

Species and Ecosystems of Management Concern Management Guide



4/19/2013
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Species and Ecosystems of Management Concern Task Team

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Species and Ecosystems of Management Concern – Management Program Guidance to BCTS Business Areas

1. Introduction

British Columbia Timber Sales (BCTS) must identify species and ecosystems that could be adversely affected by forestry related activities and require special management. Species requiring special management considerations are identified in several different ways, including by government through legal requirements such as the Identified Wildlife Management Strategy, the Forest and Range Practices Act and higher level plans, and through independent bodies such as the Committee on Status of Endangered Wildlife in Canada (COSEWIC). Additionally, forest certification programs that have been applied in BC incorporate specific management requirements for species and ecosystems that may be adversely affected by forestry activities.

Government direction, especially the Identified Wildlife Management Strategy (IWMS), provides some guidance for forest management of a minority of species; however, many species and ecosystems of concern are not included in the present list of species in the IWMS. Other species and ecosystems have been identified as having specific management requirements through Local Resource Management Plans (LRMPs), Sustainable Resource Management Plans (SRMPs), Forest and Range Practices Act (FRPA) Section 7 Orders, or as Regionally Important Wildlife. Some of these species and ecosystems are at risk (e.g. provincially red/blue-listed and federally COSEWIC/SARA-listed species and ecological communities); others are not at risk but require special management for social and/or economic reasons (e.g. commercial management species - primarily for hunting or fishing purposes, focal species and regionally important species); together these all comprise **species and ecosystems of management concern** to BCTS operations.

This guidance document provides a suggested approach to identifying the **species and ecosystems of management concern** in the BCTS Business Areas by determining species conservation status and management objectives under legal and policy tools, considering the requirements of three certification schemes adopted by BCTS, and including a **risk assessment** for those species in the context of BCTS operations. Conservation status, management objectives and certification requirements are brought together in a decision tree that assists in completing a list of species and ecosystems of management concern for a Business Area (or land management area). A risk assessment is useful to inform management priority and may incorporate elements such as the probability of impacts due to forest operations and the consequences (social, economic or environmental) of impacts to the specific species or ecosystem, with or without special management measures being applied. A recommended decision tree process and sample risk assessment methods currently being applied by BCTS Business Areas are included in Part 2 of this document.

1.1. Conservation Status Of Species

In the context of species conservation in British Columbia, the term “species” includes species, subspecies, plant varieties, some ecotypes, some populations, and ecosystems (plant communities). Plant communities are considered to be “species” in the context of rare species conservation. Certain wetlands and other “wet” ecosystems² may also be recognised as ecosystems at risk.

All of these categories have been designated by one or more jurisdictions (or agencies) 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.

1.1 Conservation Status of Species

1.1.1. COSEWIC – CANADA

1.1.2. SARA – CANADA

1.1.3. CONSERVATION DATA CENTRE RANKS – BRITISH COLUMBIA

NatureServe Global and Sub-national Ranks

B.C.'s Red and Blue Lists

1.2 Legal and Policy Tools Related to Species Management

1.2.1 Forest & Range Practices Act

S. 7 Notices (FPPR S. 7)

²Refer to *Wetlands of British Columbia* (MacKenzie and Moran. 2004)

SAR, Regionally Important Wildlife, ungulates (GAR S. 13)
Wildlife Habitat Areas (GAR S. 10)
Wildlife Habitat Features (GAR S. 11)
Ungulate Winter Ranges (GAR S. 12)
General Wildlife Measures (GAR S. 9)
IWMS

1.2.1 Land use Planning & Higher Level Plans

1.2.3. Wildlife Act – British Columbia

1.2.4 Other Acts

1.1.1. COSEWIC – Canada

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is an independent body of species experts that assesses the national biological conservation status of all wildlife in Canada. COSEWIC recommends the assessed conservation status to the federal Minister of the Environment who then decides whether to include the assessed species on the List of Wildlife Species at Risk (Schedule 1) under the *Species at Risk Act* (SARA). COSEWIC determines the conservation status of species based on their range in Canada only; the status at a provincial scale and/or outside Canada is a very minor consideration.

COSEWIC assigns the following conservation status categories to species at risk:

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.

XT (Extirpated) – species no longer exists in the wild in Canada, but exists elsewhere.

X (Extinct) – species no longer exists.

DD (Data Deficient) – species that lack sufficient data to determine a conservation status.

1.1.2. SARA – Canada

The *Species at Risk Act* (SARA) is the legislation that legally assigns the national biological conservation status of all wildlife in Canada and provides for protection and conservation of species at risk; the conservation status categories are the same as used by COSEWIC³.

The federal Minister of the Environment establishes the legal conservation status of species by adding the species name to a list in Schedule 1 of SARA, based on information and recommendations provided by COSEWIC (new and/or revised status reports), and information and recommendations provided by individuals, organizations, and governments during a public review and comment period. A species may be added to Schedule 1 of SARA with the status recommended by COSEWIC; or the Minister may decide not to add the species to the list (usually for socio-economic reasons), or refer the matter back to COSEWIC for further consideration.

SARA has three “Schedules”:

- Schedule 1 – lists all the species that legally fall under SARA – that is, the Extirpated, Endangered, Threatened and Special Concern species to which prohibitions, obligations and/or requirements of SARA apply.
- Schedule 2 – lists all the species that COSEWIC listed as Endangered or Threatened when SARA came into force, but for which the COSEWIC status report was inadequate.
- Schedule 3 – lists all the species that COSEWIC listed as Special Concern when SARA came into force, but for which the COSEWIC status report was inadequate.

Status reports for Schedule 2 and 3 species are pending. Along with any species never included on any SARA schedule (e.g., any candidate species COSEWIC currently recommends for listing), species on Schedule 2 or 3 may be considered for addition to Schedule 1.

SARA includes prohibitions against killing, harming, possessing, etc., any SARA-listed Extirpated, Endangered or Threatened species and/or damaging or destroying its residence or habitat critical to its survival or recovery. The prohibitions and obligations

³ Although COSEWIC may assess a species as Extinct, currently no species are listed as Extinct under SARA; species assessed as Data Deficient by COSEWIC are not designated as species at risk under SARA because of the uncertainty of their status.

of SARA apply for all Extirpated, Endangered and Threatened species listed on Schedule 1 wherever they (or their residences or habitat) occur on federally owned land (e.g., national parks, Indian Reserves, Military Reserves). On non-federal lands (e.g., provincial Crown land, private land) SARA applies to Extirpated, Endangered or Threatened aquatic species and migratory birds listed on Schedule 1. On non-federal lands in a province, the protection of terrestrial amphibians, reptiles, mammals, non-migratory birds, plants, and invertebrates listed on Schedule 1 is the jurisdiction and responsibility of the province. However, if the federal Minister of the Environment believes the laws of the province do not effectively protect the at-risk species or the species' residence, a legal order may be enacted under SARA by the federal government to apply the SARA prohibitions for species at risk on non-federal lands.

Species listed as Special Concern on Schedule 1 are not protected by prohibitions under SARA but a Management Plan must be prepared by the "competent minister" (one of several federal ministers, based on ministry mandate) within a fixed timeline outlining sufficient management action to prevent them from becoming Endangered or Threatened. The "competent minister" is also responsible to prepare Recovery Strategies and Action Plans for Endangered and Threatened species within a fixed timeline. SARA outlines obligations for content and timing of recovery and management planning documents.

SARA requires that permits be obtained if an activity may affect an individual (or a sub-population or the entire population) of any species on Schedule 1, its residence or any part of its critical habitat. Permitted activities include: scientific research related to conservation, activities expected to enhance chances of recovery and survival, or where the effect of the activity is incidental to carrying out the activity. A permit would be issued only if reasonable alternatives have been considered and the best solution adopted, feasible measures will be taken to minimize impacts, and the activity will not jeopardize the survival or recovery of the species.

1.1.3. Conservation Data Centre Ranks – British Columbia

The role /mandate of the CDC is to assess the conservation status of species in BC from a provincial perspective, to track changes in conservation status, and to be an information source for biological and status information. CDC uses two methods (described below) to summarize and present the results of their assessment of species status: (a) the conservation status rank procedure of NatureServe, and (b) a made-in-BC approach that assigns a species to one of three colour-coded categories that describe level of risk of endangerment. The conservation status of a species that occurs in BC is assessed at a provincial scale – a species assessed as at risk in BC may not be of national or global conservation concern.

NatureServe Global and Sub-national Ranks

The Conservation Data Centre (CDC) uses a conservation status ranking system developed by NatureServe (<http://www.natureserve.org/aboutUs/index.jsp>) which assesses species at a global, national and sub-national scale. The global and sub-national (or provincial) scales are of relevance to BCTS business.

NatureServe's global rank ("G") is the conservation status of a species⁴ on a global scale, across its entire range, as assigned by NatureServe. For example, a species may be on the edge of its range in B.C. but elsewhere in the world it has large, stable populations, so globally it would have a secure rank. NatureServe's sub-national ("S") rank is the conservation status of a species on a provincial scale; in B.C the S-rank is updated by the CDC.

The NatureServe global and the CDC sub-national rank codes are assigned as follows:

NatureServe	CDC sub-	Explanation of code
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⁴ Most ecological communities presently lack global rankings.

global code	national code	(applies to global or sub-national scale)
GX, GH	SX, SH	extinct (X) or only historically (H) occurred
G1	S1	critically imperiled
G2	S2	imperiled
G3	S3	vulnerable to extirpation or extinction
G4	S4	apparently secure; no conservation concern
G5	S5	demonstrably widespread, abundant, and secure; no conservation concern
G*G*	S*S*	multiple ranks indicate a range of possible ranks; an exact rank cannot be determined at this time
GU	SU	uncertain status, possibly in peril; more information is required
GNR	SNR	unranked - rank not yet assessed
GNA	SNA	conservation status rank is not applicable because the species is not a suitable target for conservation activities
G*T*	S*T	T-rank applies to a subspecies or variety (rather than the species as a whole, as represented by the G-rank)
G*Q	S*Q	questionable taxonomy that may reduce conservation priority
	S*B	rank for breeding populations in BC
	S*N	rank for non-breeding populations in BC
	S*M	rank for migratory species that use BC as a staging area for portions of their migration
	S?	where the numeric rank for the qualifier (B,N,M) is unknown or tentatively assigned, where no information is available or the number of occurrences is estimated
	SR	reported but without persuasive documentation to either accept or reject the report

B.C.'s Red and Blue Lists

Species and ecological communities in BC are assigned to one of three colour-coded status categories by the CDC:

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. Red-listed species and sub-species may be legally designated as, or maybe considered candidates for legal designation as Extirpated, Endangered or Threatened under the *Wildlife Act*.

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: Ecological communities and indigenous species which are not at risk in British Columbia.

Assignment to one of the three colour-coded status categories is based on a species' provincial sub-national rank (see NatureServe section, above), as illustrated in this table:

	Red List	Blue List
Animals	SX, SH, S1, S1S2, S2, S2?, S1S3	S2S3, S2S4, S3, S3? S3S4, S3S5
Plants	SX, SH, S1, S1S2, S1S3, S2, S2?	S2S3, S2S4, S3, S3?
Ecological Communities	SX, SH, S1, S1S2, S2	S2S3, S3

1.2. Legal and Policy Tools Related to Species Management

1.2.1 Forest & Range Practices Act (FRPA)

S. 7 Notices (FPPR S. 7)

Section 7 of the Forest Planning and Practices Regulation (FPPR) under FRPA (and Section 9 of the Woodlot Planning and Practices Regulation [WPPR]) identify the objective set by government for wildlife for the purposes of forestry planning under FRPA. Currently, the objective is about protection of species at risk and ungulate winter range. A person preparing a Forest Stewardship Plan or Woodlot Licence Plan is required to address the objective if the Minister responsible for the *Wildlife Act* notifies the person of the applicable species and indicators of the amount, distribution and attributes of the wildlife habitat applicable to the objective.

Section 7 Notices were produced at the Forest District level for species at risk. The notices are found at:

<http://www.env.gov.bc.ca/wld/frpa/notices/sar.html>

Species At Risk, Regionally Important Wildlife, Ungulates (GAR S. 13)

Section 13 of the Government Actions Regulation (GAR) of FRPA allows that the Minister responsible for the *Wildlife Act* may establish categories of “species at risk” if satisfied the species are endangered, threatened or vulnerable. The Minister may also identify categories of “regionally important wildlife”: species important to a region, reliant on habitat that requires special management, and adversely impacted by forest or range practices. The Minister may identify categories of “ungulates” for which protection of winter range is required for the survival of the ungulate species (note an ungulate species may also be identified as a species at risk). Species identified in the category of Species at Risk and in the category of Ungulates are listed at:

<http://www.env.gov.bc.ca/wld/frpa/species.html>

No species have been identified under FRPA in the category of “regionally important wildlife”; however, preliminary lists may have been drafted in some forest regions and maybe of value in BCTS certification documentation.

Wildlife Habitat Areas (GAR S. 10)

Many Wildlife Habitat Areas (WHAs) have been established throughout B.C. under authority of Section 10 of GAR for many FRPA-listed species at risk to protect important habitat attributes of the identified species at risk. There are also proposed WHAs that are under consideration for approval, and more will be designated over time. Approved WHAs are at <http://www.env.gov.bc.ca/wld/frpa/iwms/wha.html>. Forest managers must take WHAs and associated GWMs (see below) into account when developing and implementing Forest Stewardship Plans and Woodlot Licence Plans.

Some WHAs on the Approved WHA list are marked as “Data Sensitive”. The Conservation Data Centre requires confidentiality agreements be signed to obtain the species identity and location of these WHAs.

Wildlife Habitat Features (GAR S. 11)

Wildlife Habitat Features (WHFs) may be established by the Minister responsible for the *Wildlife Act* under authority of Section 11 of GAR. WHFs are localized features that require special management that is not otherwise provided under FRPA or other enactment. Features may include: fisheries sensitive features; marine sensitive features; significant willows or mineral licks; nests of species at risk; or other significant element of wildlife habitat. No Wildlife Habitat Features have been identified at this time (but as of August 2012 an order is pending final approval).

Ungulate Winter Ranges (GAR S. 12)

Ungulate Winter Range (UWR) has been established by the Minister responsible for the *Wildlife Act* for many identified ungulate species throughout B.C. under authority of Section 12 of GAR. Approved UWRs can be found at http://www.env.gov.bc.ca/wld/frpa/uwr/approved_uwr.html. Forest managers must take UWRs and associated GWMs into account when developing and implementing Forest Stewardship Plans and Woodlot Licence Plans.

IWMS: General Wildlife Measures (GAR S. 9)

Section 9 of GAR authorizes that General Wildlife Measures (GWMs) may be established for an area by the Minister responsible for the *Wildlife Act* for species at risk, regionally important wildlife, or specified ungulate species identified under GAR S.13. GWMs are part of the legal orders that establish WHAs, UWRs or other specified area, and outline required management practices, management constraints or objectives that must be addressed in forestry planning and implementation.

Identified Wildlife Management Strategy:

The Identified Wildlife Management Strategy (IWMS) (2004) is the policy mechanism used by the BC government to guide establishment of Wildlife Habitat Areas (WHAs) and General Wildlife Measures (GWMs) for species at risk that are affected by forest or range operations. The IWMS has two components: the Accounts and Measures document which describes species biology and management recommendations; and the Procedures document which describes procedures for establishing, modifying and rescinding a wildlife habitat area, and for implementing strategic- and landscape-level planning recommendations and provides direction to government planners, foresters and wildlife managers. IWMS can be found at <http://www.env.gov.bc.ca/wld/frpa/iwms/iwms.html>.

The 2004 strategy supersedes the original Identified Wildlife Management Strategy (1999); however the 1999 strategy may contain biological information and/or management guidance for species of concern to BCTS business areas other than those for which there are legal obligations under FRPA (i.e., the current species identified in the category of species at risk).

1.2.2. LAND USE PLANNING AND HIGHER LEVEL PLANS

In BC, strategic land use planning has been used to develop resource management objectives for public lands. Land use plans identify land use zones and associated resource management objectives and strategies for large areas. When Cabinet approves a strategic land use plan, it may be implemented as policy or through legislation. As policy, strategic land use objectives guide statutory decision-makers on resource management issues. When enabled through legislation, strategic land use objectives become legally enforceable and are a means to supplement broadly applicable legislation in order to address local resource management issues.

A Higher Level Plan is a provision that had its origins with the *Forest Practices Code Act* that was used at that time to make specific forest resource management objectives legally binding. Although the *Forest Practices Code Act* has been replaced by the *Forest and Range Practices Act*, the legal application of objectives from land use plans established under the Code has continued under FRPA. Examples of land use plans implemented solely through policy include the Kootenay Boundary Higher Level Plan. http://www.ilmb.gov.bc.ca/slrp/lrmp/cranbrook/kootenay/legaldocuments/higher_level_order.html

It is important to have a clear understanding of the land use plans in effect for a given area and the policy and legal application of the land use zones and resource management objectives that are provided.

1.2.3. Wildlife Act – British Columbia

Section 13 of the Designation and Exemption Regulation of the BC *Wildlife Act* specifically identifies four “endangered” or “threatened” species in B.C. (Burrowing Owl, Sea Otter, Vancouver Island Marmot, American White Pelican). Section 26 of the Act prohibits hunting, trapping, wounding, (etc.) of endangered or threatened species, while Section 5 allows designation of

“critical wildlife areas” to protect habitat of endangered or threatened species within a Wildlife Management Area (a land designation under the *Wildlife Act*).

Although not limited to endangered or threatened species, Section 34 of the *Wildlife Act* is relevant to BCTS business because it prohibits (except as provided by regulation) possession, taking, destruction (etc.) of birds and eggs, nests of certain birds of prey, and other nests when occupied by a bird or its egg.

1.2.4. OTHER ACTS

In addition to the laws and legal obligations presented in preceding sections that identify the conservation status of species, there are many other provincial and federal statutes and legal agreements that may affect how business may be conducted in BCTS Business Areas. Some examples include: the federal *Fisheries Act*, the provincial *Fish Protection Act*, the Canadian *Environmental Assessment Act*, the Wild Animal and Plant Protection Regulation of the *International and Interprovincial Trade Act*, and Canada’s Accord for the Protection of Species at Risk. Though BCTS managers should be familiar with the requirements and obligations of these laws as they apply to their business, these statutes do not contribute to identifying species of management concern.

1.3. Sustainable Forest Management Certification Requirements

In BC, forest certification supplements the comprehensive laws that the province has in place to ensure that its public forests are well managed. Third-party certification of forestry activities is broadly accepted as a best practice for sustainable forest and resource management and BC Timber Sales is committed to managing and administering our operations in a manner that is consistent with the principles of sustainability. BCTS recognizes all 3 of the SFM certification standards currently used on public lands in BC as being consistent with the BCTS mandate and all are currently reflected within the BCTS program provincially. The following sections discuss key provisions relating to species of management concern from each of the SFM standards – Canadian Standards Association Z809 (CSA), Forest Stewardship Council (FSC) and Sustainable Forestry Initiative (SFI).

1.3.1. CSA: Canadian Standards Association

The CSA Sustainable Forest Management (SFM) Standard is Canada’s national certification standard. The standard is a voluntary tool that provides independent third party assurance that an organization is practicing sustainable forest management. The key Criterion and elements as they pertain to Species and Ecosystems of Management Concern are:

The **Conservation of Biological Diversity** - Organizations that are certified under the CSA standard commit to the conservation of biological diversity by maintaining integrity, function, and diversity of living organisms and the complexes of which they are part. Organizations must commit to the maintenance of populations and communities over time as well as developing locally available process and methods for identifying sites with specific biological significance.

Ecosystem Diversity-Conserve ecosystem diversity at the stand and landscape levels by maintaining the variety of communities and ecosystems that naturally occur.

Species Diversity- Conserve species diversity by ensuring that habitats for the native species found in the Defined Forest Area (DFA) are maintained through time including habitats for known occurrences of species at risk. The core indicators are:

Degree of habitat protection for **focal species**.

Degree of suitable habitat in the long term for selected **focal species**.

Proportion of regeneration comprised of native species.

Genetic Diversity- Conserve genetic diversity by maintaining the variation of genes within species and ensuring that reforestation programs are free of genetically modified organisms.

Protected areas and sites of special biological significance- Respect protected areas identified through government processes. Co-operate in broader landscape management related to protected areas and sites of special biological significance.

Key Definitions (Source: CSA Standard):

Focal Species: species that warrant special conservation attention and are thus used to guide the management of ecosystems to conserve biodiversity. **Note:** Criteria for the selection of focal species can include ecological, socio-cultural, scientific, and economic considerations.

Species at Risk: species defined as at risk by national and provincial legislation applicable to a given DFA.

http://www.csa-international.org/product_areas/forest_products_marking/program_documents/CAN_CSA_Z809-02O_English.pdf

1.3.2. FSC: Forest Stewardship Council

The FSC certification is a voluntary certification system available to forestry organizations who want to demonstrate responsible forest management by having their practices evaluated against FSC's forest management standards. The key principles that pertain to Species and Ecosystems of Management Concern are as follows:

Principle 6.1.2

The manager collects and/or assembles reconnaissance level inventory information appropriate for landscape level planning and completion of a management plan for the management unit as a whole, including:

(b) a list of potentially occurring native species (including at a minimum indicator plants, **focal species** and other species of concern).

Principle 6.1.3

As part of the operational management planning process for landscapes and/or watersheds in which road-building or timber harvesting is proposed over the next five years, inventories, assessments and/or information databases of ecosystem characteristics, resources and environmental values are completed and/or assembled (see *FSC BC Guidance on Inventory* for further information). The inventory information should include information covering the following topics at a minimum:

(c) ecological classification to a level below the BEC variant (e.g. site series) where required for habitat assessments for **focal species** or other species of concern.

(f) biodiversity information including focal species and their habitats; and

(g) where access-sensitive species or their habitats are present (e.g. grizzly bears, ungulate winter ranges), assessments to determine measures for the protection of those species and habitats.

Principle 6.1.6

In areas proposed for timber harvesting, prior to preparing stand level prescriptions and selecting harvesting methods, inventories at the cutblock or stand level are completed, including at a minimum:

(b) presence of **aquatic habitats**, rare **ecosystem** features and/or other **critical habitats** identified at the site level.

Principle 6.2

Safeguards shall exist which protect rare, threatened and endangered species and their habitats (e.g. nesting and feeding areas). Conservation zones and protection areas shall be established, appropriate to the scale and intensity of forest management and the uniqueness of the affected resources. Inappropriate hunting, fishing, trapping and collecting shall be controlled.

Principle 6.2.1 Habitats of red and blue-listed species and plant communities (as defined by the BC Conservation Data Centre) and threatened species and endangered species, and species of special concern (as defined by the Committee on the Status of Endangered Wildlife in Canada) within a management unit are identified by field surveys or other means, and delineated on maps, subject to confidentiality requirements (see 7.4.1).

Principle 6.2.2 Where there are existing or potential habitats of red-listed, blue-listed, endangered or threatened species, or species of special concern, or red- or blue-listed plant communities present on the management unit, the manager demonstrates measures are in place on the management unit to minimize risk to the long-term persistence of those species and/or plant communities, by:

- a) protecting those habitats and/or plant communities by including them in the protected reserve network;
- b) avoiding habitat alteration that may result in increased risk to those species' and/or plant communities' long-term persistence; and/or,
- c) where necessary, restoring those habitats and/or plant communities to a suitable condition.

Principle 6.2.3

Where a government recovery plan or species management plan has been prepared for a red or blue-listed, threatened or endangered species, species of special concern or red- or blue-listed plant community whose habitat occurs within a management unit, the manager is implementing the recovery or species management plan. While recovery or species management plans are under development, the manager takes steps that are within his or her control to facilitate survival and recovery of the species or plant community.

Principle 6.2.4

The manager has training programs, standard operating procedures and/or protocols that specify measures for dealing with unexpected encounters with red and blue-listed, threatened and endangered species, and species of special concern, or their habitats during operational activities. Field staff are aware of these measures. When these species or habitats are encountered, prompt notification is made to personnel who are capable of implementing prescriptions and practices designed to protect and promote the survival and recovery of the species, and these practices are implemented.

Principle 6.2.5

The manager cooperates with the government authorities to prevent the harming, harassing, capturing or taking of red or blue-listed species, threatened or endangered species, or species of special concern within the management area.

<http://www.fsccanada.org/standards.htm>

1.3.3. SFI: Sustainable Forestry Initiative

The Sustainable Forestry Initiative (SFI) program is a comprehensive system of principles, objectives and performance measures developed by professional foresters, conservationists and scientists, among others. The SFI standard (http://www.sfiprogram.org/sustainable_forestry_initiative_standard.php) specifies the requirements of compliance with the program. The standard is based on principles that address environmental, economic, cultural and legal issues in addition to a commitment to continuously improve sustainable forest management and the practice of forestry by program participants.

With respect to species of management concern, SFI Principle 4 requires program participants to manage forests in ways that protect and promote biological diversity, including plant and animal species, wildlife habitats, and ecological or natural community types. The key Objectives, Performance Measures, Indicators (SFI Standard Sec. 2) and Definitions (Sec. 13) that relate to Species and Ecosystems of Management Concern are as follows:

Objective 3. Protection and Maintenance of Water Resources.

To protect water quality in rivers, streams, lakes, and other water bodies.

Performance Measure 3.2.

Program Participants shall have or develop, implement and document riparian protection measures based on soil type, terrain, vegetation, ecological function, harvesting system and other applicable factors.

Indicators:

4. Identification and protection of non-forested wetlands, including bogs, fens and marshes, and vernal pools of ecological significance.

Objective 4. Conservation of Biological Diversity including Forests with Exceptional Conservation Value.

To manage the quality and distribution of wildlife habitats and contribute to the conservation of biological diversity by developing and implementing stand- and landscape-level measures that promote a diversity of types of habitat and successional stages, and conservation of forest plants and animals, including aquatic species.

Performance Measure 4.1

Program Participants shall have programs to promote biological diversity at stand and landscape-levels.

Indicators:

1. Program to promote the conservation of native biological diversity, including species, wildlife habitats and ecological community types.
2. Program to protect threatened and endangered species.
3. Program to locate and protect known sites associated with viable occurrences of critically imperiled and imperiled species and communities also known as Forests with Exceptional Conservation Value. Plans for protection may be developed independently or collaboratively, and may include Program Participant management, cooperation with other stakeholders, or use of easements, conservation land sales, exchanges, or other conservation strategies.
4. Development and implementation of criteria, as guided by regionally appropriate best scientific information, to retain stand-level wildlife habitat elements such as snags, stumps, mast trees, down woody debris, den trees and nest trees.

Performance Measure 4.2.

Program Participants shall apply knowledge gained through research, science, technology and field experience to manage wildlife habitat and contribute to the conservation of biological diversity.

Indicators:

1. Collection of information on Forests with Exceptional Conservation Value and other biodiversity-related data through forest inventory processes, mapping or participation in external programs, such as NatureServe, state or provincial heritage programs, or other credible systems. Such participation may include providing non-proprietary scientific information, time and assistance by staff, or in-kind or direct financial support.
2. A methodology to incorporate research results and field applications of biodiversity and ecosystem research into forest management decisions.

Objective 6. Protection of Special Sites

To manage lands that are ecologically, or geologically important in a manner that takes into account their unique qualities.

Performance Measure 6.1. Program Participants shall identify special sites and manage them in a manner appropriate for their unique features.

Indicators:

1. Use of information such as existing natural heritage data, expert advice or stakeholder consultation in identifying or selecting special sites for protection.
2. Appropriate mapping, cataloging and management of identified special sites.

Key Definitions (Source: SFI Standard Sec. 13):

Forests with Exceptional Conservation Value: critically imperiled (G1) and imperiled (G2) species and ecological communities.

Critically Imperiled: A plant, animal or community, often referred to as G1, that is globally extremely rare or, because of some factor(s), especially vulnerable to extinction. Typically, five or fewer occurrences or populations remain, or very few individuals (<1,000), acres (<2,000 acres or 809 hectares), or linear miles (<10 miles or 16 kilometers) exist.

Imperiled: A plant or animal or community, often referred to as G2, that is globally rare or, because of some factor(s) is very vulnerable to extinction or elimination. Typically six to 20 occurrences, or few remaining individuals (1,000 to 3,000), or acres (2,000 to 10,000 acres or 809 to 4047 hectares), or linear miles (10 to 50 miles or 16 to 80.5 kilometers) exist.

Threatened and Endangered: Listed under The U.S. Endangered Species Act or The Canadian Species at Risk Act and listed under applicable state or provincial laws requiring protection.

2. Determining Species and Ecosystems of Management Concern -The Process

BCTS stretches across the province in 12 BA's (Business Areas). Each of these Business Areas cover potentially different ecological areas. Each BA will also have a unique set of species to manage, depending on local land use plans as well as their respective certification scheme(s). A step-wise filtering process (SOMC Decision Tree) is outlined below to assist with determining the species management list for a particular BA. This list starts with species identified through legal requirements and ends with certification requirements. Depending on the number and type of certification schemes being used in the BA, the user will need to go through one, two or all three certification portions of the filter. Each BA should review their list on a regular basis (e.g.annually) or if a significant change occurs in SAR legislation, land use orders, or a certification standard.

2.1. SOMC Decision Tree

Step 1. Legal Requirements

- a. FRPA:
 - i. Are there Section 7 Notices within the BA?
 1. If **YES**- determine species covered in Notices and add them to your species of management concern list, then move to step ii. GAR Orders Section.
 2. If **NO**- move to step ii. GAR Orders Section.
 - ii. GAR Orders- Are there GAR Orders (WHA/UWR) applicable to the BA
 1. If **YES**- determine species covered in GAR notices and add them to your species of management concern list, then move to b. SARA Schedule 1.
 2. If **NO**- move to b. SARA Schedule 1.
- b. SARA Schedule 1:
 - i. Are there SARA listed species in the BA?
 1. If **YES**- determine the species covered in SARA Schedule 1 and add them to your species of management concern list, then move to step c. Wildlife Act.
 - i. **Guidance:** To find SARA schedule 1 species applicable to the BA use the reporting function available through the Conservation Data Centre Web Site.
 - ii. **Guidance:** All Aquatic and Migratory birds are covered under SARA.
 2. If **NO**- move to c. Wildlife Act
- c. Wildlife Act
 - i. Are there any Wildlife Act endangered or threatened species in the BA.
 1. If **YES**- add them to your species of management concern list and move to Step 2. Higher Level Plans.
 2. If **NO**- move to Step 2. Higher Level Plans.

Step 2. Higher Level Plans / Land Use Plans (e.g. LRMP's, LUO's, LUP's, SLUPA's, SRMP's, etc.)

- a. Are there any Higher Level Plans in the BA that identify species of management concern that require management.
 1. If **YES**- add them to your species of management concern list and move to Step 3. Certification.
 - i. **Guidance:** Some of these plans identify habitat that requires management. In this circumstance the species for which the habitat is protected should be added to the species management list because if its habitat requires protection it is a species of management concern.
 2. If **NO**- move to Step 3. Certification.

Step 3. SFM Certification

- a. Is there a 3rd party sustainable forest management certification regime in the BA? E.g. CSA, SFI, FSC
 1. If **YES**- follow this tree for each of the certification regimes in the BA.
 2. If **NO**- The list is complete.
- b. If **YES** for **SFI**:
 1. Determine (from Conservation Data Centre) Red listed species and ecological communities in the Business Area and add them to your species of management concern list.
 - i. This will meet SFI requirements for threatened and endangered species and ecological communities.
 2. Determine (from Conservation Data Centre) the blue listed species and ecosystems classified as G1 and G2 within the operating areas and add them to your species of management concern list.
 3. Determine (from Conservation Data Centre) the yellow listed species and ecosystems classified as G1 and G2 within the operating areas and add them to your species of management concern list.
 - i. This will meet SFI requirements for critically imperiled and imperiled species and ecological communities and Forests of Exceptional Conservation Value.
- c. If **NO** for **SFI** move to d. FSC
- d. If **YES** for FSC: the species and ecosystems identified in b steps 1-3 will satisfy the FSC requirements except for:
 1. Species identified by local advisory groups through consensus with all concerned stakeholders. If your operating areas has any of these species add them to your species of management concern list.
- e. If **NO** for FSC move to f CSA
- f. IF **Yes** for CSA: the species and ecosystems identified in b steps 1-3 will satisfy the Provincial and National Species at risk requirements of CSA.
 1. Determine a list of Focal Species for Defined Forest Area (DFA).
 - i. Are there any Higher Level or Land Use Plans that have not been **approved** that identify species of management concern. If so add them to your species of management concern list.
- g. If **NO** for CSA then the list is complete.

2.2. Risk Assessment

A risk rating system designed to identify the likelihood that a BCTS forestry activity will adversely affect a species or ecosystem of management concern should be developed to avoid negative impacts. The ABCFP paper: Managing Species at Risk in British Columbia Guidance for Resource Professionals offers guidance on considerations for Species at Risk. Professional reliance and due diligence are key requirements when dealing with SAR. Resource professionals should ensure they are using the best available information pertaining to SAR and ensure they rely on qualified professionals when unsure of specific species and their requirements. The ABCFP guidance suggests the following Risk Matrix to determine the level of risk related to operating in areas of SAR.

Likelihood	Consequences		
	High	Moderate	Low
High	Very High	High	Moderate
Moderate	High	Moderate	Low
Low	Moderate	Low	Very Low

http://www.abcfp.ca/regulating_the_profession/documents/guideline_Species_at_Risk_2009.pdf

There are several BAs that have had biologists create reports that include a risk assessment for all species at risk in the particular BA. Please see the Appendix for samples.

Appendix

1.0 Chinook Business Area: Species at Risk Identification Rationale.

Defined criteria should be searchable on BCEE. Chinook Business Area (TCH) reports that the BCEE search capabilities and results include the following:

- *All Vertebrates, Dragonflies, Damselflies, Tiger Beetles, Butterflies, non-marine Molluscs, Vascular Plants and Mosses.*
- *All ecological communities currently documented and ranked by the CDC. This list is regularly expanded as new classification and mapping information becomes available.*
- *Conservation status value: global and provincial, Red and Blue List, and COSEWIC.*
- *Legal designation under the Federal Species at Risk Act (SARA), Identified Wildlife and the Provincial Wildlife Act.*
- *Forest District, BGC Zone values, Regional District and Ministry of Environment Regions for all ecological communities, and Red- and Blue-listed animals and vascular plant species.*
- *Ecosection values for ecological communities.*

Step #1: Search criteria

- Queried for all red listed species plant, animal and ecological communities within the Chilliwack, Queen Charlotte Islands, and Squamish Forest Districts.
- Queried for all blue listed plant, animal and ecological communities within the Chilliwack, Queen Charlotte Islands, and Squamish Forest Districts.
 - This step was taken to ensure that there were no G1 or G2 classified species that were blue listed
 - This search found G2/G3 SAR species and ecological communities and these were included in the SAR management population given that their actual designation was unclear.
 - The reason for inclusion of these species and ecological communities was based upon the definition as taken from the NatureServe interpretation section:
<http://www.natureserve.org/explorer/ranking.htm#globalstatus>

Rank	Definition
G#G#	Range Rank —A numeric range rank (e.g., G2G3, G1G3) is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4).

- Queried for all yellow listed plant, animal and ecological communities within the Chilliwack, Queen Charlotte Islands, and Squamish Forest Districts.
 - This step was taken to ensure that there were no G1 or G2 classified species that were yellow listed
 - This search found no G1 or G2 species or ecological communities

Step #2: SAR - District association

- The search results from step #1 were grouped by District to aid in identifying potential SAR species when working in a specific district.

Step #3: BEC – SAR – District Association

- For SAR plants search results from step #1 where grouped by BEC zone to aid in filtering potential SAR species when working in the field.

Step #4: BEC – Ecological Community – District Association

- Ecological communities have a BEC subzone/variant association. These associations were used to further refine what SAR communities could potentially exist and where they would exist on the landscape when undertaking activities on the land base.

Step #5: Final Product

- Based upon the steps above each of BCTS Chinook's operating areas will have a unique set of tables that outline what animals, plants, and ecological communities can potentially exist within each district. These tables will further refine potential SAR species and/or ecological communities where a BEC association exist.

Addition of federal Species At Risk Act (SARA) Schedule 1 Species

- In addition to the use of the BC Species and Ecosystem Explorer to identify SAR that require management, through discussions with Steve Wilson R.P. Bio who is assisting our Business Area with the confirmation of species that require management, it has been determined that we also have a requirement to manage species identified on the Schedule #1 of the Federal Species At Risk Act (SARA). The rationale for their inclusion is as follows.
- Schedule 1 species are covered by Sections 32 and 33 of SARA which make it illegal to destroy the residence of species listed as endangered or threatened (but not Special Concern). The federal government can impose Sections 32 and 33 on non-federal land if the Province fails to act, which BC has promised to do under the National Accord. Given that BCTS Chinook is both a licensee managing crown lands, as well as, being a provincial government agency, it is felt that the provincial commitment to the federal accord will require that the BA manages these additional species. All Schedule 1 species require recovery planning processes, and the goal of planning for species of Special Concern is to prevent them from becoming Threatened or Endangered.

2.0 Skeena Business Area: Risk Assessment of Interaction With Operational Components

(See the document located at the link below to view the Tables referred to (pp. 24 – 26) or for further information)

http://www.for.gov.bc.ca/ftp/TSK/external/!publish/EMS2/SFM/SOMC_Guide.pdf :

The risk rankings of Wilson (2006) were adopted for the risk of interaction between a species and each forestry operational component activity (Table 6). 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. The overall risk ratings reflect the legal and specified non-legal management direction or rankings. They are the product of the combination of the *probability of interaction* x the *consequence of interaction*.

The probability of interaction (Table 7) 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 the sites 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.

The **consequence of interaction** with a species has been split into two components – the legal/policy consequence of the influence or alteration (Table 8), and the biological consequence of the influence or alteration (Table 9). There may be a high legal consequence of not managing for a species where there is a legal requirement, but the biological consequence could be anywhere from low to high (and vice-versa). The degree of policy emphasis that was chosen is a logical ordering based on various levels of recognized conservation concern – neither BCTS nor Government has an explicit management policy for most species. The ranking of biological consequences has been done using a logical hierarchy. The equation used for calculating the total value was somewhat arbitrarily created but seems to result in a logical ordering of risk.

3.0 Strait of Georgia Business Area Risk Criteria: There are two specific criteria taken into concern when developing a level of risk of a particular species - geographic overlap and habitat overlap.

Geographic overlap

None – Operations do not overlap with published distribution of species.

Low- Operations overlap with a limited proportion of the published geographic distribution of the species. (note that a species with a very restricted distribution which overlaps significantly with an operational area would be rated as High).

Moderate- Operations overlap with a moderate proportion of the published geographic distribution of the species.

High-Operations overlap with a significant proportion of the published geographic distribution of the species.

Habitat Overlap

None – Habitats characteristics for species are not found in operating area.

Low – Habitat characteristics for species may be found in limited frequency within the operating area.

Moderate – Habitats characteristics for species may be found with moderate frequency within operating areas.

High – Habitats characteristics for species are commonly found within operating area.

In addition to the species and forestry operations assessment, species will be screened to determine whether they are covered by the existing riparian management (e.g. freshwater fish, species inhabiting riparian sites, etc.) or under other higher-level plans or management (e.g. Marbled Murrelet). Those that are covered will be excluded from the SAR focus list. Finally, species whose habitat requirements are too broad (generalists) to be spatially constrained to specific locations will be excluded from the focus list.

4.0 Example – QP rationale for identifying and managing species

Recommendations for SAR management of vascular plants and non-vascular plants (BCTS – Chinook):

Plant species considered here are those which are known to occur within the context of forested landscapes (including both aquatic or terrestrial environments). Rare plant species of open landscapes (e.g. tundra, alpine, sand dunes) were excluded from the following analysis and recommendations.

There are 77 plant taxa of concern within the Chinook forest districts (DQC, DSQ, DCK), i.e. potentially impacted by forestry, as described above. Most of the species at risk occur in one or both of two sensitive habitat-types which may be indirectly affected by logging: (a) wet habitats (occurring in rivers, lakes, or bogs, and/or closely associated with riparian or other aquatic situations including wet/flooded meadows), and (b) talus slopes, rock outcrops, and/or cliff habitats that occur within forest settings (i.e. open patches of dry to damp rocky habitat, protected by surrounding trees, species often sensitive to local seepage patterns). The list of taxa which occur in these two “hotspots” of rarity are as follows.

- (1) species occurring predominantly in wet habitats (in or in close association with streams, rivers, lakes, bogs, ponds, or wet/flooded meadows within forested setting):

mosses:

Bryum gemmiparum
Ctenidium schofieldii
Discelium nudum
Fissidens fontanus
Fissidens pauperculus
Fontinalis hypnoides
Leptodontium recurvifolium
Philonotis yezoana
Plagiomnium ciliare
Plagiothecium platyphyllum
Pleuroziopsis ruthenica
Pohlia lescuriana
Rhizomnium punctatum
Sphagnum balticum
Sphagnum orientale
Sphagnum platyphyllum
Sphagnum rubiginosum
Sphagnum schofieldii
Sphagnum sjorsianum
Sphagnum subobesum
Sphagnum wilfii

vascular plants:

Anemone virginiana var. *cyliandroidea*
Atriplex alaskensis
Carex comosa
Carex interrupta
Carex lenticularis var. *lenticularis*
Cicuta maculata var. *maculata*
Claytonia washingtoniana
Coleanthus subtilis
Eleocharis nitida
Eutrochium maculatum var. *bruneri*
Hydrophyllum tenuipes
Lindernia dubia var. *dubia*
Lupinus rivularis
Muhlenbergia filiformis
Myriophyllum pinnatum

Navarretia intertexta
Oxypolis occidentalis
Potamogeton nodosus
Schoenoplectus americanus
Senecio cymbalaria
Wolffia borealis

- (2) species occurring predominantly in rock outcrop habitats (on damp to dry talus slopes, rocks, cliffs, etc.) within forested setting:

mosses:

Andreaea schofieldiana
Barbula amplexifolia
Ctenidium schofieldii
Entodon concinnus
Gollania turgens
Grimmia elongata
Lescuraea julacea
Orthotrichum cupulatum
Orthotrichum pylaisii
Seligeria careyana

vascular plants:

Cacaliopsis nardosmia
Claytonia washingtoniana
Crepis occidentalis ssp. *conjuncta*
Geum schofieldii
Idahoia scapigera
Lewisia tweedyi

In accordance with these observations, the majority of taxa of concern may be protected by avoiding and maintaining buffer-strips of forest habitat around aquatic habitats (bogs, rivers, streams, and/or ponds, also wet/flooded meadows occurring as gaps within forests), and open rock outcrop/talus/cliff habitat, in an effort to maintain existing shade quality and minimize disruption of current seepage and drainage patterns within the forest landscape.

The remaining species, which may occur more in more mesic, forested environments (e.g. directly on tree stems, on forest floor, rocks, or decaying logs and woody debris) will be more difficult to protect without accurate species identification in the field. As such, it is recommended that taxa of concern which occur within forested environments (and therefore still likely to be directly impacted by logging, when aquatic and rock outcrop habitats are avoided) should be carefully considered by forest district, and specifically targeted for conservation efforts. For example,

(1) DQC

lichen:

Pseudocyphellaria rainierensis – “Old Growth Specklebelly”
<http://www.lichen.com/bigpix/Prairierensis.html>



Pseudocyphellaria rainierensis, the "oldgrowth specklebelly", on a Douglas-fir trunk, southwestern Washington. This lichen is found only in the few patches of remaining old-growth forest in the Pacific Northwest.

mosses:

Cirriphyllum piliferum

Daltonia splachnoides

Oedipodium griffithianum

Wijkia carlottae

(2) DSQ

mosses:

Brachythecium holzingeri

Grimmia incurva

Rhizomnium punctatum

vascular plants:

Dryopteris marginalis

(3) DCK

lichen:

Pseudocyphellaria rainierensis

mosses:

Brachydontium olympicum

Brachythecium holzingeri
Fabronia pusilla
Grimmia incurva
Hypnum holmenii
Orthotrichum tenellum
Rhizomnium punctatum
Rhynchostegium serrulatum

vascular plants:

Actaea elata
Agoseris elata
Cephalanthera austiniiae
Crepis atribarba ssp. *atribarba*
Lupinus arbustus ssp. *pseudoparviflorus*
Melica fugax
Polygonum sawatchense ssp. *oblivium*

Potential focal species for relatively mesic forest-habitats are described in more detail below (Tables 1-3), by forest district. It is recommended that conservation strategies are approached as follows:

1. For each of these districts, all rare species that are practical for collection and/or identification by field staff should be reviewed prior to logging, in order to facilitate on-site identification and/or collection for subsequent expert examination (for each of these species, note habitats, morphology, distinguishing features).
2. All documented rare species locations (including practical and difficult targets for field staff) should be considered with respect to logging area location. Established procedures should be followed to check CDC tracking records for existing location data (<http://www.env.gov.bc.ca/atrisk/ims.htm>). Particularly where species are not currently tracked by CDC (i.e. most rare moss species), the UBC Herbarium Database records should also be examined (<http://www.beatymuseum.ubc.ca/herbarium/database.html>).

Additional/new populations should be anticipated, and/or targeted, whenever possible. At minimum, field staff should be aware if logging is taking place in an area that is known to support one or more rare species, and should (a) employ reviewed morphological and microhabitat information (see Item 1) to identify on site, or (b) an expert should be consulted where it is not feasible for forestry personnel to attempt rare species identification in the field.

3. Where rare species are identified, a reserve should be designed which is sufficient to preserving the integrity of the site and the microclimate (i.e. protecting the rare species occurrence, in addition to its associated critical habitat).

Table 1. Rare forest-habitat plant species associated with DQC Forest District (excluding rare species associated with wet/aquatic habitats and/or open rocky habitats); information relevant to generating conservation strategies is described.

DQC Forest District	Type	BC Status	COSEWIC	Identification	Affected by Forestry	Comments:
<i>Pseudocyphellaria rainierensis</i> (Oldgrowth Specklebelly)	lichen	S1 (Red)	SC	practical for field staff to identify	directly affected (grows on conifers in sheltered, humid older forest ecosystems, low to moderate elevations)	-reasonable target for field staff; ensure identification information is available and reviewed prior to work
<i>Cirriphyllum piliferum</i>	moss	S1S3 (Red)	-	expert required for collection and identification	indirectly affected (grows on soil and decaying wood in open to shaded forest habitat)	-difficult target for field staff
<i>Daltonia splachnoides</i>	moss	S1 (Red)	New (2009)	expert required for collection and identification	directly affected (grows on trees and woody substrates in humid forest ecosystems)	-difficult target for field staff -very limited occurrence and habitat information available; new COSEWIC species (2009)
<i>Oedipodium griffithianum</i>	moss	S1S3 (Red)	-	expert required for collection and identification	indirectly affected (grows on moist soil and rock in shaded forest habitat)	-difficult target for field staff
<i>Wijkia carlottae</i>	moss	S2 (Red)		expert required for collection and identification	indirectly affected (grows on damp rock in shaded, humid forest habitat)	-difficult target for field staff

Table 2. Rare forest-habitat plant species associated with DSQ Forest District (excluding rare species associated with wet/aquatic habitats and/or open rocky habitats); information relevant to generating conservation strategies is described.

DSQ Forest District	Type	BC Status	COSEWIC	Identification	Affected by Forestry	Comments:
<i>Brachythecium holzingeri</i>	moss	S1S3 (Red)	-	expert required for collection and identification	directly affected (grows on trees and wood substrates in shaded/humus coniferous forest, also in open forest and under shrubs)	-difficult target for field staff
<i>Grimmia incurva</i>	moss	S1S3 (Red)	-	expert required for collection and identification	indirectly affected (grows on damp rock, shaded habitats)	-difficult target for field staff
<i>Rhizomnium punctatum</i>	moss	S1S3 (Red)	-	practical for field staff to collect for expert examination later	indirectly affected (grows in wet shaded habitats)	-potential target for field staff (relatively larger moss species) -often near streams; may be moderately protected by aquatic habitat avoidance
<i>Dryopteris marginalis</i> Marginal Wood Fern	vascular	S1 (Red)	-	practical for field staff to collect for expert examination later	indirectly affected (grows in moist woods in the montane zone)	-potential target for field staff

Table 3(a). Rare forest-habitat non-vascular plant species associated with DCK Forest District (excluding rare species associated with wet/aquatic habitats and/or open rocky habitats); information relevant to generating conservation strategies is described.

DCK Forest District	Type	BC Status	COSEWIC	Identification	Affected by Forestry	Comments:
<i>Pseudocyphellaria rainierensis</i> (Oldgrowth Specklebelly)	lichen	S1 (Red)	SC	practical for field staff to identify	directly affected (grows on conifers in sheltered, humid older forest ecosystems, low to moderate elevations)	-reasonable target for field staff; ensure identification information is available and reviewed prior to work
<i>Brachydontium olympicum</i>	moss	S1S3 (Red)	-	expert required for collection and identification	indirectly affected (grows on moist/humid shaded habitat in the mountains); but predominantly alpine	-difficult target for field staff -note predominantly alpine
<i>Brachythecium holzingeri</i>	moss	S1S3 (Red)	-	expert required for collection and identification	directly affected (grows on trees and wood substrates in shaded/humus coniferous forest, also in open forest and under shrubs)	-difficult target for field staff
<i>Fabronia pusilla</i>	moss	SH (Red)	E	expert required for collection and identification	directly affected (grows on tree bark)	-difficult target for field staff
<i>Grimmia incurva</i>	moss	S1S3 (Red)	-	expert required for collection and identification	indirectly affected (grows on damp rock, shaded habitats)	-difficult target for field staff
<i>Hypnum holmenii</i>	moss	S1S3 (Red)	-	expert required for collection and identification	indirectly affected (mainly in moist heaths, shrub thickets - open habitats; spruce forests)	-difficult target for field staff -note mainly open-habitat preference
<i>Orthotrichum tenellum</i>	moss	S1 (Red)	-	expert required for collection and identification	directly affected by tree removal (predominantly epiphytic habitat), but mainly on deciduous trees in dry, open areas	-difficult target for field staff -note mainly on deciduous trees, open-habitat preference
<i>Rhizomnium punctatum</i>	moss	S1S3 (Red)	-	practical for field staff to collect for expert examination later	indirectly affected (grows in wet shaded habitats)	-potential target for field staff (relatively larger moss species) -often near streams; may be moderately protected by aquatic habitat avoidance
<i>Rhynchostegium serrulatum</i>	moss	S1S3 (Red)	-	expert required for collection and identification	directly affected (grows on tree bases and woody substrates, forest habitat)	-difficult target for field staff

Table 3(b). Rare forest-habitat vascular plant species associated with DCK Forest District (excluding rare species associated with wet/aquatic habitats and/or open rocky habitats); information relevant to generating conservation strategies is described.

DCK Forest District		Type	BC Status	COSEWIC	Identification	Affected by Forestry	Comments:
<i>Actaea elata</i> Bugbane)	(Tall	vascular	S1 (Red)	E	practical for field staff to collect for expert examination later	indirectly affected (grows in moist shady woods, mature forest)	-potential target for field staff -habitat also includes seepage slopes and benches; may be moderately protected by open/aquatic habitat avoidance
<i>Agoseris elata</i> Agoseris)	(Tall	vascular	S1S2 (Red)	-	practical for field staff to collect for expert examination later	indirectly affected (grows in wooded habitats)	-potential target for field staff -habitat includes meadows and open woods; may be moderately protected by open/forest-gap habitat avoidance
<i>Cephalanthera austiniiae</i> (Phantom Orchid)		vascular	S2 (Red)	T	practical for field staff to collect for expert examination later	indirectly affected (grows in dense moist to mesic coniferous forests)	-potential target for field staff
<i>Crepis atribarba</i> ssp. <i>atribarba</i> Hawksbeard)	(Slender	vascular	S1 (Red)	-	practical for field staff to collect for expert examination later	indirectly affected (grows in open forests)	-potential target for field staff -note habitat also includes grasslands, shublands
<i>Lupinus arbustus</i> ssp. <i>pseudoparviflorus</i> (Montana Lupine)		vascular	S1 (Red)	-	practical for field staff to collect for expert examination later	indirectly affected (grows in moist forest habitat)	-potential target for field staff
<i>Melica fugax</i> Oniongrass)	(Little	vascular	S2 (Red)	-	practical for field staff to collect for expert examination later	indirectly affected (grows in wooded habitat)	-potential target for field staff -habitat also includes rocky valleys and open montane areas; may be moderately protected by open habitat/rock outcrop avoidance
<i>Polygonum sawatchense</i> ssp. <i>oblivium</i> Knotweed)	(Sawatch	vascular	S1 (Red)	-	practical for field staff to collect for expert examination later	indirectly affected (grows in forest habitat)	-potential target for field staff -habitat also includes dry or moist meadows, pastures, sagebrush; may be moderately protected by open habitat/forest-gap avoidance