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1.0 INTRODUCTION

1.1 SPECIES OF MANAGEMENT CONCERN

British Columbia Timber Sales (BCTS) needs management strategies for species within their operating areas that are potentially adversely affected by forestry related activities. Government direction, especially the Identified Wildlife Management Strategy (IWMS), provides some guidance for forest management of a minority of species; however, most species at risk are not included in the present list of species in the IWMS. Other species have been identified as having specific management requirements through regional Land and Resource Management Plans (LRMPs), Sustainable Resource Management Plans (SRMPs), and Forest and Range Practices Act (FRPA) Section 7 Orders. Some of these species are species at risk; others are not at risk but require management for social and/or economic reasons. Species at risk, which include ecological communities (provincially red/blue-listed and federally COSEWIC/SARA-listed species), commercial management species (primarily for hunting or fishing purposes), and regionally important species together comprise the species of management concern.

The BCTS Skeena Business Area encompasses parts of the North Coast, Kalum, and the Skeena-Stikine Forest Districts in northwestern British Columbia. This report encompasses only those parts in which the BCTS Skeena Business Unit operates, comprised of the North Coast and Kalum Forest Districts, but only the Cranberry and Kispiox Timber Supply Area portions of the Skeena-Stikine Forest District (Figure 1). The Cassiar and Bulkley TSAs are not included.

In 2006, Cambria Gordon Ltd. provided a preliminary list of the species of management concern within the BCTS Skeena Business Area (Wilson 2006), and developed a preliminary risk rating protocol for each species. This list was updated by in 2008 (Guppy 2008) and again in 2012 (Dillon 2012). Forest operations interact with a wide range of wildlife species, including mammals, birds, fish, amphibians, reptiles, plants, ecological communities, and invertebrates (limited to insects and molluscs at this time). Some species of concern do not interact with forest operations, many have only minor or uncommon interactions, and a minority have significant interactions. This report provides a summary for all the species of management concern in the BCTS Skeena Business Area, including a risk assessment for those species in the context of BCTS operations, a summary of the legal/policy and biological issues for each species, a concise synopsis of important information for each species, and management recommendations for each species.
1.2 DOCUMENTS

A list of the documents used to identify potential species of management concern for the BCTS Skeena Business Area is provided in Table 1.

Table 1. Documents Reviewed for Species of Management Concern

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Species Lists and Accounts</th>
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<tr>
<td>Federal</td>
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<tr>
<td>Species at Risk Act</td>
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<td>2015</td>
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<td></td>
<td>COSEWIC Species at Risk</td>
<td>2016</td>
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<td>Provincial</td>
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<tr>
<td>Wildlife Act</td>
<td>Endangered Species</td>
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<tr>
<td>Forest Planning and Practices Regulation (FPPR)</td>
<td>Section 7 Notices</td>
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<tr>
<td>General Actions Regulation (GAR)</td>
<td>GAR Orders (UWR/WHA)</td>
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<td>Identified Wildlife Management Strategies (IWMS)</td>
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<td></td>
<td>Conservation Data Centre (CDC)</td>
<td>2017</td>
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<tr>
<td></td>
<td>BC Species and Ecosystems Explorer (BCSEE)</td>
<td>2017</td>
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<tr>
<td>Regional</td>
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<tr>
<td>Cranberry Sustainable Resource Management Plan (SRMP)</td>
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<td>Great Bear Rainforest Land Use Order (GBR LUO)</td>
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<tr>
<td>Kalum LRMP</td>
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<td>2002</td>
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<td>Kalum SRMP</td>
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<td>West Babine SRMP</td>
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1.3 CONSERVATION STATUS

In the context of species conservation in British Columbia, the term “species” includes species, subspecies, plant varieties, some populations, and ecosystems (ecological communities). All of these categories have been designated by one or more jurisdictions as being of conservation or management concern, under the loose umbrella term “species”. It is therefore important to understand which list or regulation a species falls under, to understand the management requirements.

1.3.1 COSEWIC AND SARA LISTS - CANADA

There are two federal lists of species at risk. There is the list from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and there is the list of the Species at Risk Act (SARA). COSEWIC is an arm’s length body that independently assesses the conservation status of potential species at risk, and provides a conservation ranking of Endangered (E), Threatened (T), Special Concern (SC), or Data Deficient (DD). Species that COSEWIC has identified as Data Deficient lack sufficient data to allow the designation of a defensible conservation status – these species should be considered to be of conservation concern, but without any specific rank. COSEWIC recommends a conservation status for each species to a federal Minister, who then accepts, rejects, or changes the recommended conservation status, after a public review and comment process. Once the Minister has established a conservation status for a species, it becomes part of Schedule 1 of the Species at Risk Act. The Minister quite often
rejects a species for SARA listing, usually for socio-economic reasons rather than a disagreement with the actual conservation status. The COSEWIC list has a moral, but not legal, status; the SARA Schedule 1 list has legal status.

The conservation status of species, subspecies, ecotypes, and geographically distinct populations are determined by COSEWIC and SARA for Canada as a whole; the BC conservation status is determined by the BC Conservation Data Centre. Ecosystems (plant communities) are not considered under COSEWIC or SARA, their conservation statuses are determined by the province.

1.3.2 COSEWIC - CANADA

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is the body that determines the national biological conservation status of all wildlife in Canada. It provides recommendations for species to be managed under the Species at Risk Act, but not all COSEWIC-listed species become SARA-listed. COSEWIC determines the conservation status of species based on their range in Canada only; the status outside Canada is a minor consideration. The ranking system used by COSEWIC for species at risk is:

- NAR (Not at Risk) – the species has been determined to be not of conservation concern.
- SC (Special Concern) – species may become threatened or endangered because of biological factors and identified threats.
- T (Threatened) – species may become endangered if limiting factors are not reversed.
- E (Endangered) – species is facing imminent extinction or extirpation.
- DD (Data Deficient) – species lacks sufficient data to determine a conservation status.

There are also other ranks, but they are not relevant to the species in this report.

1.3.3 SARA - CANADA

The Species at Risk Act (SARA) is the legislation that specifies the national legal conservation status of all wildlife in Canada. The ranking system is the same as is used by COSEWIC. The “competent minister” (one of several federal cabinet ministers) establishes the legal conservation status of species based on information and recommendations provided by COSEWIC, and information and recommendations provided by individuals, organizations, and governments during a public review and comment period. Species protected under the Species at Risk Act are listed on Schedule 1 of the Act.

Once a species is listed on Schedule 1 of the Species at Risk Act, SARA still applies only on federally owned land, or elsewhere if the species is aquatic or is a migratory bird. Species listed as Special Concern do not have any legal management requirements, but should have sufficient management to prevent them from becoming Endangered or Threatened. SARA does not apply to terrestrial amphibians, reptiles, mammals, non-migratory birds, plants, and invertebrates except on federally owned land (primarily Indian Reserves and Military Reserves, in a forestry context). Instead, the province has the responsibility of implementing management requirements for these species.

The Species at Risk Act requires that permits be obtained from the federal government if operations may affect the habitat of an aquatic species or migratory bird that is listed under SARA as Endangered or Threatened.

1.3.2 RED AND BLUE LISTS – BRITISH COLUMBIA

Species of provincial conservation concern are grouped accordingly in “red” (endangered or threatened) and “blue” (special concern) lists. The species may not be of national conservation concern, and frequently are not of global conservation concern.
**RED LIST**: Includes any indigenous species, subspecies or ecological community (= “element”) 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.

**BLUE LIST**: Includes any indigenous species, subspecies or community considered to be Vulnerable (= Special Concern) in British Columbia. Vulnerable 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.

**YELLOW LIST**: List of ecological communities and indigenous species which are not at risk in British Columbia.

Ecological communities, better referred to as ecosystems, are considered to be “species” in the context of rare species conservation. A specific natural plant community (= ecological community) usually results from one or a few site series. It is the more or less stable climax or near climax plant community that defines the ecosystem. Hence a unique ecological community results from one or a few site series, with forested communities (and some that are non-forested) usually defined by the Ministry of Forests Field Guide to Site Identification and Interpretation for each Region. Not all the ecological communities are in the Field Guides, because many of the Guides are outdated. There are also additional ecological communities that result from special ecological factors that are outside the variables used to define site series. The book Wetlands of British Columbia (MacKenzie and Moran. 2004) is the primary reference for wetland and other “wet” ecosystems.

The Biogeoclimatic Ecosystem Classification (BEC) system unit(s) in which each ecological community is known to occur (future inventories may indicate range extensions) are listed for each community. The two-digit number following the slash (01 and up) indicates that the ecological community occurs on a site series that is part of the B.C. Ministry of Forests, Lands and Natural Resource Operations (FLNRO) site series classification. A two-digit number of ‘00’ indicates that the ecological community occurs on a site unit that is not part of the FLNRO site series classification but is recognized from other vegetation and site classifications, and ecosystem mapping projects. References are footnoted for each ecological community.

Determination of the known locations of red-listed ecological communities will not be feasible for many areas at this time, because ecological community occurrences have not been databased by government in an accessible manner. In local areas, Terrestrial Ecosystem Mapping (TEM) has been completed, and will show the locations of each community, to a greater or lesser level of accuracy. Predictive Ecosystem Mapping (PEM) has a lower accuracy, and hence is less useful for determining the locations of rare ecosystems. In any case, site series (ecosystem) identification is a standard part of forest operations planning, and hence, with some increase in this part of planning, will result in the detection of the ecological communities that may be affected by operations.

1.3.5 **CONSERVATION DATA CENTRE RANKS - BRITISH COLUMBIA**

The Conservation Data Centre (CDC) uses a conservation status ranking system developed by NatureServe (http://www.natureserve.org/conservation-tools/conservation-status-assessment). The BC CDC is functionally the provincial branch of the international NatureServe organization. The conservation status ranking codes are summarized in Table 2. Those ranking codes determine whether a species is placed on the red-list or blue-list, as shown in Table 3.
Table 2. Conservation Status Ranking Codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>S</td>
<td>Subnational level (status in a province, i.e., British Columbia)</td>
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<tr>
<td>G</td>
<td>Global level (status throughout its global range)</td>
</tr>
<tr>
<td>S1/G1</td>
<td>Critically imperilled due to extreme rarity (5 or fewer occurrences)</td>
</tr>
<tr>
<td>S2/G2</td>
<td>Imperilled because of rarity (6 to 20 occurrences)</td>
</tr>
<tr>
<td>S3/G3</td>
<td>Rare or uncommon (21 to 100 occurrences)</td>
</tr>
<tr>
<td>S4/G4</td>
<td>Apparently secure, with many occurrences</td>
</tr>
<tr>
<td>S5/G5</td>
<td>Abundant and secure, with many occurrences</td>
</tr>
<tr>
<td>SX, SH</td>
<td>Species extinct (X) or only historically (H) occurred in BC.</td>
</tr>
<tr>
<td>SR</td>
<td>Reported but without persuasive documentation to either accept or reject the report</td>
</tr>
<tr>
<td>SU</td>
<td>Uncertain status, possibly in peril; more information is required</td>
</tr>
<tr>
<td>T</td>
<td>Rank for subspecific taxon (subspecies or variety)</td>
</tr>
<tr>
<td>Q</td>
<td>Taxonomic problems involved; more information is required</td>
</tr>
<tr>
<td>?</td>
<td>Rank tentatively assigned; no information is available or the number of occurrences is estimated</td>
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Table 3. Conservation Status Ranks included in Red and Blue Lists.

<table>
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<th>Blue List</th>
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<td>S2S3, S3, S3?, S3S4</td>
</tr>
<tr>
<td>Plants</td>
<td>SX, SH, S1, S1S2, S2</td>
<td>S2S3, S3</td>
</tr>
<tr>
<td>Ecological Communities</td>
<td>SX, SH, S1, S1S2, S2</td>
<td>S2S3, S3</td>
</tr>
</tbody>
</table>

Global Rank (“G”)

The Global rank is the conservation status of a species on a global scale; most ecological communities presently lack global rankings. For example, a species may be on the edge of its range in BC but elsewhere in the world it has large, stable populations, so globally it would have a secure rank. NatureServe manages the global ranking information for species. The following table explains the coding system used for ranking species on a global scale.

- **Global (G)**
  - G1- G5 globally imperilled (1) to globally secure (5). Ranks of G1 to G3 indicate some level of conservation concern; G4 and G5 have no conservation concern.
  - G#G# multiple ranks indicate a range of possible ranks; an exact rank cannot be determined at this time.
  - GNR not globally ranked at this time
  - GNA not globally ranked as the species is not a suitable target for conservation activities
  - T follows the global ranking for a subspecies (rather than the species as a whole)
  - Q follows subspecies ranking for subspecies that are considered an infraspecific taxon

British Columbia or Subnational Rank (“S”)

The Provincial rank is the conservation status of a species on a provincial scale. It follows the same numerical system as the Global ranking system and is updated by the Conservation Data Centre (CDC) in British Columbia.

- **S1-S5** provincially imperilled (1) to secure (5). S1 to S3 have some level of conservation concern; S4 and S5 indicate there is no conservation concern.
- **S#S#** multiple ranks indicate a range of possible ranks; an exact rank cannot be determined at this time.
- **S#B** rank for breeding populations in BC
- **S#N** rank for nonbreeding populations in BC
- **S#M** rank for migratory species that use BC as a staging area for portions of their migration
- **?** unknown rank for the qualifier (B,N,M)

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1.3.6 IDENTIFIED WILDLIFE AND WILDLIFE HABITAT AREAS – BRITISH COLUMBIA

The Identified Wildlife Management Strategy (2004) is the mechanism used by the BC government to establish management measures for species at risk that are affected by forest or range operations. Wildlife Habitat Areas (WHAs) are designated by the BC government to protect critical habitat features of the species at risk that have been designated as Identified Wildlife by the province. The presence of approved WHAs has been noted for each species in its assessment; there are also proposed WHAs that are under consideration for approval, and more will be designated over time. For WHAs marked as “Data Sensitive”, BCTS will need to contact the CDC to obtain the species identity and location of the WHAs, with a confidentiality agreement – at this time information for the only WHA marked data sensitive is available as part of the supporting information for the North Coast Section 7 Notice.

1.3.7 FRPA SECTION 7 NOTICES AND GAR ORDERS

Several Section 7 Notices under the Forest Planning and Practices Regulation of the Forest and Range Practices Act are in force in the BCTS Skeena Business Area. Coastal Tailed Frogs, Marbled Murrelets, Northern Goshawks and Grizzly Bears are addressed in these notices. In addition, several Orders have been established under the General Actions Regulation. Moose and Mountain Goats are also covered under these protections.

Section 7 Notices for Species at Risk can be found here:
http://www.env.gov.bc.ca/wld/frpa/notices/sar.html

Tracking list for approved Ungulate Winter Ranges found here:
http://www.env.gov.bc.ca/wld/frpa/notices/uwr.html

Accounts and Measures for Identified Wildlife are at:
http://www.env.gov.bc.ca/wld/frpa/iwms/accounts.html

1.3.9 WILDLIFE ACT – BRITISH COLUMBIA

The BC Wildlife Act specifically protects four Endangered species (Burrowing Owl, Sea Otter, Vancouver Island Marmot, and American White Pelican); only the sea otter could occur in the Skeena Business Area. The web versions of the Wildlife Act and its Regulations are not always up to date; and additional species are likely to be added in the future. The Wildlife Amendment Act of 2004 made significant changes to the Wildlife Act, with some consequential changes to other Acts such as the FRPA.
1.4 HIGHER LEVEL PLANS AND LEGAL OBJECTIVES

There are numerous higher level plans relevant to the area covered by this report (Table 4). Some of these plans provide non-legal advice to resource managers; others have legal objectives.

Table 4. Higher Level Plans

<table>
<thead>
<tr>
<th>Forest District</th>
<th>Higher Level Plan</th>
<th>Completed</th>
<th>Legal Objectives</th>
<th>Year of Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Coast</td>
<td>North Coast LRMP</td>
<td>2005</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Great Bear Rainforest Land Use Order</td>
<td>2016</td>
<td>Yes</td>
<td>2016</td>
</tr>
<tr>
<td>Kalum</td>
<td>Kalum LRMP</td>
<td>2002</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Kalum SRMP</td>
<td>2006</td>
<td>Yes</td>
<td>2006</td>
</tr>
<tr>
<td></td>
<td>Nass South SRMP</td>
<td>2012</td>
<td>Yes</td>
<td>2016</td>
</tr>
<tr>
<td>Skeena Stikine</td>
<td>Kispiox SRMP</td>
<td>2005</td>
<td>Yes</td>
<td>2006</td>
</tr>
<tr>
<td></td>
<td>Kispiox LRMP</td>
<td>1996</td>
<td>Yes</td>
<td>2001</td>
</tr>
<tr>
<td></td>
<td>West Babine SRMP</td>
<td>2004</td>
<td>Yes</td>
<td>2004</td>
</tr>
<tr>
<td></td>
<td>Cranberry SRMP</td>
<td>2012</td>
<td>Yes</td>
<td>2016</td>
</tr>
</tbody>
</table>

1.5 MIGRATORY AND NESTING BIRDS

Provincially, Section 34 of the Wildlife Act prohibits the destruction of a bird, its egg, or a bird’s nest when it is occupied by the bird or its egg. Furthermore, Section 34(b) prohibits the destruction of the nests of a handful of species regardless of whether they are occupied; these species include eagles, herons, osprey and peregrine falcons. At the federal level, the Migratory Birds Convention Act (MBCA) and the associated Migratory Birds Regulations protect the nests of all migratory bird listed under Article I of the Migratory Birds Convention. Section 6 of the Migratory Birds Regulations prohibits the disturbance or destruction of nests, eggs, and other nest structures of migratory birds.

Multiple forest management companies and individuals in BC have been working towards methods to minimize incidental take of active nests and reduce the potential for contravention of the federal MBCA and the provincial Wildlife Act during standard forestry operations. These efforts have included the development of nest density ranking tools to help assess the risk of incidental take within proposed development sites, as well as establishment of Beneficial Management Practices (BMPs) for forest planners and practitioners (Stuart-Smith 2016, Smith et al. 2016).

Application of the nest density ranking tool depends on data available through the provincial Vegetation Resource Inventory (VRI) database, whereby certain vegetation characteristics can be used to predict nest density of a given VRI polygon. This report will identify the nest density rankings of all VRI polygons that are intersected by cut blocks within the BCTS Skeena Business Area’s updated 5-year development plan.

Progressive application of BMPs depending on each polygon’s nest density ranking, will help to minimize risk of incidental take and maintain important bird nesting habitat. The guiding principal of the BMPs for migratory and nesting birds is to schedule forest harvesting activities outside of high risk timing windows. Environment Canada has defined 28 nesting zones across Canada, and has estimated general nesting periods for each zone. By determining the nesting zone of a given cut block, the period during which birds are most likely to be nesting can be estimated.
2.0 METHODS

2.1 SPECIES AND ECOSYSTEMS OF MANAGEMENT CONCERN LIST

An initial list of Species at Risk for the BCTS Skeena Business Area was developed by Wilson (2006). In 2007, and again in 2012, the list was completely reviewed and revised by re-examining the original information sources, plus some minor additional sources. The current update to the list was conducted in accordance with the BCTS Species and Ecosystems of Management Concern – Management Guide (BCTS 2013). The following criteria were used in the determination process:

- Any species/ecosystems covered under Forest Planning and Practices Regulation (FPPR) Section 7 Notices within the BCTS Skeena Business Area
- Any species/ecosystems covered under Government Actions Regulation (GAR) Orders within the BCTS Skeena Business Area, including Wildlife Habitat Areas (WHA) and Ungulate Winter Range (UWR)
- Species listed on Schedule 1 of the federal Species at Risk Act (SARA)
- Species listed as threatened or endangered under the provincial Wildlife Act
- Species and ecosystems identified as requiring management under any of the Higher Level Plans or Land Use Orders in effect within the BCTS Skeena Business Area
- Species and ecosystems that are provincially red-listed
- Provincially blue- or yellow-listed species and ecosystems that are ranked globally as G1 (critically imperiled) or G2 (imperiled)

For provincially-listed species and ecosystems, or species occurring on SARA Schedule 1, the provincial Conservation Data Centre’s (CDC) Species and Ecosystems Explorer was used to determine potential for occurrence within the BCTS Skeena Business Area. Forest districts included in the search parameters included the Kalum, North Coast and Skeena Stikine Forest Districts. The species/ecosystems list generated by the search engine was then reviewed to determine whether any species were restricted to areas of the Skeena Stikine Forest District that are outside of the BCTS Skeena Business Area.

2.1.1 SPECIES SUMMARY

The basic biological and ecological information was summarized for each individual species. The known sites in the BCTS Skeena Business Area were listed for rare species. Accurate identification of most species generally requires the use of the references provided for each species, by someone experienced in identifying species in each specific group of organisms (botanist, herpetologist, entomologist, malacologist, ichthyologist, mammologist, and ornithologist). Many general biologists are also competent to identify species in one or more of the major groups of organisms.

The description provided for each ecological (plant) community, in conjunction with use of the appropriate guide to site identification, should be sufficient for a forester experienced in site series classification to recognize the community. In a few cases, detailed community descriptions are not presently available, but enough information has been provided to identify potential communities.

Common Name

The common name, also known as the English name, is provided for each species. Note that all common names are capitalized except for those of plants and ecological communities; in those two cases, only proper names (such as names of people or countries) are capitalized.

Scientific Name

The scientific name, also known as the Latin name, is provided for each species. Note that a rigid set of rules requires that all scientific names have the genus capitalized and italicized, and the species,
subspecies, and variety names lower case and italicized. The CDC version of the scientific names is accepted as the standard for this document.

**BEC Variant**

The Biogeoclimatic Ecosystem Classification (BEC) Variants are provided for each of the ecological communities. Only BEC Variants that occur within the BCTS-Skeena area are listed; the ecological community may occur elsewhere in other variants.

### 2.1.2 SPECIES RANGE AND DISTRIBUTION

The overall range of each species was summarized to the extent it affects the management recommendations. In the case of rare ecosystems, the Biogeoclimatic Ecosystem Classification (BEC) variant in which occurrence is known defines the range.

Where data were available, the distribution (= known sites) of each species in the BCTS Skeena Business Area were mapped. A GIS database of known occurrences (sites) for most species was obtained from the Conservation Data Centre (CDC) in the form of an ArcView shapefile map layer. The map has each occurrence shown as a circle that reflects the degree of precision of the coordinates for each record of an occurrence, or as a polygon for populations inhabiting an area of land. Many of the older species occurrence records have very imprecise location information, and hence the circle for such sites may be 10 km in radius. Supplementary plant data were obtained from the CDC as an Excel spreadsheet with coordinates; the Excel spreadsheet was converted to an ArcView shapefile to map the locations.

Unfortunately, the CDC database is not complete and can be inaccurate. Records with very imprecise location data have correspondingly low usefulness in operational planning. During annual updates, it may be desirable to contact Regional sources and ask for location records that may not have been sent to the CDC. The CDC database lacks many records of species, because those involved have not provided the CDC with the information.

### 2.1.3 CONSERVATION STATUS

The conservation status, for the various categories discussed in the Introduction, was tabulated by Forest District.

### 2.1.4 FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The known locations, habitat, and ecology of each species were reviewed to determine potential impacts by forest operations, based on:

- the probability of interaction with the species,
- the legal or policy implications of the species being affected, and
- the significance of the effect on the conservation status or management objectives for the species.

The phase of forest operations that might impact the species was also determined. Forest management issues relevant to the species were summarized, with a risk assessment for each aspect of forest operations. A risk assessment (discussed in detail below) was completed and tabulated for each species.

### 2.1.5 WILDLIFE HABITAT AREAS

Wildlife Habitat Areas and Ungulate Winter Ranges are listed where legally designated. Where General Wildlife Measures associated with the WHAs were considered insufficient for adequate management of a species, measures (strategies) were developed to ensure that each species will be adequately managed when there is interaction with BCTS operations. In many cases, most of the measures that are actually required to sustain the species are in the scope of activities of government or other industries – forest development effects on the species may be peripheral. In a few cases, it is noted that forest development may have a positive effect on a species by improving or creating habitat.
2.1.6 MANAGEMENT DIRECTION

The existing management objectives and strategies were reviewed and summarized for each species. The references used in this review are provided at the end of the Introduction (complete list), with the relevant references listed at the end of each species discussion. References that are recent compilations of information specific to BC that have undergone extensive peer review include:

- Identified Wildlife Management Strategy (2004), published species accounts,
- Identified Wildlife Management Strategy (2004), unpublished species accounts,
- Identified Wildlife Volume 1 (1997; 1999),
- Higher Level Plans,
- COSEWIC (Committee on the Status of Endangered Wildlife in Canada) species status reports,
- BC Conservation Data Centre reports,
- Ministry of Forests guides to site identification and interpretation,
- Wetlands of BC,
- E-Fauna BC website
- E-Flora BC website

2.1.7 MANAGEMENT OBJECTIVES AND STRATEGIES

A recommended management strategy was developed, addressing stand level and landscape level species management during forest operations. The management strategies are designed to take effect only when forest operations are planned in an area important to a species. Objectives and recommendations for appropriate management of each species, were developed, based on:

- the potential impact of forest operations,
- the probability of impact by forest operations,
- the conservation status of the species, and
- the existing management objectives, recommendations and/or direction.

Included in the assessment process were considerable personal knowledge and experience for fish, wildlife, biodiversity, and ecosystems in general, as well as personal knowledge of either the species concerned or ecologically similar species.

The management recommendations in this report refer to “known” (in the sense that the site has been recorded, and BCTS has acquired the information, not in a legal sense) and “unrecorded” occurrences. The intent is that the number of “known” occurrences will increase with time as additional sites are found, and that the management recommendations will apply to these new sites as well as those known when the report is written.

The management recommendations provided in this report are often quite prescriptive, to make them clearly understandable. If the management recommendations will not work for a particular site, such as if there is no alternative road location other than where it will adversely impact a species at risk, consultation with a biologist or other specialist regarding mitigation and/or compensation measures is advisable. The management recommendations for ecological communities sometimes include significant buffer widths; they are derived from examples of biologically similar communities in Identified Wildlife 2004, which have gone through extensive peer review. They are, therefore, the best available management recommendations.

Legal requirements such as higher level plan direction, FPPR Section 7 notices, and legislative changes, may override the report’s management recommendations. Management of species should follow the highest standard set by either the legal requirements or these management recommendations.

For red-listed species, maintaining the viability of each individual population is critical to maintain the species as a whole. The species is red-listed because it is very rare, with very few occurrences (< 20; see
above). In the “best-case” scenario, loss of viability of one population from a threatened species with 20 populations would result in the loss of 5% of the populations of the species. In most cases, there are under 20 populations of a red-listed species, hence much more than 5% of the populations would be lost. For most populations of most red-listed species the general objective is to avoid all impacts to a population, because the amount of impact that is possible without compromising the viability of a population is unknown and will be unique to every site. If this objective cannot be met, a biologist should be consulted regarding mitigation and/or compensation measures.

For blue-listed species (provincially special concern), maintaining the viability of each individual population is probably not required to maintain the species as a whole. However, the objective should be to maintain the majority of the populations in good condition.

2.1.8 REFERENCES

The published sources for the information used in each species account were listed as references at the end of each species discussion. Many of the original sources and references within the existing document (March 2008) are out of date, but have been retained for completeness.

2.2 RISK ASSESSMENT

Risk assessments were completed for each species and ecosystem identified as a Species of Management Concern within the BCTS Skeena Business Area. Risk assessments were conducted under the guidance of the Species and Ecosystems of Management Concern Management Guide (BCTS 2013), as well as Managing Species at Risk in British Columbia – Guidance for Resource Professionals (CAB and ABCFP 2009). Each identified plant, animal, and ecological community was compared to the BCTS activities and rated accordingly. The ratings were determined through review of habitat requirements for each species and comparing those with the specifics of each BCTS activity. For the purpose of risk assessment, non-forested ecosystems were separated into five groups: sand dunes, non-forested wetlands, alpine meadows, estuarine meadows, and grasslands.

A risk assessment is included in the “Forest Management Issues and Risk Assessment” section of each individual species treatment. These individual species risk assessments are compiled in the Species Management Matrix, available as a separate Excel spreadsheet. The spreadsheet provides the opportunity to sort the species by any of the variables in the spreadsheet. The operational management recommendations and the risk ratings are consistent for each species.

Risk assessment involved cross-referencing the likelihood of interaction between a given forestry activity and a species with the consequence of an interaction, per the risk rating matrix developed in CAB and ABCFP (2009). The likelihood of interaction with a given species or ecosystem of management concern was assessed for each of 25 difference forestry activities. The probability of interaction (Table 5) is the known or judged probability of interaction with BCTS forest management activities (influence or alteration on the species or its’ habitat), based on the entire range of activities undertaken by BCTS.

The largest group of species will be potentially affected only by road construction, because their habitats are not suitable for harvesting. There are actually two types of probability of interaction. One is the probability of operations occurring at the same location as a species occurrence (known or unknown). The other is the probability of operations affecting a species, if operations occur at the same location as a species occurrence. These two options are lumped together as a single variable, because of difficulty in determining the probability of operations occurring in the same location as a species occurrence. When assessing the overall risk to a given species or ecosystem, the highest likelihood of interaction from any of the forestry activities was used.
Table 5. Probability of Forestry Interaction

<table>
<thead>
<tr>
<th>Probability</th>
<th>Species Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low</strong></td>
<td>Habitat is not available for Crown land forest development, or is very unlikely to be affected by forest operations or BCTS development activities</td>
</tr>
<tr>
<td></td>
<td>• Parks</td>
</tr>
<tr>
<td></td>
<td>• Open ocean</td>
</tr>
<tr>
<td></td>
<td>• Private land</td>
</tr>
<tr>
<td></td>
<td>• S1 river; Lakes &gt;= 1000 ha</td>
</tr>
<tr>
<td></td>
<td>• First Nations Reserves</td>
</tr>
<tr>
<td></td>
<td>• Non-forested subalpine, alpine</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>Habitat is uncommonly or little affected by BCTS development activities</td>
</tr>
<tr>
<td></td>
<td>• S2, S3 stream</td>
</tr>
<tr>
<td></td>
<td>• In-shore ocean habitats other than shoreline</td>
</tr>
<tr>
<td></td>
<td>• Non-forested or non-commercial forested terrestrial</td>
</tr>
<tr>
<td></td>
<td>• Cliffs</td>
</tr>
<tr>
<td></td>
<td>• Classified lakes &lt; 1000 ha</td>
</tr>
<tr>
<td><strong>High</strong></td>
<td>Habitat is commonly affected by BCTS development activities</td>
</tr>
<tr>
<td></td>
<td>• Commercial deciduous forest</td>
</tr>
<tr>
<td></td>
<td>• Commercial riparian forest areas of streams, lakes or wetlands</td>
</tr>
<tr>
<td></td>
<td>• Ocean shoreline and estuaries</td>
</tr>
<tr>
<td></td>
<td>• Commercial conifer forest habitats</td>
</tr>
<tr>
<td></td>
<td>• Habitat is S4, S5, S6 streams, non-classified lakes, or non-classified wetlands.</td>
</tr>
</tbody>
</table>

The consequence of interactions with forestry activities were then evaluated to determine the overall risk for each species or ecosystem. Assessment of the consequence of an interaction was based on both the biological and legal consequences of impacts (Table 6).

Table 6. Consequence of Forestry Interaction

<table>
<thead>
<tr>
<th>Consequence</th>
<th>Legal or Policy Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low</strong></td>
<td>• CDC blue-listed</td>
</tr>
<tr>
<td></td>
<td>• No COSEWIC designation or COSEWIC-SC but not SARA-listed</td>
</tr>
<tr>
<td></td>
<td>• Regionally significant, but no candidate formal status</td>
</tr>
<tr>
<td></td>
<td>• Forestry not considered a threat</td>
</tr>
<tr>
<td></td>
<td>• Habitat suitability or ecological community will not be significantly reduced</td>
</tr>
<tr>
<td></td>
<td>• Population size and viability will not be significantly reduced</td>
</tr>
<tr>
<td><strong>Medium</strong></td>
<td>• CDC red-listed</td>
</tr>
<tr>
<td></td>
<td>• SARA SC</td>
</tr>
<tr>
<td></td>
<td>• COSEWIC E/T, but not SARA-listed</td>
</tr>
<tr>
<td></td>
<td>• Identified Wildlife (IWMS 2004), but no Section 7 Notices</td>
</tr>
<tr>
<td></td>
<td>• HLP non-legal policy objectives</td>
</tr>
<tr>
<td></td>
<td>• Moderate impact of forest operations</td>
</tr>
<tr>
<td></td>
<td>• Impacts temporary; species/community will recover</td>
</tr>
<tr>
<td></td>
<td>• Population size and viability could be significantly reduced</td>
</tr>
<tr>
<td><strong>High</strong></td>
<td>• Provincial S1</td>
</tr>
<tr>
<td></td>
<td>• Global G1 or G2</td>
</tr>
<tr>
<td></td>
<td>• SARA T/E</td>
</tr>
<tr>
<td></td>
<td>• COSEWIC T/E</td>
</tr>
<tr>
<td></td>
<td>• HLP Legal Objectives</td>
</tr>
<tr>
<td></td>
<td>• GAR Orders (UWR/WHA); Section 7 Notices</td>
</tr>
<tr>
<td></td>
<td>• Forestry impacts known</td>
</tr>
<tr>
<td></td>
<td>• Potential for permanent impacts to species/community</td>
</tr>
<tr>
<td></td>
<td>• Population size and viability could be significantly reduced, potentially to zero</td>
</tr>
</tbody>
</table>
Cross-referencing the likelihood of interaction with the consequence produced an overall risk rating for each species or ecosystem of management concern (Table 7). All species and ecosystems for which the risk assessment identified a risk of moderate or higher were included on the Focal Species and Ecosystems List. For species and ecosystems that were rated at low or very low risk from forestry activities, rationale is provided for their exclusion from the Focal Species and Ecosystems List in the risk assessment table.

Table 7. Risk of Interaction between a Species and the Components of Forestry Operations (CAB and ABCFP 2009).

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Very High</td>
</tr>
<tr>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Low</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

2.3 FOCAL SPECIES AND ECOSYSTEMS OCCURRENCE ANALYSIS

To facilitate effective management of focal species and ecosystems during planned forestry activities, the updated 5-year plan (2017-2021) for all cut blocks within the BCTS Skeena Business Area was compared to available occurrence data for focal species and ecosystems. Various spatial data sources were used to identify any known occurrences of focal species and ecosystems within or proximate to proposed cut blocks. Data sources included available data from the provincial Conservation Data Centre, the provincial DataBC Catalogue, and the University of British Columbia’s E-Fauna and E-Flora online databases. In addition, legal and non-legal planning features available through DataBC that were directly related to any of the focal species or ecosystems were also included in the spatial analysis. Mapped habitat polygons included in any legal orders (UWR, WHA, etc.) or higher level plans were considered areas of occurrence for the sake of the spatial analysis. However, suitable habitat identified by models based on vegetation data sourced from the provincial Vegetation Resources Inventory (VRI) database were not considered areas of occurrence. All available spatial data sources that were used for analysis are listed in Table 11 in Appendix I.

The 5-year 2017-2021 cut block plan was imported into GIS spatial software, and each cut block was fitted with a 2-km buffer around its boundary. Where spatial datasets were available as shapefiles, proximity to proposed cut blocks was analyzed by overlapping survey results with shapefiles of 2 km buffers around the cut block boundaries. Any overlaps between the buffers and known occurrence locations of focal species and ecosystems, or between the buffers and mapped habitat for any focal species or ecosystems, were reported within outcomes spreadsheets.

Where reliable spatial data could not be extracted, but could be sufficiently located by GPS coordinates or interactive map products (E-Fauna, E-Flora), the cut block plan shapefile was uploaded to the interactive map and individual occurrence points were compared to determine proximity to the proposed cut block boundaries. Range and occurrence maps that were not interactive or that did not provide coordinates for point data were not used to determine proximity to planned cut blocks.
2.4 MIGRATORY AND NESTING BIRDS

2.4.1 MIGRATORY BIRD NESTING ZONES AND CALENDARS

Environment Canada has established 28 nesting zones across Canada, based primarily on the boundaries of the Bird Conservation Regions developed by the North American Bird Conservation Initiative (Env Can 2017). Two of these zones occur within the BCTS Skeena Business Area – the A2 zone and the A4 zone (Figure 2). General nesting periods have been established for each nesting zone, as well as more detailed nesting calendars based on the proportion of migratory species that are anticipated to occur within the area at a given time (Tables 8 and 9).

Figure 2. Map of Environment Canada’s nesting zones in Canada. Zones A2 and A4 occur within the BCTS Skeena Business Area.

Nesting zone boundaries were laid over shapefiles of the 5-year (2017-2021) cut block plan to determine each block’s nesting zone. The block’s nesting zone was then used to determine its nesting period, which can be used to initiate certain elements of the Beneficial Management Practices established for the mitigation of incidental take during forestry activities (Smith et al. 2016). For blocks that straddle the boundary between the two nesting zones, nesting periods were inclusive of the earliest start date for nesting and the latest end date.
Table 8. Nesting Calendar for Nesting Zone A2

<table>
<thead>
<tr>
<th>Percentage of Species</th>
<th>Early Nesting</th>
<th>Late Nesting</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5%</td>
<td>April 4-8</td>
<td>August 10-11</td>
</tr>
<tr>
<td>6-10%</td>
<td>April 9-13</td>
<td>August 6-9</td>
</tr>
<tr>
<td>11-20%</td>
<td>April 14-22</td>
<td>August 2-5</td>
</tr>
<tr>
<td>21-40%</td>
<td>April 23 – May 4</td>
<td>July 28 – August 1</td>
</tr>
<tr>
<td>41-60%</td>
<td>May 5-14</td>
<td>July 21-27</td>
</tr>
<tr>
<td>61-100%</td>
<td>May 15 – July 20</td>
<td></td>
</tr>
</tbody>
</table>

Table 9. Nesting Calendar for Nesting Zone A4

<table>
<thead>
<tr>
<th>Percentage of Species</th>
<th>Early Nesting</th>
<th>Late Nesting</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5%</td>
<td>April 21-24</td>
<td>August 10-13</td>
</tr>
<tr>
<td>6-10%</td>
<td>April 25-28</td>
<td>August 8-9</td>
</tr>
<tr>
<td>11-20%</td>
<td>April 29 – May 8</td>
<td>August 3-7</td>
</tr>
<tr>
<td>21-40%</td>
<td>May 9-13</td>
<td>July 29 – August 2</td>
</tr>
<tr>
<td>41-60%</td>
<td>May 14-22</td>
<td>July 23-28</td>
</tr>
<tr>
<td>61-100%</td>
<td>May 23 – July 22</td>
<td></td>
</tr>
</tbody>
</table>

2.4.2 NEST DENSITY RANKINGS

The provincial Vegetation Resource Inventory (VRI) database has mapped vegetation polygons across the majority of the province, and predicts a variety of vegetation characteristics for each polygon, including stand height, age, and tree species composition. Using the spatial vegetation data available through the VRI system, Stuart-Smith (2016) has developed a nest density matrix that uses vegetation characteristic data, as well as the provincial Biogeoclimatic Ecosystem Classification (BEC) program, to rank the value of a given vegetation polygon to nesting birds, and to predict nest density within the polygon. The nest density matrix ranks a polygon based on its biogeoclimatic zone, projected age, projected height and tree species composition. Nest density rankings range from 1 (very low) to 6 (very high), and can be used to help inform application of various Beneficial Management Practices to avoid and mitigate incidental take of active bird nests during forestry activities.

The provincial VRI layer was laid over the shapefiles of the 5-year (2017-2021) cut block plan for the BCTS Skeena Business Area, and the Stuart-Smith nest density matrix was used to rate the nest density value of all VRI polygons intersected by each proposed cut block. Nest density rankings for polygons occurring in the Interior Cedar Hemlock (ICH), Engelmann Spruce – Subalpine Fir (ESSF), Mountain Hemlock (MH) and Sub-Boreal Spruce (SBS) BEC zones were assigned by direct comparison to the matrix rankings. For blocks occurring within the Coastal Western Hemlock (CWH) zone, the rankings established for the ICH and MH zones were used. VRI polygons without sufficient vegetation data were not assessed a nest density ranking.
3.0 RESULTS AND DISCUSSION

3.1 SPECIES SUMMARY

The list of 94 species and ecosystems assessed in this report is provided as part of the Risk Rating Matrices, in a separate spreadsheet of a Microsoft Excel (2016) workbook. The risk ratings for species and ecosystems assessed are broken down by group in Table 10. Of the total number, 30 (32%) require no management because BCTS Skeena operations will never interact with them; 29 (31%) have a high or very high forest management risk, and the remaining 35 (37%) have a moderate forest management risk. The “forest management risk” can be used as a first approximation of management priority, because it is calculated from a combination of the probability of impacts occurring at some time during forest operations, the legal/policy requirements for management, and the biological consequences of impacting the species.

Table 10. Forest Management Risk Summary

<table>
<thead>
<tr>
<th>Group</th>
<th>Very High</th>
<th>Forest Management Risk</th>
<th>Low</th>
<th>Very Low</th>
<th>Focal Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invertebrates (Insects, Molluscs)</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Amphibians, Reptiles</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Fish</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Mammals</td>
<td>3</td>
<td>8</td>
<td>3</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Birds</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Plants</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Ecological Communities</td>
<td>3</td>
<td>5</td>
<td>19</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>TOTAL</td>
<td>8</td>
<td>25</td>
<td>31</td>
<td>21</td>
<td>9</td>
</tr>
</tbody>
</table>

3.2 SPECIES LIST AND RISK ASSESSMENT SUMMARY

The list of species and risk assessment summary is available as a separate MS Excel (2016) spreadsheet.

3.3 SPECIES ASSESSMENTS

The assessments of each of the species that occur in the BCTS Business Area are provided in Section 5. The individual species assessments identified a number of species that the Conservation Data Centre lists for the North Coast, Kalum, and Skeena-Stikine (Bulkley) Forest Districts that do not actually occur in the BCTS Skeena Business Area. There were two reasons for this:

- Some species were listed as occurring in the three forest districts, but do not occur there.
- Some species only occur in the Bulkley TSA part of the Skeena-Stikine Forest District, in which BCTS Skeena does not operate.

These species are listed in Section 5, because the species lists from the Conservation Data Centre appears to indicate that they are relevant, but are noted as not occurring in the BCTS Skeena Business Area.

3.4 FOCAL SPECIES AND ECOSYSTEMS OCCURRENCE REPORT

A block-specific listing of known occurrences for all focal species and ecosystems has been developed for each cut block within the updated 5-year cut block plan. The listing is available as a separate MS Excel (2016) spreadsheet. Focal species recorded within 2 km of a block are listed within the spreadsheet, which is accompanied by a hyperlink to the species descriptions and management strategies in this document.
Available spatial data identified known occurrences of 23 separate focal species or ecosystems, including two amphibian species, two fish, seven mammals, eight birds, three plants and one ecosystem. While no known occurrence data for any other focal species were identified within 2 km of any cut blocks, their occurrence is still possible. As such, forest planners and practitioners should be familiar with all focal species and ecosystems that could occur in their operating area, to help ensure new occurrences are identified, documented and protected.

3.5 MIGRATORY BIRD NESTING ZONES AND NEST DENSITY RANKINGS

A block-specific listing of intersected VRI polygons and associated nest density rankings has been developed for each cut block within the updated 5-year cut block plan. The listing is available as a separate MS Excel (2016) spreadsheet. The spreadsheet also indicates each block’s nesting zone, as designated by Environment Canada, and the corresponding nesting period during which migratory birds are most likely to nest.

Individual cut blocks may intersect as many as 30 different VRI polygons, resulting in a range of nest density rankings for different parts of the block. Such variation in nest density rankings within a block can be used in the differential application of Beneficial Management Practices for the protection of migratory and nesting birds (Smith et al. 2016). For vegetation polygons that are rated high or very high for nest density (5 or 6), BMPs such as block scheduling and block retention may be suitable to help minimize potential for incidental take and ensure protection of high value nesting habitats. For polygons rated moderate or moderately high (3 or 4), scheduling block activities to avoid harvesting during the block’s nesting period may be sufficient to minimize potential for incidental take of active nests.

Of the 2123 VRI polygons intersected by cut blocks within the 5-year plan, 1 was rated very high for nest density, 885 were rated high, 838 were rated moderate or moderately-high, and 330 were rated low or very low; 287 did not have sufficient vegetation data to allow nest density analysis.
4.0 REFERENCES

4.1 HIGHER LEVEL PLANS AND RELATED DOCUMENTS

4.1.1 KALUM LAND AND RESOURCE MANAGEMENT PLAN
Kalum Forest District. (undated). Notice - Indicators of the Amount, Distribution and Attributes of Wildlife Habitat required for the Survival of Species at Risk in the Kalum Forest District.


WHAs in the Kalum FD.

4.1.2 KISPIOX LAND AND RESOURCE MANAGEMENT PLAN


4.1.3 NORTH COAST LAND AND RESOURCE MANAGEMENT PLAN


4.1.4 CENTRAL COAST LAND AND RESOURCE MANAGEMENT PLAN


4.2 LEGISLATION, REGULATIONS, AND ORDERS


Migratory Birds Regulations (C.R.C., c.1035).


Wildlife Area Regulations (C.R.C., c. 1609).


Fishery (General) Regulations (SOR/93-53).


Species at Risk Public Registry. 2006. Species List


Wild Animal and Plant Trade Regulations (SOR/96-263).


Nadina Forest District. (undated). Notice - Indicators of the Amount, Distribution and Attributes of Wildlife Habitat required for the Survival of Species at Risk in the Nadina Forest District.

North Coast Forest District (undated). Notice - Indicators of the Amount, Distribution and Attributes of Wildlife Habitat required for the Survival of Species at Risk in the North Coast Forest District.

Skeena-Stikine Forest District (undated). Notice - Indicators of the Amount, Distribution and Attributes of Wildlife Habitat required for the Survival of Species at Risk in the Skeena-Stikine Forest District.


Province of British Columbia. 2006. Order to establish the Kispiox Landscape Units and Objectives.

4.3 LITERATURE AND WEBSITES

This list includes the literature cited in the general report sections, as well as those in the individual species treatments.


COSEWIC Species at Risk website.


COSEWIC. 2006. Canadian Species at Risk.


Detailed COSEWIC Species Assessments, April 2006.


Doyle, Frank. 2006. Breeding Success of the goshawk (A. g. laingi) on Haida Gwaii/Queen Charlotte Islands 2005: Is the population continuing to decline? Prepared for British Columbia Timber Sales; Cascadia Forest Products Ltd; Gwaii Haanas National Park Reserve and Haida Heritage Site; BC Ministry of the Environment; South Moresby Forest Replacement Account.  


Flora of the Canadian Arctic Archipelago.  


Systematic Checklist of the Terrestrial Gastropods of the Columbia Basin, British Columbia  
http://www.livinglandscapes.bc.ca/cbasin/molluscs/zonitidae.html#priche.


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Green, R.N., and K. Klinka. 1994. A field guide to site identification and interpretation for the  

Extension Note 028.  
http://www.for.gov.bc.ca/rsi/research/SUMMARY/RS027.HTM.


http://ibis.geog.ubc.ca/biodiversity/efauna/

http://ibis.geog.ubc.ca/biodiversity/eflora/

[Online]. USDA Forest Service, Rocky Mountain Region.  


http://www.for.gov.bc.ca/rsi/research/SUMMARY/RS027.HTM.


Ministry of Environment. 2006. BC Species and Ecosystems Explorer.

http://www.env.gov.bc.ca/cdc/.


Pojar, J. (no date). Vegetation and some plant-animal relationships of Ecological Reserve #68, Gladys Lake. Ecological Reserves Unit, Dept. of Environent, Victoria, B.C. [no internet link]


Steen, O.A. and A.L. Roberts. 1988. Guide to wetland ecosystems of the very dry montane interior Douglas-fir Subzone eastern Fraser plateau variant (IDFb2) in the Cariboo Forest Region, British


INVERTEBRATES
1. AFRANIUS DUSKYWING

1.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Afranius Duskywing (*Erynnis afranius*) is a small dark brown (appearing black) butterfly with a few white specks on the wings. They probably inhabit meadow, forest opening, and/or open forest mesic to dry habitats. The larval food plant is unknown, but is likely to be a wild legume such as lupine or vetch.

They are known in BC only from one specimen collected at a pasture edge near New Aiyansh in the 1940s. The Yukon records shown in the books *Butterflies of Canada* and *Butterflies of British Columbia* were the result of identification errors; hence the New Aiyansh record is the most northwest known occurrence of the species and there is no other record west of the Rocky Mountains. The one record of the species at New Aiyansh is within the Nisga’a Lands under the Nisga’a Final Agreement; the Nisga’a Lands along the Nass River is the only area with a reasonable probability of Afranius Duskywing occurrence.

Afranius Duskywings can only be reliably separated from the common and widespread Persius Duskywings (*Erynnis persius*) by the shape of the male genitalia.

1.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
<th>Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Coast</td>
<td>U</td>
</tr>
<tr>
<td>Kalum</td>
<td>U</td>
</tr>
<tr>
<td>Skeena Stikine</td>
<td>U</td>
</tr>
</tbody>
</table>

**Y = KNOWN OCCURRENCE**

Afranius Duskywing – Known Occurrence in BCTS Skeena Area (1 site)

Scale is arbitrary.

1.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>G5</td>
<td>S1S3</td>
<td>Red</td>
<td></td>
<td></td>
<td></td>
<td>BC Red List</td>
</tr>
</tbody>
</table>
1.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations are very unlikely to interact with the Afranius duskywing, as the only record of the species in BC is restricted to a historical specimen collected at the edge of a pasture in New Aiyansh in the 1940s.

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log Unload</th>
<th>Wood Waste/Stockpile Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Dryland Sort &amp; Log Unload</td>
<td>Wood Waste/Stockpile Disposal</td>
</tr>
<tr>
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<td></td>
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<td></td>
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<td>Dryland Sort &amp; Log Unload</td>
<td>Wood Waste/Stockpile Disposal</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dryland Sort &amp; Log Unload</td>
<td>Wood Waste/Stockpile Disposal</td>
</tr>
</tbody>
</table>

1.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

1.6. MANAGEMENT DIRECTION

The management direction for the Afranius Duskywing is provided by the Higher Level Plans through general direction for maintenance of biodiversity.

1.7. MANAGEMENT STRATEGY

None required.

1.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


2. NORTHERN ABALONE

2.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The abalone is a mollusc with a thin, low and ovate to oval in shape shell. Near the narrow shell margin are three to six open holes on tubular projections which allow for respiration. There is a broad channel on the body whorl, between the suture and the row of holes. Irregular bumps are superimposed over a spiral of broad ribs interspaced with weak ribs. The shell is mottled reddish or greenish in colour, with areas of white or blue. The interior is pearly white with faint iridescence of pink and green. The epipodium (lateral lobe of the foot) is lacy-edged and mottled yellowish to brown in color; and thin yellowish brown to green tentacles surround the tan-coloured foot and extend out of the shell. The Northern abalone is the smallest abalone species and is the only abalone species found in Canada and has been recognized as a genetically uniform single population. It ranges in size from 4 to 6 inches and it is thought to live for 15-20 years.

The abalone is found along the Pacific Coast from Alaska to Mexico and is found in patchy distribution along the open coast of British Columbia where suitable habitat is available. This species can be found in intertidal and low subtidal areas in a variety of habitats along the open coast of British Columbia at depths of 10-18 m. At its northern range limit, it occurs from the lower intertidal zone to at least 100 m depth. The abalone prefer a firm substrate, usually rock, and are generally found in areas of moderate water exchange, such as occurs on exposed or semi-exposed coasts. They are found in areas with kelp (*Nereocystis, Macrocystis, Pterygophora*), sea urchins, sea stars, and coralline algae. Loss of sea weed (marine macroalgae) along the British Columbian coast may have increased the visibility of the molluscs to predators. Predators include crabs, lobsters, octopuses, starfish, fish and snails, and sea otters.

Northern abalone spawn synchronously. Abalone female release their eggs into the water where they are fertilized by the males; fertilization is therefore maximized when abalone concentrate in abundance during spawning. Although millions of eggs are released by a single female, only 1% or less of the offspring survive. The eggs turn into planktonic larva that drift with the currents for a short period. It is thought that the larval period is short (<10 days), and that larval dispersal is limited in geographic extent (10-100 m). They then settle on the bottom on encrusting algae and begin to develop the adult shell form. The age at which northern abalone reach 100 mm (initial maturity is 50 mm) is about 6 to 8 years. Adults likely only move over a range of a few hundred metres during their lifetimes.

This species is herbivorous and grazes on algae and other plant material on rock surfaces, using their tongues to scrape plant matter from the rocks. Juveniles feed on diatoms and micro-algae, while adults show preference for macro-algae. The colour banding on many abalone shells is caused by the changes in the type of algae that the abalone has eaten.

2.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
<th>Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Coast</td>
<td>Y</td>
</tr>
<tr>
<td>Kalum</td>
<td>Y</td>
</tr>
</tbody>
</table>

\textbf{Y = KNOWN OCCURRENCE}
2.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3G4</td>
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<td>Red</td>
<td>E (2009)</td>
<td>1-E (2011)</td>
<td>SARA Schedule 1-E; Red list</td>
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</tr>
</tbody>
</table>

2.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Northern Abalone are limited to direct alterations of their marine environment. Coastal log dumps and water drops may impact water quality in intertidal areas through increasing tannin concentrations and coarse and fine woody debris.
1.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

1.6. MANAGEMENT DIRECTION

The management direction for the Northern Abalone is provided by the National Recovery Strategy for the Northern Abalone (*Haliotis kamtschatkana*) in Canada produced by Fisheries and Oceans Canada. The Northern Abalone is protected under the *Fisheries Act* and is the only invertebrate species for which all fishing is banned in British Columbia.

1.7. MANAGEMENT STRATEGY

The main goal of the National Recovery Strategy is to halt the decline of the existing wild population with the long term goal to increase the number and density of wild abalones to levels where the population becomes self-sustainable in order to remove it from threatened status. The approaches to facilitate these goals are maintaining the fisheries closures; developing and implementing a proactive protective plan; developing a communication campaign to stop illegal harvest and raise public awareness; undertaking research and rebuilding experiments; and monitoring the population status.

1.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


3. OLYMPIA OYSTER

3.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

Smaller than most oysters, the Olympia oyster will be at most 90 millimetres in length and more likely just 60 millimetres. The Olympia oyster is a relatively small oyster with a deeply cupped lower (left) valve and a flat upper (right) valve that fits within the margins of the lower valve. Its outer shell ranges in colour from white to dark purple while its inside shell can be white, iridescent green and purple.

Of the four species of oyster currently found in British Columbia (BC), the Olympia oyster is the only native species. It lives in the intertidal zone up to 10 m depth of the west coast of North America, between southern Alaska and down to Panama. It typically makes its home in protected saltwater coves, lagoons and estuaries (saltwater rivers) where rising and falling tides won’t disturb it. It is usually attached to submerged rocks and hard ground in shallow waters. In British Columbia, the Olympia oyster is found along the Georgia Strait, the west coast of Vancouver Island, and around Queen Charlotte Strait and Sound. Olympia oysters are filter feeders, siphoning water and digesting the tiny marine algae that passes through their systems. Various crabs, snails, sea stars and birds feed on the Olympia oyster.

In Canadian waters reproduction occurs in the warmer summer months. At this time the female produces up to 300,000 eggs, which she keeps inside her shell cavity. The male then releases sperm into the surrounding water which she ingests and siphons through the eggs. About two weeks later she releases the fertilized eggs into the water, where they drift for a few weeks as larvae before settling on a hard substrate, such as a rock or even other shells. All Olympia oysters become males by age one, and then will morph between male and female, alternating each year in producing either eggs or sperm, for the rest of their 10-plus year lifespan.

3.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
<th>Present</th>
<th>Y = KNOWN OCCURRENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Coast</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Kalum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skeena Stikine</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No map is provided. Olympia oysters are found off the west coast of the North Coast Forest District.

3.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC BC</th>
<th>BC</th>
<th>Identified</th>
<th>COSEWIC</th>
<th>SARA</th>
<th>Supporting Documentation</th>
</tr>
</thead>
</table>

3.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Olympia Oyster are limited to direct alterations of their marine environment. Coastal log dumps and water drops may impact water quality in intertidal areas through increasing tannin concentrations and coarse and fine woody debris.
3.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

3.6. MANAGEMENT DIRECTION

The management direction for the Olympia Oyster is provided for in the Fisheries and Oceans Canada National Management Plan through maintenance of biodiversity, monitoring of trends, and restrictions under the Fisheries Act to prohibit destruction of habitat and the harvesting of wild populations.

3.7. MANAGEMENT STRATEGY

The management strategies outlined in the management plan include maintaining current restrictions on commercial and recreational harvest; address concerns for habitat alteration and transfer of non-indigenous predators and parasites; clarification of threats to support protection measures; population monitoring, including the establishment of index sites through collaborative effort; and communication about the detrimental effects of predator and parasite transfer.

3.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


4. PLAINS FORKTAIL

4.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The plains forktail (*Ischnura damula*) is a small damselfly, primarily associated with thermal springs including the Liard River Hot Springs in northeast BC. Males are usually blue and black, but can also be coloured green. In BC, this species is known only from two locations, at the Liard River hotsprings and at one site in the Kispiox Valley. In addition to warm springs, this species is usually associated with marsh and fen wetlands, where females lay their eggs in the tissues of aquatic plants.

Plains forktails appear very similar to the Pacific forktail (*I. cervula*), but the ranges of the two species do not overlap.

4.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
<th>Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Coast</td>
<td>Y</td>
</tr>
<tr>
<td>Kalum</td>
<td>Y</td>
</tr>
<tr>
<td>Skeena Stikine</td>
<td>Y</td>
</tr>
</tbody>
</table>

Y = KNOWN OCCURRENCE

Figure 3. Historical records of plains forktail in BC. Occurrence within Skeena Business Area is restricted to a single site in Kispiox Valley.

4.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>G5</td>
<td>S1S3</td>
<td>Red</td>
<td></td>
<td></td>
<td></td>
<td>BC Red List</td>
</tr>
</tbody>
</table>

4.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Interactions with forestry operations are unlikely. Breeding sites are restricted to aquatic vegetation, usually restricted to warm springs.
### 4.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

### 4.6. MANAGEMENT DIRECTION

The management direction for the plains forktail is provided by the Higher Level Plans through general direction for maintenance of biodiversity.

### 4.7. MANAGEMENT STRATEGY

None required.

### 4.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


AMPHIBIANS
5. COASTAL TAIRED FROG

5.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Coastal Tailed Frog (Ascaphus truei) is one of two tailed frogs in British Columbia; the second species is the Rocky Mountain Tailed Frog of southeast BC. Adults and juveniles are small (2.2–5.1 cm) with a large head, a vertical pupil, and broad and flattened outer hind toes.

Males have a short, conical "tail" that is used to inseminate females. Adults have a grainy skin that can vary in colour from tan, to chocolate brown, to olive green; fine black speckling generally occurs on paler individuals. There is often a distinct copper bar or triangle between the eyes and snout, with green undertones. Note that other species of frogs that have just metamorphosed from tadpole to adult may also have the remnants of the tadpole tail. Tadpoles can be up to 65 mm long; they possess a wide "suction mouth" for clinging to rocks in swift currents and grazing periphyton, a ventrally flattened body, and a laterally compressed tail bordered by a low dorsal fin.

Coastal Tailed Frogs are the only frog that breeds in cool permanent mountain streams in the Coast Mountains, from the Lower Mainland to Portland Canal and the Nass River on the Bulkley. They occurred in 40–60% of streams surveyed on the BC coast, but only 10% near the northern limit of the range. They breed in stable mountain streams (usually without fish) with step-pool or riffle-pool structure, and overall gradients that are not too low or excessively steep. Step-pools of cool, clear permanent streams adjacent to old forest with significant understorey are most suitable.

Adults and juveniles feed at night along streams, feeding on spiders and other terrestrial arthropods such as ticks, mites, collembolans (snow fleas), and various insects as well as snails. Tadpoles mostly eat diatoms that they scrape from submerged rocks; but also eat conifer pollen and small quantities of filamentous algae. Tailed frogs are the longest lived frog (15 - 20 years), have a long larval period (2 -4 years), and a long time to sexual maturity (8 or 9 years). Females produce a double strand of 44–85 colourless, pea-sized eggs that are attached to the underside of a large rock in the stream in late summer; eggs are generally found close to headwaters. Adults on land usually remain close to stream banks (5 - 45 m from the bank), but have been reported up to several hundred metres from a stream’s edge during wet weather. They may move upstream either for refuge during the summer months or to lay eggs. Tadpoles are relatively sedentary but movements of up to 65 m have been recorded in old-growth streams in the Squamish area; young tadpoles may move longer distances downstream from where the eggs were laid in the headwaters.

The Coastal Tailed Frog is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial Wildlife Act. The Kalum Forest District has issued a “Notice” regarding management for key aspects of Coastal Tailed Frog habitat. In the BCTS Skeena area, there are 19 sites recorded by the CDC and 12 established WHAs, with only partial overlaps.

5.2. RANGE AND DISTRIBUTION

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Y = KNOWN OCCURRENCE
5.3. CONSERVATION STATUS

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5.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The key forest management issues for the Coastal Tailed Frog are the maintenance of the water quality of streams used as breeding sites, watershed hydrology, suitable forested habitat near the streams, and connectivity between suitable streams. Logging impacts include stream exposure, increased sedimentation, bank erosion, windthrow, altered hydrology, forest fragmentation, and removal of mature forest adjacent to small streams. Suitable habitat for the Coastal Tailed Frog is declining provincially, particularly in areas that have been clearcut at higher elevations. Survival to the adult stage appears to be especially low in second-growth forests.

Management through designation of WHAs is specifically limited by government policy, to minimize timber supply impacts rather than in response to the biological requirements of the species. This places unprotected populations of Coastal Tailed Frogs directly at risk from forest management.
5.5. WILDLIFE HABITAT AREAS

There are 10 WHAs in the Kalum FD, and 2 in the North Coast FD; there are none in the Skeena Stikine FD. Please see the Ministry of Environment Ecosystems Branch website for currently Approved Wildlife Habitat Areas.

5.6. MANAGEMENT DIRECTION

The general management direction for Coastal Tailed Frogs is provided by the Higher Level Plans direction for maintenance of rare species and general biodiversity, and Identified Wildlife (2004). The management direction for each established Coastal Tailed Frog WHA is provided by the “Order” associated with each designated Wildlife Habitat Area.

5.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the Coastal Tailed Frog. Implement the Identified Wildlife (2004) strategy at both the stand and landscape level.

**Stand Level**

To address a location known to BCTS as a Coastal Tailed Frog site, manage to meet the objectives of a Wildlife Habitat Area:

- Manage established Coastal Tailed Frog Wildlife Habitat Areas using the strategies in the “Orders” for each WHA.
- When harvesting or constructing roads in the vicinity of a known Coastal Tailed Frog stream that is not already a WHA, manage the stream and adjacent areas consistent with the Identified Wildlife (2004) management strategies for a WHA, where operationally practicable. Plans and prescriptions for harvesting or roads should consider the habitat impacts and may specify enhanced riparian retention levels and measures designed to protect water quality. In general, management priority should be given to sites adjacent to mature or old forest, sites with the greatest potential to establish and maintain forest connectivity, sites closest to the headwaters, or sites with a high density of...
tadpoles. Maintain stream conditions on several streams / stream reaches in a drainage that will maintain suitable habitat for Coastal Tailed Frogs.

**Landscape Level**
To address unrecorded Coastal Tailed Frog sites:

- In North Coast, Kalum and Skeena Stikine FDs, for all S4, S5, S6 streams in areas mapped by Identified Wildlife (2004) as having potential habitat but which have not been demonstrated through inventory to not support Coastal Tailed Frogs,
  - conduct harvesting and road construction to minimize changes in water quality and hydrology,
  - where feasible and operationally reasonable, retain patches of mature/old forest in association with such streams. In general, management priority should be given to sites adjacent to mature or old forest, sites with the greatest potential to establish and maintain forest connectivity, sites closest to the headwaters, or sites with a high density of tadpoles. Maintain stream conditions on several streams / stream reaches in a drainage to ensure that at least one will maintain suitable habitat.
  - where feasible and operationally reasonable, avoid herbicide and other chemical applications (e.g., dust-palliative polymer stabilizers and soil binders) within 45 m of known or potential stream habitat; the surfactants in herbicides may adversely affect the “breathability” of amphibian skins.

**5.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES**


COSEWIC Species Summary:

6. WESTERN TOAD

6.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Western Toad (Anaxyrus boreas) has dry, bumpy skin, conspicuous, oval-shaped parotid glands, horizontal pupils, and cream-coloured or white dorsal stripe. They vary in colour from olive-green, to reddish-brown, to almost black. The parotid glands, along with those of the back and the dorsal surface of the upper legs, contain a mild, white poison that is secreted when individuals are threatened by a predator. The underside is pale and coarsely mottled, and the hind feet are equipped with two horny tubercles, which assist it in burrowing. Males are 60 to 110 mm long. They possess longer arms and narrower heads than females and develop dark nuptial pads on their thumbs during the breeding season. Females are larger, up to 125 mm long.

The Western Toad lives nine to 11 years. They breed by congregating along the shallow margins of breeding sites for a one- to two-week period each spring. Females lay 5,000 to 16,500 eggs per breeding season after sexual maturity at four to five years. Males mature in three years. The black tadpoles metamorphose in approximately three weeks, at which time they typically form large shoreline aggregations. Most males return to breeding sites annually; females return every one to three years. Females travel farther from breeding sites, moving 400 to 600+ m upland to summer ranges. Occasional long distance excursions of up to 7.2 km have been noted for this species. Summer home ranges are distinct, and approximately three to seven hectares in size.

Toads are found in a variety of habitats, including forests, wetlands, clearcuts, and grasslands, with their summer ranges usually including a combination of upland and wetland areas. Toads exploit open areas, often basking in the sun to thermoregulate. Toads hibernate for roughly four to six months each winter in animal burrows and under debris where they remain in contact with moisture. Some breeding sites can be source populations for large areas; a few productive breeding sites may sustain local and regional populations.

Declines in the number and size of amphibian populations in North American temperate-zone forests are thought to be primarily, but not exclusively, the result of logging, which typically leads to fragmentation, modification, or loss of habitat. However, toads are often abundant in clearcut habitats both terrestrially and at breeding sites in many areas of B.C., but the condition of individuals inhabiting these areas has not been studied. Direct toad mortality may occur from timber harvesting, while increased warmth in cut-over areas may be beneficial where the growing season is limited. Clearcuts may harbour more snakes and other predators, which could increase the predation rate on newly metamorphosed young. Studies are needed to address whether the increased abundance of toads in clearcuts is a true reflection of habitat suitability, or whether these areas act as reproductive sinks. Because toads are attracted to open areas, they may spend a great deal of time on roads, which increases mortality. The small metamorphs are particularly vulnerable, and easily decimated.

The Western Toad has an extensive range throughout western North America, including southern areas of the Yukon Territory, most of British Columbia, and western Alberta. It is one of the few amphibians inhabiting alpine areas. The Western Toad is red-listed by The World Conservation Union (IUCN), because of declines and local extinctions over much of its range in the United States, and is listed as Special Concern in Canada because of population declines and loss of populations in southern BC.

6.2. RANGE AND DISTRIBUTION

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6.3. CONSERVATION STATUS

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6.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Western Toad are harvesting, road construction and silviculture, which results in habitat fragmentation, modification, or loss of habitat. Direct toad mortality may occur from timber harvesting, but increased warmth in cut-over areas may be beneficial where the growing season is limited. Clearcuts may harbour more snakes and other predators, which could increase the predation rate on tadpoles and newly metamorphosed young.

Roads increases mortality of migrating adults and juveniles, which may be significant if there is regular traffic. Silvicultural impacts are reductions in vegetation cover through site preparation, and direct mortality caused by the surfactants in herbicides damaging the skin “breathability” of adults and juveniles resting on land.
Overall Risk Rating

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<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
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### 6.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

### 6.6. MANAGEMENT DIRECTION

The management direction for the Western Toad is provided through the provisions of the Higher Level Plans for maintaining biodiversity in general, and through the provincial “best management practices” referenced below.

### 6.7. MANAGEMENT STRATEGY

The following strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of Western Toads.

#### Overall Objective

Retain ≥ 70% of 2006 occurrences of this COSEWIC “Special Concern” species in healthy condition. Each loss of part or all of an occurrence of this species will incrementally worsen its conservation status.

This objective cannot be fully monitored, because there will never be a complete inventory of occurrences of the species. Hence the objective is provided to indicate the general direction for management strategies, rather than for auditing.

#### Stand Level and Landscape Level

Several species of amphibians are widespread in the BCTS Skeena Business area, and are poorly inventoried. Inventory before the start of forestry operations is not likely to be a practical option, hence general habitat management for amphibians is the most practical option. The following strategies should be applied near water bodies:

- Preserve, as much as possible, all wetlands, ponds, pools, and streams – however small or ephemeral; these small areas can be very important for amphibians.
- Protect shallow water areas (including small in-block pools or non-classified wetlands) and their vegetation from disturbance; these areas serve as breeding habitat and cover for many amphibians.
- Avoid altering natural patterns of flooding and drying of wetlands; temporary wetlands often have few predators and are important for amphibians.
• Maintain, and avoid disturbance of, existing downed logs and bark, especially large diameter pieces; downed wood in various stages of decay provides important shelter.
  o Avoid constructing permanent roads near ponds and wetlands, to minimize road mortality.
  o Minimize ditch sediment input to ponds and wetlands.
• Avoid broadcast use of herbicides near ponds and wetlands – the surfactants in herbicides adversely affect the “breathability” of amphibian skins. If herbicides must be applied, hotter and drier conditions are better so that the adults are more likely to be under cover.

6.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


¹ “Near” is here selected as 30-50 m, to correspond to standard Riparian Management Areas. Amphibians frequently move much further away from ponds and wetlands, hence the 30 m is a minimum – where possible the distance should be increased.
FISH
7. BULL TROUT

7.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

Bull Trout (*Salvelinus confluentus*) have a large head and jaws in relation to their long, slender body. Bull Trout colouration ranges from green to greyish-blue, spotted with pale yellowish-orange spots; there are no black spots on the dorsal fin. They have a larger, broader, and flatter head, and a more ventrally flattened body, than Dolly Varden.

Some are resident in relatively small mountain headwater streams, others are resident in lakes or large rivers, and others are migratory – living in the large rivers but migrating to smaller streams to spawn. The key habitat requirement is clear, cold streams with deep pools. Ground water inputs to gravel riffles may be required for optimal spawning quality. Specific large deep pools and specific riffles may be used by a large proportion of a Bull Trout population for pre-spawning aggregations and spawning sites respectively. These sites are especially critical for maintenance of a given Bull Trout population.

The primary risk to Bull Trout populations is degradation of stream habitat quality. This loss may occur through either direct effects of sedimentation or increased water temperature, or indirectly through changes to watershed hydrolology that increase sediment production through erosion and change the annual temperature regime of the headwater streams. Stand level riparian areas and road management can directly degrade stream habitat quality through direct sediment inputs, or through increased water temperatures of S4 streams resulting from removal of vegetation shade. Landscape level intensity of harvest and road construction can alter watershed hydrolology, resulting in increased channel erosion and decreased summer flows.

Bull Trout are provincially blue-listed because of sensitivity to stream morphology degradation, water quality degradation and fishing pressure. Bull Trout were formerly Identified Wildlife (1999) but were dropped from that list in 2004 as being "low priority". They were reinstated as Identified Wildlife in the 2006 Order – Category Species at Risk (Appendix 1). They are not SARA-listed.

Most of the populations in the BCTS Skeena Business area are considered to be of conservation concern due to declining populations. In 2007 NatureServe changed the global rank from S5 to S3 – globally of special concern. Most of the global population, and most of the best remaining habitat, occurs in BC hence there is a special obligation to manage for this species.

The Bull Trout is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act* or a fishing license, under the provincial *Wildlife Act* and the federal *Fisheries Act*.

7.2. RANGE AND DISTRIBUTION

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7.3. CONSERVATION STATUS

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7.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Bull Trout are disruption of migration patterns by non-fish passable road crossing structures such as culverts; reduced in-stream and riparian cover resulting from harvesting without tree and shrub retention in riparian area; and increased sedimentation and water temperature resulting from harvesting without tree and shrub retention in the riparian area or resulting from road construction that results in sedimented and/or warm ditch water flowing into the stream.

Loss of riparian vegetation adjacent to even small (S4) fish streams reduces short- and long-term LWD recruitment, which is a key component in the creation of optimal salmonid habitat such as pools and cover; increases water temperatures by removing shade from the channel – a critical habitat factor for Bull Trout; decreases bank stability and integrity of channel morphology; reduces substrate for many terrestrial insects, which are in turn an important aquatic food source; decreases inputs of organic matter (in the form of leaf litter) that supports the aquatic food chain; and decreases the buffer zone that intercepts runoff and filters sediment and pollutants.

7.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

7.6. MANAGEMENT DIRECTION

The management direction for the Bull Trout is provided through general FRPA and Fisheries Act requirements for management of game fish habitat, and through the Identified Wildlife Management Strategy (2004). The Higher Level Plans all have objectives for maintenance of water, fish and fish habitat values.

7.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known streams) and landscape level (unrecorded streams) management of the Bull Trout.

Implement the Identified Wildlife (2004) strategy at both the stand and landscape level. Some specific recommendations are summarized below.

Stand Level
To address a known Bull Trout site, manage to meet the objectives of a Wildlife Habitat Area.
• Manage Bull Trout Wildlife Habitat Areas, once established, using the strategies in the “Orders” for each WHA.
• Manage Bull Trout concentration sites (request data from Regional MoE) that are not WHAs, by not building permanent roads within 500 m, minimizing bladed structures near the stream or immediate tributaries, and retaining sufficient windfirm streamside trees to contribute a long-term supply of large woody debris. Design tree retention to minimize the windthrow risk along the stream banks; one option is to use wide patches rather than a thin continuous strip.
• Minimize public access to Bull Trout concentrations, by not building permanent roads within 500 m and by promptly deactivating temporary roads within 500 m.

**Landscape Level**
To address unrecorded Bull Trout sites, in Bull Trout watersheds

• Use bridges wherever possible for fish stream crossings; if an open-bottom arch or an embedded culvert is used, ensure that the width is considerably wider than the stream channel to minimize the risk of streambed instability, beaver plugging, debris jams, bedload deposition, or current speed problems.
  o Consider having a trained Environmental Monitor develop an *Environmental Management Plan* and monitor the on-site work for installation or removal of all fish stream crossing structures
  o Wherever possible remove pre-FPC culverts from fish streams
  o Apply the FPC *Fish Stream Crossing Guidebook* when constructing road crossings of all fish streams; ensure that all crossing structures in fish streams are “fish friendly”
• Minimize the risk of changes in stream water quality and flow patterns, especially small streams
  o Maintain the quality and flow patterns of surface water flowing into streams, when harvesting and or constructing roads
  o Gravel the surface of road approaches to all stream crossings and armour all ditches that empty into streams
  o Avoid broadcast herbicide applications within the entire Riparian Management Area, to maintain a healthy shrub layer (spot applications are acceptable)
  o For S4 (and larger) streams with moderate to high quality fish habitat, ensure high tree and understory retention to minimize changes in water temperature, shade, sediment, flow patterns, and food and nutrient inputs; this may require further tree retention to reduce windthrow risk adjacent to the streams
  o For marginal-habitat S4s, S6s, and NCDs that flow directly into moderate to high quality fish habitat, maintain high shrub and residual tree retention in the Riparian Management Area (within a 10 m width for NCDs), to maintain water quality (temperature, sediment, flow patterns). If abundant shrubs and residual trees are not present, retention of mature trees may be required to prevent harmful alteration, disruption, or destruction of fish habitat

**7.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES**


8. EULACHON

8.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Eulachon (Thaleichthys pacificus) is an anadromous fish that spawns in the Skeena and Nass Rivers. They spend most of their life in the ocean, returning in the early spring to coastal rivers to spawn. Mature adults ascend the Skeena and the Nass in mid-March to mid-May to spawn; they lay their eggs in coarse sand or gravel, in freshwater. Eggs hatch after two to three weeks. The current carries the small larvae to the sea where they probably reside in estuarine waters for several months, while juveniles use deeper water as they grow. Eulachon migrate to the ocean environment in the first summer and stay there for up to 4 years. Most adults die soon after spawning; hence they live 2-5 years.

Forestry related impacts on eulachon spawning habitat are suspected but have not been well documented. Changes in the volume and discharge patterns of rivers draining forested areas may be a plausible impact, based on research on salmon spawning habitat. Debris and associated non-oxygenated water from log handling and booming in river habitats and especially in the headwaters of estuaries could also be a problem affecting both larvae and juveniles.

Spawning failures have also been attributed to unnatural noise disturbance; adults will leave a stream without spawning if there is high noise or other disturbance. Higher water temperatures have been found to be related to smaller sizes, lower fecundity, and lower returns.

The Eulachon is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial Wildlife Act or a fishing license, under the provincial Wildlife Act and the federal Fisheries Act.

8.2. RANGE AND DISTRIBUTION

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* Pacific Coast population (E); Nass/Skeena River populations (T)

8.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Eulachon are disruption of spawning by noise and other disturbance (such as may occur during stream crossing construction) on the main river channels. Harvesting and road construction without tree and shrub retention in riparian areas of tributaries, or sediment and warm ditch water flowing into the tributaries, may result in increased sediment and water temperature in the main rivers. Coastal log dumps may also impact the estuary feeding and rearing areas of the larvae.
8.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

8.6. MANAGEMENT DIRECTION

The management direction for the Eulachon is provided through general FRPA and Fisheries Act requirements for management of game fish habitat. The Higher Level Plans all have objectives for maintenance of water, fish and fish habitat values.

8.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known streams) and landscape level (unrecorded streams) management of the Eulachon.

- Apply measures to minimize sediment input to all streams (fish-bearing or non-fish streams that are tributary to fish streams), such as graveling the road surface of all approaches to stream crossings, armouring all ditches that empty into streams, and designing cross-drains and ditches to minimize the amount of water flowing directly into streams.
- Retain most understorey shrubs, and preferably some standing trees, along all fish streams and most non-fish streams. If standing trees will have a high risk of windthrow that will damage the channel, then stub all the trees that are within 5 m of the channel to the maximum possible height to provide mid-term large woody debris inputs to the channel.

8.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


9. GREEN STURGEON

9.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The green sturgeon is similar to the white sturgeon, except it is slight smaller and different colouration. It is one of the largest and longest-living species of fish: reaching up to 70 years in age, up to 2.3 metres in length, and weighing as much as 159 kilograms.

They are olive to dark green colour on their back and sides; the lower parts are whitish green with a midventral dark, arrow-like stripe on the ventral side. Their snout is shovel-shaped with large fleshy barbels which are usually closer to the mouth than to the snout tip. Although green sturgeons are classified as bony fish, the skeleton is mostly comprised of cartilage. This species lacks scales, but has five rows of bony plates on the body called scutes. Scutes are located along their back and sides (22-33 scutes along sides) and 1 row of preanal scutes.

This species spends most of its adult life at sea, primarily in nearshore oceanic waters, bays, and estuaries. As juveniles, they spend 1-4 years in freshwater or in estuaries. This species is found from the Aleutian Islands and the Gulf of Alaska to Ensenada, Mexico. There are records for this species from the lower Fraser River and Fort Langley. McPhail (2007) also indicates that most BC records are "from the sea off the west coast of Vancouver Island or from northern estuaries (e.g. the Skeena, Nass, and Taku estuaries)."

Unfortunately, very little is known about abundance and distribution in Canada. Green sturgeon spawning and rearing has not been documented in Canada, only in the US. The species may occur in Canadian waters only for feeding.

Individuals become sexually mature at about 15-17 years (males) or approximately 17-21 years (females). Females spawn at intervals of 3-7 years. Individuals live up to several decades. They ascend rivers to spawn, but specific spawning and rearing habitats are poorly known. Spawning is believed to occur every 2-5 years in the spring. Adults typically migrate into fresh water beginning in late February; spawning occurs from March-July, with peak activity from April-June. Females produce 60,000-140,000 eggs.

Once they leave their spawning streams, green sturgeon migrate rapidly northwards, and likely travel in schools. Diet of adults includes shrimp, mollusks, amphipods, and small fish.

9.2. RANGE AND DISTRIBUTION

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Y = KNOWN OCCURRENCE
9.3. CONSERVATION STATUS

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9.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues that could potentially impact this species include modification of spawning habitats, water temperature changes and pollution; it appears not to be greatly threatened, but better information on abundance and trends are needed. These impacts are limited to direct and indirect alterations of their marine and freshwater environments from erosion and sediment issues from logging activities and construction of bridges, culverts and roads.
9.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

9.6. MANAGEMENT DIRECTION

A management plan is currently being developed by Fisheries and Oceans Canada, otherwise, this species is protected under the *Fisheries Act* and by international law under the Convention on International Trade of Endangered Species (CITES).

9.7. MANAGEMENT STRATEGY

The current management strategies require further inventory data in the form of range-wide population inventories to determine abundance and distribution; detailed studies on life history and ecological requirements; and population assessment and monitoring.

9.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


10. AMERICAN MARTEN

11. PACIFIC MARTEN

11.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The American Marten (*Martes americana*) has long shiny fur. The head is gray, legs and tail are very dark brown or black, the chest has a cream colored patch, and the back is light brown. They are long and slender, with large eyes, pointed nose, and cat-like ears. Claws are sharp and curved.

They usually occur in dense deciduous, mixed, or (especially) coniferous upland and lowland forest. They spend a lot of their time in trees, but do most of their hunting on the ground. They den in holes in dead or live trees, abandoned squirrel nests, conifer crowns, rock piles, or burrows. In the winter they use subnivean (below snow) sites for both denning and hunting prey such as mice and voles; such sites are often coarse woody debris piles. Young are born in a den, usually in a hollow tree, sometimes in a rock den.

The genetically-distinct coastal population has recently been designated as its own species, known as the Pacific marten (*M. caurina*). Habitat requirements and management strategies do not differ between the species.

The American Marten is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*.

11.2. RANGE AND DISTRIBUTION

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<tr>
<th>District</th>
<th>Present</th>
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<tr>
<td>Skeena Stikine</td>
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</table>

No map is provided; the species is generally distributed within the area.

11.3. CONSERVATION STATUS

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<th>BC Rank</th>
<th>BC List</th>
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</table>

11.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the American Marten are habitat loss and fragmentation. These occur through harvesting that removes the key large standing and downed tree components of their habitat. Timber harvesting removes pine, large spruce trees, and to a lesser extent large cottonwoods. Forest harvesting may negatively affect the distribution of the remaining habitat, so that marten have to search more widely for sufficient resources. Increased access may increase trapping mortality. Maintaining structurally diverse and productive marten habitat in logged areas is a function of the method and extent of timber harvesting, and also the type of site preparation and subsequent stand tending.

Wildlife tree retention areas, coarse woody debris recommendations, old forest retention, landscape level planning, and riparian management, have the potential to partially address marten habitat requirements through the retention of large trees, dense canopy closure, and abundant levels of CWD.
11.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

11.6. MANAGEMENT DIRECTION

The management direction for the American Marten is provided by land use plan direction to manage for fur-bearer habitat, and biodiversity and riparian management in general.

11.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the American Marten, for the areas mapped as having at least some habitat potential for American Marten. The following strategies provide a minimum level of management, which is probably sufficient to maintain American Marten in the BCTS Skeena area, although population size is likely to drop.

- Maintain mature and old cottonwood and large diameter fir and spruce along riparian and riparian-associated habitats.
  - Maintain connectivity of mature and old forest between riparian and upland habitats.
- Maintain important structural attributes for marten and prey species (i.e., CWD, wildlife trees, cottonwood, and large fir and spruce).
- Retain old forest patches that have high structural complexity including high amounts of CWD, through designation as WTPs, OGMAs, or temporary deferred harvest areas.
  - Harvest patch size distribution should be as recommended by the Biodiversity Guidebook.

11.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


12. BLACK BEAR

13. KERMODE BLACK BEAR

13.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The American Black Bear (*Ursus americanus*) occurs throughout BC. The Kermode Black Bear (*Ursus americanus kermodei*) is a subspecies that is restricted to the central and north coast of BC; it has a high frequency of a white-coat form. The Conservation Data Centre does not rank the Kermode Black Bear as a distinct conservation unit; hence their website has no information on it.

Black bears take advantage of a wide variety of vegetative and animal food sources. Spring habitats include beaches, estuaries, forested and non-forested wetlands, skunk cabbage swamps and avalanche chutes. Summer berry habitats include low, mid- and high-elevation open forests and forest openings. The fall diet is heavily oriented to spawning salmon.

They are dependent on old-growth structure for winter denning. Den cavities are most often found inside large (over 1.4 m diameter) standing live, standing dead or downed dead trees or logs. Black bears will den in second growth stands in old-growth stumps. Some dens are elevated up to 20 m above ground level, and den openings are small relative to body size. Tree cavities are most often found in Western red cedar and Yellow cedar, and cavity re-use is common. Habitat security in the form of climb trees (particularly for adult females and their cubs) is an essential element of coastal black bear habitat, due to a high rate of cannibalism. Females with cubs will not forage far from climb trees while feeding in openings.

The Black Bear is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*.

13.2. RANGE AND DISTRIBUTION

*Ursus americanus* Distribution

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*Ursus americanus kermodei* Distribution

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No map is provided; the species is generally distributed within the area.

13.3. CONSERVATION STATUS *

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* The Kermode Black Bear is not ranked separately by the Conservation Data Centre; the conservation status is for the species as a whole.

13.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Black Bear are mortality risk associated with human food and garbage, and with connected road networks; protection of critical denning and foraging habitat; provision of
stable landscape level forage supply; suitable escape trees in and near forest openings; disturbance from bear viewing (associated with roads); and potential disruption of the white coat colour gene frequency through a variety of human influences (such as increased bear movement between interior and coast along logging roads and clearings).

Ursus americanus

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<th>Silviculture</th>
<th>Fuel Handling</th>
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<td>Log Dump &amp; Water Drop</td>
<td>Wood Waste/Stockpile Disposal</td>
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Ursus americanus kermodei

| Overall Risk Rating | Planning and Layout | Roads, Bridges and Culverts | Roads, Bridges and Culverts | Harvesting | Silviculture | Fuel Handling | Dryland Sort & Log Unload | Log Dump & Water Drop | Wood Waste/Stockpile Disposal |
|---------------------|---------------------|-----------------------------|-----------------------------|------------|--------------|---------------|--------------------------|------------------------|Wood Waste/Stockpile Disposal |
|                     |                     |                             |                             |            |              | Fuel Handling | Dryland Sort & Log Unload | Log Dump & Water Drop | Wood Waste/Stockpile Disposal |
|                     |                     |                             |                             |            |              |               | Dryland Sort & Log Unload | Log Dump & Water Drop | Wood Waste/Stockpile Disposal |
|                     |                     |                             |                             |            |              | Fuel Handling | Dryland Sort & Log Unload | Log Dump & Water Drop | Wood Waste/Stockpile Disposal |
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|                     |                     |                             |                             |            |              | Fuel Handling | Dryland Sort & Log Unload | Log Dump & Water Drop | Wood Waste/Stockpile Disposal |
|                     |                     |                             |                             |            |              | Fuel Handling | Dryland Sort & Log Unload | Log Dump & Water Drop | Wood Waste/Stockpile Disposal |
|                     |                     |                             |                             |            |              | Fuel Handling | Dryland Sort & Log Unload | Log Dump & Water Drop | Wood Waste/Stockpile Disposal |
|                     |                     |                             |                             |            |              | Fuel Handling | Dryland Sort & Log Unload | Log Dump & Water Drop | Wood Waste/Stockpile Disposal |

13.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.
13.6. MANAGEMENT DIRECTION

The management direction for the Black Bear is provided in the North Coast LRMP, there is limited reference to black bears in the other land use plans. Please note that the North Coast LRMP is no longer a current document and has been replaced by the Ecosystem Based Management system.

13.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the Black Bear. The North Coast LRMP provides specific direction for Kermode Black Bear management in Section 5.5.3; the strategies here for all Black Bears are a subset of the Kermode bear management strategies.

- Locate roads to avoid important habitats (beaches, estuaries, forested and non-forested wetlands, skunk-cabbage swamps, avalanche chutes, riparian areas). Where this is not possible, provide visual screening with natural vegetation.
- Limit public road use to minimize the potential for bear human conflict and resulting black bear mortalities; deactivate and render impassable roads not presently needed for industrial use.
- Address loss of potential den cavities in large, old trees through “enhanced wildlife tree patches”, which are at least 1 hectare in size and contain standing live trees >1m diameter and >5 m height. Leaving large structured downed wood (piles) on cut blocks will provide additional opportunities for denning habitat.
- Applying variable retention harvesting may also address issues around the need for structure within managed stands, as long as suitable large trees are retained in areas of harvest. Retention patches should be “anchored” at existing black bear dens, if they are present.

13.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


14. CARIBOU (NORTHERN MOUNTAIN POPULATION)

14.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

Woodland Caribou (*Rangifer tarandus caribou* Pop.15) are a large, dark subspecies with short, heavy antlers. Woodland Caribou have three "ecotypes" in British Columbia; that is, subspecies *caribou* has three different groups of populations with distinct patterns of habitat use and feeding behaviour. The ecotype of the Northern Mountain populations is generally called "Northern Caribou".

Northern Caribou are an ecotype that lives in the mountainous and adjacent plateau areas with relatively low snowpacks in west-central and northern Interior BC. The populations of concern for this report are those associated with the Coast Range. Seasonal migrations involve considerable movements in both horizontal distance and elevation.

The critical habitat requirements of Northern Caribou are large tracts of winter range where they can exist at low densities, as an anti-predator strategy and to rotate their winter ranges; access to an adequate supply of terrestrial and arboreal lichens for food; snow interception by forest canopy to allow movements within the winter range; and relatively undisturbed high elevation calving habitat where they can calve in isolation away from predators. Mineral licks are an important habitat component. The distribution of both the summer and winter habitats on the landscape, and the ability of caribou to become spatially separated from predators, particularly during the summer months, are the most important factors to the long-term persistence of Northern Caribou.

Northern Caribou in British Columbia are protected from wilful killing, wounding, and taking, and legal harvesting is regulated under the provincial *Wildlife Act*. Under FRPA, specific regulations address winter range and mineral licks.

The BCTS Skeena Business Area overlaps with the range of four caribou herds. However, none of the caribou use was considered of sufficient importance to require management under the existing land use plans, or to include in Section 7 Notices. Caribou management will be addressed through the forthcoming National Caribou Recovery Plan, which is presently in the review, comment and refinement phase.

14.2. RANGE AND DISTRIBUTION

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<th>District</th>
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*Y = KNOWN OCCURRENCE*
14.3. CONSERVATION STATUS

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* E (May 2014); SC (May 2014). Provincial and COSEWIC borders differ therefore there are two listings for this ecotype. The southern portion of the ecotype falls within the northern part of the COSEWIC area that includes the endangered population of southern mountain caribou.

14.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Caribou are a complex set of interacting mechanisms (see Identified Wildlife 2004). Northern Caribou cannot be maintained over the long term in areas with high levels of forestry, predation, and recreation activity.

Forest harvesting affects Northern Caribou winter habitat at both the stand and landscape levels. At the stand level, harvesting and silvicultural activities may reduce lichen abundance; slow lichen regeneration
will have long-term implications for caribou winter habitat at both the stand and landscape level. Parts of the winter range with too little lichens may be abandoned, forcing caribou to concentrate in a smaller area, which may lead to increased predator efficiency. A patchwork of early seral and mature forests may also enhance habitat for other prey species such as moose that prefer early seral forests, leading to increased predator numbers and increased predation on caribou.

### 14.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

### 14.6. MANAGEMENT DIRECTION

None for the BCTS Skeena Business Area.

### 14.7. MANAGEMENT STRATEGY

The forthcoming National Recovery Strategy will provide specific protection for areas of habitat critical for recovery of the species, should there be any present in the BCTS Skeena Business Area.

### 14.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


15. FISHER

15.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Fisher (*Pekania pennanti*) is medium-sized carnivore of the weasel family that occurs in the temperate and boreal forests of North America. Fishers have long, thin bodies, dense coats and well-furred tails that make up about one-third of their total body length, pointed faces, rounded ears, and short legs. Their fur is long, luxurious, and chocolate-brown in colour, with considerable grizzling patterns around the shoulders and back. Fishers are sexually dimorphic, with males much larger than females. Fishers are two to three times the size of the similar American Martens, and have darker colouring, and shorter ears.

Fishers prefer lower elevation late-successional coniferous forests and riparian habitats. A “high density” population has about 1 fisher per 100 km², and there is a total BC population of 1,100 – 2,800 individuals. The best Fisher habitat in BC occurs in Natural Disturbance Type 3 (NDT 3); the central interior and northeast BC. Fisher require mature to old mixed or coniferous forests with large coniferous and deciduous wildlife trees and abundant course woody debris. Food consists of small mammals, birds, ungulate carrion, and any other meat source.

Fishers occur throughout most of mainland BC, east of the Coast Range, but are uncommon to rare in most of the area. Northeast BC and the central interior are the parts of BC with the highest habitat capability for Fishers. The habitat potential for Fisher in the BCTS Skeena area is low to nil; the few Fishers present are along the eastern edge of the area. Development of valley bottom habitats in the Skeena region is thought to have effectively removed much of the suitable habitat.

Fishers were formerly provincially red-listed, but are presently blue-listed (contrary to Identified Wildlife 2004). They were established as Identified Wildlife under the June 2006 Order – Category Species at Risk. They are not COSEWIC or SARA-listed, because they occur across Canada. As a result, the Fisher may revert back to the red-list in the near future, because the mountain pine beetle epidemic is destroying most of the best habitat in BC.

The Fisher is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial Wildlife Act.

15.2. RANGE AND DISTRIBUTION

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<th>District</th>
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<td>Skeena Stikine</td>
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15.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Fisher are habitat loss and fragmentation. These occur through harvesting that removes the key large standing and downed tree components of their habitat. Timber harvesting removes pine, large spruce trees, and to a lesser extent large cottonwoods. Forest harvesting may negatively affect the distribution of the remaining habitat, so that fishers must search more widely for sufficient resources. Increased access may increase trapping mortality. Maintaining structurally diverse and productive fisher habitat in logged areas is a function of the method and extent of timber harvesting, and also the type of site preparation and subsequent stand tending.

Wildlife tree retention areas, coarse woody debris recommendations, old forest retention, landscape level planning, and riparian management, have the potential to partially address fisher habitat requirements through the retention of large trees, dense canopy closure, and abundant levels of CWD.

The harvesting associated with the mountain pine beetle epidemic, and less so the epidemic itself, is degrading very large areas of Fisher habitat in the Central Interior.

15.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

15.6. MANAGEMENT DIRECTION

The management direction for the Fisher is provided by Identified Wildlife (2004).
15.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the Fisher, for the areas mapped as having at least some habitat potential for Fisher.

Implement the Identified Wildlife Management Strategy (2004) at both stand and landscape level.

The following strategies provide a minimum level of management, which is probably insufficient to maintain Fisher in the BCTS Skeena area. Landscape level land use planning, as described in Identified Wildlife, using the local knowledge of Ministry of Environment is required.

- Maintain mature and old cottonwood and large diameter fir and spruce along riparian and riparian-associated habitats.
- Maintain connectivity of mature and old forest between riparian and upland habitats.
- Maintain important structural attributes for fishers and prey species (i.e., CWD, wildlife trees, cottonwood, and large fir and spruce).
- Retain old forest patches that have high structural complexity including high amounts of CWD, through designation as WTPs, OGMAs, or temporary deferred harvest areas.
- Harvest patch size distribution should be as recommended by the Biodiversity Guidebook.

15.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


16. GREY WHALE

16.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Grey Whale (Eschrichtius robustus) is a medium to large (up to 15 m) dark grey baleen whale; the baleen is yellowish white, and the body is blotched with patches of barnacles and crustaceans. They lack a dorsal fin, and a middorsal hump is followed by a series of about 6-12 bumps; flippers are short and broad. Two to four throat grooves allow the throat to extend during feeding.

Only grey whales belonging to the eastern North Pacific population occur in Canadian waters. The entire population passes through the coastal waters of British Columbia in spring and fall on their migration between summer feeding grounds and winter breeding grounds. Feeding grounds include the coastal waters of British Columbia, with a population of a few hundred being resident during the summer. Summer resident grey whales in BC are often seen along the north coast of Vancouver Island from Cape Scott to Cape Sutil, as well as along the mainland from Shelter Bay to Cape Caution. The occurrence and distribution of grey whales in the summer months on the north coast of British Columbia is poorly understood. Feeding grey whales in the summer months have been reported from the west coasts of Calvert Island, Dundas Island, Aristazabal Island, and the McMullin Group. Apparently, summer-resident grey whales use almost all of the nearshore habitats along the outer coast of British Columbia and also some sheltered bays in the inside waterways.

Grey whales are usually found in shallow (< 60 m) water close to shore. They usually feed on sandy or gravelly bottoms, but also feed over rocky bottom and in kelp beds. They filter feed on small marine invertebrates and small fish, including herring.

Information on the cause of mortality of BC grey whales is limited. The noise pollution associated with industrial development (especially oil and gas exploration) of shallow marine areas can cause loss and deterioration of habitat. Steep slope logging and coastal forestry such as heli logging and log booms may cause degradation to feeding habitats by impacting the availability or quality of benthic prey species. Physical disturbance and chronic noise may affect foraging success. (pg. 13 of New Mgmt Plan) Seismic exploration appears to strongly displace feeding grey whales. Grey whales are killed by entanglement in fishing gear and in collisions with ships.

The Grey Whale is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial Wildlife Act.

16.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
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<tbody>
<tr>
<td>North Coast</td>
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<td>Kalum</td>
<td>Y</td>
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<tr>
<td>Skeena Stikine</td>
<td>Y</td>
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Y = KNOWN OCCURRENCE

16.3. CONSERVATION STATUS

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<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
</tr>
</thead>
</table>
16.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Grey Whale are limited to direct alterations of their marine environment. Coastal log dumps and water drops may displace them from feeding areas, and water drops may disrupt general use of nearby areas. Water drops have a remote chance of direct impacts of logs on whales.

16.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.
16.6. MANAGEMENT DIRECTION

The management direction for the Grey Whale is provided by the Federal Fisheries Act, and also through specific review of all marine developments by Fisheries and Oceans Canada.

16.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address management of the Grey Whale.

- Do not locate coastal log dumps or marine log drops in areas known or likely to be used by Grey Whales, as determined through consultation with the Department of Fisheries and Oceans.
- Locate coastal log dumps, booming grounds, and marine log drops at least one kilometre from feeding areas and migration corridors.
- Preferentially use barges as a landing zone instead of dropping logs into the water, especially when near known whale use areas.

16.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


17. GRIZZLY BEAR

17.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Grizzly Bear (*Ursus arctos*) is the second largest member of the bear family, next only to the polar bear. The long, outer guard hairs of the Grizzly Bear are often tipped with white, silver, or cream giving the bear a grizzled appearance; coat colour is usually brown but ranges from black to almost white. Grizzly Bear facial profiles are usually “dished-in” and a hump of muscle is normally present on the shoulders. The front claws on a Grizzly Bear are longer than on Black Bears, as long as 10 cm. The long front claws and hump of muscle on the shoulders are adaptations for digging.

They inhabit all elevations from sea level estuaries to high alpine meadows and talus slopes. Grizzly Bears are creatures of habit and will usually return to the same seasonal food sources and areas throughout their lifetimes of 20-30 years. Hibernating habitats tend to be high elevation areas that are sloped, and have dry, stable soil conditions that remain frozen during the winter. Dens are usually on steep north-facing slopes, with soils suitable for digging and where vegetation will stabilize the roof of the den and snow will accumulate for insulation. Grizzly Bears are efficient predators and scavengers but feed mostly on a plant material. Food includes roots and green vegetation, small and large mammals, fish, and insects. Grizzly Bears are omnivorous and opportunistic in their feeding habitats; hence a huge variety of plant, animal, fish, and insect food sources are regionally important. Throughout the active season, interior grizzlies will prey on small mammals, especially ground squirrels. Fish, roots, pine nuts, or bulbs, and insects are important whenever they are available and sufficiently abundant. Cutworm moth summer congregations under boulders in high elevation alpine talus slopes and boulder fields may be locally important; alpine winter aggregations of ladybird beetles may also be used.

Grizzly Bears have large home ranges; hence planning must include both landscape and stand level requirements of Grizzly Bears. The West Babine SRMP provides detailed objectives and strategies for Grizzly Bear management, and the Kalum Forest District has provided a “Notice” requiring management of key aspects of Grizzly Bear habitat.

Grizzly Bears are managed through population units; part or all of six population units occur within the BCTS Skeena Business Area. Each population unit has a separate conservation status, and is managed separately.

The Grizzly Bear is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*.

17.2. RANGE AND DISTRIBUTION

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<th>District</th>
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<tbody>
<tr>
<td>North Coast</td>
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<td>Kalum</td>
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<tr>
<td>Skeena Stikine</td>
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</table>

*Y = KNOWN OCCURRENCE*
Grizzly Bear – North Coast LRMP out of date: **North Coast LRMP management areas**
Scale is arbitrary.
Grizzly Bear – Kalum SRMP management areas
Scale is arbitrary.
Grizzly Bear – Kispiox, West Babine and Cranberry SRMP management areas
Scale is arbitrary.
17.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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<td>G4</td>
<td>S3</td>
<td>Blue</td>
<td>2004</td>
<td>SC (2002)</td>
<td></td>
<td>Kalum FD s.7 Notice; Skeena Stikine FD s.7 Notice; GBR LUO; WHA 6-282; North Coast LRMP; Cranberry SRMP (Draft); Kispiox LRMP; Kispiox SRMP; Kalum SRMP; Nass South SRMP; Identified Wildlife</td>
</tr>
</tbody>
</table>

17.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Grizzly Bear are harvesting, silviculture and road access management. Current timber management and silvicultural regimes, extensive site preparation and soil disturbance by heavy machinery reduce berry productivity in clearcuts, and conifer stands are planted, managed, and tended so they close in and lose any berry foraging values within much shorter time frames than they might have had under natural wildfire regimes.

Herbicide applications can also reduce berry and herbaceous plant productivity. Natural post-fire habitats may remain high productivity foraging sites (particularly for berries) for 35–70 years, and Grizzly Bears learn to rely heavily on these sites.

Clearcutting the forests forested habitats adjacent to important open foraging habitats (such as avalanche chutes, wet meadows, marshes, swamps, and subalpine meadows) removes critical security habitat and daytime bedding sites to avoid heat stress.

Roads result in Grizzly Bear mortality both directly and indirectly, through collisions on major roads, hunting and poaching, habitation of bears to people when they come in close contact and the eventual loss of some of these bears involved in human-bear conflicts, and social disruption of bears with other bears when bears start avoiding habitat near newly created roads.
17.5. WILDLIFE HABITAT AREAS

One Wildlife Habitat Area has been posted within the Kalum FD. Please see the Ministry of Environment Ecosystems Branch website for current Approved Wildlife Habitat Areas.

17.6. MANAGEMENT DIRECTION

The management direction for the Grizzly Bear is provided through Identified Wildlife (2004) and the land use plans. The Kispiox, Kalum and West Babine SRMP Objectives (2006) establish the habitat maps and objectives for those areas. The North Coast LRMP includes recommendations regarding grizzly bear management but is however out of date and has been replaced by the Ecosystem Based Management system.

17.7. MANAGEMENT STRATEGY

Implement the Identified Wildlife (2004) strategy at both the stand and landscape level, with emphasis on the direction provided by the local land use plans and Section 7 Notices. Implement, as best as possible in the absence of landscape level planning, the same management principles to the parts of BCTS Skeena Business Area that do not yet have a higher level plan.

17.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


18. HARBOUR PORPOISE

18.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Harbour Porpoise (*Phocoena phocoena*) is one of the smallest (up to 2 m long) cetacean species in BC. They are dark grey to black on the dorsal surface, and white on the belly. They are shy and short-lived; the oldest individual aged in BC waters was 10 years old. Harbour porpoise appear to regularly hybridize with Dall’s porpoise in southern British Columbia.

They occur in shelf-waters throughout BC all year, with the exception of some deep-water inlets, typically inhabiting waters less than 200 m in depth. They have a diverse diet of small fish and squid, typically feeding on small schooling fish.

Natural sources of mortality in the province include predation by sharks or killer whales. Incidental mortality in a number of fisheries in British Columbia has been documented, particularly in gillnet fisheries. Harbour porpoises are known to be susceptible to disturbance by vessel traffic and loud underwater sound sources, such as acoustic harassment devices associated with aquaculture operations. The complete loss of animals from the highly developed area of Puget Sound, and the apparent reduction in numbers in areas around Victoria and Haro Strait, are indicative of its sensitivity to human activities. Anthropogenic influences that could result in reduced reproductive rates include effects from accumulation of persistent toxins, disturbance by vessel traffic, and displacement from prime habitat by sources of high-level underwater sounds.

The Harbour Porpoise is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act* and the federal *Fisheries Act*. They are internationally listed in Appendix II of the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES), restricting their international trade. The harbour porpoise is also listed as “Vulnerable” by the World Conservation Union (IUCN 1996).

18.2. RANGE AND DISTRIBUTION

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<th>District</th>
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<tr>
<td>North Coast</td>
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<td>Kalum</td>
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<tr>
<td>Skeena Stikine</td>
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Harbour Porpoise – Known Occurrence in BC
Scale is arbitrary. From *Rare Amphibians, Reptiles, and Mammals of British Columbia.*
18.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
</tr>
</thead>
</table>

18.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Harbour Porpoise are limited to direct alterations of their marine environment. Coastal log dumps and water drops may displace them from feeding areas, and water drops may disrupt general use of nearby areas. Water drops have a remote chance of direct impacts of logs on porpoises.

Overall Risk Rating

<table>
<thead>
<tr>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log Unload</th>
<th>Log Dump &amp; Water Drop</th>
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<tbody>
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<td>Road Layout</td>
<td>Road Construction</td>
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18.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

18.6. MANAGEMENT DIRECTION

The management direction for the Harbour Porpoise is provided by the Federal Fisheries Act, the Species at Risk Act, and through specific review of all marine developments by Fisheries and Oceans Canada.

18.7. MANAGEMENT STRATEGY

Fisheries and Oceans Canada is in the process of developing a Management Plan to support the species recovery. The following forest management strategies are designed to address management of the Harbour Porpoise.

- Do not locate coastal log dumps or marine log drops in areas known or likely to be used Harbour Porpoises, as determined through consultation with the Department of Fisheries and Oceans.
- Locate coastal log dumps, booming grounds, and marine log drops at least one kilometre from feeding areas and migration corridors.
- Preferentially use barges as a landing zone instead of dropping logs into the water, especially when near known porpoise use areas.
18.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


19. HUMPBACK WHALE

19.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Humpback Whale (Megaptera novaeangliae) is a medium to large whale (up to 14 metres) with dark dorsal colouration. They have extremely long pectoral flippers (to nearly one-third of the body length), tend to raise their tail flukes above the surface when they dive, and frequently jump from the water.

Information on the cause of mortality of all whales is limited. Whales are killed by entanglement in fishing gear and in collisions with ships. The noise pollution associated with industrial development (especially oil and gas exploration) of shallow marine areas is known to cause loss and deterioration of habitat. Seismic exploration appears to strongly displace feeding grey whales. There is no specific research on the effects of helicopter log drops on humpback whales, but the effects of the sounds generated by log impacts are likely to be similar to the effects of seismic exploration. The most likely effect of log drops is to move whales away from nearby feeding areas or other generalized behavioural alterations; effects that would be difficult to document. There is also the possibility of a rare event of direct impact of a log on a whale if the helicopter pilot fails to see a whale surfacing after feeding on the ocean bottom; a closely adjacent impact could cause temporary hearing loss or tissue damage.

The mouth of Work Channel and the southern portion of Steamer Pass are important summer feeding areas for humpback whales; also, some immature whales have been staying in Work Channel all year and Steamer Pass is a migration route for the whales. The local humpback whale population has expanded and the whales are now returning to other former feeding areas; hence they could begin using additional areas.

The Humpback Whale is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial Wildlife Act, under the Federal Fisheries Act, and under the Species at Risk Act.

19.2. RANGE AND DISTRIBUTION

<table>
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<th>District</th>
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<tbody>
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<td>North Coast</td>
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<td>Kalum, Skeena</td>
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<tr>
<td>Stikine</td>
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</table>

Y = KNOWN OCCURRENCE

No map available.

19.3. CONSERVATION STATUS

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<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
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<td>G4</td>
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<td>SC (2011)</td>
<td>1-T (2005)</td>
<td>SARA Schedule 1-T</td>
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19.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Humpback Whale are limited to direct alterations of their marine environment. Coastal log dumps and water drops may displace them from feeding areas, and water drops may disrupt general use of nearby areas. Water drops have a remote chance of direct impacts of logs on whales.
19.5. WILDLIFE HABITAT AREAS
None in the BCTS Skeena Business Area.

19.6. MANAGEMENT DIRECTION
The management direction for the Humpback Whale is provided by the Federal Fisheries Act, the Species at Risk Act, and through specific review of all marine developments by Fisheries and Oceans Canada.

19.7. MANAGEMENT STRATEGY
The following forest management strategies are designed to address management of the Humpback Whale.

- Do not locate coastal log dumps or marine log drops in areas known or likely to be used Humpback Whales, as determined through consultation with the Department of Fisheries and Oceans.
- Locate coastal log dumps, booming grounds, and marine log drops at least one kilometre from feeding areas and migration corridors.
- Preferentially use barges as a landing zone instead of dropping logs into the water, especially when near known whale use areas.

19.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


20. KILLER WHALE (NORTHEAST PACIFIC OFFSHORE POPULATION)

21. KILLER WHALE (NORTHEAST PACIFIC NORTHERN RESIDENT POPULATION)

22. KILLER WHALE (WEST COAST TRANSIENT POPULATION)

22.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Killer Whale (Orcinus orca) has a distinctive black and white pattern, blunt head, and tall dorsal fin in the middle of the back. Adult males are larger than females - the maximum recorded length for a male is 9.0 m, compared with 7.7 m for a female. However, the average length of adult individuals in British Columbia waters is much smaller than these maximum lengths. The tall dorsal fin of adult males is triangular and may reach up to 1.8 m in height, while in juveniles and adult females it reaches 0.9 m or less and is generally more falcate (hooked like a sickle). Furthermore, the pectoral fins and tail flukes are larger in adult males, and the tail fluke bends downwards. The three ecotypes can only be distinguished by an expert.

There are three ecotypes of Killer Whales, “offshore” (pop. 2), “resident” (pop. 6 on the north coast, pop. 5 on the south coast), and “transient” (pop. 3). All three ecotypes of Killer Whale have been recorded year-round off the Pacific coast. The types differ slightly in morphology and genetics, and substantially in behaviour and diet. Residents feed on fish, and their distribution is closely tied with peak abundance of various species of salmon prey, transients feed on marine mammals, and offshores are poorly known but apparently feed mostly on fish.

Total abundance of each of the three ecotypes of Killer Whales is about 200; they are vulnerable to disturbance, loss of fish stocks, pollution of inshore waters, and consequent build-up of toxins, and (in the past at least) direct exploitation. Offshore Killer Whales occur throughout British Columbia’s coastal waters, but prefer offshore waters; residents stay relatively near shore in predictable areas, and transients move constantly through the coastal area.

The northern resident population has been growing steadily in size since the 1970s (when live capture fisheries stopped and shooting declined). It increased to 216 individuals by 1997, but recent data suggest that the population since declined. They will occasionally spend considerable time in brackish water and will even enter rivers. Northern residents are subject to high levels of human interaction (boat traffic) that may have negative consequences on the population. Fishing boat/human interactions include direct takes (whaling, culling), live-capture fisheries, entanglement in fishing gear, collisions with vessels, and exposure to oil spills. Among the natural factors that may be limiting the whale's populations are periodic events such as mass strandings or entrapments in narrow inlets or ice, which have the potential to drastically reduce numbers locally.

The Killer Whale (Northeast Pacific resident population) is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial Wildlife Act. The Killer Whale is listed on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
22.2. RANGE AND DISTRIBUTION

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<td>Kalum</td>
<td>Y = KNOWN OCCURRENCE</td>
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<tr>
<td>Skeena Stikine</td>
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</table>

Killer Whale (offshore and transient populations) – Known Occurrence in BC
Scale is arbitrary. From Rare Amphibians, Reptiles, and Mammals of British Columbia.

Killer Whale (resident population) – Known Occurrence of the northern population in BC
Scale is arbitrary. From COSEWIC Species at Risk website.

22.3. CONSERVATION STATUS

OFFSHORE POPULATION

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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NORTHERN RESIDENT POPULATION

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<th>Global Rank</th>
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<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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* COSEWIC assessed the southern population of ‘resident’ Killer Whales as Endangered, and the northern population (BCTS Skeena area) as Threatened.

TRANSIENT POPULATION

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<tr>
<th>Global Rank</th>
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<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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</thead>
</table>
The forest management issues for the resident population of Killer Whale are limited to direct alterations of their marine environment. Coastal log dumps and water drops may displace them from feeding areas, and water drops may disrupt general use of nearby areas. Water drops have a remote chance of direct impacts of logs on whales. There are no forest management issues for the offshore and transient Killer Whale populations; interaction with them is extremely unlikely.

**KILLER WHALES**

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Likelihood of Interaction</th>
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<td>Fuel Handling</td>
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<td>Dryland Sort &amp; Log Unload</td>
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<td>Log Dump &amp; Water Drop</td>
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**22.5. WILDLIFE HABITAT AREAS**

None in the BCTS Skeena Business Area.

**22.6. MANAGEMENT DIRECTION**

The management direction for the Killer Whale is generally provided through the *Fisheries Act*. Management direction for the northern resident and transient population is provided by the National Recovery Strategy. A Management Plan by Fisheries and Oceans for Offshore, is available. The Management Plan does not, however, contain any particular reference to logging activities.

**22.7. MANAGEMENT STRATEGY**

None required.

**22.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES**


23. LITTLE BROWN MYOTIS

23.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Little Brown Myotis (*Myotis lucifugus*) is cinnamon-buff to dark brown above, buffy to pale gray below. The hairs on the back have long glossy tips; and the ear when laid forward reaches approximately the nostril. They have adapted to using human-made structures for resting and maternity sites; they also use caves and hollow trees. Foraging habitat requirements are generalized; usually forages in woodlands near water. Maternity colonies commonly are in warm sites in buildings and other structures; also, infrequently in hollow trees. A narrow microclimate is suitable for raising young, and availability of suitable maternity sites may limit abundance and distribution. Hibernates in caves, tunnels, abandoned mines, and similar sites.

Often hunts over water or along the margins of lakes and streams; consumes flying insects, especially mosquitoes, midges, caddisflies, moths, various hoppers, and smaller beetles, sometimes spiders. Insects with wingspans of 1/8-1/2" are pursued; prey are detected by echolocation at a range of 1 m.

Widespread in North America from Alaska southward.

The Little Brown Myotis is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*.

23.2. RANGE AND DISTRIBUTION

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<tr>
<th>District</th>
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<tr>
<td>North Coast</td>
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<tr>
<td>Skeena Stikine</td>
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Y = KNOWN OCCURRENCE

No map is provided; the species is generally distributed within the area.

23.3. CONSERVATION STATUS

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<th>Global Rank</th>
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<th>SARA Schedule</th>
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23.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Little Brown Myotis are protection of winter hibernation sites from disturbance, and maintenance of a supply of wildlife trees.
23.5. WILDLIFE HABITAT AREAS
None in the BCTS Skeena Business Area.

23.6. MANAGEMENT DIRECTION
The management direction for the Little Brown Myotis is provided by land use plan direction to maintain biodiversity in general.

23.7. MANAGEMENT STRATEGY
The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the Little Brown Myotis.

Stand Level
- Protect known Little Brown Myotis roosting, maternity, and hibernation sites from disturbance.
- Pay particular attention to retention of large diameter wildlife trees that have loose bark or will likely develop loose bark in the future.

Landscape Level
- Inventory of karst areas (including limestone cliffs and caves) for use by Keen’s Long-eared Myotis (discussed above) during the summer, and for the presence of potential hibernation caves, will also inventory for important Little Brown Myotis sites. There is no specific inventory required for the Little Brown Myotis.

23.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


http://www.cancaver.ca/bats/bc/

E-Fauna BC. http://eflora.bc.ca/. [This may migrate to a more general E-Fauna BC website]


24. MOOSE

24.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

Moose (*Alces americanus*, formerly *Alces alces*) are the largest ungulates in BC, weighing up to 600 kg. They have long legs, a shoulder hump, and a dark brown to blackish coat. They have a bell of skin and hair under the throat and a large, overhanging upper lip. Their long legs allow them travel through fallen timber, muskeg, and deep snow. Their winter pelage of long guard hairs and undercoat of fine wool allows them to survive in the coldest climates on earth. Only male Moose have antlers. There are three subspecies of moose in BC; those in the southeast have the smallest bodies and antlers, those in the north are the largest.

Moose are essentially solitary animals that move about within familiar summer and winter home ranges. In a given season, their home range seldom exceeds 5 to 10 km$^2$. Their annual home range is much larger, particularly for migratory Moose. In expansive northern shrublands, Moose commonly form groups of up to eight to ten during the rutting period; this less often occurs in forested habitats.

Moose habitats usually have significant amounts of snow in winter. Moose are well adapted to snowy regions because of their long legs, which help them to travel through deep snow; they have little or no difficulty moving around in snow up to 40 cm deep and only slight difficulty in snow depths of 40 to 70 cm deep. In mountainous regions of British Columbia, Moose usually migrate between winter-spring ranges in valley bottoms and higher-elevation summer ranges, but some Moose remain in the valleys year-round. If the snowfall is light, they may stay on midelevation ranges until late winter. On plateaus, Moose usually spread out over the landscape in summer, but are strongly concentrated near lake shores, swamps, and beaver ponds. In winter, they tend to concentrate along river valleys that cut through the plateaus and in burns, logged areas, and wetland complexes. Moose commonly winter in areas with 50 cm or more of snow cover, which usually excludes other ungulates except Caribou.

Moose depend primarily on willows for winter food. Red-osier dogwood, cottonwood, paper birch, aspen, high-bush cranberry, false box, and subalpine fir are also important foods. Moose also strip bark from willows and poplars in winter. In summer, aquatic plants like horsetail, burweed, and submerged pondweeds are important foods. Moose also eat the new leaves on a variety of shrubs and herbs in summer.

During the most severe winters when the snow cover is unusually deep and long-lasting, Moose are in poor physical condition and may die from starvation or attacks by wolves. Black Bears can take significant numbers of newborn calves; Grizzly Bears kill Moose from spring through fall. Moose is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*.

24.2. RANGE AND DISTRIBUTION

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<tr>
<th>District</th>
<th>Present</th>
<th>Y = KNOWN OCCURRENCE</th>
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<tbody>
<tr>
<td>North Coast</td>
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<tr>
<td>Kalum</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Skeena Stikine</td>
<td>Y</td>
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</tbody>
</table>
Moose – Winter Range
Scale is arbitrary.

This map has since been updated (2011) for the North Coast and Kalum Forest District. However, the updated mapping has not been legally accepted at the time of updating.
24.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td>UWR Order u-6-009, Cranberry TSA Section 7 Notice; TFL41 s.7 Notice; TFL1 s.7 Notice; Kalum TSA s.7 Notice; North Coast TSA s.7 Notice; North Coast LRMP; Kispiox LRMP; Kispiox SRMP; Cranberry SRMP (Draft); Nass South SRMP</td>
</tr>
</tbody>
</table>

24.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for Moose are high densities of logging and other access roads that lead to over-harvesting of Moose. Harvesting benefits Moose through growth of willows and other shrubs in cut blocks, but removing too much forest cover can be detrimental. Moose need nearby cover to hide from predators and hunters, for shade in hot weather, and for shelter during blizzards.

24.5. WILDLIFE HABITAT AREAS

There are four approved Ungulate Winter Ranges designated for moose within the BCTS Skeena Business Area. Please see the Ministry of Environment Ecosystems Branch website for currently Approved Ungulate Winter Ranges. All three areas are situated within the Kalum FD.

24.6. MANAGEMENT DIRECTION

The management direction for Moose is provided through higher level plan direction, with the Kalum and Kispiox LRMPs having winter range maps. The Ungulate Winter Range Order for the Cranberry TSA establishes the amount and characteristics of moose habitat for the TSA. The Kispiox SRMP Objectives (2006) establish the winter range maps and objectives for that lease area.
24.7. MANAGEMENT STRATEGY
To manage for moose, follow the direction provided by Section 7 Ungulate Winter Range notices and the higher level plans.

24.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES
25. MOUNTAIN GOAT

25.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Mountain Goat (Oreamnos americanus) is a muscular, snowy white “goat” (which it technically is not) that is well adapted to escape detection in snowy landscapes. They weigh up to 120 kg, and both sexes have thin, black stiletto-like permanent horns up to 30 cm long. Male and female goats look similar, but the horns are slightly different. It is built to live in steep, rocky terrain, with disproportionately massive forequarters relative to a compact rear end. A deep chest and tremendously developed shoulder muscles give the Mountain Goat great strength for climbing and for pawing through snow for food. The goats seek out cool, shady spots in hot weather; heat stress may determine the southern limit of the Mountain Goat’s distribution. British Columbia is the heartland of Mountain Goats and contains more than half of the world’s population.

Predators like wolves and Cougars occasionally ambush an unwary stray goat, and eagles knock a few kids from cliffs. But because of their alertness, preference for steep terrain, and ability to use their horns against would-be attackers, goats are less susceptible to predation than most big game animals. Accidental losses from falls and avalanches are more significant for goats than for other ungulates, but they are not a major limiting factor.

Winter environmental factors are the primary source of mortality. Forty to sixty percent of kids die in their first winter, and many yearlings also die in their second winter, probably from starvation. Mortality rates are highest in severe winters, occasionally over 50 percent; deep and persistent snow that covers forage, saps energy reserves, and delays spring green-up is the major cause of death. In summer and early fall, most goats graze at and above the timberline, where they favour lush alpine swales and boulder meadows beside steep cliffs. Some may migrate a few kilometres between winter-spring and summer ranges, but many seasonal migrations are just local shifts in elevation. Most winter ranges are steep sites that shed snow and have a warm south to west exposure. Along the coast, winter ranges are invariably at low elevations because at high elevations, the deep, heavy snow is not readily blown away to expose forage and because near sea level, snow is much shallower in depth or even absent.

Goats eat a wide variety of plants, including lichens, ferns, grasses, herbs, shrubs, and deciduous or coniferous trees. Mountain Goats are strongly attracted to mineral licks in summer, especially interior herds. They often travel several kilometres downslope through forest to reach them. Many licks are on cliffs along incised river valleys, but some are simple clay pits where the goats may linger for up to three weeks, apparently to satisfy their craving for sodium and other minerals that are in short supply in lush spring vegetation.

Unintended harassment of goats by helicopters is a concern, particularly during the kidding season and in winter when the animals are in the poorest condition. Snowmobiles are also a concern in some areas. Timber harvesting near winter ranges can cause stress or displace goats due to noise disturbance.

The Mountain Goat is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial Wildlife Act.

25.2. RANGE AND DISTRIBUTION

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<th>District</th>
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<tr>
<td>North Coast</td>
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<tr>
<td>Kalum</td>
<td>Y</td>
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<tr>
<td>Skeena Stikine</td>
<td>Y</td>
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</tbody>
</table>

Y = KNOWN OCCURRENCE
Mountain Goat – Winter Ranges
Scale is arbitrary.
25.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
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</tr>
</tbody>
</table>

25.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Mountain Goat are harvesting removing key forest stands adjacent to the favoured steep terrain, roads close to goat habitat resulting in disturbance, roads crossing migration corridors, and increased access resulting in increased recreational disturbance (snowmobiles, etc.).

25.5. WILDLIFE HABITAT AREAS

There are four approved Ungulate Winter Ranges designated for Mountain Goats within the BCTS Skeena Business Area. Please see the Ministry of Environment Ecosystems Branch website for currently Approved Ungulate Winter Ranges. Three areas are noted in the Kalum FD while one is found in the Skeena Stikine FD, Kispiox/Cranberry area.

25.6. MANAGEMENT DIRECTION

The management direction for Mountain Goat is provided through higher level plan direction, with all areas having winter range maps. The Ungulate Winter Range Order for the Cranberry TSA establishes the amount and characteristics of mountain goat habitat for the TSA. (ftp://ribftp.env.gov.bc.ca/pub/outgoing/cdc_data/Approved_FRPR_sec7_WLPPR_sec9_Notices_and_Supporting_Info/UWR/Timber_Supply_Areas/Cranberry_TSA/Notice/CranberryTSA_UWR.pdf). The Kispiox SRMP Objectives (2006) establish the winter
range maps and objectives for that area. The Orders for the designated Mountain Goat Ungulate Winter Ranges in the Kalum Forest District are at http://www.env.gov.bc.ca/wld/frpa/uwr/approved_uwr.html.

25.7. MANAGEMENT STRATEGY

Manage for mountain goat by following the direction provided by Section 7 Ungulate Winter Range notices and the higher level plans.

25.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


WHAs in the Kalum FD and Skeena Stikine FD. http://www.env.gov.bc.ca/wld/frpa/uwr/approved_uwr.html
26. MULE DEER

27. SITKA BLACK-TAILED DEER

28. WHITE TAIL DEER

28.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

Mule Deer (*Odocoileus hemionus hemionus*) and Sitka Black-tailed Deer (*Odocoileus hemionus sitkensis*) are distinctly different subspecies of the same species. Mule Deer occur east of the Coast Range, and use relatively dry habitats. Sitka Black-tailed Deer inhabit the central and north coast, and use wet coastal forest habitats. Their distributions overlap in the more interior part of the BCTS Skeena Business Area.

Mule Deer are relatively large animals weighing up to 180 kg; they have a reddish brown coat that changes from tawny brown in summer to dark or grizzled brown in winter. They have a dark brown forehead, a whitish face with a black muzzle, and a white throat patch. Their ears are large (about 2/3 the length of the head) with black borders and white hair on the inside, and they have a large white rump patch with a narrow black-tipped tail. Sitka Black-tail Deer are much smaller (up to 90 kg) and slightly darker in color, with a small rump patch and a tail that is dark brown or black for most of its length, rather than just at the tip.

Sitka Black-tailed Deer are excellent swimmers and inhabit most of the coastal islands (except the Dundas group), inland across the Coast Range. They are introduced on the Queen Charlottes.

Mule Deer inhabit the eastern side of the Coast Range. Mule Deer and Black-tailed Deer have difficulty moving through snow deeper than 30 cm, so they cannot survive in British Columbia’s extensive alpine and subalpine zones in winter. In summer, most deer migrate to higher elevations to take advantage of nutritious new growth, but some remain at low elevations all year. Old-growth forests form a key part of the winter range for coastal Black-tailed Deer in British Columbia and are critical for their survival. They provide shelter, intercept snow so that it is shallower, and provide forage in the form of broken branches and the lichens that grow on them.

Steep, south- to west-facing sites provide the best winter range. In winter and early spring, coastal Black-tailed Deer feed on Douglas-fir, western redcedar, red huckleberry, salal, deer fern, and lichens that grow on trees. From late spring to fall, they eat a much wider variety of plants, including grasses, trailing blackberry, fireweed, pearly everlasting, and many other herbaceous plants (forbs), as well as the leaves of willows, salmonberry, salal, maple, and other shrubs or trees. The Mule Deer's key winter foods include shrubs like big sagebrush, pasture sage, bitterbrush, rabbitbrush, snowbrush, saskatoon, rose, and serviceberry, as well as the foliage of Douglas-fir trees and a variety of grasses and herbs. In spring and summer, Mule Deer prefer various grasses, along with herbs like balsamroot, clover, wild strawberry, fireweed, and the leaves of many kinds of shrubs.

The white-tailed deer (*Odocoileus virginianus*) occurs in the dry valley bottoms on the east side the BCTS Skeena Business Area; the occurrence in the area reflects a recent range expansion. They are about the size of Sitka black-tailed deer. Their most obvious characteristic, which separates them from the other two deer, is its triangular foot-long tail. On top, the tail is brown with a prominent white fringe, but the underside is snowy white. The tail of a whitetail sticks up and bobs from side to side with each bound while running.

The Mule Deer, Sitka Black-tailed Deer, and White Tail Deer are protected, in that they cannot be killed, collected or held in captivity without special permits or a hunting license, under the provincial *Wildlife Act*. 
28.2. RANGE AND DISTRIBUTION – MULE DEER

<table>
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Not stated in CDC.

28.3. RANGE AND DISTRIBUTION – SITKA BLACK-TAILED DEER

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<td>P = OCCASIONAL OCCURRENCE</td>
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<tr>
<td>Skeena Stikine</td>
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</table>

Mule Deer and Sitka Black-tailed Deer – Known Occurrence on Northern BC Coast
Scale is arbitrary. From Blood (2000).
Deer Winter Range – Kispiox SRMP Legal Objective
Scale is arbitrary.

28.4. RANGE AND DISTRIBUTION – WHITE-TAILED DEER

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<th>? = POSSIBLE OCCURENCE</th>
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Not stated in CDC.

28.5. CONSERVATION STATUS – MULE DEER AND WHITE-TAILED DEER

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28.6. CONSERVATION STATUS – SITKA BLACK TAILED DEER

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<td>North Coast LRMP; GBR LUO; Kalum LRMP</td>
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</tbody>
</table>

* The Sitka black-tailed deer is not ranked separately by the Conservation Data Centre; the conservation status is for the species as a whole.

28.7. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issue for the mule deer, Sitka black-tailed deer, and white-tailed deer is maintenance of sufficient mature/old forest winter habitat. This is done through land use planning processes, with only the Kispiox SRMP having designated winter ranges.
### DEER

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<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log Unload</th>
<th>Log Dump &amp; Water Drop</th>
<th>Wood Waste/Stockpile Disposal</th>
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#### Likelihood of Interaction

- **H**: High
- **M**: Moderate
- **L**: Low

<table>
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<tr>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
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#### 28.8. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

#### 28.9. MANAGEMENT DIRECTION

The Kispiox LRMP legal objectives include Mule Deer Winter Range designations and management direction. White-tailed deer will be managed by default through management of the mule deer.

#### 28.10. MANAGEMENT STRATEGY

- Follow the Kispiox LRMP Higher Level Plan Objectives (2006) for the Mule Deer Winter Ranges in that area.
- Key deer winter ranges have not been mapped or identified in the land use plans for the remainder of the BCTS Skeena Business Area; hence there is no specific management strategy in that area. Moose winter range management will also manage for some deer winter habitat.

#### 28.11. REFERENCES AND ADDITIONAL INFORMATION SOURCES


29. SEA OTTER

29.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

Sea otters (*Enhydra lutris*) are the largest North American mustelid, but the smallest marine mammal found in British Columbia. They are distinguished from river otters (*Lontra canadensis*) by their larger size, a lighter colored head, and longer whiskers. Sea otters spend much time floating on their backs, which river otters never do. They rarely come ashore, unlike river otters, and usually only on remote offshore reefs or bars. The sea otter pelage is mainly reddish, dark brown, or black and highly insulating due to its thickness and density of hairs; the head is whitish in older individuals, especially males. The tail is thick (to about 35 cm) and about 1/4 of body length. The otter’s hind feet are flattened and webbed, with the outer toe longest and vestigial leathery foot pads. The front feet are relatively small and round. Sea otters reach lengths of approximately 1.5 m with adult males usually weighing 25-40 kg and females between 15-25 kg.

Historically, the Sea otter was found across the North Pacific, from Japan to peninsular and south coastal Alaska and south to Baja California, Mexico. However, because of commercial harvesting this species was almost extirpated throughout its entire range. Today, with reintroductions, populations are found from the Aleutian Islands in Alaska south to California, but with gaps in its distribution where populations have not recovered. Males may move up to 30-60 miles along a coastline, whereas females generally stay within an area 5-10 miles long. Daily movements generally encompass a few kilometers.

Sea otters establish individual home ranges which incorporate feeding areas and resting areas and overlap with individuals of the same sex. Only males establish and defend territories that are established seasonally near female rafting areas. Males generally expand into new habitat first in response to increased population density at established sites; females follow into the new habitat once the male groups have moved on. Sea otters appear to make seasonal movements in response to sea conditions, moving to relatively sheltered locations during storms. Male sea otters in particular, are capable of moving great distances.

Sea otters are polygynous with females living separately from males in groups called “rafts.” Females reach sexual maturity at three to five years and males between five and six years of age. Both sexes remain reproductive until death. Mating occurs year-round with a peak in summer, followed by delayed implantation. Gestation is from 8-9 months in northern waters. Peak pupping in BC occurs in March and April. Adult females generally give birth to 1 pup every year and in some areas further north it is every other year. The young are dependent on their mother for about approximately 6 to 11 months.

In British Columbia, otters occur along stretches of exposed coastline characterized by complex rocky shorelines with small islets and offshore rocky reefs. Throughout their range in the North Pacific, sea otters inhabit shallow waters within 2 km the coastal line and not generally deeper than 40 m, although in areas where shallows extend well offshore they have been found well beyond 2 km. Kelp beds and soft-bottom communities provide important foraging habitats. Kelp beds are also used habitually as rafting sites. Most foraging occurs in subtidal zones and occasionally in intertidal areas at high tide in rough weather, they take refuge among kelp, or in coves and inlets. Most of their life is spend in the ocean, with few excursions ashore.

Sea otter diet is broad and diet varies geographically, often showing individual preferences. In habitats with rocky substrate, sea urchins are a preferred prey, but as the availability of urchins is reduced, diet shifts to a variety of marine invertebrates including bivalves, snails, chitons, crabs, sea stars are principal foods, but fish are important food items at high population densities. Sea otters also known to forage in soft bottom habitats and important components include butter clams, horse clams and geoducks. Foraging occurs throughout the day and night, with periodic resting in between feeding bouts. Otters forage usually at depths of less than 20 m. They use rocks or other hard objects as tools to break exoskeletons of invertebrate prey.
Sea otters are considered a keystone species of nearshore ecosystems. Their presence in nearshore marine ecosystems increases overall diversity and productivity, although prey species (e.g. sea urchins, abalone, sea cucumbers) suffer initial declines following colonization of an area by sea otters. Loss of sea otters from the nearshore ecosystem also has impacts. Dramatic declines of sea otters throughout Alaska’s Aleutian Islands caused a significant kelp deforestation and the vertebrate and invertebrate communities supported by kelp forests.

### 29.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
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<tr>
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<td>Kalum</td>
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<tr>
<td>Skeena Stikine</td>
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Sea Otter – Distribution of Sea Otter in British Columbia

Map from E-Fauna BC and the Province of British Columbia (2008)

### 29.3. CONSERVATION STATUS

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<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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### 29.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the sea otter are limited to direct alterations of their marine environment. Coastal log dumps and water drops may directly impact local populations through noise disturbance and indirectly through degradation of prey habitat by affecting water quality in intertidal areas through increasing tannin concentrations and coarse and fine woody debris.
29.5. WILDLIFE HABITAT AREAS
None in the BCTS Skeena Business Area.

29.6. MANAGEMENT DIRECTION
The management direction for the sea otter is provided by the National Recovery Strategy for the Sea Otter (*Enhydra lutris*) in Canada produced by Fisheries and Oceans Canada. The sea otter is protected under the *Species at Risk Act* and the *Marine Mammal Regulations* in the federal *Fisheries Act*. The species is listed as Threatened under the British Columbia *Wildlife Act*. Under this Act, it is prohibited to kill, capture, harass, or trade this species, or to destroy its habitat.

29.7. MANAGEMENT STRATEGY
There are no forestry-specific management strategies within the National Recovery Strategy for sea otters. The goal for recovery of sea otters is to see that the sea otter population is sufficiently large and adequately distributed so that threats, including events catastrophic to the species, such as oil spills, would be unlikely to cause extirpation or diminish the population such that recovery to pre-event numbers would be very slow. The population and distribution objectives to measure progress towards reaching the goal are to observe that the geographic range and number of sea otters in coastal BC continues to expand naturally beyond the 2004 continuous range in order to be able to survive habitat impacts and catastrophic events.

In addition, a recovery objective was set to identify and, where possible, mitigate threats to sea otters and their habitat to provide for recovery of the population. The recovery strategy approach focuses on identifying and reducing threats to sea otters and their habitat that could impede recovery. Strategies that are recommended to address threats and effect recovery are: research to clarify threats; population assessment (surveys); protection from oil spills and other threats; and communication to support recovery.

Critical habitat for sea otters has not been identified. Certain wintering habitats may be the most critical to sea otters’ survival and recovery. A schedule of studies towards identifying critical habitat has been included. One or more action plans, which provide the specific details for recovery implementation, will be completed by 2014, within six years of completion of the recovery strategy.
29.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


30. STELLER SEA LION

30.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Northern (= Stellar) Sea Lion (*Eumetopias jubatus*) are large marine carnivores with significant sexual dimorphism. Adult females (cows) are up to 2.5 m long and weigh up to 300 kg; males (bulls) are up to 3.1 m long and weigh up to 1100 kg. Mature males develop a prominent ‘mane’ of coarse hair on their massive muscular necks and chests, from which they derive the name ‘lion’.

There are three main breeding areas in BC:

- the Scott Islands off the northwest tip of Vancouver Island, with rookeries situated on the Scott Islands (Triangle, Beresford and Maggot Islands);
- at Cape St. James off the southern tip of the Queen Charlotte Islands, with rookeries situated on the Kerouard Islands; and
- off Banks Island on the northern mainland coast, with rookeries situated on North Danger Rocks.

A fourth BC breeding area was once located off the central mainland coast on the Sea Otter Group, but this breeding aggregation was extirpated following intense predator control programs during the 1920s and 1930s. There is also one large breeding area just north of BC in Alaska. In addition to these breeding sites, there are about 21 haulout sites distributed mainly along the exposed outer coast that are used continuously on a year-round basis, as well as numerous winter sites used on a seasonal or irregular basis. Animals haul out on a regular basis throughout the year, and tend to be highly gregarious while on land with little or no physical separation between individuals.

They typically occur within 60 km of shore during summer, but range over 200 km from shore in winter. They are non-migratory, but may disperse considerable distances from breeding sites. Most Steller sea lions feed over the continental shelf and along the shelf break. Preferred prey in BC includes herring, hake, sandlance, salmon, dogfish, eulachon, sardines, rockfish, flounder, skate, squid and octopus. They have also been observed to prey on gulls and other pinnipeds, including neonate fur seals and harbour seals.

The combined breeding population in BC and SE Alaska has sustained a fairly steady growth rate of about 2.4% since the 1960s, resulting in almost a 3-fold increase in abundance and is now about 50% above the abundance level of the early 1900s prior to any large scale kills. Sources of mortality are shooting, incidental take in fishing gear, entanglement in debris, catastrophic accidents, environmental contaminants, and displacement or degradation of their habitat. They are also susceptible to fluctuating prey populations, predation by killer whales, and disease.

The Northern Sea Lion is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act* and the federal *Fisheries Act*.

30.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
<th>Present</th>
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<tbody>
<tr>
<td>North Coast</td>
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<tr>
<td>Kalum</td>
<td>Y</td>
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<tr>
<td>Skeena Stikine</td>
<td>Y</td>
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</tbody>
</table>

*Y = KNOWN OCCURRENCE*
Northern Sea Lion – Known Occurrence on Northern BC Coast
Scale is arbitrary.
Adapted from COSEWIC Status Report. Irregularly used haul out sites are not shown.

30.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
</tr>
</thead>
</table>

30.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Northern Sea Lion are potential impacts of marine log drops or coastal log dumps. However, they adapt quite well to disturbance at haul out sites that might be associated with coastal log dumps, and in any case, there are no known regularly used haul out sites where log dumps may be located. Hence, unless a particular interaction is brought to the attention of BCTS, there is no need to address this matter. Marine log drops have the same potential as for whales – displacement from feeding areas or irregularly used haul out sites from noise disturbance, or direct impacts by logs.

Neither of these potential impacts is mentioned in the COSEWIC status report, suggesting that the probability of actual occurrence of these interactions is very low.
### 30.5. WILDLIFE HABITAT AREAS
None in the BCTS Skeena Business Area.

### 30.6. MANAGEMENT DIRECTION
The management direction for the Northern Sea Lion is provided through the Management Plan for the Stellar Sea Lion (*Eumetopias jubatus*) in Canada and generally protected through the *Fisheries Act* and the Department of Fisheries and Oceans.

### 28.7. MANAGEMENT STRATEGY
The following forest management strategies are designed to address management of the Northern Sea Lion.

- Do not locate coastal log dumps or marine log drops in areas known or likely to be used Northern Sea Lions, as determined through consultation with the Department of Fisheries and Oceans.
- Locate coastal log dumps, booming grounds, and marine log drops at least one kilometre from feeding areas and movement corridors.
- Preferentially use barges as a landing zone instead of dropping logs into the water, especially when near known Sea Lion use areas. This strategy is likely to only be needed when proposed development interacts with an intermittent use area. Individual assessment will determine the importance of that interaction.

### 30.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

31. WOLVERINE, _LUSCUS_ SUBSPECIES

31.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Wolverine, _luscus_ subspecies (_Gulo gulo luscus_) is the largest terrestrial member of the weasel family. They have stout bodies up to one metre in length with moderately bushy tails. They are dark chocolate brown over most of the body with lighter coloured hair around the forehead and along a lateral stripe extending from the ears or shoulder to the lower back.

Wolverines are widely distributed, with the highest concentrations occurring in mountainous areas in mature and old forests, with little use of mid-seral stands. There are few easily defined habitats for which they select; they require a suite of habitat variables that occur at landscape scales.

Natal and maternal dens are the only small-scale structures for which wolverines exhibit selection. Females typically situate dens in snow tunnels leading to masses of fallen trees (accumulations of classes 1–3 coarse woody debris) or broken rock slopes in the ESSF/ESSFp ecotone.

Wolverines consume a variety of food items, but large ungulates such as moose, elk, caribou and mountain goats (primarily obtained as carrion) form a large component of their diet. Wolverines also eat snowshoe hares, porcupines, marmots, ground squirrels, mice and voles, birds, fish, and vegetation. Human activity (e.g., log hauling, logging, mining) may displace or alter movement paths of wolverines in highly modified landscapes, and wolverines will often avoid entering young (<25 years) cut blocks while travelling. Roads can interrupt or alter daily movements and can be a source of mortality within the population.

Under the provincial _Wildlife Act_, wolverines are protected from killing, wounding, and taking, and legal harvest for their pelts is regulated.

31.2. RANGE AND DISTRIBUTION

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<tr>
<th>District</th>
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<td>Kalum</td>
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<tr>
<td>Skeena Stikine</td>
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</table>

_Wolverine – Habitat Potential in the BCTS Skeena area_  
Scale is arbitrary. Adapted from the Identified Wildlife account.
31.3. CONSERVATION STATUS

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<tr>
<th>Global Rank</th>
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<th>BC List</th>
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<td>SC (2014)</td>
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</table>

31.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Wolverine are the large-scale conversion of mature and old forest structural stage habitats into early structural stage habitats, and logging of high elevation forests may affect rearing success. Wolverines may also be very sensitive to disturbance, particularly disturbance from roads and recreational activities.

Parks, caribou habitat, and various no-harvest and restricted harvest areas at mid- to high elevations are the areas most likely to be maintained as suitable habitat for wolverine. Areas where most of the forest is available for forest harvesting are unlikely to maintain significant wolverine populations in the long term.

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<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Likelihood of Interaction</th>
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<td>Planning and Layout</td>
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<td>Roads, Bridges and Culverts</td>
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<td>Harvesting</td>
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<td>Silviculture</td>
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<td>Fuel Handling</td>
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<td>Dryland Sort &amp; Log Unload</td>
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<td>Log Dump Drop &amp; Water Drop</td>
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<td></td>
<td>Yard Care</td>
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<tr>
<td></td>
<td>Wood Waste/Stockpile Disposal</td>
</tr>
</tbody>
</table>

31.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

31.6. MANAGEMENT DIRECTION

The management direction for the wolverine is provided by Identified Wildlife (2004) and general land use plan direction for fur-bearer management. Management for general biodiversity, riparian areas, caribou, deer, moose, and grizzly bears will address many of the needs of wolverine.

31.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the Wolverine.

- Implement the Identified Wildlife (2004) strategy at both the stand and (where feasible) landscape level.
- Manage at stand level as for Fisher and Marten, until planning is done under Identified Wildlife.
• When harvesting or road construction is considered near a known wolverine maternal den site, provide a draft WHF boundary around it (suggestion – a 100 m radius) and treat as a no-harvest area.

### 31.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


32. ANCIENT MURRELET

32.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The ancient murrelet is a small, grey and white alicid, with a black head. It spends most of its life at sea, coming to land only to breed at colony sites in burrow nests. In BC, breeding sites are restricted to offshore islands around Haida Gwaii.

Ancient murrelets dive to depths of 10-20 m near the coastal shelf break, feeding on juvenile fishes and large zooplankton. The species is threatened substantially by the introduction of rats and raccoons to colony islands. Other threats include oil spills, climate change, and disturbance from human recreation.

The ancient murrelet is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*. It is also covered under the *Migratory Birds Convention Act*.

32.2. RANGE AND DISTRIBUTION

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<tr>
<th>District</th>
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<tbody>
<tr>
<td>North Coast</td>
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<td>Kalum</td>
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<tr>
<td>Skeena Stikine</td>
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</table>

32.3. CONSERVATION STATUS

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<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
</tr>
</thead>
</table>

32.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

There are no forest management issues for the ancient murrelet; there are no nesting sites in the BCTS Skeena Business Area, and non-nesting birds will not significantly interact with operations.

32.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.
32.6. MANAGEMENT DIRECTION
The management direction for the ancient murrelet is provided by land use plan objectives to maintain biodiversity in general.

32.7. MANAGEMENT STRATEGY
None required.

32.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

33. BALD EAGLE

33.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Bald Eagle (*Haliaeetus leucocephalus*) adults have a white head, white tail, and a large bright yellow bill; elsewhere the plumage is dark. Immatures are dark with variable amounts of light splotching on the body, underwing coverts, flight feathers, and tail base. Most eagles that breed in BC migrate south for the winter; however, some are resident all year. The number of resident eagles in BC has increased in the last 50 years due to road kills providing a reliable winter food supply.

Breeding habitat most commonly includes areas close to (within 4km) coastal areas, bays, rivers, lakes, or other bodies of water that reflect the general availability of primary food sources including fish, waterfowl, and seabirds. They perch and nest in dominant or co-dominant trees – often gnarled and very old trees. The same nest may be used year after year, or they may alternate between two nest sites in successive years. Nests with an overhead canopy of foliage are most successful. Eagles usually nest within the tree canopy at the base of a large side branch; ospreys usually nest on the very top of a tree or snag.

Bald Eagles are relatively tolerant of land use changes surrounding their nest sites, but, of course, cannot adapt to a complete loss of old-growth trees. Nests occur in extensive old-growth stands, fragmented oldgrowth parcels, and lone veteran trees in second growth or slash. The nest tree environments vary from remote wilderness to urban landscapes.

The Bald Eagle is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*. The actual nest trees are also protected under section 34b of the *Wildlife Act*, whether or not they are occupied.

33.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
<th>Present</th>
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<tbody>
<tr>
<td>North Coast</td>
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<tr>
<td>Kalum</td>
<td>Y</td>
</tr>
<tr>
<td>Skeena Stikine</td>
<td>Y</td>
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</tbody>
</table>

*Y = KNOWN OCCURRENCE*

Bald Eagle – Range and Breeding Range in BC.
Scale is arbitrary. From Demarchi *et al.* (2005).
### 33.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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<td>S5B, S5N</td>
<td>Yellow</td>
<td>NAR (1984)</td>
<td></td>
<td></td>
<td><em>Wildlife Act s.34b</em></td>
</tr>
</tbody>
</table>

### 33.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Bald Eagle are disturbance during nesting, and loss of existing and future large trees used for nesting due to removal during road construction, harvesting, and silviculture. Removal of high quality nest trees frequently occurs because they are hazard trees.

#### Overall Risk Rating
<table>
<thead>
<tr>
<th>Likelihood of Interaction</th>
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<tr>
<td>Roads, Bridges and Culverts</td>
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<tr>
<td>Risk Ranking Planning and Layout</td>
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</table>

### 33.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

### 33.6. MANAGEMENT DIRECTION

The management direction for the Bald Eagle is provided through land use plan objectives to maintain biodiversity in general, and the *Best Management Practices for Raptors*.

### 33.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the Bald Eagle.

#### Stand Level

To address a recorded Bald Eagle nesting occurrence:

- Preserve all trees used or suspected of being used by raptors as nesting sites, including presently unoccupied trees that have been used in the past.
- Maintain any trees that eagles regularly use for roosting, perching or feeding.
- Maintain a 200 m no-harvest and no-road reserve around eagle nest trees; maintain an additional 100 m free of loud noises and other human disturbances around occupied nests (in the period February through August).
- Locate new roads away from eagle nesting, roosting and foraging areas.
- Use integrated pest/weed management and avoid use of chemical pesticides.
Landscape Level
To address locations of unrecorded Bald Eagle nesting occurrence:

- Maintain existing and potential nest sites (large veteran trees), especially those within 200 m of a marine or lake shoreline, or a S1 or S2 river, to serve as nest sites and perching sites.

33.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


34. BAND-TAILED PIGEON

34.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Band-tailed Pigeon (*Patagioenas fasciata*) is the largest pigeon in North America. It is grey, with a pink cast to the head and underparts, and the underside and the outer end of the tail are pale. The bill and feet are yellow, and there is green iridescence on the back of the neck, adjacent to a thin white collar on the nape.

They usually occur in temperate and mountain coniferous and mixed forests and woodlands; mineral springs and mineral graveling sites are important (perhaps critical) for mineral (especially sodium) intake by adults. They feed on new buds, flowers, nuts, seeds, grain and berries; they also eat some insects. They are gregarious, with the size of foraging and migrating flocks ranging from tens to many hundreds of birds. At the northern extent of their range, band-tailed pigeons are migratory, with northern coastal populations arriving between March and May and returning south from late August into October. While breeding has only been confirmed in southwest BC, breeding is suspected in the north. Nesting habitat varies widely; nests can be found in trees and shrubs between 4 and 10 m from the ground, in deciduous, coniferous and mixed forests. Coastal populations are strongly associated with mineral sites, and show high site fidelity. Populations are generally declining.

The Band-tailed Pigeon is protected under both the provincial Wildlife Act and the federal Migratory Birds Regulations.

34.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
<th>Present</th>
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</thead>
<tbody>
<tr>
<td>North Coast</td>
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<tr>
<td>Kalum</td>
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<tr>
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</table>

Y = KNOWN OCCURRENCE

34.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC Schedule</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
</tr>
</thead>
</table>

34.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

While selective logging of stands may increase habitat suitability by encouraging proliferation of deciduous shrubs, impacts of forest harvesting depend on the maintenance of a variety of seral stages within a site. Band-tailed pigeon habitat may be reduced by silvicultural practices that control deciduous shrub regeneration. Suitability of important mineral sites can be impacted if adjacent habitat features, such as perches and forest cover, are removed.
### 34.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

### 34.6. MANAGEMENT DIRECTION

The management direction for the Band-tailed Pigeon is provided through land use plan objectives to maintain biodiversity in general.

### 34.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the band-tailed pigeon.

- Where mineral sites are documented, maintain complexity of adjacent habitat, including perches and forest cover.
- Maintain a variety of seral stages within and adjacent to development sites.
- Where feasible, allow proliferation of deciduous shrubs during silvicultural activities.

### 34.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


35. CANADA GOOSE, *OCCIDENTALIS* SUBSPECIES

35.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Canada Goose, *occidentalis* subspecies (*Branta canadensis occidentalis*) is a native goose with brownish body plumage, black head and neck and a white "chinsrap". There are many subspecies or races of Canada Goose, with overlapping migration routes and breeding areas. Subspecies *occidentalis* migrates along the BC coast between the Alaskan breeding areas and the Oregon winter area.

The Canada Goose, *occidentalis* subspecies is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*.

35.2. RANGE AND DISTRIBUTION

<table>
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35.3. CONSERVATION STATUS *

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</table>

* The BC rank of "S1" would normally result in assignment to the red-list. However, the "N" indicates the species is non-breeding, and which results in assignment to the blue-list.

35.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

There are no forest management issues for the Canada Goose, *occidentalis* subspecies.

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
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<th>Yard Care</th>
<th>Log Dump &amp; Water Drop Pocket</th>
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<tr>
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</table>

35.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.
35.6. MANAGEMENT DIRECTION
The management direction for the Canada Goose, *occidentalis* subspecies is provided by land use plan objectives to maintain biodiversity in general.

35.7. MANAGEMENT STRATEGY
None required.

35.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES
36. COMMON MURRE

36.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Common Murre (Uria aalge) is a medium-sized seabird with brown-black upperparts and throat, white underparts, and long dark bill. The tail is short. In winter the throat and side of face are white. Stands upright like a small penguin.

Breeds only on the outer side of Vancouver Island and the Queen Charlotte Islands; North Coast Forest District records are for non-breeding individuals only. Nests in the open or in crevices on broad and narrow cliff ledges, on cliff tops, and on flat, rocky, low-lying islands; usually nests in same exact site in successive years. Nonbreeding birds lie on open ocean and along rocky seacoasts.

Feed on marine invertebrates, small fish and squid. Dives from surface to at least 180 m while feeding.

The Common Murre is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial Wildlife Act. It is also protected under the Migratory Birds Convention Act.

36.2. RANGE AND DISTRIBUTION

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<td>Skeena Stikine</td>
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36.3. CONSERVATION STATUS

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<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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</thead>
</table>

36.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

There are no forest management issues for the Common Murre; there are no nesting sites in the BCTS Skeena area, and non-nesting birds will not significantly interact with operations.

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
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<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
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<th>Log Dump &amp; Water Drop</th>
<th>Log Dump &amp; Water Drop</th>
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36.5. WILDLIFE HABITAT AREAS
None in the BCTS Skeena Business Area.

36.6. MANAGEMENT DIRECTION
The management direction for the Common Murre is provided by land use plan objectives to maintain biodiversity in general.

36.7. MANAGEMENT STRATEGY
None required.

36.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

37. COMMON NIGHTHAWK

37.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The common nighthawk is about the size of a dove, 22-24 cm from tip of bill to the end of the tail. Its wingspan is 53-57 cm, similar to that of a Blue Jay. Nighthawks are very well camouflaged with a mottled pattern of browns, black and grey plumage. In flight, the long, pointed, bent wings have a distinct broad white patch on each outer wing. The slender shape and erratic flight of the nighthawk help identify them as well. Although the sexes are similar, the male has a white bar across the tail and a white throat; the female has no tail band and a pale yellowish beige colored throat. By early August, both male and female young look like adults except that their throat patch is less well defined. They are lighter and more extensively barred on the underside of their body. Nighthawks are well-known for the non-vocal "booming" calls which are thought to be produced by air rushing through the primary feathers of males. These sounds are presumably used for courtship display and territorial advertisement. The typical vocalization given by both sexes during level flight is a short, raucous, nasal "peent" which is quite distinctive. The common nighthawk can be distinguished from three other nighthawk species that occur in Canada by the absence of long fine feathers around the bill, the presence of a wide white stripe across the long feathers that edge the wings, the shape and colouration patterns of the tail, and the long pointed wings.

The common nighthawk nests in almost all of North America, in some parts of Central America, and possibly also in southeastern Columbia. It winters in South America, primarily in eastern Peru and Ecuador, and southern Brazil. The common nighthawk breeds across much of North America, including British Columbia east of the Coast Mountains and on the Lower Mainland and Vancouver Island; it is not found in the Coast Mountains or the Queen Charlotte Islands.

In British Columbia, nighthawks usually arrive in late May or early June. Breeding occurs shortly after arrival, and a single clutch, almost always consisting of two eggs, is laid in early June. Incubation lasts about 9 days and is attended to by the female. Nestlings are semi-precocial and tended by both parents; the young are independent in about 30 days. The life span of the common nighthawk is usually 4 to 5 years.

Nesting occurs on the ground on a bare site in an open area. Nesting habitat is diverse, and includes logged or burned areas of the coastal forests, open ponderosa pine forest, the grassland habitat of the semi-arid interior, and sand and gravel habitats of marine and fluvial beaches. Less common habitats include many human-made habitats such as farmland and pasture lands, old gravel pits, and even gravel roof-tops in urban areas; these nest locations are perhaps related to prey availability at artificial lights. Nighthawks are frequently observed to aggregate in large numbers prior to fall migration, which occurs in late August or early September. Typically, nighthawks are among the last migrants to arrive on the breeding grounds and the first to depart.

The common nighthawk feeds on flying insects such as mosquitoes, moths, beetles, flies, and caddisflies. Most active during the early morning and evening and at night, but may also be seen during the day. It catches insects high in the air or close to the ground during flight and may forage on insects around artificial lights. Its young are fed insects by regurgitation.

37.2. RANGE AND DISTRIBUTION

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<tr>
<th>District</th>
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Y = KNOWN OCCURRENCE
37.3. CONSERVATION STATUS

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<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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37.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the common nighthawk through the loss and alteration of suitable nesting habitat during reforestation of abandoned agricultural fields and harvested forests, as well as forest fire suppression. It is thought that the common nighthawk probably benefited from the newly-opened habitats created by the massive deforestation associated with the arrival of European settlers in Canada and United States. Other limiting factors may include a general decline in insect populations due to large-scale insecticide use, collisions with motor vehicles and climatic fluctuations at breeding sites and during migration. Furthermore, the proliferation of terrestrial predators around urban areas, such as domestic cats, striped skunks, raccoons, and American crows have likely caused increased nest predation.

Therefore, a cleared right-of-way or early seral forest is likely to provide a greater amount of suitable breeding habitat. Hence the management issue is to avoid completely destroying a known population during operations; if a portion of the population remains then it is likely to expand into the newly created habitat within a few years.
### 37.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

### 37.6. MANAGEMENT DIRECTION

There are currently no national recovery strategies or plans in place for the common nighthawk; however, it is protected by the *Species at Risk Act* and it also its nest and eggs, as well as the species are protected under the *Migratory Birds Convention Act*.

### 37.7. MANAGEMENT STRATEGY

None required.

### 35.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


38. GREAT BLUE HERON, FANNINI SUBSPECIES

38.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Great Blue Heron, fannini subspecies (*Ardea herodias fannini*), is the largest wading bird in North America. The wings are long and rounded, the bill is long, and the tail is short. They fly with deep, slow wingbeats and with their necks folded in an S-shape. Plumage is mostly a blue-grey colour and adults have a white crown.

Two subspecies of Great Blue Heron occur in BC, *A. herodias herodias*, which occurs across most of North America, and *A. herodias fannini*, which occurs only on the Pacific coast from Washington to Alaska. The separation of these subspecies is based on differences in plumage, morphology, and migratory behaviour. *A. herodias fannini* occurs year round on coastal BC (they are non-migratory), and occasionally inland to the Bulkley Valley.

Great Blue Herons are prey generalists, although they primarily forage for fish. They stalk prey by walking or standing in shallow water along the shoreline of oceans, marshes, lakes, and rivers and in fields or other vegetated areas. In upland areas they stalk mostly small mammals such as rodents; other prey types include amphibians, reptiles, invertebrates, and birds.

The Conservation Data Centre database does not include any nest locations for the BCTS Skeena area. However, the *Birds of BC* book states that isolated pairs breed near Prince Rupert. Non-breeding birds can potentially be seen anywhere at low elevations in the BCTS Skeena area.

The Great Blue Heron, its nests and eggs are protected year-round from direct persecution by the provincial *Wildlife Act*, as well as the *Migratory Birds Convention Act*.

38.2. RANGE AND DISTRIBUTION

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<td>Skeena Stikine</td>
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Great Blue Heron – Potential Habitat in BC, and the one Known Nesting Area in the BCTS Skeena Area.

Scale is arbitrary. Adapted from *Identified Wildlife* and *Birds of BC*.
38.3. CONSERVATION STATUS

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<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
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<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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38.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Great Blue Heron, *fannini* subspecies are removal of active or potential nest trees, both directly and through windthrow resulting from adjacent harvesting. Forest fragmentation may increase access to, or visibility of, breeding colonies for predators, such as Bald Eagles, thereby reducing the amount of suitable breeding habitat available to herons.

- **Overall Risk Rating**
- **Likelihood of Interaction**
  - Planning and Layout
  - Roads, Bridges and Culverts
  - Harvesting
  - Silviculture
  - Fuel Handling
  - Dryland Sort & Log Unload
  - Fuel Storage
  - Yard Care
  - Vegetation Management
  - Density Management
  - Fuel Transportation
  - Wood Waste/Stockpile Disposal
  - Drop pocket

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<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
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38.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

38.6. MANAGEMENT DIRECTION

The management direction for the Great Blue Heron, *fannini* subspecies is provided by land use plan objectives to maintain biodiversity in general, and by the Identified Wildlife Management Strategy.

38.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the Great Blue Heron, *fannini* subspecies.

Implement the Identified Wildlife (2004) strategy at both the stand and landscape level.

**Stand Level**

To address a recorded Great Blue Heron occurrence:
• When harvesting is considered in the vicinity (within 500 m) of a known nest site, provide a draft WHA boundary around it (or establish a WTP) and manage according to the Identified Wildlife (2004) strategy for a WHA.

Landscape Level
To address locations of unrecorded Great Blue Heron occurrence:
• Field crews should watch for, and report to BCTS, large stick nests that may be Great Blue Heron nests.

38.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


39. MARBLED MURRELET

39.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Marbled Murrelet (*Brachyramphus marmoratus*) is a small seabird with no sexual size or colour dimorphism. Adults in breeding plumage have a marbled grey-brown plumage that provides good camouflage at nest sites. The non-breeding (basic) and juvenile plumages are the black and white that is typical of most seabirds.

Marbled Murrelets forage by diving, using their wings for underwater propulsion. Adaptations for this mode of foraging include increased flight muscles and reduced wing area, resulting in high wing-loading. The consequences are that Marbled Murrelets need to fly fast (generally more than 70 km/h), are not very maneuverable in flight, and have difficulty landing and taking off. This in turn affects their choice of nest site and vulnerability to terrestrial predators.

Murrelets may be found anywhere along the coast of BC within 30 km of the Pacific coast, including the Kalum FD. A few birds venture farther inland, up to 80 km from the coast, with the IWMS strategy showing potential habitat well within the Skeena-Stikine Forest District. Proximity to good foraging sites is likely to influence selection of inland nest sites. Most nests were within 50 km of foraging sites, although breeding murrelets are known to commute 100 km or more to feed at prey concentrations. Murrelets eat small schooling fish (predominantly Pacific Sand Lance and immature Pacific Herring), and large pelagic crustaceans (euphausiids, mysids, amphipods).

The most suitable habitat is old seral stage coniferous forest that provides large trees with suitable platforms (limbs or deformities >15 cm diameter), and a variable canopy structure allowing access to the platforms. Most nests are on platforms in old conifers, but a few are on mossy cliff-ledges or a deciduous tree. Suitable stands are repeatedly used for nesting; however individual nest trees are not re-used in subsequent seasons. In watersheds with intensive logging murrelets do not pack into remaining old forest patches in higher densities; instead the number of nests in the watershed declines.

The Identified Wildlife Management Strategy (2004) accepts an average 30% decline in population and habitat over the six management units by 2032 (i.e., about 1% per year habitat loss). This is added to the 35 – 49% loss of habitat since the onset of industrial logging; this suggests that there will be no decline in the rate of habitat loss for the next several decades. This results in a planned loss of up to 79% of the historical habitat. Additional habitat reductions are likely to result from unpredictable loss of habitat through events such as catastrophic windthrow, wildfire, forest pests and diseases, and climate change. It is unclear whether 21% (or less) of the historical habitat area will be sufficient to maintain the species into the future. The Forest Practices Board (2008) is uncertain whether the Province’s approach to Marbled Murrelet management is sufficient for conservation of the species.

Marbled Murrelets are apparently partly migratory, with a north and south migration by parts of the population (*Birds of BC*). However, it appears that the federal and provincial government have agreed to manage them as non-migratory birds, and hence they do not fall under the federal *Migratory Birds Convention Act, 1994*. This should be clarified, given that the Identified Wildlife Management Strategy states that "as a federally listed species the Marbled Murrelet will come under the jurisdiction of the *Species at Risk Act (SARA)*". This is only true for federal lands or migratory species; the province has the responsibility to manage SARA-listed non-migratory species on provincial Crown land. If Marbled Murrelets are legally migratory birds, then a federal permit would be required before any development in their habitat could occur.
The Marbled Murrelet is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act* (Section 34). The Kalum, North Coast and Skeena-Stikine Forest Districts have each issued a “Notice” regarding management of key aspects of Marbled Murrelet habitat.

### 39.2. RANGE AND DISTRIBUTION

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*Y = KNOWN OCCURRENCE*

The Skeena-Stikine Section 7 Notice “supporting information” for the Notice is missing from the website; hence no map of Marbled Murrelet habitat is available for that Forest District.

### 39.3. CONSERVATION STATUS

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<td>T (2012)</td>
<td>1-T (2003)</td>
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Marbled Murrelet – Habitat in North Coast Forest District.
Scale is arbitrary. From Section 7 Notice supporting information.
39.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issue for the Marbled Murrelet is loss of nesting habitat, primarily due to harvesting. The number of murrelets is correlated to the existing areas of suitable nesting habitat and hence old-growth forest abundance; in watersheds with intensive logging murrelets do not pack into remaining old forest patches in higher densities. Breeding populations of murrelets will continue to decline as areas of suitable nesting habitat are harvested. Habitat fragmentation and creation of forest edges by clearcut logging may also adversely affect populations, although effects are minor relative to the direct effects of habitat loss. Loss of habitat through windthrow along forest edges and roads, and changes to canopy microclimates near forest edges are likely. Altered microclimates may affect nesting murrelets directly through thermal stress, or indirectly through removal or inhibition of epiphyte (primarily moss) mats used as nest substrates.
### 39.5. WILDLIFE HABITAT AREAS

There are 25 Wildlife Habitat Areas identified in the North Coast Forest District. Please see the Ministry of Environment Ecosystems Branch website for current Approved Wildlife Habitat Areas.

### 39.6. MANAGEMENT DIRECTION

The management direction for the Marbled Murrelet is provided by the Section 7 Notice for each Forest District, the Identified Wildlife Management Strategy, and land use plan objectives. The National Recovery Strategy for the Marbled Murrelet has been drafted while subsequent Wildlife Habitat areas are set aside through continuous research and monitoring activities.

### 39.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the Marbled Murrelet.

**Implement the Identified Wildlife (2004) strategy at both the stand and landscape level.**

**Stand Level**
To address a location known to BCTS as a Marbled Murrelet site, manage to meet the objectives of a Wildlife Habitat Area:

- Manage Wildlife Habitat Areas using the strategies in the “Orders” for each WHA and Identified Wildlife (2004).
- When harvesting is considered near a known nest site that is not a WHA, provide a draft WHA boundary around it and manage according to the Identified Wildlife Management Strategy for a WHA.

**Landscape Level**
To address long-term maintenance of Marbled Murrelet nesting habitat:

- Assess the habitat suitability of proposed harvest areas within the range of potential habitat of Marbled Murrelets, as mapped and discussed in Identified Wildlife (2004). Establish block boundaries, harvest prescriptions, wildlife tree patches, and, if possible, OGMAs to maintain suitability as habitat of as much forest as possible (see the Identified Wildlife 2004 for details).
REFERENCES AND ADDITIONAL INFORMATION SOURCES


Kalum Forest District. (undated). Notice – Indicators of the Amount, Distribution and Attributes of Wildlife Habitat required for the Survival of Species at Risk in the Kalum Forest District. ftp://ribftp.env.gov.bc.ca/pub/outgoing/cdc_data/Approved_FRPR_sec7_WLPPR_sec9_Notices_and_Supporting_Info/Species_at_Risk/Kalum_FD/Notice/.

North Coast Forest District (undated). Notice – Indicators of the Amount, Distribution and Attributes of Wildlife Habitat required for the Survival of Species at Risk in the North Coast Forest District. ftp://ribftp.env.gov.bc.ca/pub/outgoing/cdc_data/Approved_FRPR_sec7_WLPPR_sec9_Notices_and_Supporting_Info/Species_at_Risk/North_Coast_FD/Notice/North%20Coast%20FD_SAR.pdf.

Skeena-Stikine Forest District (undated). Notice – Indicators of the Amount, Distribution and Attributes of Wildlife Habitat required for the Survival of Species at Risk in the Skeena-Stikine Forest District. ftp://ribftp.env.gov.bc.ca/pub/outgoing/cdc_data/Approved_FRPR_sec7_WLPPR_sec9_Notices_and_Supporting_Info/Species_at_Risk/Skeena_Stikine_FD/Notice/.


40. NORTHERN GOSHAWK, *ATRICAPILLUS* SUBSPECIES

40.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The interior subspecies of the northern goshawk (*Accipiter gentilis atricapillus*) is a raven-sized forest raptor with a circumpolar distribution inhabiting coniferous and mixed forest dominated landscapes. These birds have short, rounded wings and elongated tail adapted well adapted for maneuvering through forested stands. Adults have a bluish-slate gray back, a light gray breast, and a light gray eye stripe above the eye. The tail is grey with 3-5 dark, broad bands with a thin, whitish terminal band at the tip; undertail coverts are white. The underparts are pale gray and finely barred. Immature birds are similar to adults but browner and the ventral markings are coarser and cover both the breast and belly. Goshawks are mature at approximately 2 years of age.

There are two distinct species of goshawk within the Skeena region: *A. gentilis atricapillus* and *A. gentilis laingi*. The *A. gentilis atricapillus* subspecies is found on the mainland and is thought to be more the average size for a goshawk; the *A. gentilis laingi* subspecies is found on Vancouver Island and the Queen Charlotte Islands, and also possibly on the coast of the adjoining mainland. Previous DNA analysis indicated that the goshawks within the Kispiox Forest District are *A. g. atricapillus* subspecies. The subspecies has, since the writing of the Identified Wildlife (2004) account, been confirmed to be genetically distinct from the *laingi* subspecies.

Adult males tend to remain on, or near, the nest territory year round. March and April tend to be the most active months for goshawk courtship, territory re-establishment, nest building and egg laying; however, during mild winters, courtship is initiated in February and, at times, as early as January. Nesting and feeding occurs in maturing-to-old mesic, coniferous stands with dense canopies but an open understory. Within forest dominated landscapes goshawks are relatively evenly distributed with the distance between territories being primarily driven by prey availability within landscapes. This is an important factor because breeding success is strongly linked to the over winter body condition of the female, which is dependent on the foraging quality of the territory surrounding the nest area. The northern goshawk is probably a year-round resident in most years throughout most of its range. Large trees are important in providing nesting and perching platforms, in allowing ample flight space between the trunks for the goshawks to maneuver while hunting, and in providing for greater productivity of preferred prey. Closed forest canopy is believed to provide an optimal microclimate for nesting and may also inhibit open-forest and forest-edge raptor predators. In general, nest stands are characterized by being over 45 years old (structural stages 5-7); having multi-layered canopies; being structurally diverse; with canopy closure 50-85%; in areas of larger sized trees; on the lower 2/3 of slopes; on slopes with gradients < 40 degrees; where snags and coarse woody debris are present; and not along "hard edges”.

Across their broad range goshawks take a variety of mid-sized forest prey ranging from small mammals and passerines to hares. In the Kispiox Forest District its main prey are red squirrels, forest passerines (typically thrushes, woodpeckers and jays) and grouse (Doyle and Mahon 2001).

Intensive goshawk inventory work has been conducted in the Kispiox Forest District from 1996-2002. This work examined population status, nest area habitat selection, post-fledging area use, and breeding season diet. On-going adaptive management trials are directly examining the response of goshawks to forest development near nest areas and results from those trials may be used to update these guidelines.

NOTE: The CDC does not list the interior subspecies specifically, but does list the generalized *Accipiter gentilis* and the *laingi* subspecies.
40.2. RANGE AND DISTRIBUTION

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Interior subspecies of the Northern Goshawk – Known Occurrence in BCTS Skeena Area

40.3. CONSERVATION STATUS

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40.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the *atricapillus* subspecies are losses of habitat for breeding, roosting, foraging and winter habitat, fragmentation, and degradation from forest harvesting. Risks from forest fragmentation and the conversion of older forests to younger ones include a reduced number of suitable nest areas; decreased prey species abundance and accessibility; increased competition and predation from...
edge-adapted species; reduced juvenile dispersal and gene flow; increased human access and disturbance; and altered microclimate conditions within interior forests.

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<th>Silviculture</th>
<th>Fuel Handling</th>
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<th>Log Dump &amp; Water Drop Pocket</th>
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<td>Harvest Area Layout</td>
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<td>Road Maintenance</td>
<td>Bridge Installation</td>
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40.5. WILDLIFE HABITAT AREAS

There are currently 36 known goshawk nest areas (or GHAs) in the Kispiox Forest District. Planners should be aware of these areas prior to planning and layout to avoid harvesting and road development within these areas. The database of goshawk nest site locations will be stored and updated annually by the Ministry of Forests. This information should be treated as confidential and not distributed to the public as it could result in the persecution or collection of goshawks by poachers or falconers.

40.6. MANAGEMENT DIRECTION

The management direction of the *atricapillus* subspecies is provided through Identified Wildlife (2004), the Kispiox LRMP Higher Level Plan, and the Kispiox Focal Wildlife Species Management Guidelines. This species is also protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*.

40.7. MANAGEMENT STRATEGY

Recommended conservation measures are focused on the nest area/post-fledging area because: 1) those territory components are well described from local studies, 2) goshawks reoccupy nest areas for many years, and 3) disturbance to or removal of nest area habitat represent an obvious and direct impact to the reproductive success of individual territories. The management area around nest areas is defined as a “Goshawk Habitat Area” (GHA).

Cut block and road design should: 1) avoid impact within known goshawk nest areas, 2) maintain connectivity of the nest areas to adjacent areas of mature forest, and 3) maintain potential alternate nest areas within 1 km of the original nest area. Seasonal limitations on activities include no mechanized activity within 500 m of an active nest area and no human activity within 200 m of active nest between February 15 and August 15.

Given the known population densities in the Kispiox, and the observed ability of at least some goshawks to relocate their nest areas following disturbance, protection of all nest areas is not critical to maintaining a viable goshawk population within the Kispiox FD. Under the current landscape condition, we recommend
that at least 75% of nest areas should be protected. This number should provide the necessary flexibility to address resource conflicts/operational constraints with specific nest areas, while protecting most nest areas that are found. Where a no protection prescription is proposed, the area must meet the basic condition of having at least two potential alternate nest areas available within 1 km of the original area. Potential alternate nest areas are areas at least 50 ha in size of high value nest area habitat as identified by the nest area suitability mapping.

The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the interior Goshawk. Implement the Identified Wildlife (2004) strategy at both the stand and landscape level.

Stand Level
To address a location known to BCTS as a Goshawk site, manage to meet the objectives of a Wildlife Habitat Area:

- Manage Wildlife Habitat Areas using the strategies in the “Orders” for each WHA and Identified Wildlife (2004).
- Maintain suitable foraging habitat in close proximity to known nests, particularly within the immediate 2200 ha surrounding the WHA.
- Minimize the influence of harvesting adjacent to WHAs to maintain the stand’s integrity.
- Minimize disturbance when working adjacent to a WHA between 15 February and 1 September. Avoid blasting, road construction, helicopter activity, etc.

Landscape Level
To address unrecorded interior Goshawk sites:

- Field crews in the Kispiox Forest District should watch for raptors that may be goshawks, below canopy level of older, closed canopy conifer stands; this restriction will eliminate most sightings of other raptors.

40.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


41. NORTHERN GOSHAWK, *LAINGI* SUBSPECIES

41.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Northern Goshawk, *laingi* subspecies (*Accipiter gentilis laingi*) is a large, robust hawk with short, rounded wings and elongated tails that are well adapted for maneuvering and flight through forested stands in pursuit of prey. The upper parts are dark bluish-slate becoming blackish on the top of the head and behind the eye. There is a broad white stripe over the eye. The tail is grey with 3-5 dark, broad bands with a thin, whitish terminal band at the tip; undertail coverts are white. The underparts are pale gray and finely barred. Immature birds are similar to adults but browner and the ventral markings are coarser and cover both the breast and belly. “Queen Charlotte Goshawk” is the common name applied to the coastal subspecies *laingi*; it is greyer overall and smaller in size than the more abundant interior subspecies.

Nesting and feeding occurs in maturing-to-old mesic, coniferous stands with dense canopies but an open understory. Large trees are important in providing nesting and perching platforms, in allowing ample flight space between the trunks for the goshawks to maneuver while hunting, and in providing for greater productivity of preferred prey. Closed forest canopy is believed to provide an optimal microclimate for nesting and may also inhibit open-forest and forest-edge raptor predators. In general, nest stands are characterized by being over 45 years old (structural stages 5-7); having multi-layered canopies; being structurally diverse; with canopy closure 50-85%; in areas of larger sized trees; on the lower 2/3 of slopes; on slopes with gradients < 40 degrees; where snags and coarse woody debris are present; and not along “hard edges”.

Adult males tend to remain on, or near, the nest territory year round. March and April tend to be the most active months for goshawk courtship, territory re-establishment, nest building and egg laying; however, during mild winters, courtship is initiated in February and, at times, as early as January.

The Queen Charlotte Goshawk occurs only on coastal British Columbia, mainly the Queen Charlotte Islands, Vancouver Island and other large coastal islands. The subspecies has, since the writing of the Identified Wildlife (2004) account, been confirmed to be genetically distinct from the relatively common interior subspecies.

The Queen Charlotte Goshawk is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*.

41.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
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<tbody>
<tr>
<td>North Coast</td>
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<tr>
<td>Kalum</td>
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<tr>
<td>Skeena Stikine</td>
<td>Y = KNOWN OCCURRENCE</td>
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</tbody>
</table>
Queen Charlotte Goshawk – Wildlife Habitat Area in the BCTS Skeena Area.
Scale is arbitrary.

Potential Range, with the WHA location. (from Identified Wildlife, and map above)

41.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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<td>Red</td>
<td>2004</td>
<td>T (2013)</td>
<td>1-T (2003)</td>
<td>SARA 1-T; BC Red List; North Coast FD s.7 Notice; WHAs; Nass South SRMP; North Coast LRMP; Identified Wildlife</td>
</tr>
</tbody>
</table>
41.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Queen Charlotte Goshawk are losses of habitat for breeding, roosting, foraging and winter habitat, fragmentation, and degradation from forest harvesting. Risks from forest fragmentation and the conversion of older forests to younger ones include a reduced number of suitable nest areas; decreased prey species abundance and accessibility; increased competition and predation from edge-adapted species; reduced juvenile dispersal and gene flow; increased human access and disturbance; and altered microclimate conditions within interior forests.

41.5. WILDLIFE HABITAT AREAS

There is one WHA designated in the BCTS Skeena Business Area, near Alder Creek east of Prince Rupert (see map above). It is stated to be “data sensitive” but the map data is available under the Section 7 Notice “supporting information”.

41.6. MANAGEMENT DIRECTION

The management direction for the Queen Charlotte Goshawk is provided through Identified Wildlife (2004), the North Coast LRMP, and the North Coast Section 7 Notice. Please note that the North Coast LRMP is out of date and has been replaced by the Ecosystem Based Management system.

41.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the Queen Charlotte Goshawk.

Implement the Identified Wildlife (2004) strategy at both the stand and landscape level.

**Stand Level**

To address a location known to BCTS as a Queen Charlotte Goshawk site, manage to meet the objectives of a Wildlife Habitat Area:

- Manage Wildlife Habitat Areas using the strategies in the “Orders” for each WHA and Identified Wildlife (2004).
- Maintain suitable foraging habitat in close proximity to known nests, particularly within the immediate 2200 ha surrounding the WHA.
- Minimize the influence of harvesting adjacent to WHAs to maintain the stand’s integrity.
- Minimize disturbance when working adjacent to a WHA between 15 February and 1 September. Avoid blasting, road construction, helicopter activity, etc.

Landscape Level
To address unrecorded Queen Charlotte Goshawk sites:

- Field crews in the North Coast F.D. should watch for raptors that may be goshawks, below canopy level of older, closed canopy conifer stands; this restriction will eliminate most sightings of other raptors.

41.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


42. OLIVE-SIDED FLYCATCHER

42.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Olive-sided Flycatcher (*Contopus borealis*) is a relatively large flycatcher. It is large-headed, with a proportionately short tail. The plumage is brownish-olive above (browner on juveniles) with a dull white to yellowish throat, breast, and belly. The streaked or mottled chest patches are darker.

They breed in forest and woodland, especially in burned-over areas with standing dead trees, in taiga, subalpine coniferous forest and mixed coniferous-deciduous forest, and along the forested edges of beaver ponds and rivers. Birds also use small mountaintop ponds. Forests surrounding these sites are usually coniferous or mixed with deciduous trees. Black spruce is frequently present at northern sites. They are usually territorial in nonbreeding areas and may display strong year-to-year site fidelity on the breeding and wintering grounds.

They forage primarily by hovering or sallying forth from a high, exposed perch atop a tree or snag, attacking prey in flight. The diet is made up almost entirely of flying insects, and this bird has a special fondness for wild honeybees and other Hymenoptera. Other insects include beetles, flies, true bugs, grasshoppers, moths, and dragonflies.

The Olive-sided Flycatcher is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*.

42.2. RANGE AND DISTRIBUTION

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<td>Skeena Stikine</td>
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42.3. CONSERVATION STATUS

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<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
</tr>
</thead>
</table>

42.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issue for the Olive-sided Flycatcher is maintenance of dead and dying trees on the landscape; such trees are removed from harvest areas, and also are removed adjacent to operational areas due to being hazard trees.
42.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

42.6. MANAGEMENT DIRECTION

The management direction for the Olive-sided Flycatcher is provided through land use plan direction to maintain biodiversity in general.

42.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the Olive-sided Flycatcher.

- Retain snags, older trees, and small openings where possible.
- When salvaging windthrow, insect damaged, or fire damaged trees, include some damaged but standing trees in retention areas.

42.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


43. PELAGIC CORMORANT, *PELAGICUS* SUBSPECIES

43.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Pelagic Cormorant, *pelagicus* subspecies (*Phalacrocorax pelagicus pelagicus*) is a small cormorant. It is a black seabird with a metallic gloss; its face in a vivid magenta. It has a long, hooked bill, long tail, and long, thin neck. It is distinguished from other cormorants in the area by its small head and much thinner bill; it is the only cormorant in the area that has conspicuous white patches on its flanks during the breeding season.

The Pelagic Cormorant breeds from Alaska south to California, and is a common resident along the inner and outer coastal areas of BC. It rarely occurs very far up inlets. It prefers rocky coasts and forages in rough water in bays, harbours, lagoons, surge narrows and coves. It feeds on fish. It is a colonial nester, sometimes nesting with other cormorant species. It prefers to nest on the highest, steepest and least accessible rocky cliffs facing water. The only known nesting sites in the BCTS Skeena area are on and near the Osborne Islands offshore from Prince Rupert.

The Pelagic Cormorant is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*.

43.2. RANGE AND DISTRIBUTION

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<th>District</th>
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<td>Kalum</td>
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<td>Skeena Stikine</td>
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**Y = KNOWN OCCURRENCE**

Pelagic Cormorant – Known Breeding Sites in the BCTS Skeena Area.
Scale is arbitrary.

43.3. CONSERVATION STATUS

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<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
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<th>SARA Schedule</th>
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<td>BC Red List</td>
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</table>
### 43.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

There are no forest management issues for the Pelagic Cormorant; BCTS Skeena operations are very unlikely to interact with nesting sites.

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log Unload</th>
<th>Wood Waste &amp; Stockpile Disposal</th>
<th>Log Dump &amp; Water Drop Pocket</th>
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<td>Road Layout</td>
<td>Road Construction</td>
<td>Road Deactivation</td>
<td>Road Maintenance</td>
<td>Bridge Installation</td>
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#### 43.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

#### 43.6. MANAGEMENT DIRECTION

The management direction for the Pelagic Cormorant is provided by land use plan objectives to maintain biodiversity in general.

#### 43.7. MANAGEMENT STRATEGY

None required.

#### 43.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


44. PEREGRINE FALCON, *PEALEI* SUBSPECIES

44.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Peregrine Falcon, *pealei* subspecies (*Falco peregrinus pealei*) is a slender, fast flying falcon with the top of the head black, and the black extends down the neck. The back and wings are black, and the underside is grey. Peale's Peregrines are darker and larger than the two other subspecies that occur in BC.

Peale's Peregrine Falcon typically nests on ledges of rocky island cliffs, usually near seabird colonies. Occasionally, nests occur on mainland headland cliffs. A few nests occurred on grassy ledges on rock bluffs. More rarely, old nests of Pelagic Cormorants (*Phalacrocorax pelagicus*), Bald Eagles and Common Ravens have been used. Nest sites are repeatedly re-used, and nesting birds are sensitive to disturbance. The location of known nest sites will only be released by the Conservation Data Centre with special conditions, to minimize the risk of nest poaching.

Peale's Peregrine Falcons are specialized feeders, preying mainly upon seabirds, especially Ancient Murrelets.

The migration of Peale’s Peregrine Falcon is not well defined. Some birds may be short distance migrants, following the prey base while others remain in the breeding areas year round. Young tend to disperse relatively large distances. Individuals from the Queen Charlotte Islands have been observed as far south as California.

The northern mainland coast has not been extensively surveyed but at least six breeding pairs have been documented in the past.

The Peregrine Falcon, its nests, and its eggs are protected under the federal *Migratory Birds Convention Act* and provincial *Wildlife Act*.

44.2. RANGE AND DISTRIBUTION

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<th>District</th>
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<td>North Coast</td>
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<td>Skeena Stikine</td>
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44.3. CONSERVATION STATUS

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</table>
44.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

There are no forest management issues for the Peregrine Falcon, *pealei* subspecies; forest operations are unlikely to interact with the species.
### Likelihood of Interaction

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
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<th>Log Dump &amp; Water Drop</th>
<th>Yard Care</th>
<th>Wood Waste/Stockpile Disposal</th>
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#### 44.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

#### 44.6. MANAGEMENT DIRECTION

The management direction for the Peregrine Falcon, *pealei* subspecies is provided by land use plan objectives to maintain biodiversity in general.

#### 44.7. MANAGEMENT STRATEGY

None required.

#### 44.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


45. RUSTY BLACKBIRD

45.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Rusty Blackbird is a thrush-sized passerine. The slightly rounded tail is almost equal in length to the wings, which are narrow and pointed. This blackbird has pale yellow eyes and a slightly curved black bill. During the breeding season, the male’s plumage turns completely black with a slight green iridescence on the body and violet iridescence on the head and neck. The female’s plumage is greyish brown with no iridescence. In winter, the plumage of both sexes takes on a rusty hue, which explains the species’ name. In the fall, it is difficult to distinguish juveniles from adults, although young birds have dark irises.

The breeding range of the Rusty Blackbird includes a vast portion of Canada and Alaska, as well as parts of Minnesota, Michigan, Vermont, New Hampshire, Maine, New York, and Massachusetts. Its winter range includes most of the central and eastern United States, although a very small number of Rusty Blackbirds winter, albeit sporadically, in the southern part of most Canadian provinces. In Canada, the Rusty Blackbird occurs in all of the provinces and territories, which represent 70% of the North American breeding range.

Typically, Rusty Blackbirds are monogamous and couples nest in isolated pairs on the margins of wetlands. Depending on the latitude, birds usually reach their breeding grounds in April or May. The female builds her nest in riparian vegetation near or above a body of water. Nests are generally constructed with conifer twigs, dead grasses with small roots or other plant parts, moss, and lichen. They are lined with a layer of fine grasses and, occasionally, feathers, hairs, and sphagnum. The female generally produces one clutch per year. She incubates the eggs herself and the male brings her food. A clutch contains three to six eggs and incubation lasts two weeks. The nestlings generally remain in the nest for 11 to 13 days and are tended by both parents; they may leave several days before they are able to fly. Migration begins in late August and lasts until early October.

The Rusty Blackbird breeds in the boreal forest and favours the shores of wetlands such as slow-moving streams, peat bogs, marshes, swamps, beaver ponds and pasture edges. In wooded areas, the Rusty Blackbird only rarely enters the forest interior. Nests are located in trees or shrubs, usually in or near water, and frequently 6 meters above ground in a conifer. During migration and winter, habitat is primarily wooded wetlands and riparian areas but also includes various open woodlands, scrub, pastures, and cultivated lands.

The Rusty Blackbird feeds mainly on invertebrates, particularly aquatic insect larvae, crustaceans, and snails associated with aquatic environments. It also feeds on salamanders and small fish. During the winter, the Rusty Blackbird supplements its diet with seeds and small fruits. It forages on the ground and in shallow water.

45.2. RANGE AND DISTRIBUTION

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<thead>
<tr>
<th>District</th>
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<td>North Coast</td>
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Y = KNOWN OCCURRENCE
45.3. CONSERVATION STATUS

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<tr>
<th>Global Rank</th>
<th>BC Rank</th>
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<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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45.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forestry operations have the potential to impact the rusty blackbird through harvesting and road construction. The most serious threat is thought to be the conversion of forests for forestry, agricultural or human habitation purposes. Other activities, such as the degradation and/or conversion of wetlands, could lead to further habitat destruction in the species’ breeding range. Harvesting would remove suitable nesting habitats and/or degrade nearby habitat quality along wetlands and in riparian areas. Road construction could also impact breeding habitat directly through loss of habitat and indirectly through increased access, disturbance and noise levels from traffic in previously suitable habitat.
45.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

45.6. MANAGEMENT DIRECTION

There are currently no national recovery strategies or plans in place for the rusty blackbird; however, it is protected by the *Species at Risk Act* and also its nest and eggs, as well as the species itself, are protected under the *Migratory Birds Convention Act*.

45.7. MANAGEMENT STRATEGY

None required.

45.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


46. SHORT-EARED OWL

46.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Short-eared Owl (*Asio flammeus flammeus*) is a medium-sized owl with small ear tufts. At a distance, it appears to be a pale buff colour, with black “wrist” patches on the wing. Its flight is moth-like, with erratic wing beats, typically carrying it low over the ground. When perched, it sits slantwise, rather than vertical, as do most other owls of its size.

Short-eared Owls prey on small rodents, which undergo regular population cycles. When microtine populations crash in one area, Short-eared Owl populations must move to find a new prey supply. In general, nest site fidelity is not strong, presumably because this species is nomadic. Roosts may be used year after year. They migrate south in the fall and spend the winter in southern BC and further south.

Extensive open areas such as grasslands, savannahs, rangeland, or marshes with an abundant prey base, suitable nest sites, and adequate roosting sites are important breeding habitats. Most nests are in shrubby, grassy fields adjacent to agricultural areas such as pastures, fallow fields, and cultivated fields; clearcuts are sometimes used (more research required). The primary threat to this species is loss or degradation of old-field winter habitat. Short-eared owl management is primarily a range management issue.

Nesting is only known to occur in southern BC, north to Prince George in the Interior. Nesting in the BCTS Skeena area is very unlikely; the nearest that nesting might occur would be in the Smithers area. Identified *Wildlife* does not map any potential habitat anywhere near the BCTS Skeena area.

The Short-eared Owl, its nests, and its eggs are protected from direct persecution in British Columbia under the provincial *Wildlife Act*.

46.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
<th>Present</th>
<th>Y = KNOWN OCCURRENCE</th>
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<td>Skeena Stikine</td>
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Short-eared Owl – Range and Breeding Range in BC.
Scale is arbitrary. From Demarchi *et al.* (2005).
46.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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</table>

46.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

There are no forest management issues for the Short-eared Owl; nesting is very unlikely to occur in the BCTS Skeena area.

46.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

46.6. MANAGEMENT DIRECTION

The management direction for the Short-eared Owl is provided by land use plan objectives to maintain biodiversity in general.

46.7. MANAGEMENT STRATEGY

None required.

46.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


47. SWAINSON’S HAWK

47.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

Swainson’s Hawks (*Buteo swainsoni*) are large, broad-winged hawks with a short, dark, hooked beak. The wings are long, and taper noticeably at the tip. The colour is highly variable, with both light and dark morphs of both adults and immatures; a good bird field guide may be required for identification.

Swainson’s Hawks are uncommon to fairly common as migrants passing through BC; they are very rare as a nesting resident. They nest in scattered coniferous and deciduous trees in riparian areas, wetland borders, open forest, abandoned agricultural areas, or rock bluffs. Nest sites may be re-used for many years.

Breeding is normally from the Kamloops FD southward. *Birds of BC* shows two separate breeding records near Hazelton; at least one of these (37 km N of Hazelton) was a 1921 historical record from when the species was more abundant in the province.

They prey on small mammals (voles to ground squirrels) and insects such as grasshoppers.

Major threats are agricultural use of pesticides and loss of grassland habitat to urbanization, agriculture and forest encroachment.

The Swainson’s Hawk is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*.

47.2. RANGE AND DISTRIBUTION

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<td>Skeena Stikine</td>
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</tbody>
</table>

Swainson’s Hawk – Breeding Range in BC.
Scale is arbitrary. From Demarchi *et al.* (2005).

47.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>Identified Wildlife</th>
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<td>BC Red List</td>
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</tbody>
</table>
47.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

There are no forest management issues for the Swainson's Hawk; the probability of forest operations interacting with a nest site is very low because (1) the normal nesting habitat is seldom harvested, and (2) the probability of any nesting occurring in the BCTS Skeena area is very low.

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<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log Unload</th>
<th>Log Dump &amp; Water Drop Pocket</th>
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47.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

47.6. MANAGEMENT DIRECTION

The management direction for the Swainson's Hawk is provided by land use plan direction to maintain biodiversity in general.

47.7. MANAGEMENT STRATEGY

None required.

47.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


48. TRUMPETER SWAN

48.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Trumpeter Swan (Cygnus buccinator) is the largest waterfowl in North America and the largest swan in the world. It is a majestic bird, with snowy white feathers; jet-black bill, feet, and legs; and 8-foot wingspan.

They inhabit ponds, lakes, and marshes; breeding in areas of reeds, sedges or similar emergent vegetation, primarily on freshwater, occasionally in brackish situations. They winter on coastal open ponds, lakes and sheltered bays and estuaries. Adults feed mostly on aquatic vegetation; young first eat aquatic insects and crustaceans but in 5 weeks begin feeding on aquatic plants. They prefer shallow, slow-moving water for feeding. They also graze in fields.

In British Columbia, nesting has been documented in forested landscapes at 24 – 823 m elevation, on both large and small shallow lakes with emergent vegetation. Nests are built in emergent marsh vegetation, or on a muskrat house, beaver lodge, or island. The nest is a large mass of plant material; the same nest site is used in successive years. Nest site is either in or surrounded by water over 0.5 m deep. A nest bowl 25–40 cm wide is lined with down.

The species is sensitive to disturbance and environmental contamination on the wintering and breeding grounds. Breeding populations are locally but widely distributed across northern British Columbia. Wintering swans are distributed along the entire coast, with major concentrations on Vancouver Island and the lower Fraser River valley. A few winter in the interior. There is one known nesting site in the BCTS Skeena area, northwest of Kitimat.

The Trumpeter Swan is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial Wildlife Act. The Trumpeter Swan was formerly Identified Wildlife (1999) but was dropped from that list in 2004 (both the published and unpublished versions) as being "lower priority".

48.2. RANGE AND DISTRIBUTION

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<tr>
<th>District</th>
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<tr>
<td>North Coast</td>
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<tr>
<td>Skeena Stikine</td>
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48.3. CONSERVATION STATUS

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48.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Trumpeter Swan are disturbance of the nesting and wintering sites.
48.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

48.6. MANAGEMENT DIRECTION

The management direction for the Trumpeter Swan is provided through land use plan objectives to maintain biodiversity in general. It is also available in the 1997/1999 Identified Wildlife Management Strategy.

48.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the Trumpeter Swan.

- Where a Trumpeter Swan nest site is identified, establish a 500 m management zone around the wetland or lake. Do not construct roads within 200 m of the shoreline; avoid operations within the next 300 m during the breeding season (April through July). Maintain a visual buffer along the edge of the wetland or lake; the normal reserve zone may be adequate.

48.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


49. WESTERN GREBE

49.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Western Grebe (*Aechmophorus occidentalis*) is a large, strikingly black and white grebe with a swan-like neck and a long, thin bill. It is the only grebe that fits this description.

Western Grebes nest in emergent vegetation along the margin of medium to large fish-bearing lakes. They spend the winter along the coast, north to the Alaska panhandle. Large wintering flocks are vulnerable to marine oil spills.

The Western Grebe is provincially red-listed, because of the very limited number of breeding sites. They were formerly Identified Wildlife (1999) but were dropped from that list in 2004 as being “lower priority”.

The Western Grebe is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*.

49.2. RANGE AND DISTRIBUTION

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<td>Skeena Stikine</td>
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Y = KNOWN OCCURRENCE

![Western Grebe – Distribution in BC.](image)

Scale is arbitrary. From Burger (1997) – Shaded area is non-breeding habitat.

49.3. CONSERVATION STATUS

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<th>Global Rank</th>
<th>BC Rank</th>
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<td>SC (2014)</td>
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<td>BC Red List</td>
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</table>

49.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

There are no forest management issues for the Western Grebe in the BCTS Skeena operating area, because no nesting occurs in the area. Nesting disturbance is the only significant potential impact of forest operations on Western Grebes.
### 49.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

### 49.6. MANAGEMENT DIRECTION

The management direction for the Western Grebe is provided through land use plan objectives for maintenance of general biodiversity.

### 49.7. MANAGEMENT STRATEGY

None required.

### 49.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

50. WESTERN SCREECH-OWL, *KENNICOTTII* SUBSPECIES

50.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Western Screech-owl, *kennicottii* subspecies (*Megascops kennicottii kennicottii*) is a small streaked owl, with ‘ear tufts’ and yellow eyes. The overall coloration is grey-brown, with fine dark vermiculations on the breast overtop an off-white background, and a streaky mottled effect throughout most of the remainder of the plumage. It occurs along entire coast, including the Gulf Islands and Vancouver Island. *O.k. kennicottii* is darker than the interior subspecies, *O. k. macfarlanei*. The genus name has recently been changed from *Otus* to *Megascops* (Conservation Data Centre).

They inhabit cavities in large diameter aspen and cottonwood trees, including those excavated by Pileated Woodpeckers and Northern Flickers. Breeding territories are closely associated with riparian habitats, particularly those dominated by black cottonwood, trembling aspen, and water birch. Since cavities are needed for both nesting and roosting, a breeding territory must contain at least two suitable cavities to be useful to a pair of screech-owls. Nest trees may be in decay class 2 through 6. Because cavities of Pileated Woodpecker and Northern Flicker are most often used, it may be important to consider the nesting requirements of these species in ecosystems where the Interior Western Screech-Owl occurs.

The Western Screech-Owl is non-migratory; young birds disperse in late summer and fall to establish new territories. Pairs are resident throughout the year on nesting territories. There is a nesting record from near Kitimat.

Habitat conservation may be partially addressed by OGMAs, riparian reserves, and wildlife tree retention area. The mandatory parts of riparian management likely afford little direct protection for Interior Western Screech-Owl habitat, since many territories are along very small non fish bearing streams and wetlands. It is also likely that associated upland forest habitat is important for foraging.

The Western Screech-owl, *kennicottii* subspecies is protected, in that it cannot be killed, collected or held in captivity without special permits, under the provincial *Wildlife Act*. The interior subspecies is Identified Wildlife, but the coastal subspecies is not.

50.2. RANGE AND DISTRIBUTION

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50.3. CONSERVATION STATUS

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<th>Identified Wildlife</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
</tr>
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</table>
Western Screech-owl – Range in BC.
Scale is arbitrary. From Demarchi et al. (2005).

50.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Western Screech-owl, *kennicottii* subspecies is loss of existing and future nest sites through harvesting, and from disturbance during the nesting season.

50.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

50.6. MANAGEMENT DIRECTION

The management direction for the Western Screech-owl, *kennicottii* subspecies is provided by land use plan objectives to maintain biodiversity in general. The “interior” subspecies Identified Wildlife management recommendations are indicative of good management for the coastal subspecies.
50.7. MANAGEMENT STRATEGY

The following forest management strategies are designed to address both stand level (known sites) and landscape level (unrecorded sites) management of the Western Screech-owl, *kennicottii* subspecies.

- Avoid harvesting near known nests, buffer with wildlife tree patch. During the nesting season (April to August) do not operate heavy machinery near enough to disturb the birds (specific distance depends on topography, forest type, etc. but suggest 500 meters).
- Locate new roads away from known nest sites.

50.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


PLANTS
51. *Didymodon leskeoides*

### 51.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

*Didymodon leskeoides* is a green to red-brown 2-6 cm tall moss with a central stand present. The stem leaves are spreading-twisted and weakly catenulate when dry and spreading and keeled when moist. Asexual reproduction is possibly completed through axillary buds; sexually sterile in range of flora. No sporophytes are known. *Didymodon leskeoides* differs from *D. rigidulus var. ditrichoides* by the short and broadly decurrent leaf margins (the former has long and narrowly decurrent margins). It is easily distinguished from *Hymenostylium recurvirostrum*, with which it commonly occurs, by its usually olive or orange-brown tinge, as opposed to the green to yellow color of the latter.

Habitat consists of the spray zone of falls, alpine tundra, and damp cliff shelf; usually this species has been found growing on damp rocks at moderate elevations. This species has been found in British Columbia, Northwest Territories, Alaska and Asia. Anderson *et al.* (1990) included this species in the North American moss list, although it is thought to be endemic to Japan.

### 51.2. RANGE AND DISTRIBUTION

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**Y = KNOWN OCCURRENCE**

### 51.3. CONSERVATION STATUS

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### 51.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations could potentially impact this species through direct loss and alteration of habitat due to harvesting, road construction, and dryland sort yards.

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<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
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<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log</th>
<th>Yard Care</th>
<th>Log Dump &amp; Water Drop</th>
<th>Site Preparation</th>
<th>Fuel Transportation</th>
<th>Dens Management</th>
<th>Forest Management</th>
</tr>
</thead>
</table>
51.5. PROTECTED HABITAT AREAS
None in the BCTS Skeena Business Area.

51.6. MANAGEMENT DIRECTION
The management direction for the this species is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction).

51.7. MANAGEMENT STRATEGY
None required.

51.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


Klinkenberg, Brian. (Editor) 2010. E-Flora BC: Electronic Atlas of the Plants of British Columbia [eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver.

52. AMERICAN SWEET-FLAG

52.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The American sweet-flag (*Acorus americanus*) is a grass-like plant with tiny flowers arranged in a spadix (a fleshy cylinder similar to the centre of a skunk cabbage flower). The spadix is slender, 4-10 cm long and is enclosed by the leaves. The leaves are long and flat.

American Sweet-flag inhabits shallow water in the montane zone; they may occur in wetlands, along low-gradient streams, or along lakeshores.

The only recorded location near the BCTS Skeena operating area is “Smithers”. It is primarily a southern, inland species (rather than a northern or coastal species). Therefore, there is a low (although possible) probability of unknown occurrences being in the BCTS Skeena operating area.

52.2. RANGE AND DISTRIBUTION

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<td>Skeena Stikine</td>
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American Sweetflag – Known Occurrence near the BCTS Skeena Area (1 site)

Scale is arbitrary.

52.3. CONSERVATION STATUS

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<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
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<td>BC Red List</td>
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</table>
52.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

There are no forest management issues for the American sweet-flag. There is only a low probability of the species even occurring in the BCTS Skeena operating area, and, if it does occur there, the probability of interaction with the species is also low due to the shallow water habitat. Therefore, the overall probability of interaction is too low to manage for the species.

52.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

52.6. MANAGEMENT DIRECTION

The management direction for the American sweet-flag is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction). The management direction is strategic and lacking in detail; hence the recommendations developed for this species are more specific.

52.7. MANAGEMENT STRATEGY

None required.

52.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


53. ARCTIC DAISY

53.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The arctic daisy (*Leucanthemum arcticum*) is a small, compact plant that has a white “daisy” flowerhead with a greenish centre.

The arctic daisy occurs in wet to moist salt marshes and gravelly shores in the lowland zone (CWHwm).

It is known in BC only from a historical collection made in 1893 on Larcom Island in Observatory Inlet. Other records are known from the Alaskan coast.

53.2. RANGE AND DISTRIBUTION

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<th>District</th>
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Arctic Daisy – Known Historical Occurrence in BCTS Skeena Area (1 site)

Scale is arbitrary.

53.3. CONSERVATION STATUS

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<td>BC Red List</td>
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</table>

53.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the arctic daisy are potential impacts from shoreline log dumps.
### 53.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

### 53.6. MANAGEMENT DIRECTION

The management direction for the arctic daisy is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction). The management direction is strategic and lacking in detail; hence the recommendations developed for this species are more specific.

### 53.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the arctic daisy. Special consideration should be given to management of this species, because it is rare in western Canada (BC, YK).

**Overall Objective**
Manage 100% of the area occupied by this species to maintain, and preferably enhance, the suitability of the habitat for the existing plants and for the regeneration of new plants. Each loss of part or all of an occurrence of this red-listed species will significantly worsen its conservation status.

**Stand Level**
To address a recorded arctic daisy occurrence:

- Protect arctic daisy occurrences from all development; do not construct log dumps or conduct other operations. If this is impossible, consult a biologist to develop a mitigation/compensation plan that will maintain or enhance the population of the plant.
- Avoid concentrating and/or diverting subsurface or surface water flows into or away from the area inhabited by the plant.

**Landscape Level**
To address locations of an unrecorded arctic daisy occurrence:

- A biologist experienced in field inventory of rare species and able to identify arctic daisy should survey for the species when developing coastal log dump plans.

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<tr>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log Unload</th>
<th>Wood Waste/Stockpile Disposal</th>
<th>Log Dump &amp; Water Drop Pocket</th>
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• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, GPS coordinates, and a ‘pressed’ specimen (if there are few plants present, collect only a flower and a few leaves) for the location of any arctic daisy found, so that the abundance and locations of the species can be tracked. Reporting forms are at http://www.env.gov.bc.ca/cdc/documents/plantobs.pdf.

53.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


54. CRYPTIC PAW

54.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The cryptic paw (*Nephroma occultum*) foliose lichen is leafy, rounded and loosely pressed in appearance. It is characterized by the upper surface being pale yellowish- to greenish- or bluish grey, and having net-shaped ridges; the lower surface is and pale tan to sometimes blackish. Both sides are dull and naked (hairless). The bottom is finely wrinkled. It measures 2 to 7 cm across, and has rounded lobes 4-12 mm wide. It produces many asexual propagules, called soredia, along the margins and the ridges of the upper surface, and lacks apothecia, the spore producing sexual stage of reproduction. Some forms of *Nephroma parile* are similar, but in that species, the upper surface is usually brownish and is at most weakly wrinkled, never net-ridged.

At most sites, Cryptic Paw is found on or near the extreme branch tips of understory conifers (presumably the soredia dropped from the canopy), with the branch tips less than 5 years old. The density of these lichens ranges from distinctly sparse to locally frequent (20 thalli (plant bodies) per square meter considered frequent). Only one or two thalli per site were recently found in more than half the B.C. sites, but virtually all the plants were vigorous.

The Cryptic Paw Lichen is restricted to humid old-growth forests at lower elevations in mountainous regions. It appears to have very specific ecological requirements, which include high humidity and moderate summer temperatures. The lichen occurs most frequently in the mid to upper canopy, on bark and wood of conifers. The species reproduces through spores. Splashing rain carries spores short distances. Migrating birds and other animals disperse spores over longer distances. The Cryptic Paw Lichen is found only on the Coast from Alaska south to Oregon, west of the Cascades except for inland disjuncts in BC. There are 45 BC locations in which the lichen is known to occur, with much of the global range in BC. Inventory requires both climbing into the tree canopy and search of ground litter; intensive search is required to detect the typically low density populations.

There are two concentrations of Cryptic Paw in BC, one is the ICH associated with the Caribou Mountains, the other is the area in which BCTS Skeena operates (see map below). Hence management for the species in the Skeena area is critical to conservation of the species in BC. The lichen is presently listed by COSEWIC and SARA Schedule 3 as *Special Concern*; it is in the public consultation process to move the species to SARA Schedule 1 *Special Concern*. The *Special Concern* status is because (1) Canadian sites account for more than 50% of the global range, with (2) only 5 locations protected from forest harvesting, (3) The species has restricted habitat requirements; it grows only in mid to lower canopy of old growth coastal and interior humid cedar-hemlock forest. (4) It reproduces only by vegetative propagules with limited dispersal distance. (5) The species is vulnerable to forest harvesting, changes in understory humidity, insect defoliation (hemlock looper), and fire. In 2007 the global status was changed from G3 to G4 (globally of special concern to globally reasonably secure).

The key to conservation of Cryptic Paw lichens is maintenance of antique forests – old growth forests that are very old, not just meeting the minimum definition of “old growth”.

54.2. RANGE AND DISTRIBUTION

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Y = KNOWN OCCURRENCE
54.3. CONSERVATION STATUS

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<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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54.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the cryptic paw are road construction, forest harvesting, changes in understory humidity, insect defoliation (hemlock looper), and fire. Climate change will almost certainly
increase the rate of loss of the very old forests on which the species depends. Interior old-growth forest conditions are required by this species.

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log</th>
<th>Log Dump &amp; Water Drop</th>
<th>Likelihood of Interaction</th>
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54.5. PROTECTED HABITAT AREAS
None in the BCTS Skeena Business Area.

54.6. MANAGEMENT DIRECTION
The management direction for the cryptic paw is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction). The management direction is strategic and lacking in detail; hence the recommendations developed for this species are more specific.

54.7. MANAGEMENT STRATEGY
The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the cryptic paw.

**Overall Objective**
Retain ≥ 70% of 2006 occurrences of the blue-listed species in healthy condition. Each loss of part or all of an occurrence of this blue-listed species will incrementally worsen its conservation status. This objective cannot be fully monitored, because there will never be a complete inventory of occurrences of the species. Hence the objective is provided to indicate the general direction for management strategies, rather than for auditing.

**Stand Level**
To address a recorded cryptic paw occurrence:

- Option 1: Protect cryptic paw occurrences with no-harvest reserves such as wildlife tree patches; do not construct roads or conduct other operations in the reserves.
- Option 2: If operations are a desired and apparently reasonable option, consult a biologist to develop management strategies for harvesting, silviculture and road construction. Interior old forest conditions will need to be maintained to maintain the species.
- Maintain the area as an herbicide-free zone.
**Landscape Level**

To address locations of unrecorded cryptic paw occurrence:

- Maintain a high component of antique forest as old growth management areas, emphasizing areas with known populations of cryptic paw.
- Plan for the maturation of some old growth forest into antique forest, to replace the inevitable loss of some antique forest over time.

**54.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES**


55. EMINENT BLUEGRASS

55.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The eminent bluegrass (*Poa eminens*) is a tall (up to 1 m) perennial grass with broad leaves that have sharp edges and spear-like tips. It has large flowers. If the soil around this grass is disturbed, the rhizomes spread vigorously, making it excellent for beach stabilization.


Known in BC only from the mouth of Bish Creek in Douglas Channel and the Kildala River estuary near Kitimat.

55.2. RANGE AND DISTRIBUTION

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<tr>
<th>District</th>
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<tbody>
<tr>
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<td>Kalum</td>
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<tr>
<td>Skeena Stikine</td>
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</table>

Eminent Bluegrass – Known Occurrence in the BCTS Skeena Area (2 sites)

Scale is arbitrary.

55.3. CONSERVATION STATUS

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<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
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<td>BC Red List</td>
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</table>

55.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the eminent bluegrass are potential impacts from shoreline log dumps.
55.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

55.6. MANAGEMENT DIRECTION

The management direction for the eminent bluegrass is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction). The management direction is strategic and lacking in detail; hence the recommendations developed for this species are more specific.

55.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the eminent bluegrass.

Overall Objective

Retain ≥ 70% of 2006 occurrences of the blue-listed species in healthy condition. Each loss of part or all of an occurrence of this blue-listed species will incrementally worsen its conservation status.

This objective cannot be fully monitored, because there will never be a complete inventory of occurrences of the species. Hence the objective is provided to indicate the general direction for management strategies, rather than for auditing.

Stand Level

To address a recorded eminent bluegrass occurrence:

- If feasible, protect most individual plants and/or most of the habitat of known eminent bluegrass plants populations during log dump construction. This may not be possible due to the relatively large area affected by a log dump, in which case consider whether creation of new adjacent habitat and transplantation of existing plants is feasible or desirable. In some locations, the cost of doing this may be reasonably low.
- Avoid concentrating and/or diverting subsurface or surface water flows into or away from areas inhabited by the plant.
Landscape Level

To address locations of an unrecorded eminent bluegrass occurrence:

- A biologist experienced in field inventory of rare species and able to identify eminent bluegrass should survey for the species when developing coastal log dump plans.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, GPS coordinates, and a ‘pressed’ specimen (if there are few plants present, collect only a flower and a few leaves) for the location of any arctic daisy found, so that the abundance and locations of the species can be tracked. Reporting forms are at http://www.env.gov.bc.ca/cdc/documents/plantobs.pdf.

55.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


56. FOUR-LEAVED MARÉ’S TAIL

56.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The four-leaved mare’s tail (*Hippuris tetraphylla*) is listed by the Conservation Data Centre for the North Coast FD; however, the nearest record for the species appears to be the Central Coast FD.

56.2. RANGE AND DISTRIBUTION

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56.3. CONSERVATION STATUS

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<td>BC Red List</td>
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</table>

56.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The four-leaved mare’s-tail does not appear to occur within the BCTS Skeena Business Area, and is not of forest management concern, as such.

56.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

56.6. MANAGEMENT DIRECTION

The management direction for the four-leaved mare's-tail is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction).
56.7. MANAGEMENT STRATEGY
None required.

56.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


57. FROSTED GLASS-WHISKERS

57.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

Frosted glass-whiskers (*Sclerophora peronella*) is in a group of lichenized fungi known as calicioid or “stubble” lichens because of their tiny stalked spore-bearing structures. The species has been found on the bark and wood of old trees and can be recognized by the pale colour of its spore-bearing apothecia that are raised on stalks 0.5 to 0.8 mm above the substrate. The main body (thallus) of the lichen is imbedded in the substrate.

Frosted glass-whiskers occurs on hardwoods, usually on exposed heartwood of living trunks, and more rarely on bark. It is often associated with mature and old-growth coniferous and deciduous forests, but also occurs in savannas and parklands. The one specimen from British Columbia was collected on bark at the base of a large black cottonwood in a rich, shady cottonwood stand. Found exclusively on the wood and bark of older trees, frosted glass-whiskers seems to prefer stable humidity and small temperature fluctuations in microhabitats of intermediate light.

It is known from only three locations in Canada (2 in Nova Scotia and 1 in BC) and is rare to extremely rare throughout its global range, which includes much of the northern hemisphere. The entire known physical area of coverage for frosted glass-whiskers in the three known Canadian locations is about one square meter. The BC site is at a provincial park as the south end of Kitsumkalum Lake (a former forest service Recreational Reserve).

57.2. RANGE AND DISTRIBUTION

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</table>

Frosted Glass Whiskers – Known Occurrence in the BCTS Skeena Area (1 site)
Scale is arbitrary.

57.3. CONSERVATION STATUS

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</table>
57.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Frosted Glass-whiskers are loss of frosted glass-whiskers habitat through harvesting, silviculture and road construction. However, the species so extremely rare that specific management for it is not feasible beyond protection of the one known site.

Management for the species, beyond the one known site, can only be done through landscape level biodiversity management and riparian management.

57.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

57.6. MANAGEMENT DIRECTION

The management direction for the Frosted Glass-whiskers is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction). The management direction is strategic and lacking in detail; hence the recommendations developed for this species are more specific.

57.7. MANAGEMENT STRATEGY

- Protect known sites from harvesting and all other disturbance.
- Consider inventory/search for additional populations, by a specialist.

57.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


58. HULTEN’S BRYHNIJA MOSS

58.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

Hulten’s bryhnia moss (*Bryhnia hultenii*) is a medium sized plant that is composed of light green to brownish green moderately loose to dense tufts. Stems range in size from 2.5-7 cm with rather numerous branches that are occasionally regular pinnate branching. Leaves are broadly ovate-triangular and strongly concave; they are often shorter than 1 mm and broad. The branch leaves are smaller, and more of a round to ovate shape approximately 0.6 by 0.5 mm; these leaves have smaller cells and almost undifferentiated basal cells.

No sporophytes have been found in North America, thus the only description of capsules is from Asia. This species is closely related to *B. novae-angliae*, but can be distinguished by its stem foliage being julaceous and equal-sized leaves that are strongly concave and cucullate. Furthermore, *B. hultenii* can be distinguished from *B. novae-angliae* by a sharply differentiated alar region, composed of thin-walled, pellucid cells, as well as by the costa becoming thin distally and lacking a spine.

Hulten’s bryhnia moss is found throughout British Columbia, Alaska and northeast Asia. Habitat consists of soil and rocks at the base of cliffs, under dense alder, also found in the bottom of gullies, beside watercourses and in other wet to mesic locations that have moderate to strong shade. This species is known only from a single locality (Inver Creek near Prince Rupert), which has since been logged, and it is doubtful that this species is extant in British Columbia.

58.2. RANGE AND DISTRIBUTION

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Y = KNOWN OCCURRENCE

58.3. CONSERVATION STATUS

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</table>

58.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations could potentially impact this species through direct loss and alteration of habitat due to harvesting, road construction, and dryland sort yards.
### 58.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

### 58.6. MANAGEMENT DIRECTION

The management direction for this species is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction).

### 58.7. MANAGEMENT STRATEGY

None required.

### 58.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


E. B. Bartram in A. J. Grout, Moss Fl. No. Amer. 3: 264. 193

In Klinkenberg, Brian. (Editor) 2010. *E-Flora BC: Electronic Atlas of the Plants of British Columbia* [eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver.


59. LESSER BROWN SEDGE

59.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The lesser brown sedge (*Hippuris tetraphylla*) occurs in dry disturbed sites and open forests within the montane zones of southeast BC. Its potential occurrence in the Skeena Region is restricted to the Bulkley TSA in the Skeena Stikine FD. It does not occur in the BCTS Skeena Business Area.

59.2. RANGE AND DISTRIBUTION

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59.3. CONSERVATION STATUS

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<td>BC Red List</td>
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59.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

There are no forest management issues for the lesser brown sedge. There is a very low probability of the species occurring in the BCTS Skeena Business Area, and, if it does occur there, the probability of interaction with the species is also low due to its montane habitat. Therefore, the overall probability of interaction is too low to manage for the species.

59.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.
59.6. MANAGEMENT DIRECTION

The management direction for the lesser brown sedge is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction). The management direction is strategic and lacking in detail; hence the recommendations developed for this species are more specific.

59.7. MANAGEMENT STRATEGY

None required.

59.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


60. MOUNTAIN MOONWORT

60.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The mountain moonwort (*Botrychium montanum*) is a small perennial fern with a single above ground frond. The frond varies in height but may reach a height of 12 cm. It is a dull, glaucous gray-green, somewhat succulent, and divided into two segments that share a relatively short common stalk. The sterile segment is once pinnatifid with well separated, irregular, angular, ascending lobes with entire or toothed margins. The fertile segment is longer than the sterile segment, is branched, and bears grape-like sporangia. Spores germinate underground and develop into minute subterranean, non-photosynthetic gametophytes which depend on an endophytic fungus for nourishment. Reliable field determination of moonworts depends on the careful use of technical keys and comparison with silhouette outlines of verified specimens.

Identification can be complicated because there is often a high degree of morphological variability between individuals in a population and between populations of the same species; several species may grow together at the same site, and the few diagnostic characters may not be apparent in small plants.

The glaucous gray-green color, succulent texture, relatively short common stalk, and irregular angular lobes rather than distinct pinnae are diagnostic of mountain moonwort, but it could be mistaken for the upswept moonwort.

It occurs in mesic, shady coniferous (mostly western red cedar) forests in the upper montane and lower subalpine zones (ICHmc2, ICHmw2, and ICHmw3).

Special consideration should be given to management of this species, because it is globally uncommon. In recognition of this, an area of antique forests associated with McCully Creek (a tributary of the Kispiox River) in which the mountain moonwort (and upswept moonwort and stalked moonwort) occurs was initially proposed for “Sensitive Area” designation to protect not only the moonworts, but also the rare species of lichens characteristic of antique forests. This never occurred, but an ‘Old Growth Management Zone’ has been established for the area under the Kispiox SRMP Higher Level Plan Objectives for Biodiversity, Visual Quality and Wildlife' (Order effective June 1, 2006).

60.2. RANGE AND DISTRIBUTION

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<td>Y</td>
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<tr>
<td>Skeena Stikine</td>
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</table>

The Conservation Data Centre apparently has incorrect coordinates for the location of this species. Below is a map based on the “Botrychium basin” map, as well as detail from that map.
60.3. CONSERVATION STATUS

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<td>BC Red List</td>
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</table>

60.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the mountain moonwort through harvesting, road construction, and silviculture. Tree removal may adversely plants of mountain moonwort through an abrupt change in microclimate.
(decreased shade) from forested to non-forested habitat, and tree removal may also significantly increase understorey plant competition. Conversion to other tree or understorey species, or increased crown closure, during regeneration may adversely affect the habitat. Road construction, site preparation such as disc trenching or mounding, or vegetation management may destroy existing plants. Special consideration should be given to management of mountain moonwort, because it is globally uncommon.

60.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

60.6. MANAGEMENT DIRECTION

The management direction for the mountain moonwort is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction). The management direction is strategic and lacking in detail; hence the recommendations developed for this species are more specific.

60.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the mountain moonwort. Special consideration should be given to management of this species, because it is globally uncommon.

**Overall Objective**

Manage 100% of the area occupied by this species to maintain, and preferably enhance, the suitability of the habitat for the existing plants and for the regeneration of new plants (this may include some harvesting). Each loss of part or all of an occurrence of this red-listed plant will significantly worsen its conservation status.

**Stand Level**

To address a recorded mountain moonwort occurrence:

- **Option 1**: Protect mountain moonwort occurrences with no-harvest reserves such as wildlife tree patches; do not construct roads or conduct other operations in the reserves.
- **Option 2**: If operations are a desired and apparently reasonable option, consult a biologist to develop management strategies for harvesting, silviculture and road construction.
Harvesting: Harvesting may be able to occur, but may need to be modified to maintain ecological variables such as soil moisture and shade. Reduced crown closure may improve the habitat.

Silviculture: A site preparation and planting prescription for mountain moonwort sites should be developed to maintain the species in occupied sites, both in the short-term and the long-term. Stand density may need to be maintained lower than normal.

Roads: Develop road construction plans to maintain the species in occupied sites and perhaps create habitat in the right of way.
- Maintain the area as an herbicide-free zone.
- Avoid concentrating and/or diverting subsurface or surface water flows into or away from the area inhabited by the species.

Landscape Level
To address locations of unrecorded mountain moonwort occurrence:
- A biologist experienced in field inventory of rare species and able to identify mountain moonwort should survey for the species when developing harvest and road construction plans within a 2 km radius of known sites in the ICH.
- Forestry field crews should be aware of the appearance of all moonworts, and watch for them during normal layout (etc.) work in the summer in the ICH. If moonworts are found, they should be identified to determine if one of the rare species is present.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, GPS coordinates, and one ‘pressed’ frond for the location of any mountain moonwort found, so that the abundance and locations of the species can be tracked. Reporting forms are at http://www.env.gov.bc.ca/cdc/documents/plantobs.pdf.

60.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


61. MUELLER’S ISOPTERYGIOPSIS MOSS; MUELLER’S SILK-MOSS

61.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

Mueller’s silk moss (Isopterygiopsis muelleriana) is a pale green or yellow-green moss; shoots several centimeters long and 1.5 mm wide; they are flattened along one plane and branches. Leaves are straight and abruptly taper to a fine point; they are sparsely located on the stems. This moss is rather ordinary and has few field characteristics that distinguish it from other, similar mosses; however, the long, straight branches and distant leaves give this species a characteristic comb-like appearance. Identification should be confirmed by microscope.

This species is found in montane areas that are moist and very sheltered, usually in slightly base-enriched crevices in cliffs and in block scree. It is best looked for in crevices at the foot of north-facing crags.

61.2. RANGE AND DISTRIBUTION

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61.3. CONSERVATION STATUS

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61.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations could potentially impact this species through direct loss and alteration of habitat due to harvesting, road construction, and dryland sort yards.

61.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.
61.6. MANAGEMENT DIRECTION
The management direction for this species is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction).

61.7. MANAGEMENT STRATEGY
None required.

61.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


Klinkenberg, Brian. (Editor) 2010. E-Flora BC: Electronic Atlas of the Plants of British Columbia [eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver.
62. OLDGROWTH SPECKLEBELLY

62.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

Oldgrowth specklebelly (Pseudocyphellaria rainierensis) is a lichen that is large (5 to 12 cm across), broad-lobed, and loosely attached. The dull upper surface is a pale greenish-blue that is usually smooth, although short stiff hairs may appear and make it feel rough. The top is also often weakly dimpled. This is the only BC lichen with a spotted lower surface (tiny white spots on a pale brownish background), a white medulla, and torn lobe margins. The underside is also wrinkled and matted with short tufts of hair. The lobes are short to elongate, thin, stiff and brittle; they loosely overlap and measure 1.5 to 3 cm across.

The species occurs only in northwest North America, with six locations in British Columbia. Of the BC sites, only one located in the upper Chilliwack Valley has been verified recently. Two other populations are likely extirpated, and the status of the remaining three locations is not known. In at least two locations, the populations consist of a single plant. About half the specimens recently examined showed signs of environmental stress. There are two known sites in the Skeena: at the western end of Douglas Channel about 45 km west of Kitimat in Hartley Inlet, and east of Kitimat on the trail to Robinson Lake leading from the road between Kitimat and Kitimat Mission.

The plant occurs in sheltered old-growth forest ecosystems at low to moderate elevations in at least five of the ten sub-zones of the Coastal Western Hemlock zone. It colonizes a wide assortment of trees and shrubs, but occurs most frequently on conifers. It is very slow at becoming established, but can become locally abundant with time. The climatic conditions of the habitat in B.C. are highly oceanic and markedly humid. Associated species include sword fern, false azalea, Alaska blueberry, oval-leaf blueberry and dwarf dogwood.

62.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
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<td>Kalum</td>
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<tr>
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62.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
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<th>SARA Schedule</th>
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<td>1-SC (2012)</td>
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62.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the Oldgrowth Specklebelly are loss of habitat through harvesting and road construction. The lichen is highly sensitive to logging, which is blamed for the extirpation of one population on Vancouver Island. The species is not likely to become established in plantation forests.

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log Unload</th>
<th>Log Dump &amp; Water Drop Pocket</th>
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</tr>
</tbody>
</table>

62.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

62.6. MANAGEMENT DIRECTION

The management direction for the Oldgrowth Specklebelly is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see
Introduction). The management direction is strategic and lacking in detail; hence the recommendations developed for this species are more specific.

62.7. MANAGEMENT STRATEGY

Overall Objective

Manage 100% of the area occupied by this species to maintain, and preferably enhance, the suitability of the habitat for the existing plants and for the regeneration of new plants. Each loss of part or all of an occurrence of this red-listed plant will significantly worsen its conservation status.

Stand Level

To address a recorded Oldgrowth Specklebelly occurrence:

- Protect Oldgrowth Specklebelly occurrences with no-harvest reserves such as wildlife tree patches; do not construct roads or conduct other operations in the reserves. Avoid all forest development impacts, including leaving a buffer (preferably 200+ m wide) to maintain interior forest conditions.
- Maintain the area as an herbicide-free zone.

Landscape Level

To address locations of unrecorded Oldgrowth Specklebelly occurrence:

- A biologist experienced in field inventory of rare species and able to identify Oldgrowth Specklebelly should survey for the species when developing harvest and road construction plans within a 2-km radius of known sites in the CWH.
- Where operationally reasonable, conifer stands in the CWHv2 and CWHvm that are very old (standing trees > 250 years combined with similar size fallen logs in a state of advanced decay), should be considered for inventory prior to development. These are the two BEC variants with known occurrences in the BCTS Skeena area, and are of relatively limited area.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, GPS coordinates, and one sample for the location of any Oldgrowth Specklebelly found, so that the abundance and locations of the species can be tracked. Reporting forms are at: http://www.env.gov.bc.ca/cdc/documents/plantobs.pdf.

62.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


COSEWIC summary (Full report not available – pre-dates the digital era).

63. ROUGH ROCK-MOSS

63.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The genus for rough rock-moss (*Andreaea rupestris* var. *papillosa*) was named to honour G.R. Andreae, who was a German apothecary in the 18th century. It forms black to dark red-brown tufts or cushions on rocky habitats. Its sporophytes are black or dark red-brown, relatively frequent, maturing in spring or, at high elevations, after snow melt.

Any dark brown to black moss that forms tufts of tiny plants on plane rock surfaces (rather than in crevices) is likely to be *Andreaea*. With opened sporangia, when dry, the genus is very characteristic since the four or more longitudinal openings gape to release spores.

There are ten species of *Andreaea* in the province; four resemble *A. rupestris* and are not readily distinguishable without microscopic examination and experience. The other five, *A. blyttii, A. nivalis, A. megistospora, A. rothii, and A. schofieldiana* have a distinct midrib. The largest is *A. nivalis* in which the leaves are usually strongly curved and reddish to brown, the plants are usually more than 50 mm long and soft, while *A. rupestris* rarely has stems as long as 10 mm and stems are brittle. *A. nivalis* is usually at higher elevations and most frequent in late snow areas. *A. blyttii* forms short black turfs over rocks in late snow areas.

Rough rock-moss is widespread in cooler climates of the Northern Hemisphere; it is reported also as scattered in cooler parts of the Southern Hemisphere. In North America, its range extends across the boreal region and southward along mountain chains of both east and west coasts.

Habitat consists of exposed to somewhat shaded siliceous rock surfaces (cliffs, boulders of talus) from sea level to subalpine and alpine elevations.

63.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
<th>Present</th>
<th>Y = KNOWN OCCURRENCE</th>
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<tbody>
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<td>Skeena Stikine</td>
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63.3. CONSERVATION STATUS

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<th>BC Rank</th>
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</tr>
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</table>

63.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations could potentially impact this species through direct loss and alteration of habitat due to harvesting, road construction, and dryland sort yards.

63.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.
### 63.6. MANAGEMENT DIRECTION

The management direction for the this species is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction).

### 63.7. MANAGEMENT STRATEGY

None required.

### 63.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


Klinkenberg, Brian. (Editor) 2010. E-Flora BC: Electronic Atlas of the Plants of British Columbia [eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver.


64. WESTERN YEW

64.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The western yew (*Taxus brevifolia*) is an understory tree in wetter biogeoclimatic subzones along the coast. It ranges from a low spreading shrub to a small tree (5-15 m), with a twisted trunk and horizontally spreading branches. It can be found at low to mid elevations, in rich, moist forests. Traditionally, western yew has had cultural significance as a medicinal plant to First Nations on the coast of British Columbia.

64.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>District</th>
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<tbody>
<tr>
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<tr>
<td>Skeena Stikine</td>
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</table>

Y = KNOWN OCCURRENCE

Range of the western yew in British Columbia (Parish and Thompson 1994)

64.3. CONSERVATION STATUS

<table>
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<tr>
<th>Global Rank</th>
<th>BC Rank</th>
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64.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact western yew habitat through removal of shade trees during forest harvesting. Road construction and harvesting may also directly impact western yew through impacts to the understory. During silviculture, the species is normally not replanted as part of plantation forests, but may regenerate naturally due to its shade tolerance.
64.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

64.6. MANAGEMENT DIRECTION

Management direction for western yew is provided through direction for management of red-listed and blue-listed (“rare”) species by the applicable Higher Level Plans (see Introduction).

64.7. MANAGEMENT STRATEGY

The Great Bear Rainforest Land Use Order provides specific objectives for the retention of western yew in development areas. The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the whitebark pine.

Overall Objective

Retain western yew in quantities sufficient to satisfy the requirements of the applicable First Nation. This objective cannot be fully monitored, because there will never be a complete inventory of occurrences of the species. Hence the objective is provided to indicate the general direction for management strategies, rather than for auditing.

Stand Level

To address a recorded western yew occurrence:

- Where practicable, retain western yew trees or include in Stand Retention areas.
- Document all occurrences of western yew, note retention or management actions, and submit areas as digital spatial data to the applicable First Nation and the Province of British Columbia.

Landscape Level

- Within the area of possible occurrence of western yew (see range map), ensure that the occurrence and location of all individual western yew are noted during block and road layout.
64.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


65. WHITEBARK PINE

65.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

Whitebark pine (*Pinus albicaulis*) is a pine that sometimes grows up to 20 m tall with a straight trunk; however, it is more often contorted and dwarfed, or shrubby and sprawling. The bark is thin with light-whitish scales; young twigs are hairy, needles are in bunches of five (unlike lodgepole pine, which has bunches of three needles).

These pines inhabit mesic to dry slopes in the subalpine to alpine zones on moderately dry to fresh, nitrogen-medium soils. They can be common in parkland forests on water-shedding sites that are free of snow early in the year.

Whitebark pine presently has a relatively high number of individuals over a moderately large range in subalpine regions of BC. However, long-term trends suggest a major decline resulting from mountain pine beetle and white pine blister rust epidemics, global warming, and successional replacement.

Where it is reasonably common, whitebark pine is a ‘keystone’ species of high-elevation ecosystems. It strongly influences patterns of subalpine snow accumulation and snowmelt, and its continued decline may alter watershed hydrology. Whitebark pine also moderates microenvironments and facilitates the recruitment and growth of other plants. Clark’s nutcracker has evolved to exploit the highly nutritious seed of this pine; its seeds are also an important source of dietary fat for other animals such as squirrels and grizzly bears.

In the BCTS Skeena area whitebark pine is known only from the high elevation boundary of the Kalum Forest District, southeast of Terrace. The tree may occur anywhere along the southeast boundary of forest district, south of Highway 16.

65.2. RANGE AND DISTRIBUTION

<table>
<thead>
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<tbody>
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<tr>
<td>Skeena Stikine</td>
<td>Y</td>
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</tbody>
</table>

*Y = KNOWN OCCURRENCE*
65.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact whitebark pine through direct loss through harvesting, and loss of habitat through harvesting, silviculture and road construction. Harvesting will directly remove all mature trees within the block boundary and road right of way. Road construction will permanently destroy the habitat. During silviculture, the species is normally not planted as part of plantation forests, and, due to its shade intolerance, in not likely to naturally regenerate or (if small trees survive harvesting and pine mistletoe slashing) survive in plantation forests.
65.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

65.6. MANAGEMENT DIRECTION

The management direction for the plants is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed ("rare") species by the three higher level plans (see Introduction). The management direction is strategic and lacking in detail; hence the recommendations developed for this species are more specific.

65.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the whitebark pine.

Overall Objective

Retain ≥ 70% of 2006 occurrences of the blue-listed species in healthy condition. Each loss of part or all of an occurrence of this blue-listed species will incrementally worsen its conservation status. If possible, retain 100% of all trees of this species, because the occurrence in the BCTS Skeena area is at the northern limit of its present range – it may survive here better than further south, and perhaps expand its distribution and abundance, during global warming.

This objective cannot be fully monitored, because there will never be a complete inventory of occurrences of the species. Hence the objective is provided to indicate the general direction for management strategies, rather than for auditing.

Stand Level

To address a recorded whitebark pine occurrence:

- Protect most individual trees and/or most of the habitat of known whitebark pine populations during harvesting, road construction, and silviculture. Most of the trees will be outside areas of merchantable timber, or on rocky outcrops within otherwise merchantable areas; hence avoidance should generally be possible.
• Avoid concentrating and/or diverting subsurface or surface water flows into or away from areas inhabited by the plant.

Landscape Level

• Within the area of possible occurrence of whitebark pine (high elevation along the southeast boundary of Kalum District, south of Hwy 16), ensure that the occurrence and location of all individual whitebark pine are noted during block and road layout.

65.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


66. WHITE-LIP REIN ORCHID

66.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The white-lip rein orchid (*Piperia candida*) has flower stems up to 60 cm high. Leaves are prostrate to erect. Inflorescences sparsely flowered; flowers completely white except for a faintly green mid-vein; with a faint fragrance. Inhabits dry forests and forest margins in the lowland to montane zones. The BCTS Skeena known site is White Island (= White Islets?), off Dundas Island. The *Rare Plants* book also shows a record for Prince Rupert, but neither the CDC nor the E-Flora includes that record.

66.2. RANGE AND DISTRIBUTION

<table>
<thead>
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<tbody>
<tr>
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<td>Kalum</td>
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<td>Skeena Stikine</td>
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Y = KNOWN OCCURRENCE

White-lip Rein Orchid – Known Occurrence in the BCTS Skeena Area (1 site)
Scale is arbitrary.

66.3. CONSERVATION STATUS

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<tr>
<th>Global Rank</th>
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<th>CF Priority</th>
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<td></td>
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<td>BC Red List</td>
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</table>

66.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the white-lip rein orchid through harvesting, road construction, and silviculture. Tree removal may adversely affect habitat of the white-lip rein orchid through an abrupt change in microclimate (decreased shade) from forested to non-forested habitat, and tree removal may also significantly increase understorey plant competition. Conversion to other tree or understorey species, or increased crown closure during regeneration may adversely affect the habitat. Road construction, site preparation such as disc trenching or mounding, or vegetation management may destroy existing plants.
66.5. PROTECTED HABITAT AREAS
None in the BCTS Skeena Business Area.

66.6. MANAGEMENT DIRECTION
The management direction for the plants is provided, to a greater or lesser extent, through direction for management of red-listed and blue-listed (“rare”) species by the three higher level plans (see Introduction). The management direction is strategic and lacking in detail; hence the recommendations developed for this species are more specific.

66.7. MANAGEMENT STRATEGY
The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the mountain moonwort. Special consideration should be given to management of this species, because it is globally uncommon.

**Overall Objective**
Manage 100% of the area occupied by this species to maintain, and preferably enhance, the suitability of the habitat for the existing plants and for the regeneration of new plants (this may include some harvesting). Each loss of part or all of an occurrence of this red-listed plant will significantly worsen its conservation status.

**Stand Level**
To address a recorded white-lip rein orchid occurrence:

- Option 1: Protect white-lip rein orchid occurrences with no-harvest reserves such as wildlife tree patches; do not construct roads or conduct other operations in the reserves.
- Option 2: If operations are a desired and apparently reasonable option, consult a biologist to develop management strategies for harvesting, silviculture and road construction.

**Harvesting:** Harvesting may be able to occur, but may need to be modified to maintain ecological variables such as soil moisture and shade.

**Silviculture:** A site preparation and planting prescription for white-lip rein-orchid sites should be developed to maintain the species in occupied sites, both in the short-term and the long-term. Stand density may need to be maintained lower than normal.
Roads: Develop road construction plans to maintain the species in occupied sites and perhaps create habitat in the right of way.

- Maintain the area as an herbicide-free zone.
- Avoid concentrating and/or diverting subsurface or surface water flows into or away from the area inhabited by the species.

Landscape Level
To address locations of unrecorded white-lip rein orchid occurrence:

- A biologist experienced in field inventory of rare species and able to identify white-lip rein-orchid should survey for the species when developing harvest and road construction plans within a 2 km radius of known sites in the CWHvh.
- Forestry field crews should be aware of the appearance of all rein orchids, and watch for them during normal layout (etc.) work in the summer in the CWHvh. If rein orchids are found, they should be identified to determine if one of the rare species is present.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, GPS coordinates, and one ‘pressed’ frond for the location of any mountain moonwort found, so that the abundance and locations of the species can be tracked. Reporting forms are at http://www.env.gov.bc.ca/cdc/documents/plantobs.pdf.

66.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


ECOLOGICAL COMMUNITIES – FOREST
67. LODGEPOLE PINE / KINNIKINNICK

67.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The lodgepole pine / kinnikinnick (*Pinus contorta / Arctostaphylos uva-ursi*) ecological community is confined to dry upper slopes and ridge crests with thin morainal/colluvial veneers over bedrock. Soils are very poor to medium and very xeric. These are stunted and widely spaced PI forests with a small component of western hemlock. Shrub layers are sparse (mostly small lodgepole pine); herb layer is scattered kinnikinnick, dwarf blueberry, prince’s pine, bunchberry, and rattlesnake-plantain. The moss layer is red-stem feathermoss, rock mosses, step moss, and some lanky moss and electrified cat’s tail moss.

67.2. RANGE AND DISTRIBUTION

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<th>BCTS Skeena BEC Unit</th>
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Range of Potential Occurrence in BCTS Skeena Area lodgepole pine/kinnikinnick ecological community

Scale is arbitrary

67.3. CONSERVATION STATUS

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<tr>
<th>Global Rank</th>
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</table>
67.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the lodgepole pine / kinnikinnick ecological community through harvesting, road construction, and silviculture. Harvesting removes some or all the mature/old trees characteristic of this community, and may significantly alter the understorey shrub, herb and moss layers. Permanent loss will occur in areas used for road construction. The community may be permanently lost through conversion to other tree species during regeneration, especially since the dry habitat may make re-establishment of some species relatively difficult. Vegetation management, although it may be less required in dry sites, may permanently alter the understorey shrub and herbaceous species composition. Road construction or harvesting in any direction nearby may impact the community through increased windthrow; changes in interior forest environmental conditions (temperature, humidity, etc.); and/or increased use by “edge” species of predators, parasites, competitors, or weeds.

67.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

67.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

67.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the lodgepole pine / kinnikinnick ecological community.

**Overall Objective**

- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status

**Stand Level**

To address a recorded lodgepole pine / kinnikinnick ecological community occurrence in natural mature/old seral condition:
• Do not develop within the community
• Where avoidance of the community is not practicable, restrict harvesting to the minimum required to allow road access or safe block development

Landscape Level
To address unrecorded lodgepole pine / kinnikinnick ecological community occurrences:
• Determine the site series compositions in all forested areas to be impacted through forest harvesting activities or related developments.
• Protect mature and old-growth occurrences of the ecological community.
• Where avoidance of the community is not practicable, restrict harvesting to the minimum required to allow road access or safe block development
• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

67.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES
68. RED ALDER / SALMONBERRY / COMMON HORSETAIL

68.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The red alder / salmonberry / common horsetail (Alnus rubra / Rubus spectabilis / Equisetum arvense) ecological community occurs on low fluvial benches, generally at streamside or adjacent to back channels and other low-lying areas that experience prolonged annual flooding. The tree layer consists almost exclusively of red alder. Shrub, herb, and moss layers are generally very limited in abundance, with salmonberry, stink currant, devil’s club, and false lily-of-the-valley characteristic. Soils are mostly Regosols, hygric to subhydric, rich to very rich. This community was formerly called the red alder / false lily-of-the-valley (Alnus rubra / Maianthemum dilatatum) ecological community, and was restricted to the CWHvh2/10.

68.2. RANGE AND DISTRIBUTION

<table>
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</table>

Range of Potential Occurrence in BCTS Skeena Area red alder / salmonberry / common horsetail ecological community
Scale is arbitrary

68.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
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<tbody>
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<td>GNR S3</td>
<td>Blue</td>
<td>4</td>
<td>GBR LUO</td>
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68.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the red alder / false lily-of-the-valley ecological community through harvesting, road construction, and silviculture. Harvesting removes some or all the mature/old trees characteristic of this community, and may significantly alter the understorey shrub, herb and moss layers. The community
Vegetation management may permanently alter the understorey shrub and herbaceous species composition. Harvesting and/or road construction within this community may alter the floodplain hydrology. Road construction or harvesting in any direction nearby may impact the community through increased windthrow; changes in interior forest environmental conditions (temperature, humidity, etc.); and/or increased use by “edge” species of predators, parasites, competitors, or weeds.

### 68.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

### 68.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

### 68.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the red alder / salmonberry / common horsetail ecological community.

**Overall Objective**

- Retain 70% of the area of this blue-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status

**Stand Level**

To address a recorded red alder / salmonberry / common horsetail ecological community occurrence in mature/old seral condition:

- Minimize development within the community to achieve the 70% retention target.
Landscape Level
To address unrecorded red alder / salmonberry / common horsetail ecological community occurrences:

- Determine the site series compositions in all forested areas to be impacted through forest harvesting activities or related developments.
- Minimize harvesting and development within mature and old-growth occurrences of the ecological community.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

68.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


69. SITKA SPRUCE / FALSE LILY-OF-THE-VALLEY WET HYPERMARITIME 1

69.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Sitka spruce / false lily-of-the-valley Wet Hypermaritime 1 (Picea sitchensis / Maianthemum dilatatum Wet Hypermaritime 1) ecological community occurs on the major coastal islands and the fringe of the Coastal mainland. The Sitka spruce / false lily-of-the-valley Wet Hypermaritime 1 ecological community is forested with Sitka spruce, western hemlock, and some western redcedar, amabilis fir and red alder. Shrubs are salmonberry, stink currant, oval-leaved blueberry and some Alaskan blueberry and red elderberry; and the herb layer has lady fern, three-leaved foamflower, deer fern, false lily-of-the-valley, sword fern, and some stream violet, Alaska oniongrass, Hooker’s fairybells, and Cooley’s hedge-nettle. Mosses are coastal leafy moss, step moss, lanky moss and Kindbergia. Soils are medium to rich.

69.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
<th>District</th>
<th>Kalum</th>
<th>Skeena</th>
<th>Stikine</th>
<th>Y = KNOWN OCCURRENCE</th>
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<tbody>
<tr>
<td>CWHvh2/08; CWHwh1/07</td>
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Range of Potential Occurrence in BCTS Skeena Area Sitka spruce / false lily-of-the-valley Wet Hypermaritime 1 ecological community

Scale is arbitrary

69.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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<tr>
<td>G2G3</td>
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<td>BC Red List</td>
</tr>
</tbody>
</table>
69.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the Sitka spruce / false lily-of-the-valley ecological community through harvesting, road construction, and silviculture. Harvesting removes some or all the mature/old trees characteristic of this community, and may significantly alter the understorey shrub, herb and moss layers. The community may be permanently lost through conversion to other tree or understorey species during silviculture. Vegetation management may permanently alter the understorey shrub and herbaceous species composition. Road construction or harvesting in any direction nearby may impact the community through increased windthrow; changes in interior forest environmental conditions (temperature, humidity, etc.); and/or increased use by “edge” species of predators, parasites, competitors, or weeds.

69.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

69.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

69.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the Sitka spruce/false lily-of-the-valley Wet Hypermaritime 1 ecological community.

**Overall Objective**
- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status

**Stand Level**
To address a recorded Sitka spruce/false lily-of-the-valley Wet Hypermaritime 1 ecological community occurrence in natural mature/old seral condition:
• Do not develop within the community
• Where avoidance of the community is not practicable, restrict harvesting to the minimum required to allow road access or safe block development

Landscape Level
To address unrecorded Sitka spruce/false lily-of-the-valley Wet Hypermaritime 1 ecological community occurrences:
• Determine the site series compositions in all forested areas to be impacted through forest harvesting activities or related developments.
• Protect mature and old-growth occurrences of the ecological community.
• Where avoidance of the community is not practicable, restrict harvesting to the minimum required to allow road access or safe block development
• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

69.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

70. SITKA SPRUCE / SALMONBERRY VERY WET MARITIME

70.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Sitka spruce / salmonberry Very Wet Maritime (Picea sitchensis / Rubus spectabilis Very Wet Maritime) ecological community occurs at low elevations (0 to 600 m) on floodplains of the windward slopes of northern Vancouver Island, and on the mainland on the windward slopes of the Coast Mountains north to Portland Canal. It is rare within a narrow range. This high-bench floodplain community experiences irregular over-bank flooding but is strongly influenced by sub-irrigation. It is dominated by Sitka spruce, western hemlock, and red alder. The shrub layer is characterized by an abundance of devil’s club and salmonberry. There is a diverse herb layer, including rich indicators such as oak fern, spiny wood fern, sword fern, and foamflowers. Mosses are dominated by coastal leafy moss with a moderate cover of lanky moss. Productive forests were harvested early on and no occurrences of non-harvested stands are confirmed. This ecological community has high values as grizzly bear habitat. The Kalum SRMP specifically references this plant community.

70.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
<th>District</th>
<th>Kalum</th>
<th>Skeena Stikine</th>
<th>Y = KNOWN OCCURRENCE</th>
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<tbody>
<tr>
<td>CWHvm1/09</td>
<td>North Coast</td>
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Range of Potential Occurrence in BCTS Skeena Area Sitka spruce / salmonberry Very Wet Maritime ecological community
Scale is arbitrary

70.3. CONSERVATION STATUS

<table>
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<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
<th>COSEWIC</th>
<th>SARA Schedule</th>
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<td>2</td>
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<td>BC Red List</td>
</tr>
</tbody>
</table>
70.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the Sitka spruce / salmonberry Very Wet Maritime ecological community through harvesting, road construction, and silviculture. Harvesting removes some or all the mature/old trees characteristic of this community, and may significantly alter the understorey shrub, herb and moss layers. The community may be permanently lost through conversion to other tree or understorey species during regeneration. Vegetation management may permanently alter the understorey shrub and herbaceous species composition. Harvesting and/or road construction within this community may alter the floodplain hydrology. Road construction or harvesting in any direction nearby may impact the community through increased windthrow; changes in interior forest environmental conditions (temperature, humidity, etc.); and/or increased use by “edge” species of predators, parasites, competitors, or weeds.

70.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

70.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

70.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the Sitka spruce / salmonberry Very Wet Maritime ecological community.

**Overall Objective**

- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.
To address a recorded Sitka spruce / salmonberry Very Wet Maritime ecological community occurrence in natural mature/old seral condition:

- Do not develop within the community
- Where avoidance of the community is not practicable, restrict harvesting to the minimum required to allow road access or safe block development

**Landscape Level**

To address unrecorded Sitka spruce / salmonberry Very Wet Maritime ecological community occurrences:

- Determine the site series compositions in all forested areas to be impacted through forest harvesting activities or related developments.
- Protect mature and old-growth occurrences of the ecological community.
- Where avoidance of the community is not practicable, restrict harvesting to the minimum required to allow road access or safe block development
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

### 70.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

71. SITKA SPRUCE / SALMONBERRY WET SUBMARITIME 1

71.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Sitka spruce / salmonberry Wet Submaritime 1 (*Picea sitchensis / Rubus spectabilis* Wet Submaritime 1) ecological community has a naturally limited distribution (floodplains) within a small range. It occurs on the floodplains of major rivers at low elevations (to 600 m) in the Kitimat Ranges and western slopes of the Hazelton Mountains, primarily along stretches of the Skeena and Nass Rivers. Soils are coarse textured Regosols and Dystric Brunisols. The soil moisture regime fluctuates seasonally from mesic to hygric and the soil nutrient regime is rich to very rich. The highly productive forest is dominated by Sitka spruce and subalpine fir is also present at higher elevations. Devil’s club and salmonberry are prominent in the shrub layer. The herb layer is dominated by oak fern, spiny wood fern, and lady fern. It is a high-bench floodplain riparian community with annual, sporadic flooding in the rooting zone and occasional over-bank flooding. The Kalum SRMP specifically references this plant community.

71.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
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<th>BEC Unit</th>
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<td>Unit</td>
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Range of Potential Occurrence in BCTS Skeena Area Sitka spruce / salmonberry Wet Submaritime 1 ecological community

Scale is arbitrary

71.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
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<td>S2</td>
<td>Red</td>
<td>2</td>
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<td>BC Red List</td>
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</table>

71.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the Sitka spruce / salmonberry Wet Submaritime 1 ecological community through harvesting, road construction, and silviculture. Harvesting removes some or all the mature/old trees
characteristic of this community, and may significantly alter the understorey shrub, herb and moss layers. The community may be permanently lost through conversion to other tree or understorey species during regeneration. Vegetation management may permanently alter the understorey shrub and herbaceous species composition. Harvesting and/or road construction within this community may alter the floodplain hydrology. Road construction or harvesting in any direction nearby may impact the community through increased windthrow; changes in interior forest environmental conditions (temperature, humidity, etc.); and/or increased use by “edge” species of predators, parasites, competitors, or weeds.

### 71.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

### 71.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

### 71.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the Sitka spruce / salmonberry Wet Submaritime 1 ecological community.

**Overall Objective**

- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status

**Stand Level**

To address a recorded Sitka spruce / salmonberry Wet Submaritime 1 ecological community occurrence in natural mature/old seral condition:

- Do not develop within the community
- Where avoidance of the community is not practicable, restrict harvesting to the minimum required to allow road access or safe block development
Landscape Level
To address unrecorded Sitka spruce / salmonberry Wet Submaritime 1 ecological community occurrences:

- Determine the site series compositions in all forested areas to be impacted through forest harvesting activities or related developments.
- Protect mature and old-growth occurrences of the ecological community.
- Where avoidance of the community is not practicable, restrict harvesting to the minimum required to allow road access or safe block development.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

71.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

72. SITKA SPRUCE / SLOUGH SEDGE

72.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Sitka spruce / slough sedge (*Picea sitchensis* / *Carex obnupta*) ecological community occurs along tidal sloughs and estuaries with a strongly fluctuating water table, and are influenced by salt spray or brackish water. This forest community is dominated by Sitka spruce, with minor components of western hemlock and western redcedar; Pacific crab apple is almost entirely restricted to the shrub layer. Pacific crab apple, salal, and salmonberry dominate the shrub layer, with minor components of shrubform conifers. The herb layer is dominated by slough sedge, with minor components of other species. There is a minor component of Oregon beaked-moss and lichens. The community typically occurs behind sedge marshes in estuaries.

72.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
<th>District</th>
<th>Kalum</th>
<th>Skeena Stikine</th>
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Range of Potential Occurrence in BCTS Skeena Area Sitka spruce / slough sedge ecological community
Scale is arbitrary

72.3. CONSERVATION STATUS

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<th>Global Rank</th>
<th>BC Rank</th>
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<th>COSEWIC</th>
<th>SARA Schedule</th>
<th>Supporting Documentation</th>
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72.4 FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the Sitka spruce / slough sedge ecological community through harvesting, road construction, and silviculture. Harvesting removes some or all the mature/old trees characteristic of this community, and may significantly alter the understorey shrub, herb and moss layers. The community may
be permanently lost through conversion to other tree or understorey species during regeneration. Vegetation management may permanently alter the understory shrub and herbaceous species composition. Road construction or harvesting in any direction nearby may impact the community through increased windthrow; changes in interior forest environmental conditions (temperature, humidity, etc.); and/or increased use by “edge” species of predators, parasites, competitors, or weeds. Shoreline or off-shore developments (breakwaters, wharves, dredging, log booms, etc.) that reduce salt spray or brackish water influences on the community may have long-term adverse impacts.

### Overall Risk Rating

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<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log Unload</th>
<th>Log Dump &amp; Water Drop</th>
<th>Drop Pocket</th>
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</tbody>
</table>

#### 72.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

#### 72.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

#### 72.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the Sitka spruce / slough sedge ecological community.

**Overall Objective**

- Retain 70% of the area of this blue-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

**Stand Level**

To address a recorded Sitka spruce / slough sedge ecological community occurrence in mature/old seral condition:

- Minimize development within the community to achieve the 70% retention target.

**Landscape Level**

To address unrecorded Sitka spruce / slough sedge ecological community occurrences:
• Determine the site series compositions in all forested areas to be impacted through forest harvesting activities or related developments.
• Minimize harvesting and development within mature and old-growth occurrences of the ecological community.
• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

72.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

73. SITKA SPRUCE / TALL TRISETUM

73.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Sitka spruce / tall trisetum (*Picea sitchensis / Trisetum canescens*) ecological community occurs on active floodplains of larger rivers, with a prolonged elevated water table during the growing season. This forest community is dominated by Sitka spruce, western hemlock, and a minor component of red alder. The sparse shrub layer is composed of western hemlock and Sitka spruce. The herb layer is dominated by moderate amounts of hairy wildrye and Alaska oniongrass, with a few false lily-of-the-valley, sword fern, lady fern, nodding trisetum and three-leaved foamflower. Mosses are, dominated by step moss, lanky moss, and alligator liverwort; minor components of many other mosses occur.

73.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
<th>District North Coast</th>
<th>Kalum</th>
<th>Skeena Stikine</th>
<th>Y = KNOWN OCCURRENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWHvh2/09; CWHwh1/08</td>
<td>Y</td>
<td>Y</td>
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</table>

Range of Potential Occurrence in BCTS Skeena Area Sitka spruce / tall trisetum ecological community
Scale is arbitrary

73.3. CONSERVATION STATUS

<table>
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<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
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<td>BC Red List</td>
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</table>

73.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the Sitka spruce / tall trisetum ecological community through harvesting, road construction, and silviculture. Harvesting removes some or all the mature/old trees characteristic of this community, and may significantly alter the understorey shrub, herb and moss layers. The community may
be permanently lost through conversion to other tree or understorey species during regeneration. Vegetation management may permanently alter the understorey shrub and herbaceous species composition. Harvesting and/or road construction within this community may alter the floodplain hydrology. Road construction or harvesting in any direction nearby may impact the community through increased windthrow; changes in interior forest environmental conditions (temperature, humidity, etc.); and/or increased use by “edge” species of predators, parasites, competitors, or weeds.

73.5. PROTECTED HABITAT AREAS
None in the BCTS Skeena Business Area.

73.6. MANAGEMENT DIRECTION
The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

73.7. MANAGEMENT STRATEGY
The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the Sitka spruce / tall trisetum ecological community.

**Overall Objective**
- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition
  - same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status

**Stand Level**
To address a recorded Sitka spruce / tall trisetum ecological community occurrence in natural mature/old seral condition:
- Do not develop within the community
- Where avoidance of the community is not practicable, restrict harvesting to the minimum required to allow road access or safe block development

**Landscape Level**
To address unrecorded Sitka spruce / tall trisetum ecological community occurrences:
- Determine the site series compositions in all forested areas to be impacted through forest harvesting activities or related developments.
- Protect mature and old-growth occurrences of the ecological community.
- Where avoidance of the community is not practicable, restrict harvesting to the minimum required to allow road access or safe block development.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

73.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

74. WESTERN HEMLOCK - SITKA SPRUCE / LANKY MOSS

74.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The western hemlock - Sitka spruce / lanky moss (*Tsuga heterophylla* - *Picea sitchensis* / *Rhytidiadelphus loreus*) ecological community occurs in submesic sites. This forest community is dominated by western hemlock and western redcedar, with amabilis fir and/or Sitka spruce. The shrub layer is dominated by shrub-form western hemlock, red huckleberry, false azalea, and others; salal is common on some sites. The herb layer has a moderate component of deer fern, with minor components of other species. Mosses are abundant, with lanky moss and step moss dominating.

74.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
<th>District</th>
<th></th>
<th></th>
<th>Y = KNOWN OCCURRENCE</th>
</tr>
</thead>
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<tr>
<td>CWHvh2/04; CWHwh1/01; CWHwh2/01</td>
<td>North Coast Y</td>
<td>Kalum Y</td>
<td>Skeena Stikine</td>
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</tbody>
</table>

Range of Potential Occurrence in BCTS Skeena Area western hemlock – Sitka spruce / lanky moss ecological community

Scale is arbitrary

74.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
<th>Supporting Documentation</th>
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<tbody>
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<td>GNR S3</td>
<td>Blue</td>
<td>2</td>
<td>GBR LUO</td>
<td></td>
</tr>
</tbody>
</table>

74.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the western hemlock – Sitka spruce / lanky moss ecological community through harvesting, road construction, and silviculture. Harvesting removes some or all the mature/old trees characteristic of this community, and may significantly alter the understorey shrub, herb and moss layers.
The community may be permanently lost through conversion to other tree or understorey species during regeneration. Vegetation management may permanently alter the understory shrub and herbaceous species composition. Road construction or harvesting in any direction nearby may impact the community through increased windthrow; changes in interior forest environmental conditions (temperature, humidity, etc.); and/or increased use by “edge” species of predators, parasites, competitors, or weeds.

### 74.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

### 74.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

### 74.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the western hemlock - Sitka spruce / lanky moss ecological community.

**Overall Objective**

- Retain 70% of the area of this blue-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status

**Stand Level**

To address a recorded western hemlock - Sitka spruce / lanky moss ecological community occurrence in mature/old seral condition:

- Minimize development within the community to achieve the 70% retention target.

**Landscape Level**

To address unrecorded western hemlock - Sitka spruce / lanky moss ecological community occurrences:
• Determine the site series compositions in all forested areas to be impacted through forest harvesting activities or related developments.
• Minimize harvesting and development within mature and old-growth occurrences of the ecological community.
• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

74.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

75. WESTERN REDCEDAR – SITKA SPRUCE / DEVIL’S CLUB VERY WET HYPERMARITIME 2

75.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The western redcedar – Sitka spruce / devil’s club Very Wet Hypermaritime 2 (*Thuja plicata* - *Picea sitchensis* / *Oplopanax horridus* Very Wet Hypermaritime 2) ecological community occurs on sites with continually flowing (not stagnating) seepage water, typically at lower and toe slopes. Conditions are rich and moist to wet. The site series is fairly common in small patches. This productive forest community is dominated by western hemlock, amabilis fir, Sitka spruce, and western redcedar. Devil’s club is common in the shrub layer; other common shrubs are salal, red huckleberry, Alaskan blueberry, salmonberry, and western hemlock. The herb layer is dominated by a diversity of fern and three-leaved foamflower. There is a high diversity of mosses, with lanky moss, step moss, and large leafy moss dominating. Two phases are recognized, mineral (07a) and lithic (07b).

75.2. RANGE AND DISTRIBUTION

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</tr>
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<td></td>
<td>Stikine</td>
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</table>

Range of Potential Occurrence in BCTS Skeena Area western redcedar – Sitka spruce / devil’s club Very Wet Hypermaritime 2 ecological community

Scale is arbitrary

75.3. CONSERVATION STATUS

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<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
<th>Supporting Documentation</th>
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<td>GBR LUO</td>
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</tbody>
</table>
75.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the western redcedar - Sitka spruce / devil's club Very Wet Hypermaritime 2 ecological community through harvesting, road construction, and silviculture. Harvesting removes some or all the mature/old trees characteristic of this community, and may significantly alter the understory shrub, herb and moss layers. The community may be permanently lost through conversion to other tree or understory species during regeneration. Vegetation management may permanently alter the understory shrub and herbaceous species composition. Harvesting and/or road construction within or upslope of this community may alter seepage hydrology. Road construction or harvesting in any direction nearby may impact the community through increased windthrow; changes in interior forest environmental conditions (temperature, humidity, etc.); and/or increased use by "edge" species of predators, parasites, competitors, or weeds.

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sorting &amp; Log Unload</th>
<th>Log Dump &amp; Water Drop Pocket</th>
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</thead>
<tbody>
<tr>
<td>Planning Risk Rating</td>
<td>Falling</td>
<td>Yarding</td>
<td>Skidding</td>
<td>Stacking</td>
<td>Silviculture</td>
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<td>Yarding</td>
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<td>Likelihood of Interaction</td>
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<td>M</td>
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<td>L</td>
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</tr>
</tbody>
</table>

75.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

75.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

75.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the western redcedar - Sitka spruce / devil's club Very Wet Hypermaritime 2 ecological community.

**Overall Objective**
- Retain 70% of the area of this blue-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.
Stand Level
To address a recorded western redcedar - Sitka spruce / devil’s club Very Wet Hypermaritime 2 ecological community occurrence in mature/old seral condition:
  • Minimize development within the community to achieve the 70% retention target.

Landscape Level
To address unrecorded western redcedar - Sitka spruce / devil’s club Very Wet Hypermaritime 2 ecological community occurrences:
  • Determine the site series compositions in all forested areas to be impacted through forest harvesting activities or related developments.
  • Minimize harvesting and development within mature and old-growth occurrences of the ecological community.
  • Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

75.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES
76. WESTERN REDCEDAR - SITKA SPRUCE / SKUNK CABBAGE

76.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The western redcedar - Sitka spruce / skunk cabbage (*Thuja plicata* - *Picea sitchensis* / *Lysichiton americanus*) ecological community occurs as localized swamp forests with poorly drained soils with some mineral seepage influence. Soils are gleyed and relatively rich. It occurs mainly on gradual lower slopes or level/depressional areas; most often on fluvial deposits overlain with organic blankets or veneers. Trees tend to root on mounds; depressions are often too wet. It is dominated by western hemlock, western redcedar, Sitka spruce, and yellow-cedar. The diverse shrub layer has little devil’s club; it is dominated by western hemlock, false azalea, and red huckleberry. The diverse herb layer has an abundance of skunk cabbage, few ferns other than deer fern, and bunchberry is fairly common. Mosses are moderately diverse, and dominated by lanky moss, large leafy moss, step moss, common green sphagnum and shiny liverwort. Two phases are recognized, the mineral (13a) and peaty (13b).

76.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
<th>District North Coast</th>
<th>Kalum</th>
<th>Skeena Stikine</th>
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Range of Potential Occurrence in BCTS Skeena Area western redcedar – Sitka spruce / skunk cabbage ecological community

Scale is arbitrary

76.3. CONSERVATION STATUS

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<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
<th>Supporting Documentation</th>
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<td>S3?</td>
<td>Blue</td>
<td>1</td>
<td>GBR LUO</td>
</tr>
</tbody>
</table>
76.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the western redcedar - Sitka spruce / skunk cabbage ecological community through harvesting, road construction, and silviculture. Harvesting removes some or all the mature/old trees characteristic of this community, and may significantly alter the understorey shrub, herb and moss layers. The community may be permanently lost through conversion to other tree or understorey species during regeneration. Vegetation management may permanently alter the understorey shrub and herbaceous species composition. Harvesting and/or road construction within or upslope of this community may alter seepage hydrology. Road construction or harvesting in any direction nearby may impact the community through increased windthrow; changes in interior forest environmental conditions (temperature, humidity, etc.); and/or increased use by “edge” species of predators, parasites, competitors, or weeds.

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log Unload</th>
<th>Log Dump &amp; Water Drop Pocket</th>
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</thead>
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<tr>
<td>Likelihood of Interaction</td>
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<td>Road Layout</td>
<td>Harvest Area Layout</td>
<td>Road Construction</td>
<td>Road Detractation</td>
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<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>L</td>
<td>L</td>
</tr>
</tbody>
</table>

76.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

76.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

76.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the western redcedar – Sitka spruce / skunk cabbage ecological community.

Overall Objective

- Retain 70% of the area of this blue-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status

Stand Level

To address a recorded western redcedar – Sitka spruce / skunk cabbage ecological community occurrence in mature/old seral condition:
• Minimize development within the community to achieve the 70% retention target.

Landscape Level
To address unrecorded western redcedar – Sitka spruce / skunk cabbage ecological community occurrences:
• Determine the site series compositions in all forested areas to be impacted through forest harvesting activities or related developments.
• Minimize harvesting and development within mature and old-growth occurrences of the ecological community.
• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

76.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES
77. WESTERN REDCEDAR - WESTERN HEMLOCK / SWORD FERN

77.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The western redcedar - western hemlock / sword fern (Thuja plicata - Tsuga heterophylla / Polystichum munitum) ecological community occurs on dry sites on steep, upper, colluvial slopes. Soils are rapidly drained with base-rich parent material. This forest community is dominated by western redcedar, western hemlock and Sitka spruce; some red alder may be present. A shrub layer is nearly absent, with some western hemlock and an occasional Alaskan blueberry. The herb layer is dominated by ferns such as spiny wood fern, oak fern, and sword fern; other herbs are very scarce. The moss community is lacking in diversity, with lanky moss and Oregon beaked moss being moderately common.

77.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
<th>District North Coast</th>
<th>Kalum</th>
<th>Skeena Stikine</th>
<th>Y = KNOWN OCCURRENCE</th>
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<tbody>
<tr>
<td>CWHvm1/04; CWHvm2/04</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
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</tbody>
</table>

Range of Potential Occurrence in BCTS Skeena Area western redcedar – western hemlock / sword fern ecological community
Scale is arbitrary

77.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
<th>Supporting Documentation</th>
</tr>
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<tbody>
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<td>GNR</td>
<td>S3?</td>
<td>Blue</td>
<td>1</td>
<td>GBR LUSO</td>
</tr>
</tbody>
</table>
77.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations impact the western redcedar - western hemlock / sword fern ecological community through harvesting, road construction, and silviculture. Harvesting removes some or all the mature/old trees characteristic of this community, and may significantly alter the understory shrub, herb and moss layers. The community may be permanently lost through conversion to other tree or understory species during regeneration. Vegetation management may permanently alter the understory shrub and herbaceous species composition. Road construction or harvesting in any direction nearby may impact the community through increased windthrow; changes in interior forest environmental conditions (temperature, humidity, etc.); and/or increased use by “edge” species of predators, parasites, competitors, or weeds.

77.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

77.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

77.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the western redcedar – western hemlock / sword fern ecological community.

Overall Objective

- Retain 70% of the area of this blue-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.
Stand Level
To address a recorded western redcedar – western hemlock / sword fern ecological community occurrence in mature/old seral condition:

- Minimize development within the community to achieve the 70% retention target.

Landscape Level
To address unrecorded western redcedar – western hemlock / sword fern ecological community occurrences:

- Determine the site series compositions in all forested areas to be impacted through forest harvesting activities or related developments.
- Minimize harvesting and development within mature and old-growth occurrences of the ecological community.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

77.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

ECOLOGICAL COMMUNITIES – NON-FORESTED
78. BEAKED DITCH-GRASS HERBACEOUS VEGETATION

78.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The beaked ditch-grass Herbaceous Vegetation (*Ruppia maritima* Herbaceous Vegetation) ecological community occurs in intertidal areas throughout the Coast. It occurs in brackish, mudbottomed pools, lagoons, sloughs, drainage channels and mudflats that dissect lower portions of estuarine marshes. Tidal inundation is usually prolonged to depths of 0.5 – 4 m; locations in pools may be permanently flooded. Flooding can be permanent or prolonged during each tidal cycle. Sites are often small in extent but occasionally occur over large areas of tidal flats where sedimentation rates are low. The community consists of pure, or almost pure, stands of beaked ditch-grass. Soils are silty Rego-Gleysols. Beaked ditch-grass is also known as Widgeon-grass.

78.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
<th>District</th>
<th>North Coast</th>
<th>Kalum</th>
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<td>U</td>
<td>U</td>
<td>U</td>
<td>U = occurrence in the BEC Unit possible, but not confirmed</td>
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</table>

**RANGE MAP:** No range map is provided, because of the difficulty of mapping a range restricted to the intertidal zone along the Coast.

78.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
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<td>BC Red List</td>
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78.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest management issues for the beaked ditch-grass Herbaceous Vegetation ecological community are impacts from coastal log dumps. There are no trees to harvest, hydrology is not likely to be significantly affected by adjacent harvesting, and roads will not be built through the ecological community.
78.5. PROTECTED HABITAT AREAS
None in the BCTS Skeena Business Area.

78.6. MANAGEMENT DIRECTION
The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

78.7. MANAGEMENT STRATEGY
The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the beaked ditch-grass Herbaceous Vegetation ecological community.

Overall Objective
• Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status

Stand Level
To address a recorded beaked ditch-grass Herbaceous Vegetation ecological community occurrence:
• Do not develop within the community, or within a 50 m buffer.
• If log dump development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
• Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

Landscape Level
To address unrecorded beaked ditch-grass Herbaceous Vegetation ecological community occurrences:
• Determine the intertidal ecological community composition at or within 50 m of proposed coastal log dump sites. Most of the intertidal communities that occur on in the BCTS Skeena area are red-listed, the rest are blue-listed.
• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

78.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES
79. DUNE WILDRYE – BEACH PEA

79.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The dune wildrye – beach pea (*Leymus mollis* ssp. – *Lathyrus japonicas*) ecological community is an herbaceous vegetation ecosystem found on coastal sand dunes, within 10 m of high tide mark. Its occurrence on the north coast is not well documented.

Threats to this ecosystem are mainly associated with recreational activities and development of artificial erosion barriers, though it is also susceptible to impacts from invasive European beachgrass.

79.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS</th>
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Range of potential occurrence of dune wildrye – beach pea ecological community

79.3. CONSERVATION STATUS

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79.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

There are no forest management issues for the dune wildrye – beach pea ecological community; interaction with forest operations is very unlikely. There are no trees to harvest and roads are not likely to be built through the ecological community.

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
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</tbody>
</table>

79.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

79.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

79.7. MANAGEMENT STRATEGY

None required.

79.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES


80. FEW-FLOWEERED SPIKE-RUSH / HOOK-MOSSES

80.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The few-flowered spike-rush / hook-mosses (*Eleocharis quinqueflora / Drepanoclados spp.*) ecological community occurs on small sloping peatlands at mid- to high elevations, in slope positions with continual slow surface seepage. Plant diversity is low; few-flowered spike-rush is dominant, with lesser amounts of shore sedge, narrow-leaved cotton-grass, and other species sometimes present. Various hook-mosses dominate the moss layer, but other brown mosses can also be common. Peat forms as a characteristically dense and tenacious mesic peat. Peat depths are frequently shallow, but can be up to 2 m. Terric Mesisols and Humisols are common soil types.

80.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
<th>District North Coast</th>
<th>Kalum</th>
<th>Skeena Stikine</th>
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<td>U</td>
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<td>U = occurrence in the BEC Unit possible, but not confirmed</td>
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Range of Potential Occurrence in BCTS Skeena Area few-flowered spike-rush / hook-mosses ecological community

Scale is arbitrary

80.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
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<tr>
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<td>Red</td>
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</table>

80.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest management issues for the few-flowered spike-rush / hook-mosses ecological community are impacts from road construction and changes in site hydrology. There are no trees to harvest. There may be
changes in hydrology from harvesting and road construction, and road ditches may cause water/sediment
diversion into or out of the wetland. Loss or degradation of wetland area may occur if roads are constructed
through or adjacent to an occurrence.

80.5. PROTECTED HABITAT AREAS
None in the BCTS Skeena Business Area.

80.6. MANAGEMENT DIRECTION
The management direction for ecological communities is provided by Higher Level Plans for part of the area
covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in
the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

80.7. MANAGEMENT STRATEGY
The following forest management strategy is designed to address both stand level (recorded sites) and
landscape level (unrecorded sites) management of the few-flowered spike-rush / hook-mosses ecological
community.

Overall Objective
- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition
  – same species composition, physical structure, ecological processes, soil structure, absence of
  invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will
  significantly worsen its conservation status

Stand Level
To address a recorded few-flowered spike-rush / hook-mosses ecological community occurrence:
- Do not develop within the community, or within a 50-m buffer.
- If development is required to impact the community or the buffer, because there is no alternative
  site, consult a biologist and develop management strategies that will best meet the above objectives
  for as much of the community as possible.
- Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the
  community.
Landscape Level
To address unrecorded few-flowered spike-rush / hook-mosses ecological community occurrences:

- Where development is planned near wetland fens, determine the ecological community composition at or within 50 m of development sites. Most fen site associations within the Skeena Region are either blue- or red-listed.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

80.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES
81. HUDSON BAY CLUBRUSH / RUSTY HOOK-MOSS

81.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Hudson Bay clubrush / rusty hook-moss (*Trichophorum alpinum* / *Scorpidium revolvens*) ecological community only occurs in the moist subzones of the SBS and SBPS. It occurs where the water table is relatively stagnant and at or slightly above the peat surface for much of the growing season, commonly around small peatland lakes and ponds, and in flarks. Hudson Bay clubrush dominates, but there is usually a diversity of other peatland species typical of base-rich and saturated peatland habitats, such as cordroot sedge, slender sedge, shore sedge, buckbean, and seaside arrowgrass. Brown mosses and various calciphiles dominate the moss layer. Many sites are underlain by calcareous marl, and peat water is usually neutral to alkaline. Peat decomposition is apparently retarded under these conditions because the entire peat profile often has few signs of decomposition. Typic Fibrisols are common. Peat is usually deep (> 3 m).

81.2. RANGE AND DISTRIBUTION

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<thead>
<tr>
<th>BCTS District</th>
<th>Skeena District</th>
<th>Kalum</th>
<th>Skeena District</th>
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<td>U</td>
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<td>U = occurrence in the BEC Unit possible, but not confirmed</td>
</tr>
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Range of Potential Occurrence in BCTS Skeena Area Hudson Bay clubrush / rusty hook-moss ecological community
Scale is arbitrary

81.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
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<td>Red</td>
<td>2</td>
<td>BC Red List, GBR LUO</td>
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</table>
81.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest management issues for the Hudson Bay clubrush / rusty hook-moss ecological community are impacts from road construction and changes in site hydrology. There are no trees to harvest. There may be changes in hydrology from harvesting and road construction, and road ditches may cause water/sediment diversion into or out of the wetland. Loss or degradation of wetland area may occur if roads are constructed through or adjacent to an occurrence.

81.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

81.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

81.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the Hudson Bay clubrush / rusty hook-moss ecological community.

Overall Objective
- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status

Stand Level
To address a recorded Hudson Bay clubrush / rusty hook-moss ecological community occurrence:
- Do not develop within the community, or within a 50-m buffer.
• If development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
• Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

Landscape Level
To address unrecorded Hudson Bay clubrush / rusty hook-moss ecological community occurrences:

• Where development is planned near wetland fens, determine the ecological community composition at or within 50 m of development sites. Most fen site associations within the Skeena Region are either blue- or red-listed.
• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

81.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES
82. LYNGBYE’S SEDGE HERBACEOUS VEGETATION

82.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Lyngbye’s sedge (Carex lyngbyei) herbaceous vegetation ecological community is widespread in coastal estuaries. It occurs along tidal flats and channel margins where there are strong fluctuations of brackish water, active sedimentation, and diurnal flooding and exposure. Species diversity is low, with near monocultures of Lyngbye’s sedge common; coast silverweed (Potentilla egedii), tufted harigrass (Deschampsia cespitosa) and common spike-rush (Eleocharis palustris) also occur.

82.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
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Range of potential occurrence of Lyngbye’s sedge – herbaceous vegetation ecological community

82.3. CONSERVATION STATUS

<table>
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<tr>
<th>Global Rank</th>
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<td>S2</td>
<td>Red</td>
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<td>BC Red List</td>
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</tbody>
</table>

82.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest management issues for the Lyngbye’s sedge Herbaceous Vegetation ecological community are impacts from coastal log dumps. There are no trees to harvest, hydrology is not likely to be significantly affected by adjacent harvesting, and roads will not be built through the ecological community.
82.5. PROTECTED HABITAT AREAS
None in the BCTS Skeena Business Area.

82.6. MANAGEMENT DIRECTION
The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

82.7. MANAGEMENT STRATEGY
The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the Lyngbye’s sedge Herbaceous Vegetation ecological community.

Overall Objective
• Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status

Stand Level
To address a recorded Lyngbye’s sedge Herbaceous Vegetation ecological community occurrence:
• Do not develop within the community, or within a 50-m buffer.
• If log dump development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
• Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

Landscape Level
To address unrecorded Lyngbye’s sedge Herbaceous Vegetation ecological community occurrences:
• Determine the intertidal ecological community composition at or within 50 m of proposed coastal log dump sites. Most of the intertidal communities that occur on in the BCTS Skeena Business Area are red-listed, the rest are blue-listed.

• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

82.8. REFERENCES AND ADDITIONAL INFORMATION


83. PACIFIC WILLOW – RED-OSIER DOGWOOD / HORSETAIL

83.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Pacific willow – red-osier dogwood / horsetail (Salix lucida ssp. lasiandra – Cornus stolonifera / Equisetum spp.) ecological community occurs sporadically on the low-bench floodplain in protected channels of large, low-gradient rivers. It is a tall shrub ecosystem that can develop a closed canopy, with a sparse understory dominated by horsetails and a dense sub-canopy of red-osier dogwood and alder shrubs. Soils are fluvial sands and silts, with limited accumulation of organic materials.

83.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
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</table>

**RANGE MAP:** No range map is provided; occurrence on the mainland is unknown.

83.3. CONSERVATION STATUS

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
<th>Supporting Documentation</th>
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<tr>
<td>G2</td>
<td>S2</td>
<td>Red</td>
<td>2</td>
<td>BC Red List</td>
</tr>
</tbody>
</table>

83.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest management issues for the Sitka willow – Pacific willow / skunk cabbage ecological community are impacts from road construction, primarily crossing sites. There are no trees to harvest and hydrology is not likely to be significantly affected by adjacent harvesting.

83.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.
83.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

83.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the Sitka willow – Pacific willow / skunk cabbage ecological community.

Overall Objective

• Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

Stand Level

To address a recorded Sitka willow – Pacific willow / skunk cabbage ecological community occurrence:

• Do not develop within the community, or within a 50-m buffer.
• If development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
• Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

Landscape Level

To address unrecorded Sitka willow – Pacific willow / skunk cabbage ecological community occurrences:

• Where development is planned within a low-bench floodplain, determine the ecological community composition.
• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

83.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

84. PEARLY EVERLASTING – LEAFY ASTER

84.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The pearly everlasting – leafy aster (Anaphalis margaritacea - Aster foliaceous) ecological community is threatened by harvesting, recreation and other development. There are likely less than 20 intact occurrences. It is dominated by herbaceous plants, but disclimax conditions prevail due to regular disturbances from snow creep and avalanches that prevent trees and shrubs establishment. Soils are mesic, deep and well drained. The herbaceous layer is lush and includes both grasses and forbs. Pearly everlasting and leafy aster are the dominant herbs. The herb-rich meadow includes woodland strawberry, yarrow, arctic lupine, edible thistle, woolly sunflower, spreading phlox, bracken, western meadowrue, purple peavine, and scarlet paintbrush. Generally grasses and sedges each provide two to three percent cover. Species include Hood’s sedge, alpine timothy, Alaska brome, blue wildrye and Alaska oniongrass. No mosses or lichens have been recorded for this ecological community. It is not certain whether the ecological community occurs in the MHmm1 on the mainland, or just Vancouver Island; it should be watched for.

84.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS</th>
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RANGE MAP: No range map is provided; occurrence on the mainland is unknown.

84.3. CONSERVATION STATUS

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<td>2</td>
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</table>

84.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations are known to interact with the pearly everlasting – leafy aster ecological community, through direct destruction during road construction. Road construction may be followed by weed invasion and increased use for grazing.
84.5. PROTECTED HABITAT AREAS
None in the BCTS Skeena Business Area.

84.6. MANAGEMENT DIRECTION
The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

84.7. MANAGEMENT STRATEGY
The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the pearly everlasting – leafy aster ecological community.

Overall Objective
- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

Stand Level
To address a recorded pearly everlasting – leafy aster ecological community occurrence:
- Do not develop within the community, or within a 50-m buffer.
- If road development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
- Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

Landscape Level
To address unrecorded pearly everlasting – leafy aster ecological community occurrences:
- Where road development is planned in subalpine or alpine meadows, determine the ecological community composition.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

84.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES
85. PURPLE REEDGRASS HERBACEOUS VEGETATION

85.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The purple reedgrass Herbaceous Vegetation (*Calamagrostis purpurascens* Herbaceous Vegetation) ecological community is known from Snowy Mountain in the eastern North Cascades Range; it may occur in other alpine areas with some variation in the details of the community. The purple reedgrass Herbaceous Vegetation ecological community is floristically rich. In addition to purple reedgrass are single-spikes sedge, alpine fescue, sandwort, mountain locoweed, and diverse-leaved cinquefoil. Other herbs include Lyall’s goldenweed, spiked wood-rush, spike trisetum, and umber pussytoes. Dwarf alpine woody plants are less common and include dwarf snow willow. Juniper haircap moss is the most commonly encountered moss; lichens are also present. The subalpine grasslands that form the early successional stage may last a century or more are less complex communities dominated by purple reedgrass. Soils are sandy to coarse textured; mostly basic, and may be mildly saline sites, and may include drought conditions.

85.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
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Range of Potential Occurrence in BCTS Skeena Area purple reedgrass Herbaceous Vegetation ecological community

Scale is arbitrary

85.3. CONSERVATION STATUS

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<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
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<th>CF Priority</th>
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<td>BC Red List, GBR LUO</td>
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</table>
85.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations may interact with the purple reedgrass Herbaceous Vegetation ecological community, through direct destruction during road construction followed by weed invasion. There are no trees to harvest and hydrology is not likely to be significantly affected by adjacent harvesting.

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<thead>
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<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log Unload</th>
<th>Log Dump &amp; Water Drop</th>
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<td>M</td>
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<td>M</td>
<td>M</td>
<td>M</td>
</tr>
</tbody>
</table>

85.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

85.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

85.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the purple reedgrass Herbaceous Vegetation ecological community.

**Overall Objective**
- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

**Stand Level**
To address a recorded purple reedgrass Herbaceous Vegetation ecological community occurrence:
- Do not develop within the community, or within a 50-m buffer.
- If road development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
• Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

**Landscape Level**

To address unrecorded purple reedgrass Herbaceous Vegetation ecological community occurrences:

• Where road development is planned in subalpine or alpine meadows, determine the ecological community composition.

• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at [http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf](http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf).

**85.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES**


86. SANDBERG’S BLUEGRASS – SLENDER WHEATGRASS

86.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Sandberg's bluegrass – slender wheatgrass (*Poa secunda* ssp. *secunda* – *Elymus trachycaulus*) ecological community is a grassland ecosystem found on south to southwest facing, dry slopes with coarse soil texture. Known occurrences are restricted to the Bulkley component of the Skeena Stikine FD, though occurrences within the Skeena Business Area are possible.

This ecosystem has been documented in the Bulkley Valley, and is believed to have been heavily impacted through reservoir flooding for hydroelectric development. Threats to this site association include continued urban, agricultural and transportation development, as well as fire suppression and the spread of invasive species.

86.2. RANGE AND DISTRIBUTION

<table>
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86.3. CONSERVATION STATUS

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</table>

86.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations may interact with the Sandberg’s bluegrass – slender wheatgrass ecological community, through direct destruction during road construction followed by weed invasion. There are no trees to harvest, and it is not likely to be significantly affected by adjacent harvesting.
86.5. PROTECTED HABITAT AREAS
None in the BCTS Skeena Business Area.

86.6. MANAGEMENT DIRECTION
The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

86.7. MANAGEMENT STRATEGY
The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the Sandberg's bluegrass – slender wheatgrass ecological community.

**Overall Objective**
- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

**Stand Level**
To address a recorded Sandberg's bluegrass – slender wheatgrass ecological community occurrence:
- Do not develop within the community, or within a 50 m buffer.
- If development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
- Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

**Landscape Level**
To address unrecorded Sandberg's bluegrass – slender wheatgrass ecological community occurrences:
- Where development is planned within a grassland, determine the ecological community composition.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

86.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

87. SASKATOON / SLENDER WHEATGRASS

87.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The saskatoon – slender wheatgrass (*Amelanchier alnifolia – Elymus trachycaulus*) ecological community is a brushy grassland ecosystem with a rich diversity of shrubs and forbs. It is found on southwest facing, dry slopes and ridges with base-rich soils. Known occurrences are restricted to the Bulkley component of the Skeena Stikine FD, though occurrences within the Skeena Business Area are possible.

87.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
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<th>Kalum</th>
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</table>

87.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest operations may interact with the saskatoon – slender wheatgrass ecological community, through direct destruction during road construction followed by weed invasion. There are no trees to harvest, and it is not likely to be significantly affected by adjacent harvesting.

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log Unload</th>
<th>Log Dump &amp; Water Drop</th>
<th>Yard Care</th>
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<td>Yard Care</td>
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</table>
87.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

87.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the saskatoon – slender wheatgrass ecological community.

Overall Objective

- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

Stand Level

To address a recorded saskatoon – slender wheatgrass ecological community occurrence:

- Do not develop within the community, or within a 50 m buffer.
- If development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
- Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

Landscape Level

To address unrecorded saskatoon – slender wheatgrass ecological community occurrences:

- Where development is planned within a grassland, determine the ecological community composition.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

87.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

88. SEA PLANTAIN – DWARF ALKALIGRASS

88.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The sea plantain – dwarf alkaligrass (*Plantago maritima* – *Puccinellia pumila*) ecological community occurs mainly in the estuaries of the northern Coast and Mountains, and protected shores on pebbly or gravelly flats in the middle and upper intertidal. These sites are protected from wave action and often have little fresh water influence. Tidal flooding and exposure occur with most tides. Suitable habitats occur in protected embayments where there is no accumulation of fine-textured sediment – such sites are infrequent. Species diversity is low, and there is scattered cover of sea plantain, dwarf alkaligrass, sea milkwort, and *Fucus* seaweed. The substrate is typically sandy/gravelly and gleyed.

88.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS</th>
<th>District</th>
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**RANGE MAP:** No range map is provided, because of the difficulty of mapping a range restricted to the intertidal zone along the Coast.

88.3. CONSERVATION STATUS

<table>
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<tr>
<th>Global Rank</th>
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<td>G2</td>
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<td>Red</td>
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</table>

88.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

The forest management issues for the sea plantain – dwarf alkaligrass ecological community are potential impacts from coastal log dumps. There are no trees to harvest, hydrology is not likely to be significantly affected by adjacent harvesting, and roads will not be built through the ecological community.
88.5. PROTECTED HABITAT AREAS
None in the BCTS Skeena Business Area.

88.6. MANAGEMENT DIRECTION
The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

88.7. MANAGEMENT STRATEGY
The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the sea plantain – dwarf alkaligrass ecological community.

**Overall Objective**
- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

**Stand Level**
To address a recorded sea plantain – dwarf alkaligrass ecological community occurrence:
- Do not develop within the community, or within a 50 m buffer.
- If log dump development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
- Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

**Landscape Level**
To address unrecorded sea plantain – dwarf alkaligrass ecological community occurrences:
- Determine the intertidal ecological community composition at or within 50 m of proposed coastal log dump sites. Most of the intertidal communities that occur on in the BCTS Skeena area are red-listed, and the rest are blue-listed.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.
89. **SITKA SEDGE / PEAT-MOSSES**

89.1. **SPECIES SUMMARY: IDENTIFICATION AND HABITAT**

The Sitka sedge / peat-mosses (*Carex sitchensis / Sphagnum spp.*) ecological community occurs at low elevations along the Coast, in wet drainage channels or hollows in sloping peatlands where there is gradually flowing surface water. The occurrences are often small in area. Sitka sedge grows in dense swards with peat-mosses in carpets or floating in shallow water. A diversity of other species also occurs with low cover. Peat accumulations range from thin veneers to deep blankets of poorly to well-decomposed peat. Organic layers are often intermixed with mineral materials. Fibrisols are the most common soil type, but Mesisols and Humisols also occur.

89.2. **RANGE AND DISTRIBUTION**

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
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<td>Y</td>
<td>U</td>
<td>U = occurrence in the BEC Unit possible, but not confirmed</td>
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</table>

Range of Potential Occurrence in BCTS Skeena Area Sitka sedge / peat-mosses ecological community
Scale is arbitrary

89.3. **CONSERVATION STATUS**

<table>
<thead>
<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
<th>Supporting Documentation</th>
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<td>S2</td>
<td>Red</td>
<td>1</td>
<td>BC Red List, GBR LUO</td>
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</table>

89.4. **FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT**

Forest management issues for the Sitka sedge / peat-mosses ecological community are impacts from road construction and changes in site hydrology. There are no trees to harvest. There may be changes in hydrology from harvesting and road construction, and road ditches may cause water/sediment diversion.
into or out of the wetland. Loss or degradation of wetland area may occur if roads are constructed through or adjacent to an occurrence.

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
<th>Dryland Sort &amp; Log Unload</th>
<th>Yard Care</th>
<th>Log Dump &amp; Water Drop</th>
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<td>M</td>
<td>M</td>
<td>L</td>
</tr>
</tbody>
</table>

89.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

89.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

89.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the Sitka sedge/peat-mosses ecological community.

**Overall Objective**

- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

**Stand Level**

To address a recorded Sitka sedge/peat-mosses ecological community occurrence:

- Do not develop within the community, or within a 50 m buffer.
- If development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
- Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.
Landscape Level
To address unrecorded Sitka sedge/peat-mosses ecological community occurrences:

- Where development is planned near wetland fens, determine the ecological community composition at or within 50 m of development sites. Most fen site associations within the Skeena Region are either blue- or red-listed.
- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

89.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES
90. SITKA WILLOW – PACIFIC WILLOW / SKUNK CABBAGE

90.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The Sitka willow – Pacific willow/skunk cabbage (Salix sitchensis – Salix lucida ssp. lasiandra/Lysichiton americanus) ecological community occurs at low elevations throughout the Coast and Mountains, Georgia Depression, and coastal transition areas of the Interior at peatland margins and in floodplain depressions. These swamps often occur between floodplain forests and marshes or shallow-water habitats in flood-scar depressions of larger rivers. Sitka willow and Pacific willow are often co-dominant and form a closed canopy of tall shrubs and low trees. The understory is lush and dominated by skunk cabbage and lady fern. Wetter microsites have small-flowered bulrush, Pacific water parsley, and horsetails. There is little moss. Soils are Gleysols with dark peat veneers; deeper humic organic deposits are common in palustrine locations.

90.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
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<th>Skeena Stikine</th>
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Y = occurrence in the BEC Unit possible, but not confirmed

Range of Potential Occurrence in BCTS Skeena Area Sitka willow - Pacific willow / skunk cabbage ecological community
Scale is arbitrary

90.3. CONSERVATION STATUS

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<th>Global Rank</th>
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<td>Red</td>
<td>1</td>
<td>BC Red List</td>
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90.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest management issues for the Sitka willow – Pacific willow / skunk cabbage ecological community are impacts from road construction, primarily crossing sites. There are no trees to harvest and hydrology is not likely to be significantly affected by adjacent harvesting.

<table>
<thead>
<tr>
<th>Overall Risk Rating</th>
<th>Planning and Layout</th>
<th>Roads, Bridges and Culverts</th>
<th>Harvesting</th>
<th>Silviculture</th>
<th>Fuel Handling</th>
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<th>Log Dump &amp; Water Drop Pocket</th>
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<td>M</td>
<td>M</td>
<td>M</td>
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</tr>
</tbody>
</table>

90.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

90.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

90.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the Sitka willow – Pacific willow / skunk cabbage ecological community.

Overall Objective

- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

Stand Level

To address a recorded Sitka willow – Pacific willow / skunk cabbage ecological community occurrence:

- Do not develop within the community, or within a 50 m buffer.
- If development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
• Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

**Landscape Level**
To address unrecorded Sitka willow – Pacific willow / skunk cabbage ecological community occurrences:

• Where development is planned within a wetland swamp, determine the ecological community composition.
• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

**90.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES**
91. SWEET GALE / SITKA SEDGE

91.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The sweet gale / Sitka sedge (*Myrica gale / Carex sitchensis*) ecological community occurs at low elevations in the Georgia Depression and Coast and Mountains Ecoprovinces in a wide variety of landscape positions. Sites can be shallowly flooded in the early season, but water will drop to just below the surface for most of the growing season. Sweet gale and hardhack form a closed and sometimes dense thicket mostly < 1.5 m in height. Sitka Sedge dominates the herb layer, but there is a scattering of other species on most sites. Mosses are generally sparse, but on some sites peat-mosses or other mosses can be abundant. Peat deposits are mostly shallow, moderately to well decomposed sedge and wood peat. Terric Humisols and Mesosols are common soil types.

91.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
<th>District</th>
<th>Kalum</th>
<th>Skeena Stikine</th>
<th>Y = KNOWN OCCURRENCE</th>
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<tr>
<td>Stikine</td>
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Range of Potential Occurrence in BCTS Skeena Area sweet gale / Sitka sedge ecological community
Scale is arbitrary

91.3. CONSERVATION STATUS

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<tr>
<th>Global Rank</th>
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<td>3</td>
<td>BC Red List, GBR LUO</td>
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91.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest management issues for the sweet gale / Sitka sedge ecological community are impacts from road construction, primarily crossing sites. There are no trees to harvest and hydrology is not likely to be significantly affected by adjacent harvesting.
91.5. PROTECTED HABITAT AREAS
None in the BCTS Skeena Business Area.

91.6. MANAGEMENT DIRECTION
The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

91.7. MANAGEMENT STRATEGY
The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the sweet gale / Sitka sedge ecological community.

**Overall Objective**
- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

**Stand Level**
To address a recorded sweet gale / Sitka sedge ecological community occurrence:
- Do not develop within the community, or within a 50 m buffer.
- If development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
- Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

**Landscape Level**
To address unrecorded sweet gale / Sitka sedge ecological community occurrences:
• Where development is planned near wetland fens, determine the ecological community composition at or within 50 m of development sites. Most fen site associations within the Skeena Region are either blue- or red-listed.

• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

91.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

92. TUFTED HAIRGRASS – DOUGLAS’ ASTER

92.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The tufted hairgrass – Douglas’ aster (Deschampsia cespitosa ssp. beringensis – Aster subspicatus) ecological community occurs in medium to large estuaries in the north and central Coast and Mountains. It occurs in the high marsh zone between the backshore shrub communities and the low marsh, usually in broad and extensive flats. These sites are limited to zones within the estuary where weakly brackish conditions predominate and inundation is irregular. The community is floristically diverse and widespread. Tufted hairgrass and Douglas’ aster are dominant and diagnostic species, but many other species are often prominent. Soils are mostly Humic Gleysols with silty and sandy textures, but Terric Mesisols have also been encountered.

92.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Skeena BEC Unit</th>
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**RANGE MAP:** No range map is provided, because of the difficulty of mapping a range restricted to the intertidal zone along the Coast.

92.3. CONSERVATION STATUS

<table>
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<tr>
<th>Global Rank</th>
<th>BC Rank</th>
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<tbody>
<tr>
<td>G3</td>
<td>S2</td>
<td>Red</td>
<td>2</td>
<td>BC Red List</td>
</tr>
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</table>

92.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest management issues for the tufted hairgrass – Douglas’ aster ecological community are impacts from coastal log dumps. There are no trees to harvest, hydrology is not likely to be significantly affected by adjacent harvesting, and roads will not be built through the ecological community.
92.5. PROTECTED HABITAT AREAS
None in the BCTS Skeena Business Area.

92.6. MANAGEMENT DIRECTION
The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

92.7. MANAGEMENT STRATEGY
The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the tufted hairgrass – Douglas' aster ecological community.

Overall Objective
• Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

Stand Level
To address a recorded tufted hairgrass – Douglas’ aster ecological community ecological community occurrence:
• Do not develop within the community, or within a 50 m buffer.
• If log dump development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
• Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

Landscape Level
To address unrecorded tufted hairgrass – Douglas’ aster ecological community occurrences:
• Determine the intertidal ecological community composition at or within 50 m of proposed coastal log dump sites. Most of the intertidal communities that occur on in the BCTS Skeena Business Area are red-listed, the rest are blue-listed.
• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

92.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES
93. TUFTED HAIRGRASS – MEADOW BARLEY

93.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The tufted hairgrass – meadow barley (*Deschampsia cespitosa* ssp. *beringensis* – *Hordeum brachyantherum*) ecological community is widespread in the upper intertidal area throughout the coast. It receives brief, daily flooding with brackish water, occurring on fan estuaries, on steep coastal shores and along creeks. This site association has relatively low species diversity, dominated by tufted hairgrass; meadow barley is subdominant, while Lyngbye’s sedge and coastal silverweed also occur.

93.2. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>BCTS Unit</th>
<th>District</th>
<th>North Coast</th>
<th>Kalum</th>
<th>Skeena</th>
<th>Stikine</th>
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Estimated range of tufted hairgrass – meadow barley ecological community in BC

93.3. CONSERVATION STATUS

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<th>CF Priority</th>
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<td>S2</td>
<td>Red</td>
<td>2</td>
<td>BC Red List</td>
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</table>

93.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest management issues for the tufted hairgrass – meadow barley ecological community are impacts from coastal log dumps and barge landing facilities. There are no trees to harvest, hydrology is not likely to be significantly affected by adjacent harvesting.
93.5. PROTECTED HABITAT AREAS

None in the BCTS Skeena Business Area.

93.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

93.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the tufted hairgrass – meadow barley ecological community.

**Overall Objective**

- Retain 100% of the area of this red-listed ecological community in natural condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

**Stand Level**

To address a recorded tufted hairgrass – meadow barley ecological community ecological community occurrence:

- Do not develop within the community, or within a 50 m buffer.
- If log dump development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
- Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.
Landscape Level
To address unrecorded tufted hairgrass – meadow barley ecological community occurrences:

- Determine the intertidal ecological community composition at or within 50 m of proposed coastal log dump sites. Most of the intertidal communities that occur on in the BCTS Skeena Business Area are red-listed, and the rest are blue-listed.

- Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf.

93.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES

94. WESTERN HEMLOCK / CLOUDBERRY / PEAT-MOSSES

94.1. SPECIES SUMMARY: IDENTIFICATION AND HABITAT

The western hemlock / cloudberry / peat-mosses ecological community occurs in the cold, snowy subzones of the ICH of the Nass Basin, east of the Coast Mountains at elevations below 750 m. These bogs occur in small, closed basins with little or no groundwater influence. Stunted western hemlock is always prominent, but other conifers are often scattered through the area. Dwarf woody plant species, such as cloudberry and western bog-laurel, dominate the open herb layer. Peat-mosses are abundant, elevating most of the soil surface above the water table. Soils are typically Fibrisols or Mesisols of poorly decomposed peat-moss peat underlain by deep sedge or woody peat. *Wetlands of BC* says this community only occurs in the Nass Basin; the Conservation Data Centre also lists it for two small inlets north of the Nass in the ICHwc.

94.2. RANGE AND DISTRIBUTION

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<th>Skeena Stikine</th>
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<td>Skeena Stikine</td>
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</table>

Range of Potential Occurrence in BCTS Skeena Area western hemlock / cloudberry / peat-mosses ecological community

Scale is arbitrary

94.3. CONSERVATION STATUS

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<tr>
<th>Global Rank</th>
<th>BC Rank</th>
<th>BC List</th>
<th>CF Priority</th>
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<td>BC Red List</td>
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</table>
94.4. FOREST MANAGEMENT ISSUES AND RISK ASSESSMENT

Forest management issues for the western hemlock / cloudberry / peat-mosses ecological community are impacts from road construction and changes in site hydrology. Trees are not suitable for harvest. There may be changes in hydrology from harvesting and road construction, and road ditches may cause water/sediment diversion into or out of the wetland. Loss or degradation of wetland area may occur if roads are constructed through or adjacent to an occurrence.

94.5. WILDLIFE HABITAT AREAS

None in the BCTS Skeena Business Area.

94.6. MANAGEMENT DIRECTION

The management direction for ecological communities is provided by Higher Level Plans for part of the area covered by this report; the remainder of the area has no direction. Objectives for red-listed ecosystems in the Central and North Coast Area are outlined in the Great Bear Rainforest Land Use Order.

94.7. MANAGEMENT STRATEGY

The following forest management strategy is designed to address both stand level (recorded sites) and landscape level (unrecorded sites) management of the western hemlock / cloudberry / peat-mosses ecological community.

Overall Objective

- Retain 100% of the area of this red-listed ecological community in natural mature/old seral condition – same species composition, physical structure, ecological processes, soil structure, absence of invasive species, etc. Each loss of part or all of an occurrence of this red-listed community will significantly worsen its conservation status.

Stand Level

To address a recorded western hemlock / cloudberry / peat-mosses ecological community occurrence:

- Do not develop within the community, or within a 50 m buffer.
- If development is required to impact the community or the buffer, because there is no alternative site, consult a biologist and develop management strategies that will best meet the above objectives for as much of the community as possible.
• Avoid concentrating and/or diverting adjacent terrestrial water flows into or away from the community.

**Landscape Level**

To address unrecorded western hemlock / cloudberry / peat-mosses ecological community occurrences:

• Where development is planned near wetland bogs, determine the ecological community composition at or within 50 m of development sites.
• Provide the Conservation Data Centre (Victoria) with a map, photographs, description, and GPS coordinates for the location of any red- or blue-listed ecological community that is found, so that the abundance and locations of the community can be tracked. Reporting forms are at [http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf](http://www.env.gov.bc.ca/ecology/dteif/FS882_2011.pdf).

**94.8. REFERENCES AND ADDITIONAL INFORMATION SOURCES**

## APPENDIX I. SPATIAL DATA SOURCES

Table 11. Spatial Data Sources for Focal Species/Ecosystems Occurrence Analysis

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<tr>
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<td>Kermode Bear</td>
<td>GBR LUO</td>
<td>Kermode Stewardship Areas</td>
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<td>High Value Grizzly Bear Habitat</td>
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<td>Cranberry SRMP</td>
<td>Grizzly Bear Capability and Suitability Mapping</td>
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<td>Grizzly Bear Critical Stand Level Patch Habitats</td>
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