaceous openings are ideal for black-tailed deer foraging, secure travel and bedding.
Observed Species	See Terrain zone chart (Table 3).
Rare species	<p>Birds: common nighthawk <i>Chordeiles minor</i> - SARA Threatened, olive-sided flycatcher <i>Contopus borealis</i> - SARA Threatened & BC Blue-list.</p> <p>Butterflies: common wood nymph <i>Cercyonis pegala</i> BC Red-list, western pine elfin <i>Incisalia eryphon</i> BC Blue-list.</p> <p>Dragonflies: blue dasher <i>Pachydiplax longipennis</i> BC Blue-list, western pondhawk <i>Erythemis collocata</i> BC Blue-list.</p>

6.2.2 Vegetation Type 2

CDFmm 02 Douglas-fir – arbutus *Pseudotsuga manziesii* – *Arbutus menziesii*

Terrain Zones: The cliff, steep sections of Lowlands Slope - zone 7, Pickles Buffer Forest - zone 6, and Homestead Slope - zone 11.

The dry-site vegetation on three areas of shear to 40% gradient corresponds to the CDFmm 02 site series.

The presence of honeysuckle and false box are indicative of this dry water-shedding habitat. These upper rocky cliff sites are the fragmented edges of the staircase ‘risers’, where interlaced layers of fractured sandstone and conglomerate bedrock are exposed with very thin soils on ledges and in crevices. These steep rocky sites contribute both unique habitat opportunities for plants and wildlife, as well as aesthetically pleasing views.

Two areas of the major southwest-facing slope are included. The north end is in the Lowlands Slope zone and the middle portion, immediately adjacent to Pickles Marsh, is in the Pickles Buffer Forest zone. The former begins as a 2m high shear to undercut sandstone and conglomerate rock face with clinging plants and quickly rises to over 10m high with slopes from shear to 40%. This area is recovering from use as an official dumping site and has few trees and patchy shrub and herbaceous

vegetation. A notable patch of St. John's wort, shown in Photo site F7, stretches over the hillcrest and down this slope. This and other introduced species probably came from dumped material.

The Pickles Buffer Forest section of the southwest slope is a narrow 10-15m wide, 5-8m high, 40-60% gradient, ending in the marsh, much of it very close to Central Road. This slope was the least disturbed during the recent logging and retains a partial mature second growth canopy, fairly dense shrubs and few herbs, with the distinct dry site species. Some dumping also occurred in this area, there are still two vehicle chassis embedded next to the marsh. There are several open areas under the tree canopy that consist of large boulders covered with moss that either were side cast during road building or were deposited to cover dumped material.

The northern end of Homestead Slope is a major cliff site, with up to 20m high sections ranging from 30 to 90% slope and shear sections, see Photo site F11. Few large trees remain and much of the canopy vegetation is overhanging from the lower slopes. A couple of bigleaf maples are likely indicative of seepage areas. This area also has distinctive dry site vegetation.

Vegetation Type 2

Main Canopy & Above	
Species, percent cover & DBH	Above: Cover <1% Fd DBH 900-1310mm (zone 2). Main canopy: Cover 25% (mainly zone 6). Fd DBH 445-1410mm, Cw DBH 420-605mm, Bg DBH 415mm
Age (estimated)	Fd old-growth >150yr. Second-growth up to 115 yrs, based on cut stumps on the Lands.
Height	Above >40m. Main 30-40m
Secondary Canopy	
Species, percent cover & DBH	Cover up to 15% Cw DBH 335-535mm, Dr DBH 140-640mm, Fd135-415mm
Height	10-30m
Understory	
Shrubs & trees <10 m	Up to 15% young trees: arbutus, Bg, Cw, Fd, Hw, Pw, occ. bigleaf maple, bitter cherry & domestic cherry. Mix other shrubs cover 5-20%: baldhip rose, cascara, dull Oregon-grape, English holly, evergreen blackberry, falsebox, hairy honeysuckle, Himalayan blackberry, oceanspray, orange honeysuckle, Pacific dogwood, red huckleberry, salal, Saskatoon berry, Scotch broom, tall Oregon-grape, trailing blackberry, twin flower.
Herbs	Mix, cover up to 15%: bedstraw, bracken, Canada thistle, cleavers, common tansy, English daisy, foxglove, grass sp., herb robert, licorice fern, small-flowered alumroot, St John's wort, starflower, sword fern, thyme-leaved speedwell, wall lettuce, yerba buena. Note: Extending down from the crest in zone 7 at the dump-site is a 40x10m area of introduced St John's wort and this is accompanied by many of the introduced species listed above, most notably the evergreen and Himalayan blackberry.
Mosses	<i>Dicranum</i> sp., electrified cat's, Oregon-beaked and step mosses (+ many rock mosses).
Rare species	This vegetation community is Red-listed in BC.
Special Features	The few old-growth Douglas-firs provide both a genetic refugia, as well as some elements of older forest habitat. The steep rock substrate supports uncommon shrub, herb and rock-moss and lichen communities that will likely persist as the forest grows. The views from the cliff tops are dramatic and the cliffs themselves are aesthetically pleasing.
Expected Changes	Increasing areas of canopy closure as the forest grows will shade out lower layers, but this will probably be very slow on these narrow steep sites, so that rocky openings will persist. Windthrow and lack of moisture will be a problem for growing trees.
Disturbance History	First logging occurred prior to 1930 left a few old-growth trees on the cliffs, the second logging around 2000 took most of the trees that had grown undisturbed until then. Dumping disturbed the east-facing slope in 2 areas.

FAUNA

Wildlife Habitat / Features	<ul style="list-style-type: none"> • Old-growth trees provide thick bark and large limb habitat for foraging, nesting and perching. • Fragmented rock on steep slopes provides habitat for reptiles and there may be basking sites and hibernacula for snakes and alligator lizards on these slopes. • The rocky steep slopes also create a more open woodland habitat favoured by many edge foraging and nesting species. Bats were noted patrolling these edges.
Observed Species	See Terrain zone chart (Table 3).
Rare Species	Butterfly: common wood nymph <i>Cercyonis pegala</i> BC Red-list.

6.2.3 Vegetation Type 3

CDFmm 06 Western redcedar, Grand fir – Foam flower *Thuja plicata*, *Abies grandis* – *Tiarella trifoliata*

Terrain Zones: Five terrain zones (excluding the steep cliff portions) Pickles Buffer Forest - zone 6, Homestead Slope - zone 11, Homestead Forest – zone 14, Home-site Forest - zone 16, and the drier areas of Swale Woods - zone 17.

The CDFmm 06 site series most closely applies to these five relatively rich, moist areas that have accumulated some dark brown sandy loam soil over the rocky fragments. Four areas are relatively flat and adjacent to wetlands: Pickles Buffer Forest is adjacent to Pickles Marsh, Homestead and Home-site Forests are adjacent to Homestead Marsh; and the drier edge of Swale Woods is adjacent to the Former Swale Marsh. The fifth area is the gentle middle and lower slopes of Homestead Slope that is the western edge of Homestead Marsh. Overall, the Type 3 forest canopy is a mixture of conifers with an occasional bigleaf maple. Shrubs are sparse with more dull Oregon-grape and little salal, and sword fern usually dominates the herb layer. The diversity of the shrub and herb layers is likely the result of the reduced tree canopy at this time.

Many old-growth Douglas-firs remain, particularly in the narrow up to 30m wide rim around Pickles Marsh that is also a relatively undisturbed second-growth forest remnant. Homestead Slope also has a number of old-growth, some residual second growth and many already large young regenerating trees. The slope also has openings that may reflect more rock exposure that will develop a different character, but the majority of the understory on the lower Homestead Slope is made up of sword fern. The Swale Woods are also fairly large second or third growth where the trees have sufficient dry micro-sites in an area with a strongly fluctuating water table and abundant slough sedge. Homestead Forest is a 15 year old recovering clear-cut with only a few residual second-growth trees, abundant young trees and broad open areas with mainly dull Oregon-grape. The Home-site Forest is small conifer stand, about 35 years old, growing over what was the Home-site apple orchard, and this area will eventually blend in with the remaining Homestead Forest but now is distinctly older.

Vegetation Type 3

Main Canopy & Above	
Species, percent cover & DBH	Above: Cover 1-5% mainly Fd DBH 915-1815mm, occasional Bg DBH 800-1025mm. Main canopy: Cover 5-25%. Mixture of Bg DBH 250-510mm, Cw DBH 465-945mm, Dr DBH to 585mm, Fd DBH 405-710mm, Hw DBH to 335mm. Occasional Pw DBH to 330mm, Sitka spruce (Ss) DBH 10 360mm & big leaf maple.
Age (estimated)	Fd & Bg old-growth >150yr. Second-growth up to 115 yr based on cut stumps on the Lands.
Height	Above >40m. Main 20-40m
Secondary Canopy	
Species, percent cover & DBH	Cover 5-10% Both damaged second-growth and mixed species of young regeneration: Bg DBH to 350mm, Cw DBH 135-430mm, Dr DBH 118-780mm, Fd DBH 180-440mm, Hw DBH 180-420mm & occasional bigleaf maple, bitter cherry & non-native ash sp. DBH to 280mm.
Height	10-20m

Understory	Shrubs & trees <10 m Patches of young trees cover 5-15%: bitter cherry, Bg, Dr, Fd, Hw, Ss Other shrub mix cover 5-15%: baldhip rose, black gooseberry, cascara, dull Oregon-grape up to 10%, English hawthorn, English holly, evergreen blackberry, gummy gooseberry, Himalayan blackberry, Nootka rose, oceanspray, Pacific crab apple, red huckleberry, salal, salmonberry, Scotch broom, snowberry, tall Oregon-grape, trailing blackberry, twinflower.
Herbs	Dominated by sword fern 50-60%. Other 5-20% mix: bedstraw, big-leaved sandwort, bracken, bull thistle, buttercup sp., Canada thistle, cleavers, clover sp., common tansy, coral root sp., crisp sandwort, Dewey's sedge, English daisy, foamflower, foxglove, grass sp., hairy cat's ear, herb robert, Horsetail sp., large-leaved avens, Lyall's anemone, pathfinder plant, pearly everlasting, Siberian miner's lettuce, slough sedge, small-flowered bulrush, spiny wood fern, starflower, stinging nettle, thyme-leaved speedwell, vanilla-leaf, wall lettuce, wild ginger.
Mosses	Cover 5-30% include a mixture of badge, <i>Dicranum</i> sp., electrified cat's tail, lanky, Menzie's tree, Oregon beaked & occasional flat & step mosses.
Rare species	This vegetation community is Red-listed in BC.
Special Features	The remaining old-growth Douglas-firs may be both an original genetic refugia for some small species, and, with the canopy of residual second-growth, provides some elements of older forest habitat. These areas protect a large variety of less common native herb species. The non-native ash likely came from other introduced ash on the Lake Farm. The Swale Woods, zone 17 has a split-rail fence, dating from the original Home-site.
Expected Changes	Portions of this vegetation type that were least affected by the recent logging will continue to mature and develop increasing canopy structure. Young trees in other portions will increasingly develop into the canopy. Already some initial patches of pole-sapling-canopy closure is shading out the understory, but enough of the original canopy has been retained to ensure that the understory species survive and they will re-disperse. Patchy openings will develop as trees age, blow down or develop root rot.
Disturbance History	First logging occurred prior to 1930 and many old-growth trees were left. The southern portion of Homestead Slope, zone 11 may have been farmed or selectively opened at one time, as there are some large second-growth Fd trees with large branches right to the ground, evidence that they grew in the open. Home-site Forest, zone 16 was part of the original settlement on the Lands. Recent logging around 2000 high-graded some of the Buffer forest, zone 6, and removed most of the second-growth trees from Homestead Slope and Forest. The Swale Woods and Home-site Forest were un-logged at this time.

FAUNA

Wildlife Habitat / Features	<ul style="list-style-type: none"> • Old-growth & large second-growth trees provide thick bark and large limb habitat for foraging, nesting and perching and also will be the main source of future coarse woody debris. • Dense sword fern herb layer supports ground-nesting birds and many small ground-foraging and web-spinning species as well as providing security cover and forage.
Observed Species	See Terrain zone chart (Table 3).
Rare species	<p>Amphibian: northern red-legged frog <i>Rana aurora</i> - SARA Special Concern; BC Blue-list.</p> <p>Butterfly: common wood nymph <i>Cercyonis pegala</i> BC Red-list.</p> <p>Dragonfly: western pondhawk <i>Erythemis collocata</i> BC Blue-list.</p>

6.2.4 Vegetation Type 4

CDFmm 04 grand fir / dull Oregon-grape *Abies grandis* / *Mahonia nervosa*

Terrain Zones: Pickles Creek riparian portion - zone 2 and Lowlands Forest - zone 5.

The relatively rich Lowland Forest and the 2-4m high narrow ridge on the east side of Pickles Creek and wetland will likely develop into a mature CDFmm 04 vegetation type. The terrain is also rocky as on the upper sandstone shelves, but more sediment has collected in pockets. A row of old-growth Douglas-firs remain along this ridge adjacent to Pickles Creek and there is some second-growth canopy, although it was high-graded. Very few residual second-growth trees, often broken or non-marketable, remain in the Lowlands forest, and there are some very large western redcedar stumps. Shrubs are fairly dense, dominated by salal, dull Oregon-grape and baldhip rose. Overall the herb layer is patchy, with occasional grassy openings where shrubs are reduced.

Vegetation type 4

Main Canopy & Above	
Species, percent cover & DBH	Above: Only by Pickles Creek: Cover 2% Fd DBH 995-1415mm. Main canopy: Cover 2-15%. Mixture of Bg DBH 390mm, Cw DBH 300-1175mm, Dr DBH 280-705mm, Fd DBH 310-670mm, Hw DBH 180-445mm.
Age (estimated)	Fd & Bg old-growth >150yr. Second-growth up to 115 yr based on cut stumps on the Lands.
Height	Above >50m. Main 20-40m
Secondary Canopy	
Species, percent cover & DBH	Cover up to 30% broken residual trees & taller regenerating trees: Cw DBH 355mm, Dr DBH 165-245mm, Fd, Hw DBH to 215mm & Pw.
Height	10-20m
Understory	
Shrubs & trees <10 m	Young trees cover 10-20%: arbutus, Bg, Cw, Dr, Fd, Hw, Pl, Pw, Ss. Salal 5-45%. Other shrub mix cover 10-15%: baldhip rose, black raspberry, dull Oregon-grape, English holly, evergreen blackberry, evergreen huckleberry, English holly, oceanspray, red elderberry, red huckleberry, salal, salmonberry, Scotch broom, trailing blackberry, twinflower.
Herbs	<5-15% mix: American brooklime, bedstraw, blue skullcap, bracken, bull & Canada thistle, buttercup sp., Chilean tarweed, cleavers, common tansy, clover sp., creeping buttercup, deer fern, Dewey's sedge, English daisy, foamflower, forget-me not sp., foxglove, grass sp., hairy cat's ear, herb robert, common horsetail, lady fern, Lyall's anemone, marsh speedwell, pinedrops, self heal, slough sedge, starflower, stinging nettle, sweet cicely, sword fern, reed canary grass, vanilla-leaf, wall lettuce, wild ginger, yerba buena.
Mosses	Cover 5-15% dense patches: badge, <i>Dicranum</i> sp., electrified cat's tail, lanky, Menzie's tree, Oregon & slender beaked, step & running club mosses.
Rare species	This vegetation community is Red-listed in BC.
Special Features	These recovering forest areas are adjacent to wetlands and thus offer aquatic edge habitat to many species. Areas have a rich diversity of vegetative species, habitat character and age classes. Pickles Creek forest also has a notable line of old-growth Douglas-fir and these old trees offer the genetic and habitat values.
Expected Changes	Trees in the open clear-cut areas are regenerating well and canopy closure that is occurring in patches at the pole-sapling stage will increase; although the irregular borders and patchy nature of the sites is likely to retain sufficient openings to keep the diversity of the understory. Suppression and windthrow of crowded young trees will contribute to coarse woody debris, that will be reduced as older wood decays.

Disturbance History	First logging occurred prior to 1930 and some old-growth trees were left. The second logging was around 2000 and removed nearly all of the mature second-growth, except immediately adjacent to Pickles Creek.
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FAUNA

Wildlife Habitat / Features	<ul style="list-style-type: none"> • Old-growth trees provide thick bark and large limb habitat for foraging, nesting and perching and also will be the main source of future coarse woody debris. • Well-developed shrub-layer, diversity of vegetative species and the proximity to wetlands offers valuable aquatic edge and habitat complexity.
Observed Species	See Terrain zone chart.
Rare species	Bird: common nighthawk <i>Chordeiles minor</i> - SARA Threatened, great blue heron <i>Ardea herodias</i> SARA Special Concern, BC Blue-list. Butterfly: common wood nymph <i>Cercyonis pegala</i> BC Red-list.

6.2.5 Vegetation Type 5 - Complex

CDFmm 01 Douglas-fir – dull Oregon-grape *Pseudotsuga menziesii* – *Mahonia nervosa* &

CDFmm 04 grand fir / dull Oregon-grape *Abies grandis* / *Mahonia nervosa*

Terrain Zone: Pickles Slope–zone 1.

As mentioned, the cut hill slope along Chickadee Road is an exposed example of glacial gouging-action across the geologic profile. This profile continues under the vegetation on the adjacent Pickles Slope. This slope could be divided into the various tread and riser areas that probably will support slightly different vegetation. A complex of the CDFmm 01 and 04 is proposed as the potential classification of these areas, although as the vegetation develops, divisions may become more evident. The solid sandstone tread-type vegetation is visible on this slope near the road, where the understory for the remaining conifers is moss-dominated, as shown in Photo site 3. Areas with more soil from erosion and deposition, or with additional moisture, perhaps collecting at the lower tread-riser junction, have bigleaf maple and other more moisture dependent species. Overall the zone appears to be a mixture between these two types and overall the zone is recovering from significant recent logging impacts. A few old-growth Douglas-firs were retained, as well as individual and tiny patches of second-growth trees, although virtually all the valuable timber was cut. This vegetation complex provides a buffer to Pickles Creek.

Skids roads are present across the slope. Also, an old access road, that formerly came from Pickles Road, entered the Lands, crossed Pickles Creek and went up to the crest of the hill. This road is being retained as a public trail. As this Vegetation type repeats others already described, the specific vegetation and wildlife details for this area are best viewed in the Terrain Zone charts for zone 1 (Table 2a and Table 3), with additional details below.

Vegetation Type 5

Rare species	These vegetation communities are Red-listed in BC.
Special Features	The east-north-east facing aspect, the slope ranging from of 11-21°, the elevation change in steps through 30m, together with the patchy logging gives rise to the variable vegetation response. Pockets of remnant second-growth trees, old veteran Douglas-firs, bracken-filled openings, thick regenerating seedlings and small areas of early canopy closure create a varied habitat.
Expected Changes	As the forest ages the young regenerating patches will go through the dark understory phase of canopy closure, but the current patchy age structure with many residual mature trees across this terrain zone will allow understory species to persist. Tree growth will be limited on areas with very shallow soils with resultant individual growth-suppression and wind-throw.
Disturbance History	As discussed, the first logging occurred in the late 1800's-early 1900's and a few spring-board stumps persist. Subsequently, a narrow private road through this area was made or improved so that it was driveable. Around 2000, the site was 'messily'

logged, leaving tree-patches as well as single trees. A new gazetted road along the northern border of the Lands, along the northern edge of Zone 1, was created at the time of subdivision of a nearby property in the early 2000's.

FAUNA

Wildlife Habitat / Features	<ul style="list-style-type: none"> • Old-growth trees provide thick bark and large limb habitat for foraging, nesting and perching and also will be the main source of future coarse woody debris. • Well-developed shrub-layer, diversity of vegetative species and the proximity to wetlands offers valuable aquatic edge and habitat complexity. • As noted, old-growth trees provide thick bark and large limbs for foraging, nesting and perching and also will be the main source of future coarse woody debris. • Well-developed shrub-layer, diversity of vegetative species and character with small dense thickets, herbaceous openings, as well as the proximity to the creek and wetlands offers secure habitat for foraging, travel and bedding in addition to valuable aquatic edge habitat.
Observed Species	See Terrain zone chart.
Rare species	No rare species noted, but unusual dense patches (greater than 50 plants) of flowering Prince's pine.

6.2.6 Wetlands Vegetation Type 6

CDFmm/14 red alder - slough sedge *Alnus rubra* - *Carex obnupta* equivalent to

Ws 52 red alder - skunk cabbage *Alnus rubra* - *Lysichiton americanus*

Terrain Zones: Pickles Creek wetland - zone 2, Lowlands Marshes - zone 4, Pickles Buffer Forest Marsh - zone 6, Big Tree Marsh - zone 9, Transect Marsh - zone 10, Northeast Marsh – zone 14 and Swale Woods – zone 17.

The CDFmm 14 site series or its equivalent, the swamp wetland class 52, is represented in six zones. On the Lands these are slough sedge-dominant wetlands. Some are in natural drainage areas. Others are now in areas where logging equipment depressed the surface into deep ruts and where water pooling in the ruts supported the proliferation of slough sedge along these low-lying skid road tracks. This is particularly evident in the Lowlands where numerous small marsh patches exist. Slough sedge dominates with a few wet-site herbs, usually including marsh speedwell, field mint, and other sedge or rush species.

Many of these sites have red alder or occasionally various conifers in the tree canopy, usually growing on slightly raised micro-sites. Some marshes are at least partially open, while, the Swale Woods zone has the most mature forest canopy, although it retains the slough sedge dominated understory. The two Uplands marshes are tiny wet basins in a very rocky bench-land. Prior to the logging, these small Uplands marshes sustained as open marsh habitats, surrounded by mature forest. Similarly NE Marsh in Homestead Forest, was largely open and may have been part of the adjacent wetlands' drainage system to the Swale Marsh.

The Swale Woods wetland area, the continuation of NE Marsh through the Swale Woods to the Swale Marsh, is best described by the forested site series designation of CDFmm/14 redcedar – slough sedge vegetation type. This wetland-forest is adjacent to the Swale Marsh and likely has a strongly fluctuating water table. The conifer canopy is well developed. Many of the trees in the Swale Woods are likely close to 100 years old and particularly the redcedar and grand fir are of considerable size, growing among the slough sedge. Other conifers such as Douglas-fir and the occasional White pine are also growing on raised micro-sites. While this area supports substantial older conifer development it is not developing other site series CDFmm 11 *western redcedar-skunk cabbage* characteristics.

Overall, these small slough sedge-dominant wetlands provide essential aquatic habitat for many species, as well as creating openings and edges that give foraging, sheltering and travelling opportunities. In the Lowlands, where the Taylor's checkerspot butterfly was originally found in 2005, the young regenerating conifers of the surrounding forest are now shading much of this habitat. In Big Tree and Transect wetlands, within the Butterfly Reserve, regenerating trees, particularly around the marshes were removed to reduce shading. Details of the location, vegetation and wildlife for each wetland are included in Terrain zone map, Figure 6, and Terrain zone vegetation and wildlife charts Tables 2 A-E and Table 3.

Vegetation type 6

Main Canopy & Above	
Species, percent cover & DBH	Above: Cover <1% on edge of Pickles Creek wetland only. Fd DBH 995-1415mm. Main canopy: Mixture of Bg DBH 390mm, Cw DBH 410-740mm, Fd DBH 530-670mm, Hw DBH 445mm.
Age (estimated)	Fd & Bg old-growth >150yr. Second-growth up to 115 based on cut stumps on the Lands.
Height	Above >40m. Main 30-40m
Secondary Canopy	
Species, percent cover & DBH	On Pickles Creek & Lowlands wetlands only Cover 15-20% Dr DBH 280-460mm. 5-10% Mix of: Bg DBH to 305mm, Cw DBH 135-395mm, Fd DBH to 310mm, Hw DBH to 180mm & Pw.
Height	10-30m
Understory	
Shrubs & trees <10 m	Cover vary from 5% to 15%, esp. on hummocks & on coarse woody debris. Salal dominant in some. Mix: young trees & overhanging branches of Bg, Dr, Cw, Fd & Pw, also baldhip rose, cascara, evergreen blackberry, hardhack, Nootka rose, non-native ash, Pacific crab apple, red huckleberry, salmonberry, trailing blackberry & occ. Labrador tea & willow sp.
Herbs	65-85% Sword fern. Other mix 5-10%: bedstraw, bog St. John's wort, bracken, bull & Canada thistle, common horsetail, common rush, creeping buttercup, deer fern, field mint, forget-me-not sp., foxglove, grass sp., hedge nettle, lady fern, leathery grape fern, marsh skullcap, marsh speedwell, marsh violet, reed canary grass, sedge sp., skunk cabbage, Siberian miner's lettuce, thyme-leaved speedwell, water parsley, yellow pond lily.
Mosses	Oregon-beaked, step moss and other species.
Rare species	This vegetation community is Red-listed in BC.
Special Features	Old stumps and coarse woody debris in these wetlands provide additional habitat features. In the Uplands the two small marshes are discrete moist sites in very dry terrain, moisture collects on an impermeable surface below. Leathery grape fern was observed in both Uplands Wetlands.
Expected Changes	Regenerating trees will surround and grow on hummocks within these wetlands. Usually these wetlands are enhanced with the re-established canopy-shade of red alder. Some of these wetlands are on drainage channels and these will become more complex as the moisture input is increasingly intercepted by the developing canopy and is retained and discharged more slowly. Pockets of open water may develop when water levels are high. Where there are enough elevated microsites, such as in the Lowlands, some of this area may develop into western redcedar wetland habitat. The future of the exposed Uplands marshes is unknown, as discussed in the managed vegetation types.
Disturbance History	First logging occurred prior to 1930 and the impact on these wetlands is unknown, other than the removal of the overhead canopy and likely the disruption of the original hydrologic drainage patterns. The second logging had considerable impact due to the use of heavy logging equipment in moist areas. The equipment dug ruts and compacted the soil, thus creating the wetland patches or at least channelling the

flows of water and thus redefining the borders of the slough sedge habitat. Skid roads cut across obvious drainage patterns, thus the hydrology particularly in the Lowlands was disrupted once again.

FAUNA

Wildlife Habitat / Features	<ul style="list-style-type: none"> • These small wetlands provide moisture for many species, as well as openings and edge habitat for foraging, travel and shelter. • The moisture and/or aquatic plant species that are added to the forest habitat are essential for the life cycle of specific wildlife, particularly invertebrates or amphibians, thus adding biodiversity and enriching forest species webs. • Also these wetlands tend to slow down runoff and also remove silt and other materials, thus stabilizing water supplies and filtering forest water.
Observed Species	See Terrain zone chart. Note that these wetlands are so small that most wildlife species also will be seen in the adjacent forest, clear-cut or woodland habitat.
Rare species	While northern red-legged frogs would certainly take advantage of the wetland habitat, none were seen there during the Baseline inventory.

6.2.7 Wetlands Vegetation Type 7 – Complex

CDFmm / Wm 05 Common cattail *Typha latifolia* & CDFmm / Wm 06 Great bulrush (here: Soft-stemmed bulrush *Schoenoplectus tabernaemontani*)
Terrain Zones: Pickles Marsh-zone 3 and Homestead Marsh-zone 13.

The two major wetlands, Pickles and Homestead marshes are combinations of two important wetland vegetation categories, both of which are Blue-listed in BC. This complex of bulrush and cattail marshes are known to sometimes occur, and as is usual with bulrush marshes, both marshes have sections of open water (MacKenzie and Moran 2004). In these protected waters, the great bulrush is replaced with the soft-stemmed bulrush.

Two small bays and a main central portion of Pickles Marsh are included in the Lands. In each of these areas, the vegetative species have different levels of abundance, although a similar group of species is likely present throughout. Spirea and a few dead, flooded trees line the wetland edges. Heads of the bays and inflow sites are sedge dominated, tending from the forested slough sedge into the open canopy, deeper water sedge species. Sedges are combined with a variety of other wetland species, including some reed canary grass. Sedge areas open up to cattail and yellow pond-lily patches. The large central portion of the marsh is covered in approximately 45% bulrush, 35% cattail and <5% yellow pond-lily. Bulrush and cattail intermix throughout, as seen in Photo site F 2, although patches of each species also exist. Open water varies from none visible to 50% of the surface of the small bays, and covers about 10% of the large middle section. These open water areas have both submerged and floating species.

Homestead Marsh has been changing in the last few years due to beaver activities. The beaver have dammed a major outflow drainage ditch that was dug to drain and expose additional pasture-land for cattle. Due to this dam, the water levels have risen perhaps 20-30cm. Previously, this wetland was approximately one half the size and for many years was in the **Ws 50 pink spirea – Sitka sedge *Spirea douglasii* – *Carex sitchensis*** wetland category. Now with the raised water levels, the spirea (hardhack) is confined to the northern end of the marsh and is gradually dying off. The same combination of bulrush and cattail, seen in the nearby and connected Pickles Marsh, appears to be developing in the deeper open water areas. Currently the open water has many floating and submerged species.

On the neighbouring Swale farm property, along the southeast border of the Lands, a new dirt dam, through the marsh, has been created by the Swale Farm neighbour to facilitate the construction of a fence to contain the farm's domestic animals, see Photo site F13. This farm-dam remains open at its southern end where several ditches converge. Water drains out through this gap and will continue to back up, from the beaver dam, onto the Swale farm property.

The characteristics of the vegetation for each area of both Pickles and Homestead marshes are described in more detail in the Terrain zone charts 2 B and D.

Vegetation Type 7

Rare species	These vegetation communities are Blue-listed in BC.
Special Features	The various bays and inlets of Pickles Marsh provide additional niche-habitat that is more secluded and has a variety of vegetative species for the many wetland species. The mixing of the two wetland types varies the species composition, as both dominant species tend to take over marsh habitat. Beavers and their continued dam maintenance are essential for the survival of both large complex wetlands. Beaver dams also control the outflows of Pickles Marsh, but these dams are not on the Lands. The farm-dam along the southeast border of Homestead Marsh creates a great wildlife viewing point, although it is increasingly inaccessible from the Lands as water levels rise.
Expected Changes	As noted beavers are the keystone species for these dynamic wetlands and thus much depends upon their health and survival which are somewhat unpredictable. If beaver dam-building continues, higher water levels will continue to flood more land and create additional wetland habitat. But in foraging and dam-building, beavers change the surrounding forest and wetland shoreline habitat. They may move on (or die out) if chosen vegetative species are no longer readily available, or if they are subject to disease, disturbance or trapping. Homestead Marsh is likely to develop additional deep-water emergent vegetation, particularly as the adjacent farming activities will release additional nutrients that encourage the growth of cattail. The fate of the southeast farm-dam is unknown.
Disturbance History	Beavers were heavily trapped in this area for furs when Europeans first visited and it is unknown what these wetlands looked like prior to the original disturbance of the beavers. Also early farming settlement in the area led to the ditching and draining of the Swale Marsh. The continued ditching of the land around wet areas in the Swale Grazing Meadow area continued into the 1990's. The dying second-growth trees along the edges of the Pickles Marsh and at the north end of Homestead Marsh suggest that water levels have not been this high since early European settlement. The massive changes in forest cover around these marshes during the first logging, prior to 1930, and the presence of a large logging camp, mill and homestead in the vicinity must have affected the wetlands. Overall the hydrology patterns may have changed extensively during this period. The second logging had considerable impact around these marshes, once more reducing the forest canopy and the water-retention capability of the surrounding lands, leading to freshets and siltation. The creek draining into Homestead Marsh was completely damaged by logging equipment driving across with no creek protection. The most recent changes to Homestead Marsh are due to beaver flooding, increasing the size of the marsh as discussed. Also the new farm-dam along the Lands' border is a recent disturbance.

FAUNA

Wildlife Habitat / Features	<ul style="list-style-type: none"> • Beavers are the keystone species, both retaining water for the marshes as well as adding lodges, travel corridors, additional dams and connections to the shoreline. Many other species take advantage of the work of the beavers. • The varied habitat of shoreline edges, open water, floating and emergent vegetation supports the needs of a diversity of species incl. drinking, foraging, travelling & sheltering. • As noted, the separate bays of Pickles Marsh give additional secluded habitat. • Species using the adjacent old-growth habitat for sheltering or nesting, such as large birds and various bat species can forage in these large marshes • As these marshes are connected to the Beadnell Creek system, they not only support cutthroat trout, but they also provide a continuous fresh water supply for the downstream Coho salmon stream.
Observed Species	See Terrain zone chart.

Rare species

Bird: common nighthawk *Chordeiles minor* - SARA Threatened
 Barn swallow *Hirundo rustica* – BC Blue-list
 Dragonfly: blue dasher *Pachydiplax longipennis* – BC Blue-list.

Open Water Vegetative Type 7A

Terrain Zones: Pickles Marsh-zone 3 and Homestead Marsh-zone 13.

Portions of the two major wetlands have shallow open water that is continually flooded and is dominated by both submerged and floating leaved vegetation, most of which is rooted in the bottom substrate. The distribution of species in open water depends upon factors such as water chemistry, substrate quality, water depth turbidity and water flow, and while investigation of these factors is beyond the scope of this inventory, shallow water vegetation types are generally considered to be in water greater than 60 cm (MacKenzie & Moran 2004). Thus the open water vegetation in these wetlands is likely to be occurring where water depths are greater than 60 cm.

These marshes appear to have components of several vegetation types, which have been proposed as shallow-waters classes where “shallow-waters are aquatic wetlands permanently flooded by still or slow-moving water and dominated by rooted submerged and floating-leaved aquatic plants” (MacKenzie & Moran 2004, p. 148) including:

- Yellow-pond-lily – Bladderwort *Nuphar polysepala* – *Utricularia vulgaris* type is often found on peat sediments,
- Water shield – Bladderwort *Brasenia schreberi* – *Utricularia* spp. type occurs in slightly deeper water.
- Water smartweed *Polygonum amphibium* type that occurs with scattered floating pondweed is usually found in water on nitrogen-poor sandy substrates and may be present in southern Homestead Marsh due to the recent flooding of grazed/compacted meadowland with little available organic material and/or due to sandy sediments from the creation of the new farm-dam.

These open water areas provide significant fish and wildlife habitat. There is surface cover, especially for fish and amphibians, as well as abundant prey species. The plants are very palatable, partly due to the lack of highly developed structural-support-fibres. Of note, yellow pond-lily is an important food for beavers.

6.2.8 Creek Vegetation Type 8

Possible: CDFmm / 07 western redcedar / common snowberry *Thuja plicata* / *Symphoricarpos albus* or CDFmm / 08 red alder / salmonberry *Alnus rubra* / *Rubus spectabilis*

Terrain Zone: creek portion of Homestead Riparian-west-zone 12.

The CDFmm 07 or 08 site series may describe the future mature vegetation around a small creek that drains into Homestead Marsh in the northern portion of the Homestead Riparian-west terrain zone. Currently, because of recent logging and use of heavy equipment in the area, it is difficult to determine which site series will dominate in the future. This drainage area, at the toe of the steepest portion of Homestead Slope, is a very gently sloping, flood plain. Prior to the recent logging, the herb layer was a well-developed dense fern habitat beneath a canopy large redcedars.

Currently the tree canopy is mainly young red alder with <5% young conifers. The shrub layer is dense, primarily salmonberry with little in the herbaceous layer. An open area about 15m in diameter where the creek runs into the marsh is recovering from the use of logging equipment to repeatedly crossing the creek where no culvert had been installed. The soil in the creek flood plain is a sandy

loam with small fragments of sandstone below the surface. The vegetation and wildlife are described in detail in Terrain zone charts Table 2 D and Table 3, with additional information below.

Rare species	These vegetation communities are Red-listed in BC.
Special Features	A few large western redcedar stumps remain that provide moist protective habitat for both plants and wildlife. The well-developed shrub habitat, while small in area, provides a seed source for re-vegetation as well as food and shelter for wildlife
Expected Changes	The deciduous forest will age and gradually be mixed with growing conifers. The narrow gully, small soil pockets and rocky substrate in this little gully will likely limit the tree growth and may prevent a complete canopy closure stage. The shrubs may increase in the currently exposed areas and then decrease overall as the tree canopy develops. The area was formerly nick-named “Fernvale” due to the diversity, size and luxuriance of the fern species and these may repopulate in the future. The creek will likely develop a deeper more defined course over time.
Disturbance History	The presence of large stumps and some residual veteran trees, around the creek and on the slopes above, suggests that there may have been less disturbance to this small area in the initial, early 1900’s logging. During the subsequent, more recent logging the area was heavily impacted by both logging and the passage of large equipment, without any regard for the existence of the creek.

FAUNA

Wildlife Habitat / Features	<ul style="list-style-type: none"> Large stumps, abundant shrubs and the creek provide important wildlife habitats and valuable edge habitat occurs towards the larger Homestead wetland. The fresh water inflow is important for the larger wetland and for all the species that make use of it.
Observed Species	See Terrain zone chart Table 3. Note that this area is small and wildlife species would be shared with the surrounding Terrain zones.
Rare species	Amphibian: Northern red-legged frog SARA Special Concern– BC Blue-list

6.2.9 Management-Impacted Vegetative Type 9 - Various

A: Uplands Butterfly Reserve

As noted, the 3.12 ha Butterfly Reserve is in the Uplands East CDFmm 01 Douglas-fir – dull Oregon-grape *Pseudotsuga menziesii* – *Mahonia nervosa* vegetation site series. The reserve has been managed to maximize butterfly habitat such as open woodlands, as well as the small wetlands or ‘vernal pools’ that are breeding sites for the Taylor’s checkerspot butterfly. Most butterflies require sunny habitat with sites for perching and sheltering, open sunny travel corridors, appropriate plants for larval development and usually a fairly broad range of flowering plants for nectaring as adults. Marsh speedwell, the main food plant for Taylor’s checkerspot larvae or caterpillars on Denman, grows in the Reserve’s vernal pools and the butterflies will nectar on many flowers that bloom in the open woodland habitat.

The first management step, begun in January 2015, was to reduce the overall tree canopy, particularly where the trees were shading the wetlands and the butterfly travel corridor between the two wetlands, by removing most of the regenerating conifers. The few mature trees, remaining after the 2000 logging, and any arbutus were retained. The cut trees were left scattered on site to contribute nutrients, as well as to add complex habitat structure at the ground surface. The present tree cover, from shrub sized regenerating seedlings to mature trees, is about 20%.

The wetlands' slough sedge normally thrives in semi-shaded habitat, often under red alder, so how the vegetation in these small wetlands will develop in the open is unknown. A 500m butterfly monitoring transect was set up and used in the summer of 2016. During 13 transect monitoring visits from April 7 to May 31, 2016, seven butterfly species were detected, including one National endangered species and one BC blue list species, as shown in Appendix IV. A BC red list species, common woodnymph, was also seen elsewhere within the Butterfly Reserve. The current vegetation in the reserve is shown below; the wetland vegetation is described in the Terrain zone chart.

Butterfly Reserve

Main Canopy & Above	
Species, percent cover & DBH	Main canopy: Cover 1-2% Fd DBH 310 up >1000mm (some broken old trees) & occ. Cw DBH 425mm
Age (estimated)	Fd & Bg old-growth >150yr. Second-growth up to 115 yr 80-85 yrs, based on cut stumps on the Lands.
Height	Main 20-30m
Secondary Canopy	
Species, percent cover & DBH	Cover 5%. Fd DBH 125-175mm, occ. Cw DBH 300mm, Pw DBH 240mm.
Height	10-20m
Understory	
Shrubs & trees <10 m	Cover 15-20% Young trees: arbutus, Cw, Dr, Fd, Pw. Cover 25% dull Oregon, red huckleberry, <u>salal</u> , twinflower.
Herbs	Bracken 20%, grass sp. 20%, misc. other: hairy cat's ear, pearly everlasting.
Mosses	30-40% <i>Dicranum</i> sp., Oregon-beaked & many rock mosses.
Rare species	This vegetation community is Red-listed in BC although it is in a very early seral stage.
Special Features	A 500m transect has been set out for monitoring butterflies and this will be lengthened. Considerable recent young dead tree debris is distributed across the reserve on top of the 5-10% CWD from the 2000 logging. The reserve includes 2 wetlands and a major skid road.
Expected Changes	The reserve is a work in progress. Initially the terrain will be more open butterfly habitat. Further management will depend on the response of the shrub and herbaceous vegetation species to exposure. The slough sedge may not thrive in open habitat.
Disturbance History	First logging occurred prior to 1930 and the second, messy clear-cut logging around 2000 that removed nearly all of the forest in this area. The third cutting was in 2015-16 where many of the young conifers were removed.

FAUNA

Wildlife Habitat / Features	<ul style="list-style-type: none"> the open woodland habitat is favoured by open land species. In 2016, a common nighthawk aggressively guarded habitat in this area. old-growth firs, while broken-topped in this area still provide large limbs and thick bark for wildlife, as well as a potential genetic reservoir.
Observed Species	See Terrain zone chart.
Rare species	Bird: common nighthawk <i>Chordeiles minor</i> -Threatened for SARA Butterflies: common wood nymph <i>Cercyonis pegala</i> -Red-listed in BC, western pine elfin <i>Incisalia eryphon</i> - Blue-listed in BC. Dragonflies: blue dasher <i>Pachydiplax longipennis</i> - Blue-listed in BC, western pondhawk <i>Erythemis collocata</i> - Blue-listed in BC.

B: Beaver Impact

Possible CDFmm / 12 western redcedar / vanilla-leaf *Thuja plicata* / *Achlys triphylla*: Terrain Zone – 12 (land portion).

A beaver-managed riparian area is approximately 5 to 15m wide, along the west side of Homestead Marsh, and encompasses the flat to gently inclined (6°) toe of Homestead Slope. The future forest vegetation when it develops may reflect either a continuation of the middle and lower slope Vegetation Type 3, or due to the proximity of the marsh and a fluctuating ground water table, may be classified as CDFmm /12.

Currently beavers are active in this previously logged area, see Photo site F12. They have major travel corridors and are harvesting herbaceous, shrub and pole-sapling vegetation so that the only remaining tree canopy is less than 5% cover at 10-25 m in height. Herbaceous vegetation predominates with patches of bracken, reed canary grass and Canada thistle flourishing in the open. Original forest-herbaceous elements include mainly sword fern, with a mix of deer fern, lady fern, skunk cabbage and vanilla leaf. The vegetation is described in more detail in the Terrain zone chart.

C: Farm Management

Two Terrain zones on the eastern border of the Lands have been used for cattle grazing and / or pasture for almost 100 years. The former Swale meadow is a small portion of the western edge of what was, prior to European settlement, a large beaver-dam-flooded swale. On the remote edges of this wetland, some remaining natural vegetation is typical of a fen, perhaps Wf 52 Sweet gale – Sitka sedge type. The Lands' small 0.3 ha portion of the former Swale Marsh Meadow is now fenced from the rest of swale. Deep drainage ditches that connect to the Beadnell Creek system, cross this portion to the NE corner of the Lands. Reed canary grass predominates and a few assorted shrubs grow on elevated micro-sites (side cast from the ditch construction). No restoration or other activities have occurred in this portion, since the Owner's acquisition of the Lands.

The Swale Grazing Meadow, 0.9 ha adjacent to the Swale Marsh, was likely free of surface water during the period of European settlement, particularly after the ditches bordering Homestead Marsh were completed. Beef cattle still have access to this area, but an increasingly extensive beaver dam is blocking the drainage of the outflow ditches of Homestead Marsh. Rising water levels, of 10-20cm in the last 10 years, have enlarged the perimeter of Homestead Marsh into the low lying areas of the Swale grazing zone, approximately 1/3 of the area. Grazing keeps the vegetation primarily herbaceous. Grasses predominate on the land and common rush on the flooded area. A few shrubs, tree seedlings and a single Douglas-fir tree less than 20m high cover about 15% of the zone. Vegetation is described in more detail in the Terrain zone chart. Currently, the grazing perpetuates the open-land habitat and no action has been taken to fence-off this zone.

6.3 Detailed Terrain Zone Inventory

Additional details about the vegetation and wildlife species noted in each terrain zone are covered in the following tables.

6.3.1 Terrain Zone Vegetation

The vegetation in each of the Terrain zones is described in the following Table 2 A – E. The following terms apply to these tables:

- Percentages are the best estimates of cover.
- For species scientific names and rarity, see Appendix species lists.
- The following tree species two letter codes are used Bg = grand fir, Cw = western redcedar, Dr = red alder, Fd = Douglas-fir, Hw = western hemlock, Pl = lodgepole pine, Pw = western white pine and Ss = sitka spruce.

- Underlined species are dominant.
- CWD = coarse woody debris.
- Short forms: regen.=regenerating (young trees), resid.=residual (older trees), sp. = species, incl.=including & occ.=occasional.
- * Mosses: While several notable mosses are listed, many other moss species occur on rocks, trees, stumps & coarse woody debris.
- ** The Butterfly Reserve is designated for special management for butterfly conservation, including the endangered species Taylor's checkerspot that previously bred there.

Table 2 A: Vegetation Terrain Zones 1-4.

Zone	Name & Type	Slope	Aspect	Canopy Main DBH (mm) Approx. Heights (m) & Cover (%)	Canopy Secondary DBH (mm) Approx. Heights (m) & Cover (%)	Shrub	Herb	Moss*	Features/ Description	
1	Pickles Slope	East-facing (recovering clearcut slope)	1. 14° 2. 17-21° @ road 11°	1.65° 2. 60°	2 Types: 1. Moist: Above 1-2% Fd old-growth Main resid. <2% 30-40m Cw DBH 490-1000mm 2. Drier: Above occ. Fd old-growth. Main resid. 10-15% 30-45m Cw DBH 710-1050mm Fd DBH 380mm Hw DBH 315-410mm (Note: Driest: Cw, Fd, Hw).	Type 1: 35-40% 10-20m regen. Hw, Bg, Cw, Fd. & occ. resid. big-leaf maple DBH 620mm <u>Dr</u> 5-10% on old roads & openings (larger near slope top) DBH 80-235mm & to 430mm near top Type 2: 10-20m <5% regen. Fd DBH 165mm Hw DBH 175mm.	Type 1: up to 50% <10m regen. arbutus, Dr, <u>Hw</u> , Bg, Cw, <u>Fd</u> , Pw. Other: cascara, dull Oregon grape, salal, red elderberry, red huckleberry and occ. English holly. Type 2: up to 50% <10m regen. Hw, Bg, Dr, Fd 30% other: <u>dull Oregon grape</u> , Pacific dogwood, red huckleberry, <u>salal</u> . Driest: occ. Dr, Fd, Hw <10%. dull Oregon grape <2% salal on edges.	Type 1: 15-30%. <u>vanilla leaf</u> 5-10%. sword fern 10% top & edges Other: bed straw, bracken, Canada thistle, dewey's sedge, grass sp., spiny wood fern, star flower, violet sp., woodland strawberry, wall lettuce. Type 2: 10% Mix: beautiful bittercress, bedstraw, big-leaved sandwort, bracken, Canada thistle, Chilean tarweed, English daisy, grass sp, Nootka rose, Prince's pine, rattlesnake plantain, spiney wood fern, starflower, sword fern, violet sp., wall lettuce, woodland strawberry. Driest: bracken <2%	Type 1: 10% electrified cat's tail, Oregon-beaked, slender-beaked, step mosses. Type 2: 10-20% <i>Dicranum</i> sp, lanky, Oregon & slender-beaked, step mosses. Driest: Cover 60% Oregon-beaked & step mosses.	Slope varies in steps with underlying bedrock. Occ. snags, springboard stumps, 5-20% coarse woody debris. Numerous openings, vegetation varies with slope & bedrock & some patches with dense canopy of young pole-sapling Hw. Skid roads with Dr have invasive sp.
2	Pickles Creek & Forest	East-side (creek, riparian forest)	14° to 33.5°	East slope 240°	Above 2% 40-50m Fd DBH 995-1415mm Main resid.15% 30-40m Bg DBH 390mm Fd DBH 530-670mm Cw DBH 410-740mm Hw DBH 445mm	20-30m <u>Dr</u> 15% DBH 280-460mm Other 5-10%: Cw DBH 300-395mm Fd DBH 310mm Hw DBH 180mm	Slope: Salal 45% Other 10%: Bg, Fd, <u>Hw</u> , Pw, baldhip rose, dull Oregon grape, evergreen huckleberry, red huckleberry, twin flower. Wetland: 15% Mix: Cw, Dr, <u>salal</u> , spirea, occ. Labrador tea.	Slope: <5% Mix: bedstraw, Chilean tarweed, foam flower, grass sp., star flower, sword fern. Wetland: <u>slough sedge</u> 85% Other <5%: deer fern, lady fern, reed canary grass, skunk cabbage, water parsley, yellow pond-lily.	Slope: 15% <i>Dicranum</i> sp., electrified cat's tail, lanky, <u>Oregon beaked & step</u> mosses. Wetland: mosses on logs, liverworts on ground.	Low (2-4m) east-side slope to creek channel, plus creek, with adjacent slough sedge wetland up to 35m wide, draining from under Chickadee Rd to Pickles Marsh.
3	Pickles Marsh	(major wetland)	-	-		West Bay: hardhack occ. <1% Middle: spirea at edges & occ. hummock East Bay: spirea at edges & 5-10% at head of bay, dead trees 1% 4-30m high, most on W side. Occ. wild apple.	West Bay: slough sedge 10%, other sedge sp. 45-50%, cattail 35-40%, yellow pond-lily 5% & duckweed. Middle: tule 45%, cattail 35% yellow pond-lily <5%. East Bay: <i>Head of bay:</i> slough sedge 20+%, reed canary grass 10-15%, hedge nettle & other sedge sp. <i>Rest of bay:</i> cattail 25-30% & other sedge sp. 5-10%. Open water: duckweed (<1%), greater bladderwort & floating-leaved pondweed.	2 small marsh bays & major middle portion between peninsulas. Complex of tule, cattails, sedge & open water patches (West Bay: no visible open water, Middle:10%, East Bay: 50%). Edges also lady fern, horsetail sp. water parsley & skunk cabbage.		
4	Lowlands Marshes	(wetland)			30% <20m Dr to 20% Occ. regen. Bg. Hw, Pw	5-10% on hummocks & on CWD: baldhip rose, salal, regen trees: Fd & Pw.	slough sedge 65% Other 5-10% mixed or in patches: bracken, field mint, forget-me-knot sp., horsetail sp., marsh skullcap, marsh speedwell, skunk cabbage, thyme-leaved speedwell.	Drainage channels of slough sedge wetland from 5-20m wide, into north end of Pickles Marsh. Bare areas & CWD 10+%.		

Table 2 B: Vegetation Terrain Zones 5-7.

Zone	Type & Name	Slope	Aspect	Canopy Main DBH (mm) Approx. Heights (m) & Cover (%)	Canopy Secondary DBH (mm) Approx. Heights (m) & Cover (%)	Shrub	Herb	Moss	Features/ Description
5	Lowlands Forest (recovering clear-cut flats)	various, hummocky, raised corridors		2% 20-40m Cw DBH 890, 1035, 1175mm. Dr DBH 665- 705mm occ. Fd DBH 355-415mm occ. Hw DBH 295-315mm	25-30% 10-20m broken top resid. trees Cw DBH 355mm, regen. >10m Dr DBH 165- 245mm, Fd, Hw DBH 215mm, Pw.	<10m regen. 10-20% arbutus, Bg, Cw, Dr, Fd, Hw, Pl, Pw, Ss. Other patchy 5- 25%: baldhip rose, black raspberry, cascara, dull <u>Oregon grape</u> , English holly, evergreen blackberry, ocean spray, red elderberry, red huckleberry, <u>salal</u> , salmonberry, Scotch broom, trailing blackberry, twin flower.	Mixed & in patches 10-15%: American brooklime, bed straw, blue skullcap, bracken, bull & Canada thistle, common horsetail, common tansy, deer fern, Dewey's sedge, English daisy, forget me not sp., foxglove, grass sp., hairy cat's ear, herb robert, lady fern, marsh speedwell, pinedrops, skunk cabbage, slough sedge, star flower, stinging nettle, <u>sword fern</u> , vanilla leaf, wall lettuce, wild ginger, yerba buena.	5-10% some dense patches Mix: <u>Dicranum</u> sp., electrified cat's tail, <u>lanky</u> , <u>Oregon</u> & <u>slender</u> <u>beaked</u> , <u>step</u> & running club mosses.	Complex low area crossed by raised corridors (2 old railway grade mounds & old road), recent skid roads both on grades & in low rutted areas & also by 2 low patchy Dr-slough-sedge drainages to Pickles Marsh. Patchy: open herb/shrub areas, residual tree patches & dense dark patches of conifer pole-sapling regen. CWD with large Cw & Fd stumps 10-15%.
6	Pickles Marsh Buffer Forest (forest remnant)	Varies = flat to sloped edge to marsh	varies surrounding marsh	15-20% Above 1-5% >40m Fd DBH 915- 1815mm Main resid. 30- 40m Bg DBH 425- 450mm Cw DBH 650- 945mm Dr DBH up to 585mm Fd DBH 565- 710mm Hw DBH up to 335mm Steep Slope 2: >30m Fd DBH 445- 1410mm Cw DBH 420- 605mm Bg DBH 415mm	10-15% 15-25m Dr DBH 220- 330mm Fd DBH 290- 345mm Bg DBH 350mm Steep Slope 2: 10-30m Cw DBH 335mm Dr DBH 140mm Fd DBH 135- 415mm	5-10%, patchy Mix: Bg, Dr, Fd, Ss, baldhip rose, dull Oregon grape, English holly, red huckleberry, occ. Salal, trailing blackberry, twin flower. Steep Slope 2: Bg, Cw, Fd, Pw, occ. bigleaf maple, baldhip rose, false box, ocean spray, orange honeysuckle, red huckleberry, salal, twin flower	80%. <u>sword fern</u> 60% (dense patches). Other: bed straw, big-leaved sandwort, cleavers, common horsetail, coral root sp., foam flower, foxglove, grass sp., hairy cat's ear, herb robert, Lyal's anemone, pathfinder plant, Siberian miner's lettuce, slough sedge patches, small-flowered bulrush, spiny wood fern, star flower, stinging nettle, thyme-leaved speedwell, vanilla leaf, wall lettuce, wild ginger. Steep Slope 2: bedstraw, bracken, grass sp., licorice fern, star flower, sword fern, yerba buena.	5% some dense patches. Mix: badge, <u>Dicranum</u> sp., lanky, electrified cat's tail, Oregon beaked & running club mosses. Steep Slope 2: <u>Dicranum</u> sp., electrified cat's tail, Oregon- beaked & step mosses.	Remaining rim of forest, up to 30m wide, around Pickles marsh. CWD 5%, exposed duff 1+%. NOTE: Includes steep southern portion Slope 2 adjacent to marsh.

7	Lowlands Slope west-facing. Note portion of slope in 6 (Recovering clear-cut slope)) North & steep Pickles Buffer Forest (PBF) section shear to 40%. South in PBF 9-20% 210-245°	Above < 1% >40m Fd DBH 900 to 1310mm Main resid. 2% 20-30m Cw DBH 890-995mm	15% 10-20m resid. & regen. Bg DBH 250mm Cw DBH 430-535mm Dr DBH 150-640mm Fd DBH 190-330mm Hw DBH to 235mm.	20-30% <10 m Regen. 15%: arbutus, Bg, big leaf maple, bitter cherry, domestic cherry, <u>Dr</u> <u>Fd</u> <u>Hw</u> <u>Pw</u> . <u>salal</u> 10-15 % <u>dull Oregon grape</u> 10% Himalayan blackberry 1-2% Other mix : baldhip rose, cascara, English holly, English ivy, falsebox, ocean spray, orange honeysuckle, Pacific dogwood, red elderberry, red huckleberry, Scotch broom, tall Oregon grape, trailing blackberry, twin flower.	10-15% <u>sword fern</u> 5-10% & patches of vanilla leaf. Others: alumroot sp., bedstraw, bracken, Canada thistle, cleavers, common tansy, English daisy, fox glove, grass sp., herb robert, sedge sp., Siberian miner's lettuce, St John's wort, star flower, vanilla leaf, wall lettuce, wild ginger.	Patchy up to 20%. badge, <u>Dicranum sp.</u> , electrified cat's tail, lanky, <u>Oregon</u> & slender-beaked & step mosses.	Some steep & shear exposed sandstone and conglomerate. Begins 3m high in N, rises quickly up to 15m, drops in S to 6m. CWD 10-20%. Garbage formerly dumped, later buried or removed. Note: Resid. forest in middle, adjacent to marsh, included in "6" Pickles Buffer Forest & portions of gentle slope in S, included in "5" Lowlands.
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Table 2 C: Vegetation Terrain Zones 8-10.

Zone	Type & Name	Slope	Aspect	Canopy Main DBH (mm) Approx. Heights (m) & Cover (%)	Canopy Secondary DBH (mm) Approx. Heights (m) & Cover (%)	Shrub	Herb	Moss	Features/ Description
8a	Uplands Forest west (recovering clear-cut flats)	~ flat, undulating		Above 1% >30m Fd DBH to 1320mm Main 5-10% 10-25m resid. & regen. Cw DBH 310-540mm Dr DBH 480mm Fd DBH 130-335mm Hw DBH to 300mm.		<10m (many nearly 10m) Regen. 10-15% mix: arbutus Bg Cw Dr <u>Fd</u> Hw Pw. Scotch broom 10% Other 20-30% mix : baldhip rose, <u>dull Oregon grape</u> , English holly, evergreen blackberry, gummy gooseberry, Himalayan blackberry, ocean spray, red huckleberry, <u>salal</u> , tall Oregon grape, trailing blackberry & twin flower. Occ. Nootka rose.	Grass incl. reed canary 10-20%. Other 30% mix: <u>bracken</u> , bull & Canada thistle, common tansy, English daisy, foxglove, hairy cat's ear, pearly everlasting, reed canary grass, rush sp., Scouler's harebell, sedge sp., sheep sorrel, Siberian miner's lettuce, small-flowered bulrush, St John's wort, star flower, vanilla leaf, yerba buena.	5-10% <u>Dicranum sp.</u> , electrified cat's tail, Oregon beaked and rock mosses.	W side of Central Rd. Extensive open areas, large log landing, considerable young forest regen. CWD 10-20%, stumps and duff. Rock fragments on surface 20-30%.
8b	Uplands Forest east (recovering clear-cut flats)	flat, undulating to 6°	flat - near Slope 3 90°	Above 1% >30m Fd DBH to 1115mm, Cw DBH to 1160mm Main resid. <5% 20-30m Fd DBH 255-425mm Cw DBH 240-840mm Pw DBH to 395mm.	5-10% 10-20m Regen. & resid.: Dr DBH 200-420mm Cw DBH 300mm Fd DBH 195-200mm Hw 240mm occ. Pw.	50-60% <10m Regen. 10-15% arbutus, Bg, Cw, Dr, <u>Fd</u> , Hw, Pl, Pw, Scouler's willow. dull Oregon grape 30% ocean spray 1% <u>salal</u> 30% Other mix: baldhip rose, cascara, English holly, Nootka rose, red huckleberry, Scotch broom, tall Oregon grape, trailing blackberry & twin flower.	10-15% bracken 2% bull & Canada thistle 2% Mix in patches: cleavers, common tansy, creeping buttercup, Dewey's sedge, English daisy, foxglove, grass sp., grove-lover, hairy cat's ear, herb robert, many & small flowered wood-rush, large-flowered avens, pearly everlasting, prince's-pine, reed canary grass, Scouler's harebell, sheep sorrel, Siberian miner's lettuce, sword fern, star flower, vanilla leaf, wall lettuce, yerba buena.	5+% <u>Dicranum sp.</u> , electrified cat's tail, Oregon & slender beaked & rock mosses.	E side of Central Rd. Regenerating young forest with open areas, many old logging-skid trails, portion of old railway embankments, erratics, slabs & fragments of rock on surface. Duff, CWD & stumps 5-10%. Managed Butterfly Reserve** in N near road (regen. & broom removal 2015-16).

9	Big Tree Marsh Uplands East (wetland)	flat			Dr <1%. Overhanging branches <5%: Dr & Cw. Occ. trailing blackberry.	common rush <1% other sedge sp. 5-10% <u>slough sedge</u> 85% Other 10+% mix: bedstraw, bracken, bull & Canada thistle, evergreen blackberry, foxtail, grass sp., hedge nettle, leathery grape fern, marsh speedwell.	Small sedge wetland in Uplands E clearcut. CWD 5-10%.
10	Transect Marsh Uplands East (wetland)	flat			Overhanging branches 1-2%: Cw, Dr & Fd. Bg <1%, Nootka rose 2%, red huckleberry <1%, spirea <1%, <u>salal</u> 5%. Other 1-2% mix: cascara, evergreen blackberry, salmonberry, trailing blackberry, willow sp.	<u>Slough sedge</u> 80% Each 1-2%: bedstraw, bog St. John's wort, common rush, lady fern, marsh speedwell, marsh violet & other sedge sp. Other: occ. creeping buttercup, bull thistle, common horsetail, foxglove, grass sp., leathery grape fern, Siberian miner's lettuce & water parsley.	Small sedge wetland in Uplands E clearcut. CWD, most under sedge, 5%.

Table 2 D: Vegetation Terrain Zones 11-14.

Zone	Type & Name	Slope	Aspect	Canopy Main DBH (mm) Approx. Heights (m) & Cover (%)	Canopy Secondary DBH (mm) Approx. Heights (m) & Cover (%)	Shrub	Herb	Moss	Features/ Description
11	Homestead Slope East-facing (recovering clear-cut slope)	8.5°-60° at cliff sites. Upper-mid section at N&S ends is steepest	40° in N, wraps to 60°, then to 40° in S	Above: 1% 30-50m Fd DBH 835-1370mm. Main: 5-10% 20-30m Fd DBH to 445mm, Cw DBH to 860mm, Hw DBH to 325mm, occ.: big leaf maple Dr DBH to 395mm Ss DBH 360mm Bg DBH to 510mm. Note Main Fd cut stump ~100yrs. Upper Steep portion: few Cw & Fd 30-40m.	5-10% 10-20mm resid& regen. Dr DBH 115-780mm Cw DBH to 430m Fd to DBH 440mm Hw DBH 180-420mm occ. big leaf maple & bitter cherry.	<10m 10-15% Bg Dr Fd Hw occ. PI Other 5%: baldhip rose, bigleaf maple, bitter cherry, black gooseberry, cascara, dull Oregon-grape, English hawthorn, English holly, evergreen blackberry, oceanspray, red elderberry, red huckleberry, salal, salmonberry & trailing blackberry. Upper Steep portion: evergreen blackberry, false box, hairy honeysuckle, ocean spray, red huckleberry, saskatoon, snowberry & salal.	70-80% <u>sword fern</u> 50-60% slough sedge <5% vanilla leaf 5% Other mix: bracken, Canada thistle, cleavers, crisp sandwort, Dewey's sedge, grass sp., herb robert, Siberian miners' lettuce, spiny wood fern, star flower, stinging nettle, wall lettuce & wild ginger. Upper Steep portion: bedstraw, grass sp., licorice fern, small-flowered alumroot, sword fern & thyme-leaved speedwell.	10-20% badge, electrified cat's tail, Oregon beaked & occ.flat & step mosses. Upper Steep portion: Dicranum sp., electrified cat's, Oregon-beaked, step & rock mosses.	Over 20m high slope on west side, facing Homestead Marsh. Top begins v. gradually like a continuation of the Uplands Forest, then drops quite steeply, esp. in the N and then inclines gently to the toe. Upper portion at N end has a shear & steep rocky clifftop section, up to 10m wide & up to 12m high. This part is very open with some overhanging canopy. Mid region has many skid roads.
12	Homestead Riparian West Edge (recovering clear-cut)	Flat up to 6° at S end	60°	<5% 10-25m Bg DBH to 305mm Cw DBH to 310mm Dr DBH to 165mm occ. Hw & standing dead on marsh edge, most <15m. Creek (N end): 10-12m Dr DBH 90-170mm occ. Fd DBH 90mm Hw DBH 90mm.		<10m Regen. 5-10%: Bg Cw Dr, Fd, Ss. Other mix to 20%: cascara, evergreen blackberry, red elderberry, red huckleberry, salmonberry, spirea, trailing blackberry. Creek: salmonberry 75%, Mix <5%: Bg, bigleaf maple, bitter cherry, cascara, Hw., Scotch broom & trailing blackberry.	bracken 15% Canada thistle 5% reed canary patches to 70% slough sedge patches 10% sword fern patches to 20% Other: bleeding heart, deer fern, grass sp., lady fern, skunk cabbage & vanilla leaf. Creek: (mostly at open road crossing) American brooklime, bracken, common juncus, hedge nettle, herb robert, lady fern, large-leaved avens, marsh forget-me-not, slough sedge, sweet cicely & wall flower.	Occ. Menzie's tree moss, Oregon beaked moss esp. on wood.	N is creek portion, then widens to 15m as a flat to gentle toe of slope along western marsh edge. Mostly open canopy. CWD, stumps & duff 20%. Active harvest & travel area for beaver. Creek: floodplain of small creek is 75% bare with Bg & Cw stumps, CWD 5%.
13	Homestead Marsh (wetland)	flat		5% 20-25m dead second-growth snags: Bg, Cw, occ. bigleaf maple.		Spirea overall 35% (S end 20%). Standing dead trees <5% Other mix: Dr, Pacific crab apple, red elderberry, salmonberry.	Emergent (Most at N end): reed canary grass 10%, common rush 15%, slough sedge 10%, other sedge sp. 25%, small-flowered bulrush 2%, mix of cattail & soft-stemmed bulrush 5%. Other: narrow-leaved bur-reed. Floating/submerged Mix (Most at S end 30%): floating-leaved pondweed, water smartweed, watershield, yellow pond-lily. Also common duckweed, greater bladderwort (plentiful but unknown cover).		Beaver-dammed wetland & includes flooded ditches & former low-meadow land of Swale Farm Grazing meadow, zone 19. Open water primarily in S 50% & N 10%.
14	Homestead Forest (recovering clear-cut flats)	~flat		Main resid. <5% >20m Bg DBH 250mm, Cw DBH to 735mm, Fd DBH 300-355mm Few dead or dying along marsh edge.	5-10% young trees 10-20m Cw DBH 215mm, Fd occ. Dr & Hw.	<10m 10-15%: Bg Dr Fd Hw PI Pw. dull Oregon grape 10% Other mix 5-10%: baldhip rose, English holly, evergreen blackberry, gummy gooseberry, Nootka rose, Pacific crab apple, red huckleberry, salal, Scotch broom, snowberry, trailing blackberry, twin flower.	bracken 25% reed canary 5-10% Other mix: bedstraw, bull thistle, buttercup sp., Canada thistle, clover sp., common tansy, English daisy, foxglove, grass sp., hairy cat's ear, herb robert, Lyall's anemone, pearly ever-lasting, self heal, star flower, sweet cicely, thyme-leaved speedwell, vanilla leaf, wall lettuce, yerba buena.	<5% badge, lanky, Menzie's tree & Oregon & slender beaked mosses.	Recovering clearcut adjacent to old home site, homestead marsh, NE marsh & Swale Woods. Numerous recent stumps & hummocks, as well as sections of railway logging embankments, skid roads & split-rail fence along Lake Farm border.

Table 2 E: Vegetation Terrain Zones 15-19.

Zone	Type & Name	Slope	Aspect	Canopy Main DBH (mm) Approx. Heights (m) & Cover (%)	Canopy Secondary DBH (mm) Approx. Heights (m) & Cover (%)	Shrub	Herb	Moss	Features/ Description
15	NE Marsh (wetland)	flat				<10m regen. 5%: Bg Cw Dr Hw. Other 15% mix: cascara, non-native ash sp., Pacific crab apple, red huckleberry, spirea & trailing blackberry.	slough sedge 85% reed canary grass <10% Other 5-10% mix: bed straw, bracken, bull thistle, buttercup sp., Canada thistle, common rush, grass sp., hedge nettle, lady fern & marsh speedwell.		Sedge wetland on NE edge of recovering clearcut, stumps on edges & split rail fence along Lake Farm border.
16	Home-site Forest (forest remnant)	~flat		25% 20-30m Bg DBH 375- 615mm Fd DBH 405- 530mm		2% cover 10 domestic apple trees under canopy (8 living). Other <2% mix: English holly, non- native ash, Pacific dogwood, red elderberry, trailing blackberry.	reed canary grass 50%. Other 5% mix: bracken, common tansy, creeping buttercup, herb robert, stinging nettle, sweet cicely, sword fern, wall lettuce, yerba buena.	15-20% badger, electrified cat's tail, Oregon beaked & step mosses.	Ring of conifers & old orchard at former home site, about 35 yr (>20 years older than recent clear- cut). Old metal debris & invasive, non-native species.
17	Swale Woods (forest remnant)	mostly flat, SW edge 8°	40°	25% 40-50m Bg DBH 450- 1025mm At N end Fd DBH 510-590mm Cw DBH 465 to 610mm occ. Pw DBH 330mm	10% 10-30m Mix: bitter cherry DBH 235mm, Bg DBH 135- 335mm cascara DBH 150-210mm Cw DBH 135 to 225mm Dr DBH to 215mm Fd DBH 180mm non-native ash sp. DBH 285mm.	<10m 40% bald hip rose <5% cascara 10% Nootka rose 10% Pacific crab apple 20% trailing blackberry <5% <10% mix: Bg, Cw, Fd Other 1-2%: dull Oregon-grape, English holly, non- native ash sp., red huckleberry, salal, salmonberry.	slough sedge 85% Other <5% mix: bed straw, bracken, cleavers, creeping buttercup, grass sp., herb robert, large-eaved avens, Lyal's anemone, sword fern & occ. stinging nettle, thyme- leaved speedwell.	35% in dry forest badger, electrified cat's tail, Menzie's tree, Oregon beaked, tree & occ. step & Mnium sp. mosses. <2% in wet forest: Oregon- beaked & step mosses.	30m wide strip of residual forest near E border, adjacent to powerline & Swale marsh. Numerous shrubs with dominant slough sedge. Continuation of NE Marsh, draining into Swale. Split rail fence on W & N.
18	Former Swale Wetland Meadow (meadow)	flat				single cherry 3.5m occ. Nootka rose 2.5m spirea <5% along ditch single Pacific crab apple 3m	buttercup sp. <1% Canada thistle <1% reed canary grass 90% slough sedge <5% other sedge <5%.		Former hay & pasture meadow. Deep fenceline ditches on N & E, & powerline on W edge.
19	Swale Farm Grazing Meadow (meadow)	~flat		<20m single Fd 2 dead snags		15% <10m Mix: regen. Cw, Fd, English hawthorn, evergreen blackberry, Nootka rose, Pacific crab apple, spirea, wild plum.	cattail <5% common rush 40% various pasture grass sp 40% (reed canary grass <1%) Other mix: Canada thistle, common plantain, creeping & western buttercup, hairy cats' ear, marsh speedwell, self heal, white clover & yarrow.		Hummocky, open meadow grazed by cattle of adjacent Swale farm. Former drainage ditches on N & W edges. Flooding of low areas, due to beaver dam in main ditch, extends Homestead wetland.

6.3.2 Terrain Zone Wildlife Species

Table 3. Wildlife Species in Each Terrain Zone. See Appendix II for wildlife codes.

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 HUWI 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	<i>see Pickles Marsh & Pickles Marsh Buffer Forest</i>
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 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
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

Table 3 cont'd. Wildlife Species in Each Terrain Zone.

Zone	Type & Name	Wildlife Noted During Baseline Survey (Mammals/ Birds/ Reptiles & Amphibians/ Invertebrates - on alternate lines)
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 VIR 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

6.4 Non-vegetative Features

A variety of additional features are found on the Lands:

- Beaver dams and lodges are present on the Lands. Beavers maintain the hydrology of the Lands, particularly the wetlands' water levels and creeks' flow due to wetland management. These wetlands provide fresh water and habitat opportunities for the rest of the wildlife species. They also retain water, providing moisture for adjacent vegetation.
- Small glacial erratics, Photo site F3, often greater than 1m in diameter, are dispersed infrequently over the Lands.
- Old logging railway embankments are present in Terrain zones 5, 8b, and 14. On the Lands, 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.
- Typical of Denman's early homesteads, there are cedar split-rail fences on the Lands. A good fence runs on the perimeter along the north and through the east side of Terrain zone 14.
- Straight drainage ditches, up to 1m deep, remain from previous agricultural drainage efforts in Terrain zones 13, 18 and 19. Also a shallow ditch-like depression in Terrain zone 8b just northeast of Central Road may have been dug to drain off water to Pickles Marsh adjacent to the old railway logging route.
- Remains of previous dumping activities exist at two major sites. The former 'official' dump site, 90m by 20m, was largely covered with fill, although some embedded material is still evident. Adjacent to Pickles Marsh, two old vehicles, are partially buried and grown over by vegetation and other material is partially buried under sand just below the crest of the slope for a distance of 20m by 40m.
- Old skid roads, most currently covered by red alder, criss-cross the Lands. Many are shown on Figure 2. The designated trails make use of former skid roads, including the remains of an older

forestry road that comes off the south side of Chickadee Road, just east of Pickles Creek, runs south, then west, crosses Pickles Creek and returns to Chickadee Road.

- An old re-stored bridge 3.8 x 1.1 m crosses a creek flowing into Pickles Marsh in the northwest portion of the Lands, photosite F 16.

6.5 Risks to the Lands

The principal risks to the Lands include:

- Harm to the beaver population through disturbance, disease or nuisance trapping. The loss of beavers and their maintenance of dams and water levels would completely reduce the critical wetland features of the Lands.
- Accidental wildfire caused by humans and resulting from several actions 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 smokers who are careless about the disposal of butts. Widespread fire could destroy the regenerating forest. Currently, widespread wild fire due to lightening is rare risk.

Other risks include:

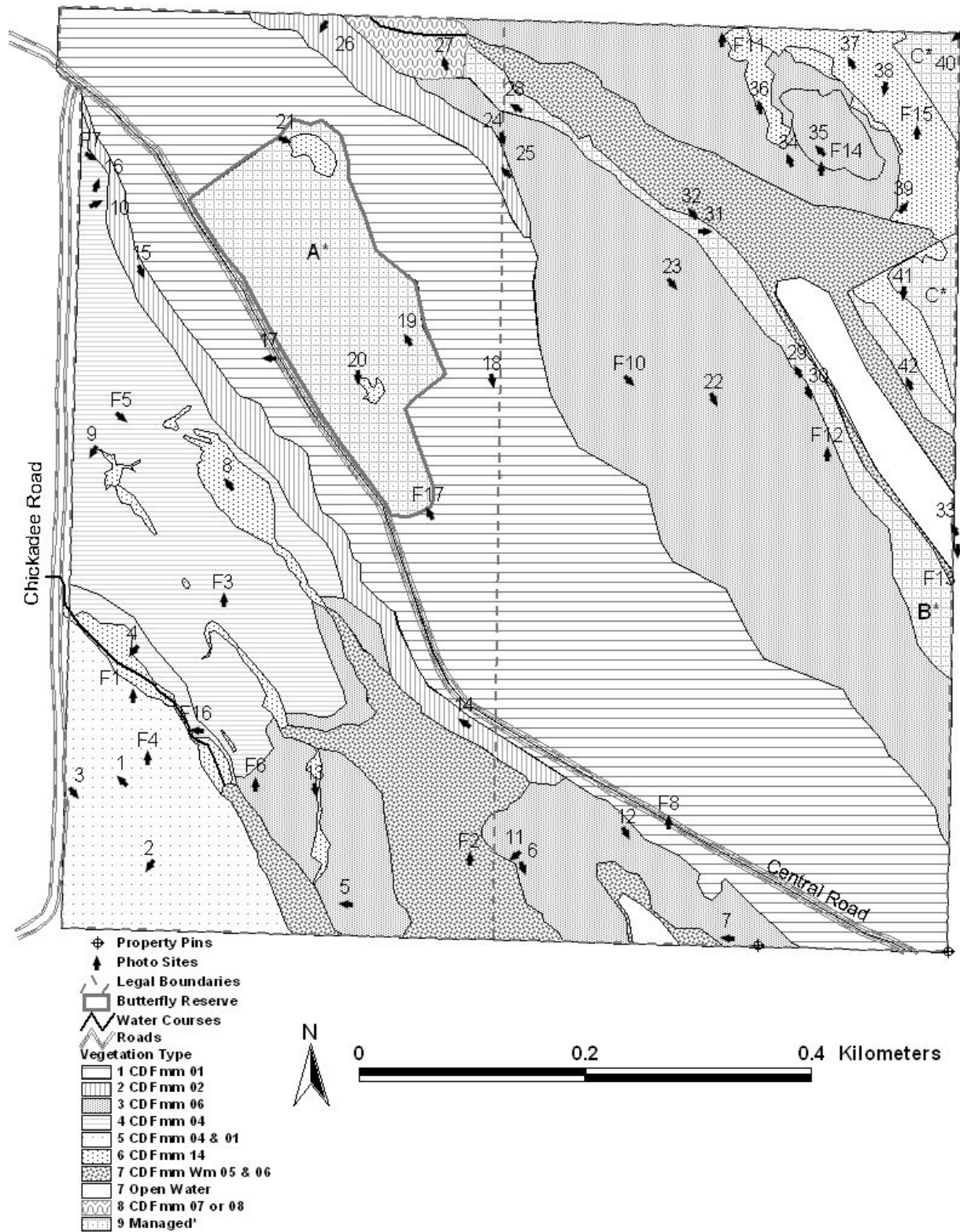
- Invasive alien species, such as broom, St. John's wort, English holly, reed canary grass and black slugs. These plant species tend to dominate the habitat and encroach upon the surrounding area such that they retard the regeneration of native species or out-compete them. Black slugs are increasingly seen in wild lands on Denman Island 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 species or to new diseases, as discussed below.
- New and more virulent forms of root-rot or other diseases. The extensive world-wide travel by islanders who then visit the Lands or who cross through in vehicles, may inadvertently lead to the introduction of diseases new to the Lands. In addition, new farm practices, spraying or the introduction of new plant or animal species may adversely affect the Lands' ecosystems.
- 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. Windthrow along the borders with the private land could have more of a severe impact on the entire edge forests if the border trees on the private lands were cut.
- Excessive nutrient-loading or other pollutants in the creeks and wetlands. Excessive nutrients could cause blooms that would choke out some species and lead to the growth of more nutrient-tolerant invasives. Other pollutants could poison wetlands or add to toxins that are accumulated through the food web and result in species degradation. Adjacent agricultural activities could be the source of nutrient loading through water run-off.
- Border encroachment. Almost ½ of the Lands borders other protected areas and thus encroachment at these sites is unlikely to cause major problems, but the long borders with private land are unmarked and encroachment issues there are possible. Currently, cattle range on the Swale Farm Grazing Meadow, but a proposed fencing project along the Lands' border with the Swale farm cattle pasture will prevent cattle access.
- Climate change, an unknown risk factor. Increased severe storm events, as noted in the point about winds, may lead to additional windthrow damage to forests. Increased risk of natural forest fires could result from lightening during thunderstorms that may become more common. Drying effects will affect shallow wetlands, but in general the wet Lands is likely to be a refugia for fauna and flora.

7.0 References

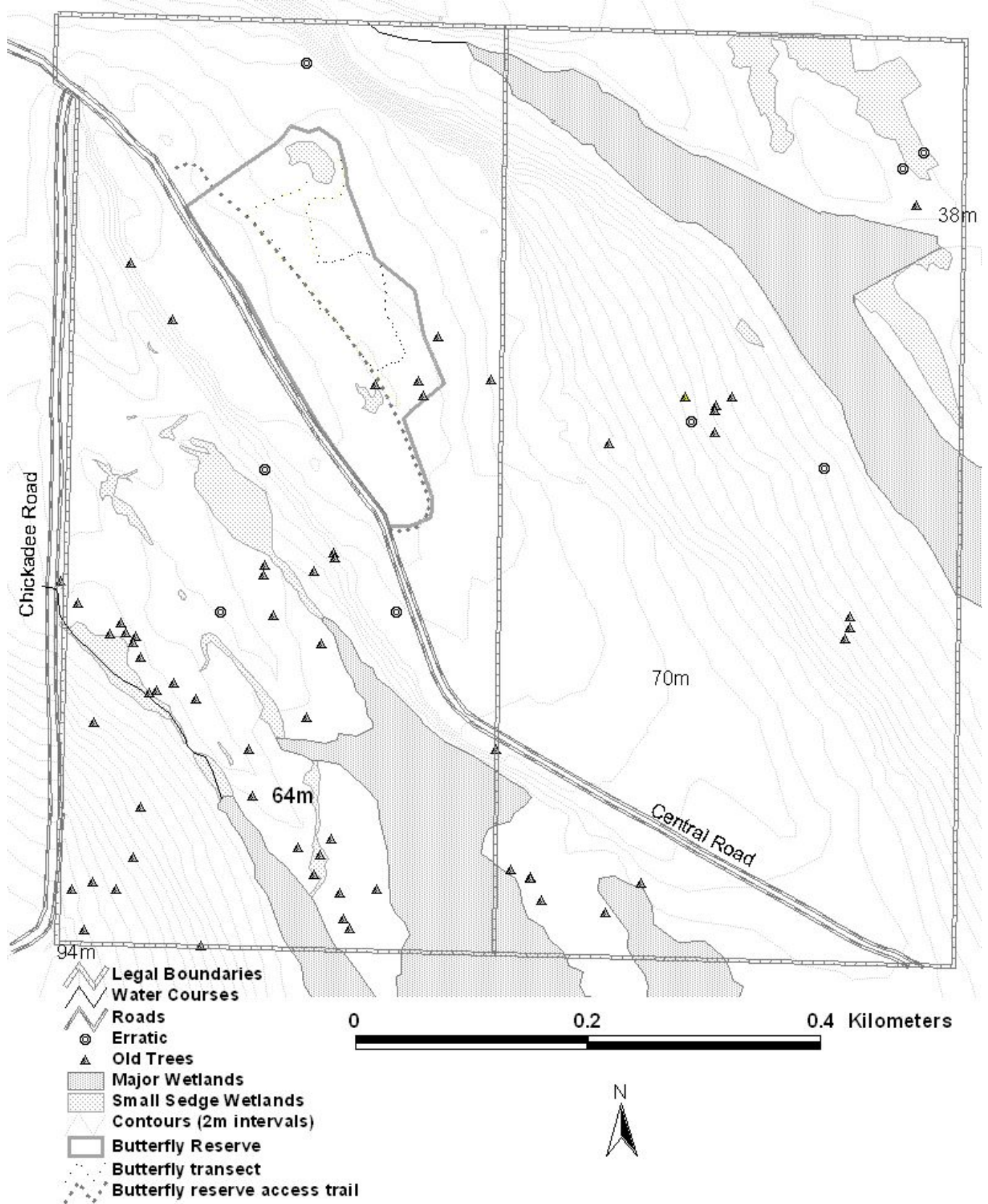
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8.0 Figures and Attachments

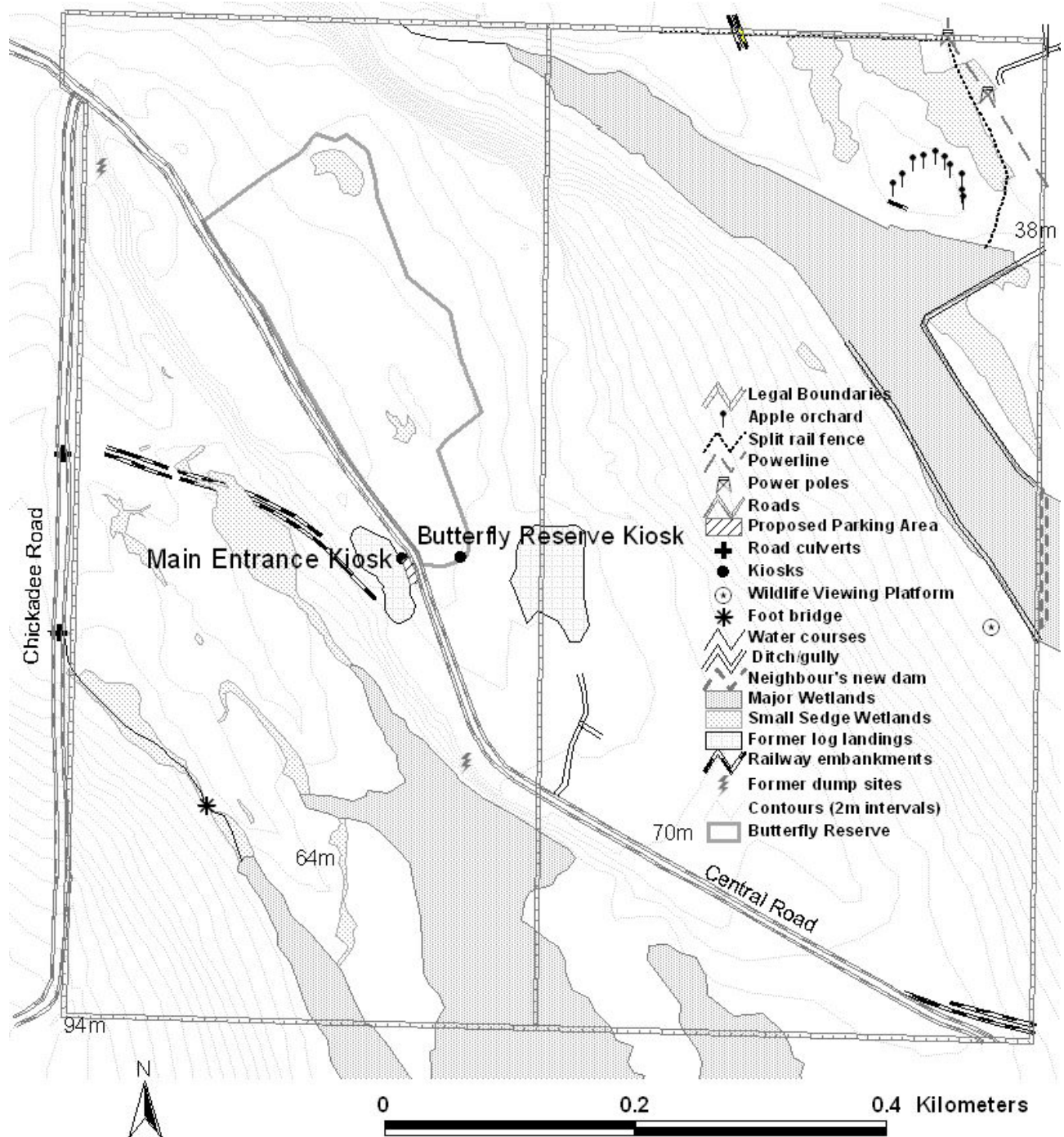
8.1 Map of the Lands – Vegetation Types



8.2 Map of the Lands – Natural Features and Butterfly Reserve



8.3 Map of the Lands – Manmade Features



Appendix I. Photo Site Table of Vegetation Types and Features.

This includes photographs of significant features and vegetation types in the Lands.

All photos were taken by J. Balke during field surveys between May 25 and Sept 8, 2016.

Photos are on file with the Owner and the Covenant Holder.

1. Vegetation Types Photos

#	Terrain Zone	Name	Comment	Veg Type	Date	UTM	Aspect
1	1	Pickles Slope	dry medium driest	CDFmm 01 & CDFmm 04	Jul-19	10 U 369092 5490207	315
2	1	Pickles Slope			Jul-19	10 U 369116 5490132	213
3	1	Pickles Slope			Jul-19	10 U 369050 5490196	140
4	2	Pickles Creek & Wetland		CDFmm 04, CDFmm/14-Ws 52	Jul-19	10 U 369102 5490321	220
5	3	Pickles Marsh West Bay		CDFmm / Wm 05- CDFmm / Wm 06, & open water	Jul-19	10 U 369289 5490098	275
6	3	Pickles Marsh Middle			Aug-03	10 U 369443 5490138	230
7	3	Pickles Marsh East Bay			Aug-03	10 U 369627 5490068	275
8	4	Lowlands Marshes		CDFmm/14-Ws 52	Jun-26	10 U 369186 5490470	325
9	5	Lowlands Forest		CDFmm 04	Aug-27	10 U 369065 5490496	210
10	5	Lowlands Forest			Jun-25	10 U 369070 5490732	165
11	6	Pickles Buffer Forest		CDFmm 02, CDFmm 06, CDFmm/14-Ws 52	Aug-03	10 U 369443 5490138	160
12	6	Pickles Buffer Forest			Jun-25	10 U 369538 5490159	150
13	6	Pickles Buffer Forest		CDFmm/14-Ws 52	Aug-27	10 U 369262 5490198	170
14	6	Pickles Buffer Forest steep		CDFmm 02	Sep-08	10 U 369394 5490259	305
15	7	Lowlands Slope steep		CDFmm 02, CDFmm 04	Aug-14	10 U 369110 5490656	160
16	7	Lowlands Slope			Jun-25	10 U 369070 5490732	20
17	8a	Uplands West		CDFmm 01	Jun-25	10 U 369222 5490579	270
18	8b	Uplands East		CDFmm 01	Jun-24	10 U 369418 5490568	170
19	8b	Butterfly Reserve		CDFmm 01 - Managed	Jun-24	10 U 369344 5490597	330
20	9	Big Tree Marsh		CDFmm/14-Ws 52	Jun-23	10 U 369300 5490562	180
21	10	Transect Marsh		CDFmm/14-Ws 52	Jun-24	10 U 369237 5490771	110
22	11	Homestead Slope		(gentle slope from Uplands CDFmm 01) CDFmm 06	Jun-20	10 U 369615 5490542	155
23	11	Homestead Slope			Aug-26	10 U 369578 5490645	140
24	11	Homestead Slope	sl. steep		Jun-20	10 U 369426 5490772	166
25	11	Homestead Slope	steeper	CDFmm 02	Sep-08	10 U 369431 5490743	315
26	11	Homestead Slope	steepest	CDFmm 02	Aug-27	10 U 369269 5490871	210
27	12	Homestead Riparian W Creek		CDFmm / 07 or CDFmm / 08	Jun-19	10 U 369377 5490839	345
28	12	Homestead Riparian W		Managed	Jun-19	10 U 369439 5490800	300
29	12	Homestead Riparian W			Jun-19	10 U 369698 5490556	330
30	12	Homestead Riparian W			Jun-19	10 U 369698 5490556	160
31	13	Homestead Marsh	Mid to N	CDFmm / Wm 05 & CDFmm / Wm 06	Jun-19	10 U 369600 5490704	90
32	13	Homestead Marsh	Mid to S		Jun-19	10 U 369600 5490704	322
33	13	Homestead Marsh	S end	open water	Jul-14	10 U 369830 5490416	330
34	14	Homestead Forest		CDFmm 06	Jun-13	10 U 369681 5490754	340
35	15	Home-site Forest		CDFmm 06	Jun-13	10 U 369708 5490762	316
36	16	NE Marsh		CDFmm/14-Ws 52	Jun-13	10 U 369656 5490801	351

37	17	Swale Woods	North	CDFmm 06, CDFmm/14-Ws 52	Jun-13	10 U 369736 5490840	330
38	17	Swale Woods	Mid - wetland		Sep-09	10 U 369766 5490816	190
39	17	Swale Woods	South		Aug-27	10 U 369782 5490713	40
40	18	Former Swale Wetland		Managed	Jun-12	10 U 369831 5490862	228
41	19	Swale Grazing		Managed	Jun-12	10 U 369779 5490645	185
42	19	Swale Grazing		Managed	Jun-12	10 U 369783 5490556	336

2. Features Photos

#	Feature Type	Terrain Zone	Terrain Zone Name	Date	UTM
F1	Spring-board Stumps	1	Pickles Slope	May-31	10 U 369102 5490282
F2	Tule & Cattail Wetland Mix	3	Pickles Marsh	Aug-03	10 U 369400 5490137
F3	Erratic	5	Lowlands Forest	Jun-26	10 U 369183 5490366
F4	Canopy Closure (Pole-sapling)	5	Lowlands Forest	May-31	10 U 369116 5490226
F5	Railway Embankment	5	Lowlands Forest	Aug-27	10 U 369093 5490527
F6	Old-growth Douglas-fir	6	Pickles Buffer Forest	Jun-25	10 U 369211 5490204
F7	St John's Wort	7	Lowlands Slope	Aug-27	10 U 369066 5490748
F8	Central Road	8	Uplands	Jun-19	10 U 369576 5490169
F9	Rocky Surface	8	Uplands Forest	Sep-04	many
F10	Skid Road	11	Homestead Slope	Jun-20	10 U 369543 5490561
F11	Rocky Cliff	11	Homestead Slope	Sep-04	10 U 369426 5490481
F12	Beaver Activity	12	Homestead Riparian	Sep-09	10 U 369715 5490493
F13	New Farm-dam	13	Homestead Marsh	Jul-14	10 U 369830 5490416
F14	Domestic Apple Tree	16	Home-site Forest	Aug-27	10 U 369710 5490745
F15	Split-rail Fence	17	Swale Woods	Jun-12	10 U 369795 5490777
F 16	Foot Bridge	2	Creek & Riparian	Apr-14*	10 U 369157 5490249
F 17	Butterfly Kiosk	8	Uplands Forest	Mar-14*	10 U 369360 5490446

* 2017

Appendix II. Overall Wildlife List on Settlement Lands.

Common Name	Scientific Name	Rarity	Code
Mammals			
*Bat species identified from Anabat Walkabout's echolocation call record.			
American beaver	<i>Castor canadensis</i>		CACA
black-tailed deer	<i>Odocoileus hemionus</i>		ODVI
deer mouse	<i>Peromyscus maniculatus</i>		PEMA
hoary bat*	<i>Lasiurus cinereus</i>		LACI
little brown bat*	<i>Myotis lucifugus</i>	SARA Endangered	MYLU
mink	<i>Mustela vison</i>		MUVI
raccoon	<i>Procyon lotor</i>		RACC
red squirrel	<i>Tamiasciurus hudsonicus</i>		TAHU
river otter	<i>Lontra canadensis</i>		LOCA
western long-eared bat*	<i>Myotis evotis</i>		MYEV
Birds			
American goldfinch	<i>Carduelis tristis</i>		AMGO
American robin	<i>Turdus migratorius</i>		AMRO
bald eagle	<i>Haliaeetus leucocephalus</i>		BAEA
band-tailed pigeon	<i>Patagioenas fasciata</i>	SARA SP; BC BLUE	BTP1
barn owl	<i>Tyto alba</i>	SARA SP; BC BLUE	BAOW
barn swallow	<i>Hirundo rustica</i>	BC BLUE	BASW
barred owl	<i>Strix varia</i>		BAOW
Bewick's Wren	<i>Thryomanes bewickii</i>		BEWR
black-throated gray warbler	<i>Dendroica nigrescens</i>		BTGW
brown creeper	<i>Certhia americana</i>		BRCR
brown-headed cowbird	<i>Molothrus ater</i>		BRCO
bushtit	<i>Psaltiriparus minimus</i>		BUSH
Canada goose	<i>Branta canadensis</i>		CAGO
Cassin's vireo	<i>Vireo cassinii</i>		CAVI
cedar waxwing	<i>Bombycilla cedrorum</i>		CEWA
chestnut-backed chickadee	<i>Parus rufescens</i>		CBCH
chipping sparrow	<i>Spizella passerina</i>		CHSP
common nighthawk	<i>Chordeiles minor</i>	SARA TH	CONI
common raven	<i>Corvus corax</i>		CORA
common yellowthroat	<i>Geothlypis trichas</i>		COYE
cooper's hawk	<i>Accipiter cooperii</i>		COHA
dark-eyed junco	<i>Junco hyemalis</i>		DEJU
downy woodpecker	<i>Picoides pubescens</i>		DOWO
European starling	<i>Sturnus vulgaris</i> (Intro)		EUST
fox sparrow	<i>Passerella iliaca</i>		FOSP
golden-crowned kinglet	<i>Regulus satrapa</i>		GCKI
great blue heron	<i>Ardea herodias</i>	SARA SP; BC BLUE	GBHE
hairy woodpecker	<i>Picoides villosus</i>		HAWO
hammond's flycatcher	<i>Empidonax hammondi</i>		HAFL
hermit thrush	<i>Catharus guttatus</i>		HETH
hooded merganser	<i>Lophodytes cucullatus</i>		HOME
house finch	<i>Carpodacus mexicanus</i>		HOFI
house wren	<i>Troglodytes aedon</i>		HOWR
hutton's vireo	<i>Vireo huttoni</i>		HUVI
killdeer	<i>Charadrius vociferus</i>		KILL
MacGillivray's warbler	<i>Oporornis tolmiei</i>		MAWA
mallard	<i>Anas platyrhynchos</i>		MALL
marsh wren	<i>Cistothorus palustris</i>		MAWR
northern flicker	<i>Colaptes auratus</i>		NOFL

northern harrier	<i>Circus cyaneus</i>		NOHA
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Overall Wildlife List Cont'd.

northern harrier	<i>Circus cyaneus</i>		NOHA
northern saw-whet owl	<i>Aegolius acadicus</i>		NSOW
northwestern crow	<i>Corvus caurinus</i>		NOCR
olive-sided flycatcher	<i>Contopus borealis</i>	SARA TH; BC BLUE	OSFL
orange-crowned warbler	<i>Oreothlypis celata</i>		OCWA
Pacific-slope flycatcher	<i>Empidonax difficilis</i>		PSFL
Pacific (winter) wren	<i>Troglodytes pacificus</i>		PAWR
pied-billed grebe	<i>Podilymbus podiceps</i>		PBGR
pileated woodpecker	<i>Dryocopus pileatus</i>		PIWO
pine siskin	<i>Carduelis pinus</i>		PISI
purple finch	<i>Carpodacus purpureus</i>		PUFI
red crossbill	<i>Loxia curvirostra</i>		RECR
red-breasted nuthatch	<i>Sitta canadensis</i>		RBNU
red-breasted sapsucker	<i>Sphyrapicus ruber</i>		RBSA
red-tailed hawk	<i>Buteo jamaicensis</i>		RTHA
red-winged blackbird	<i>Agelaius phoeniceus</i>		RWBL
ring-necked pheasant	<i>Phasianus colchicus</i> (Intro)		RNPH
ruby-crowned kinglet	<i>Regulus calendula</i>		RCKI
rufous hummingbird	<i>Selasphorus rufus</i>		RUHU
song sparrow	<i>Melospiza melodia</i>		SOSP
sora	<i>Porzana carolina</i>		SORA
sooty grouse	<i>Dendragapus obscurus</i>		SOGR
spotted towhee	<i>Pipilo erythrophthalmus</i>		SPTO
Swainson's thrush	<i>Catharus ustulatus</i>		SWTH
Townsend's warbler	<i>Setophaga townsendi</i>		TOWA
tree swallow	<i>Tachycineta bicolor</i>		TRSW
trumpeter swan	<i>Cygnus buccinator</i>		TRSW
turkey vulture	<i>Cathartes aura</i>		TUVU
varied thrush	<i>Ixoreus naevius</i>		VATH
violet-green swallow	<i>Tachycineta thalassina</i>		VGSW
Virginia rail	<i>Rallus limicola</i>		VIRA
warbling vireo	<i>Vireo gilvus</i>		WAVI
western screech-owl	<i>Otus kennicottii</i>	SARA SP; BC Blue	WESO
western tanager	<i>Piranga ludoviciana</i>		WETA
western wood-pewee	<i>Contopus sordidulus</i>		WWPE
white-crowned sparrow	<i>Zonotrichia leucophrys</i>		WCSP
willow flycatcher	<i>Empidonax traillii</i>		WIFL
Wilson's warbler	<i>Wilsonia pusilla</i>		WIWA
wood duck	<i>Aix sponsa</i>		WODU
yellow warbler	<i>Dendroica petechia</i>		Yewa
yellow-rumped warbler	<i>Dendroica coronata</i>		YRWA
Amphibians & Reptiles			
common garter snake	<i>Thamnopsis sirtalis</i>		THSI
northern alligator lizard	<i>Elgaria coerulea</i>		ELCO
northwestern garter snake	<i>Thamnopsis ordinoides</i>		THOR
northern red-legged frog	<i>Rana aurora</i>	SARA SP; BC BLUE	RLFR
Pacific chorus frog	<i>Pseudacris regilla</i>		PSRE
Invertebrates			
Butterflies			
arctic skipper	<i>Carterocephalus palaemon</i>		ARSK
anise swallowtail	<i>Papilio zelicaon</i>		ANSW
cedar hairstreak	<i>Mitoura rosneri</i>		
common wood nymph	<i>Cercyonis pegala</i>	BC RED	COWO
dun skipper	<i>Euphyes vestries</i>	SARA TH; BC RED	

grey hairstreak	<i>Strymon melinus</i>		
hydaspe fritillary	<i>Speyeria hydaspe</i>		HYFR
Lorquin's admiral	<i>Limnitis lorquini</i>		
marginated white	<i>Pieris marginalis</i>		

Overall Wildlife List Cont'd.

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

Appendix III. Overall Plant List on Settlement Lands.

* Introduced.

Scientific Name	Common Name	Scientific Name	Common Name
<i>Abies grandis</i>	grand fir	* <i>Cytisus scoparius</i>	Scotch broom
<i>Acer macrophyllum</i>	big-leaf maple	* <i>Dactylis glomerata</i>	cock'sfoot grass
<i>Achillea millifolium</i>	yarrow	* <i>Digitalis purpurea</i>	foxglove
<i>Achlys triphylla</i>	vanilla leaf	<i>Dicentra formosa</i>	Pacific bleeding-heart
<i>Adenocaulon bicolor</i>	pathfinder	<i>Dryopteris expansa</i>	spiny wood fern
* <i>Agrostis stolonifera</i>	creeping bentgrass	<i>Eleocharis palustris</i>	common spike-rush
* <i>Aira caryophylla</i>	silver hair grass	<i>Elymus glaucus</i>	blue wildrye
* <i>Aira praecox</i>	spring hair grass	<i>Epilobium angustifolium</i>	fireweed
<i>Alnus rubra</i>	red alder	<i>Epilobium ciliatum</i>	purple-leaved willowherb
<i>Anaphalis margaritacea</i>	pearly everlasting	<i>Epilobium sp.</i>	willowherb
<i>Anemone lyallii</i>	Lyall's anemone	<i>Equisetum arvense</i>	common horsetail
* <i>Anthoxanthum odoratum</i>	sweet vernal grass	<i>Equisetum telmateia</i>	giant horsetail
<i>Aquilegia formosa</i>	Sitka columbine	<i>Festuca pratensis</i>	meadow fescue
<i>Arbutus menziesii</i>	arbutus	<i>Festuca rubra</i>	red fescue
<i>Asarum caudatum</i>	wild ginger	<i>Fragaria vesca</i>	wild strawberry
<i>Athyrium filix-femina</i>	lady fern	<i>Galium aparine</i>	cleavers
<i>Boschniakia hookeri</i>	Vancouver groundcone	<i>Galium triflorum</i>	sweet-scented bedstraw
<i>Bothrychium multifidum</i>	leathery grape fern	<i>Gaultheria shallon</i>	salal
* <i>Bromus inermis</i>	smooth brome	* <i>Geranium molle</i>	dove's foot cranesbill
* <i>Bromus hordeaceus</i>	soft brome	* <i>Geranium robertianum</i>	herb robert
<i>Bromus vulgaris</i>	Columbia brome	<i>Geum macrophyllum</i>	large-leaved avens
<i>Bromus sitchensis</i>	Alaska brome	<i>Glyceria borealis</i>	northern mannagrass
<i>Campanula scouleri</i>	Scouler's harebell	<i>Glyceria striata</i>	fowl mannagrass
<i>Cardamine oligosperma</i>	little western bitter-cress	<i>Gnaphalium palustre</i>	lowland cudweed
<i>Carex deweyana</i>	Dewey's sedge	<i>Gnaphalium uliginosum</i>	marsh cudweed
<i>Carex exsiccata</i>	inflated sedge	<i>Heuchera micrantha</i>	small-flowered alumroot
<i>Carex hendersonii</i>	Henderson's sedge	<i>Hieracium albiflorum</i>	white hawkweed
<i>Carex lasiocarpa</i>	slender sedge	* <i>Holcus lanatus</i>	Yorkshire fog
<i>Carex obnupta</i>	slough sedge	<i>Holodiscus discolor</i>	oceanspray
<i>Carex polystachya</i>	thick-headed sedge	<i>Hypericum anagalloides</i>	bog St. John's-wort
<i>Carex scoparia</i>	pointed broom sedge	* <i>Hypericum androsaemum</i>	tutsan
<i>Carex stipata</i>	sawbeak sedge	* <i>Hypochaeris radicata</i>	hairy cat's ear
<i>Carex viridula</i>	green sedge	* <i>Ilex aquifolium</i>	English Holly
<i>Cerastium fontanum</i>	mouse-ear chickweed	<i>Juncus acuminatus</i>	tapered rush
<i>Chimaphila umbellata</i>	pipsissewa/ Prince's pine	<i>Juncus effusus</i>	common rush
* <i>Cirsium arvense</i>	Canada thistle	<i>Juncus ensifolius</i>	dagger-leaf rush
<i>Cirsium brevistylum</i>	short-styled thistle	<i>Juncus tenuis</i>	slender rush
* <i>Cirsium vulgare</i>	bull thistle	* <i>Lactuca muralis</i>	wall lettuce
<i>Claytonia perfoliata</i>	miner's lettuce	* <i>Lathyrus sylvestris</i>	everlasting pea
<i>Claytonia sibirica</i>	Siberian miner's lettuce	<i>Ledum groenlandicum</i>	Labrador tea
* <i>Digitalis purpurea</i>	foxglove	<i>Lemna minor</i>	common duckweed
<i>Collomia heterophylla</i>	vari-leaved collomia	* <i>Leucanthemum vulgare</i>	oxeye daisy
<i>Cornus nuttallii</i>	Pacific dogwood	<i>Linnaea borealis</i>	twinflower
* <i>Crataegus monogyna</i>	hawthorn	<i>Lonicera ciliosa</i>	orange honeysuckle
* <i>Crepis capillaris</i>	smooth hawksbeard	<i>Lonicera hispidula</i>	hairy honeysuckle
* <i>Cynosurus cristatus</i>	crested dogtail	* <i>Lapsana communis</i>	nipplewort

Scientific Name	Common Name	Scientific Name	Common Name
<i>Luzula multiflora</i>	many-flowered woodrush	* <i>Rubus laciniata</i>	evergreen blackberry
<i>Luzula parviflora</i>	small-flowered woodrush	<i>Rubus leucodermis</i>	black raspberry
<i>Lysichiton americanum</i>	skunk cabbage	<i>Rubus parviflorum</i>	thimbleberry
<i>Mahonia aquifolium</i>	tall Oregon grape	<i>Rubus spectabilis</i>	salmonberry
<i>Mahonia nervosa</i>	dull Oregon grape	<i>Rubus ursinus</i>	trailing blackberry
<i>Malus fusca</i>	Pacific crab apple	* <i>Rumex acetosella</i>	sheep's sorrel
* <i>Malus pumila</i>	domestic apple	<i>Rumex aquaticus</i>	western dock
* <i>Matricaria matricarioides</i>	pineapple weed	<i>Salix</i> sp.	willow
<i>Melica subulata</i>	Alaska oniongrass	<i>Sambucus racemosa</i>	red elderberry
* <i>Mentha arvensis</i>	field mint	<i>Sanicula crassicaulis</i>	Pacific sanicle
<i>Microsteris gracilis</i>	pink twink	<i>Satureja douglasii</i>	yerba buena
<i>Mimulus moschatus</i>	monkey flower	<i>Scirpus microcarpus</i>	small-flowered bulrush
<i>Moehringia macrophylla</i>	big-leaved sandwort	<i>Schoenoplectus tabernaemontani</i>	soft-stemmed bulrush
* <i>Myosotis discolor</i>	common forget-me-not	<i>Scutellaria galericulata</i>	marsh skullcap
* <i>Myosotis scorpioides</i>	marsh forget-me-not	<i>Scutellaria lateriflora</i>	blue skullcap
<i>Nemophila parviflora</i>	grove-lover (small-flowered nemophila)	* <i>Senecio sylvaticus</i>	wood groundsel
<i>Nuphar polysepalum</i>	yellow water lily	<i>Solidago canadensis</i>	Canada goldenrod
<i>Oenanthe sarmentosa</i>	Pacific water parsley	* <i>Sonchus asper</i>	prickly sow-thistle
<i>Osmorhiza berteroi</i>	mountain sweet cicely	<i>Sparganium angustifolium</i>	narrow-leaved bur-reed
<i>Paxistima myrsinites</i>	falsebox	<i>Spiraea douglasii</i>	hardhack
<i>Persicaria amphibia</i>	water smartweed	<i>Stachys chamissonis</i>	Cooley's hedgenettle
* <i>Phalaris arundinacea</i>	reed canary grass	<i>Stellaria calycantha</i>	northern starwort
<i>Pinus monticola</i>	western white pine	<i>Stellaria crispa</i>	crisp starwort
<i>Pinus contorta</i>	lodgepole pine	<i>Symphoricarpos mollis</i>	common snowberry
* <i>Plantago lanceolata</i>	ribwort plantain	<i>Symphoricarpos hesperius</i>	creeping snowberry
* <i>Plantago major</i>	broad-leaved plantain	* <i>Tanacetum vulgare</i>	tansy
<i>Poa palustris</i>	fowl bluegrass	* <i>Taraxacum officinale</i>	dandelion
* <i>Poa pratensis</i>	Kentucky bluegrass	<i>Thuja plicata</i>	western red cedar
<i>Polystichum munitum</i>	sword fern	<i>Tiarella trifoliata</i>	three-leaved foamflower
<i>Potamogeton natans</i>	floating pondweed	<i>Trientalis latifolia</i>	northern starflower
<i>Potamogeton richardsonii</i>	Richardson's pondweed	* <i>Trifolium dubium</i>	small hop-clover
<i>Prunella vulgaris</i>	self-heal	* <i>Trifolium repens</i>	white clover
<i>Prunus</i> sp.	plum	<i>Tsuga heterophylla</i>	western hemlock
<i>Pseudotsuga menziesii</i>	Douglas-fir	<i>Typha latifolia</i>	cat-tail
<i>Pteridium aquifolium</i>	bracken	<i>Urtica dioica</i>	stinging nettle
* <i>Ranunculus acris</i>	field buttercup	<i>Utricularia macrorhiza</i>	greater bladderwort
<i>Ranunculus flammula</i>	lesser spearwort	<i>Vaccinium parviflorum</i>	red huckleberry
* <i>Ranunculus repens</i>	creeping buttercup	<i>Vaccinium ovatum</i>	evergreen huckleberry
<i>Ranunculus uncinatus</i>	small-flowered buttercup	<i>Veronica beccabunga</i>	American brooklime
<i>Ribes divaricatum</i>	coastal black gooseberry	* <i>Veronica officinalis</i>	common speedwell
<i>Ribes lacustre</i>	black gooseberry	<i>Veronica scutellata</i>	marsh speedwell
<i>Ribes lobbbii</i>	gummy gooseberry	<i>Veronica serpyllifolia</i>	thyme-leaved speedwell
<i>Ribes sanguineum</i>	red flowering current	* <i>Vicia hirsuta</i>	hairy vetch
<i>Rosa gymnocarpa</i>	baldhip rose	* <i>Vicia lathyroides</i>	spring vetch
<i>Rosa nutkana</i>	Nootka rose	* <i>Vicia sativa</i>	common vetch
* <i>Rubus armeniacus</i>	Himalayan blackberry	* <i>Vinca major</i>	greater periwinkle
		<i>Viola sempervirens</i>	trailing yellow violet

Appendix IV. Butterfly Reserve Monitoring Results 2016.

Butterfly species seen on transect.

Common name	Scientific name	Conservation Status	Dates
anise swallowtail	<i>Papilio zelicaon</i>		May 25, 31
pale tiger swallowtail	<i>Papilio eurymedon</i>		May 25, 31
western elfin	<i>Incisalia iroides</i>		May 25, 31
western pine elfin	<i>Incisalia eryphon</i>	<i>BC Blue list</i>	Apr 7, 28, May 2, 4, 11
western spring azure	<i>Celastrina echo</i>		Apr 19, 28, May 2, 4
Taylor's checkerspot	<i>Euphydryas editha taylori</i>	<i>SARA Endangered</i>	May 4
cedar hairstreak	<i>Mitoura rosneri</i>		May 19

Appendix V. Tree Codes.

Fd
Cw
Bg
Dr

END OF DOCUMENT