



SUSTAINABLE  
FORESTRY  
INITIATIVE  
WESTERN CANADA

SFI-01150

**drax**

**WOOD PRODUCER  
INFORMATION PACKAGE**

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# 1. Introduction

The Western Canada Sustainable Forestry Initiative® Implementation Committee (WCSIC) is comprised of members of Sustainable Forestry Initiative (SFI®) Certified Organizations in British Columbia, Alberta, and Saskatchewan, structured under two regional committees, BC, and Prairie.

SFI Certified Organizations are certified by an accredited certification body to be in conformance with the SFI Forest Management Standard, Small-Scale Forest Management Module for Indigenous Peoples, Families and Communities, Fiber Sourcing Standard, Certified Sourcing Standard and/or the Chain of Custody Standard. In addition, Certified Organizations believe forest landowners have an important stewardship responsibility and a commitment to society. We recognize the importance of maintaining viable public and private forest forestlands.

SFI Certified Organizations support sustainable forestry practices on forestland they manage and promote it on other lands where they source fiber. They endorse efforts to protect private property rights, and to help all landowners manage their forestland sustainably. The WCSIC performs local outreach and education activities that promote sustainable forestry, the SFI program, and SFI Standard conformance on public and private forestlands.

The Wood Producer Information Package is an outreach tool for landowners or wood producer supplying wood to SFI Certified Organizations from North American forests. The Package provides guidance for managing forestlands consistent with SFI Program Principles and Objectives. SFI Certified Organizations also encourage forest landowners to participate in forest management certification. Landowners considering certifying their lands should contact the nearest SFI Program Participant or the WCSIC through our website: [www.wcsic.ca](http://www.wcsic.ca).

## Purpose

The purpose of this Information Package is to provide guidance to SFI Certified Organizations and Wood Producers on SFI Fibre Sourcing Standard requirements for Wood Producer Training (Objective 6, Performance Measure 6.2) and Landowner Outreach (Objective 7, Performance Measure 7.1).

# 2. Sustainable Forestry Initiative (SFI) Inc.

## SFI Principles

SFI Certified Organizations who purchase fiber from other forest owners and/or managers support the following principles as provided in the SFI 2022 Fiber Sourcing Standard:

1. Sustainable Forestry
2. Forest Productivity and Health
3. Protection of Water Resources
4. Protection of Biological Diversity
5. Aesthetics and Recreation
6. Protection of Special Sites
7. Legal Compliance
8. Research
9. Training and Education
10. Community Involvement and Social Responsibility, and Respect for Indigenous Rights
11. Transparency
12. Continual Improvement
13. Responsible Fiber Sourcing

Many forest companies and organizations have currently achieved SFI certification, or certification to other sustainable forest management standards to help ensure the future well-being of the forest ecosystem.

To demonstrate conformance with SFI or other standards, companies hire third-party independent auditors, who verify that the companies' forest practices and environmental management meet the requirements of the certification system. To ensure transparency, these auditors' reports must be made available to the public. The audit verification is an ongoing process that ensures continuing conformance with the sustainable forest management standards. For more information on the SFI Standard please refer to the SFI website: <https://forests.org/>.

### SFI Objectives

The SFI Fiber Sourcing Standard 2022 contains Objectives, Performance Measures, and Indicators to communicate and verify conformance with the overarching Principles. There are eleven Objectives that SFI Certified Organizations adhere to for their Fiber Sourcing Standard certification, supported by numerous Performance Measures and Indicators applicable to fiber sourcing from North American forests. We provide the listing of the Objectives below and encourage readers to review the more detailed Performance Measures and Indicators on the SFI website: <https://forests.org/>:

- Objective 1: Biodiversity in Fiber Sourcing
- Objective 2: Adherence to Best Management Practices
- Objective 3: Use of Qualified Resource Professionals, Qualified Logging Professionals and SFI Certified Logging Companies
- Objective 4: Legal and Regulatory Compliance
- Objective 5: Forestry Research, Science and Technology
- Objective 6: Training and Education
- Objective 7: Community Involvement and Landowner Outreach
- Objective 8: Public Land Management Responsibilities
- Objective 9: Communications and Public Reporting
- Objective 10: Management Review and Continual Improvement
- Objective 11: Avoid Controversial Sources

### SFI's Work

SFI is a sustainability leader through their work in four focus areas:

- Standards (certification)
- Conservation (research, projects, grants)
- Community (SFI Implementation Committees, First Nations)
- Education (school programs, employment)

### Company Audits & Inspections

As part of Drax's commitment to sustainable forestry management & multiple certifications relating to sustainability of forest products, an on-site visit to the wood producers' operations may be conducted to answer any questions about the certification program. Drax will implement a questionnaire for all wood procured directly from the forest. Within this questionnaire, Drax will ask questions as to how forest management is being conducted in relation to the certification standards that are held by the company. Monitoring is a method to ensure on the ground activities align with measures that mitigate specified risks within the supply base area. Based on the results of the questionnaire, Drax will categorize suppliers by risk rating to determine how site selection for audit will be completed.

The focus of field site monitoring will be to ensure information received by the supplier in relation to management can be observed or corroborated on the ground. Where possible, photos will be taken to ensure monitoring activity records can be visually documented. All monitoring activities will be documented and recorded for future reference by the BP and for internal and external auditing purposes.



Figure 1. SFI Certification is Third Party Verified through annual audit.

- If the inspection results corroborate the questionnaire, the BP will consider any specified risks mitigated for that wood producer's source.
- If the inspection results do not corroborate the questionnaire, the supplier will be subject to the Procurement Policy

Drax will maintain records of questionnaires, field site inspection forms, and correspondence with the supplier for each applicable site.

- All non-conformities will be documented in the onsite inspection form and communicated with the supplier
- Records of non-conformities will be recorded and documented
- If a supplier is found to have non-conformities two years in a row, they will be subject to the Procurement Policy

All potential wood procured directly from the forest is vetted through the Sustainability Team's questionnaire process prior to purchase of the feedstock. Harvest units that are put through the questionnaire process that are deemed to not meet the requirements of the Sustainability Team's review will be considered "High Risk" feedstock sources & will not be procured by the BP.

Feedstock sources that are removed from consideration via the Procurement Policy will also be considered "High Risk" feedstock sources & will not be procured by the Drax unless documentation can be provided to suggest that the source meets the Drax's sustainability requirements.

### **Procurement Policy**

Drax will also implement a Procurement Policy for all wood procured direct from the forest. The company expects that all suppliers contribute to the attainment of information required to carry out due diligence for sourcing sustainable fiber. The Procurement Policy is in place to address suppliers who do not provide the necessary information for the Drax to carry out effective mitigation or to address consecutive identifications of non-conformities.

Any feedstock from a supplier who either does not provide enough information, is found to have purposefully mislead the company in questionnaires, or where the supplier has demonstrated multiple non-conformities that are unreasonable, Drax will:

- Determine the root cause of the supplier's unwillingness to cooperate
- Determine if there is a way to obtain information that protects the suppliers' sensitivities but still achieves the BP's information requirements
- If the supplier and the BP cannot come to a mutual agreement on required information the Drax may:
  - o Determine the wood supplied is non-eligible input SFI products
  - o Withhold the supplier's deliveries to the BP's facilities
  - o Non-renewal of purchase agreements upon expiry
  - o Termination of the purchase agreement
  - o Removal from consideration on future purchases

### 3. Sustainable Forest Management Practices

The WCSIC supports forest land managers in conducting sustainable forest management operations. Wood producers are expected to conduct harvesting operations in compliance with all applicable provincial or federal legislation. There is legislation that applies to both Crown (public) forest land and private land that is managed for forestry. SFI Certified Organizations encourage wood producers to consider the following guidance on forest land managed by the wood producer or landowner. Landowners should contact an appropriate qualified resource professional for additional guidance particularly with respect to Best Management Practices for Water Quality.

#### A. Reforestation:

Prompt reforestation of lands managed for forestry will help to ensure successive crops of trees, in addition to supporting many other non-timber objectives. Reforestation plans can detail the steps needed to successfully re-establish seedlings on harvested forest lands. SFI Certified Organizations will, on request, support you in identifying Registered Forest Professionals in your area to assist you in developing a reforestation plan for your site. See below for more information on Qualified Resource Professionals and web links to seedling nurseries in Canada. A list of seedling nurseries can also be obtained from the applicable SFI Certified Organization. Note that seedlings generally need to be ordered at least one year in advance of planting dates. See below in the Best Management Practices section for guidance on successful reforestation.

#### B. Afforestation:

When feasible, forest landowners are encouraged to practice afforestation; converting lands back to productive forests or planting trees on lands that have not recently supported forests. Afforestation has many benefits to the environment; two examples are increased overall land productivity and increasing carbon storage. In certain jurisdictions, afforestation may qualify as carbon credits for offsetting greenhouse gas emissions.

#### C. Invasive Species:

The SFI Standard requires participants to limit the introduction, impact and spread of invasive species (plants and animals) that directly threaten or are likely to threaten native plant and animal communities.



*Figure 2. Check machinery prior to movement & clean as needed to prevent the spread of invasive species*

Information on the control of invasive plants can be found through:

- The Invasive Species Council of British Columbia: <https://bcinvasives.ca/>
- The Alberta Invasive Species Council: <https://abinvasives.ca/>
- The Saskatchewan Invasive Species Council: <https://www.saskinvasives.ca/>
- The Federal Government of Canada's strategies for Invasive Alien Species in Canada: <https://www.canada.ca/en/environment-climate-change/services/biodiversity/invasive-alien->

[species-strategy.html](#). The program includes invasive plants and animals.

**D. Water Quality and Riparian Management:**

Riparian habitat (area adjacent to creeks, lakes, and wetlands) is very important for protecting water quality and provides high value wildlife habitat. Special measures are often required in riparian habitat to ensure water quality and habitat is managed on a sustainable basis. SFI Certified Organizations will, on request, support you in identifying qualified resource professionals in your area to assist you in preparing prescriptions to manage riparian habitat.

Management and control of sediment during road construction, maintenance and deactivation activities is key to maintaining water quality. Adhere to local wet weather shutdown guidelines and cease activity if there are any safety or environmental concerns. Do not direct ditchwater directly into any fish streams or drinking water source areas (i.e., use ditch blocks, sumps, etc. Hay bales can also be used to assist with sediment control, but ensure they are maintained and removed once activity is complete. Where material is available, armor culvert intakes and outtakes for any areas of concern for sediment transport. See below in the Best Management Practices section for guidance on riparian management.

**E. Fish and Fish Habitat:**

It is prohibited under the [Federal Fisheries Act \(https://www.dfo-mpo.gc.ca/campaign-campagne/fisheries-act-loi-sur-les-peches/introduction-eng.html\)](https://www.dfo-mpo.gc.ca/campaign-campagne/fisheries-act-loi-sur-les-peches/introduction-eng.html) to undertake works that result in the death of fish, a harmful alteration, disturbance, or destruction of fish habitat (HADD) or to introduce a deleterious substance (e.g., excessive sediment) into fish habitat. Works in or adjacent to fish habitat may require a project review by Fisheries and Oceans Canada (<https://www.dfo-mpo.gc.ca/index-eng.html>) and if works are determined to result in a HADD an authorization will be required before work can be undertaken. The Fisheries and Oceans Canada website provides Measures to Protect Fish and Fish Habitat (<https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html>), Codes of Practice (<https://www.dfo-mpo.gc.ca/pnw-ppe/practice-pratique-eng.html>) and guidance when a project review (<https://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/request-review-demande-d-examen-001-eng.html>) is required.

**F. Soil Conservation:**

Protecting the soil resource is the key to long-term productivity of forest lands. Conducting operations in a manner that conserves the soil resource is critical to sustainable forestry. Weather conditions can be a major factor in soil disturbance. Operations should avoid conditions that create excessive rutting or compaction. Plan operations with soil disturbance in mind. Weather conditions and soil disturbance should be assessed, and consideration given to curtailing or stopping activities causing soil disturbance when soils are too wet to support equipment. For example, in the BC Interior and prairies, consider winter harvesting on wet ground to better support equipment. With different soil types, and phases of harvesting, it may be possible to carry out some operations in wet weather without causing excessive soil disturbance. Appropriate equipment should be used to minimize soil disturbance.



*Figure 3. Proper equipment, such as this wide-tired skidder, and proper techniques to reduce the impact to soil*

The area in permanent roads, trails and landings should be minimized to maintain productive forestland. SFI Certified Organizations will, on request, support you in identifying qualified resource professionals in your area to assist you in managing the soil resource on your forestlands. See below in the Best Management Practices section for guidance on soil management.



**G. Biodiversity & Wildlife:**

Both regulation and government approved land use plans set out requirements at the stand and landscape level. These requirements vary by province and region. Landowners may seek assistance from SFI Certified Organizations or by contacting an appropriate qualified resource professional.

**H. Wildlife Management:**

Managing Forest lands for general wildlife features or habitat characteristics as well as specific management for species at risk are important components of sustainable forestry. SFI Certified Organizations may have guides for species at risk management that could be made available upon request. In addition, SFI Certified Organizations will support you in identifying qualified resource professionals in your area to assist you in developing wildlife management strategies.

- Government of Canada Species at Risk:  
<https://www.canada.ca/en/services/environment/wildlife-plants-species/species-risk.html>
- NatureServe Canada's Conservation Data Centers:  
<https://www.natureserve.org/canada>



Figure 4. Species at Risk - Grizzly Bears

**I. Forests with Exceptional Conservation Value (FECV):**

Forest landowners are encouraged to evaluate their lands to determine if they have FECV. FECV are lands with critically imperiled (G1) and imperiled (G2) species and ecological communities, a conservation status determined by NatureServe that can be accessed through the link provided below. Landowners may seek assistance from SFI Certified Organizations or by contacting an appropriate qualified resource professional.



Figure 5. FECVs

The WCSIC has also completed an FECV Assessment for BC, AB and SK that can be provided. Recommended Best Practices include assessing the presence of FECVs in the proposed work location, ensuring that site specific plans address the conservation of known locations or critical habitat, and ensuring that pre-work meetings are held to review specific instructions or plans. Workers should also be instructed to stop work and seek direction if any previously unidentified wildlife features are encountered during work activities.

NatureServe Canada's Conservation Data Centers:  
<https://www.natureserve.org/canada>

As a member of WCSIC, Drax has reviewed the completed FECV Assessment for British Columbia, Alberta, & Saskatchewan. Based on the results of this assessment, Drax has completed a summary of species identified that interact with the areas that the company may procure fiber from. The full list of species & ecological communities included in the WCSIC FECV Assessment can be found in Appendix E: FECVs.

The following species have been identified in multiple jurisdictions:

Scientific Name	English Name	Category	Global Status	Province
<i>Anepeorus rusticus</i>	Rustic Flat-headed Mayfly	Invertebrate Animal	G2	AB / SK
<i>Baetisca columbiana</i>	Columbia Armored Mayfly	Invertebrate Animal	G2G4	AB / SK
<i>Bombus suckleyi</i>	Suckley's Cuckoo Bumble Bee	Invertebrate Animal	G2G3	AB / SK

Collema coniophilum	Crumpled tarpaper	Lichen	G2	BC / AB
Ephydatia muelleri	Mueller's Freshwater Sponge	Invertebrate Animal	G2G4	AB / SK
Grus americana	Whooping Crane	Vertebrate Animal	G1	AB / SK
Megachile fortis	Robust Sunflower Leafcutter Bee	Invertebrate Animal	G2	AB / SK
Melaporphyria immortua	Dark-banded Flower Gem	Invertebrate Animal	G1?	AB / SK
Myotis septentrionalis	Northern Myotis	Vertebrate Animal	G2G3	AB / BC / SK
Oreohelix stantoni	Cypress Hills Mountainsnail	Invertebrate Animal	G1G2	AB / SK
Physcomitrium hookeri	bladder-cap moss	Nonvascular Plant	G2G4	AB / SK
Porpidia thomsonii	Thomson's Boulder Lichen	Fungus/Lichen	G2G4	AB / SK
Rhizoplaca haydenii	Hayden's Rimmed Navel Lichen	Fungus/Lichen	G2G3	AB / SK
Rinodina terrestris	pepper-spore lichen	Fungus/Lichen	G2G4	AB / SK
Salix turnorii	Turnor's willow	Vascular Plant	G2	AB / SK
Sarcogyne hypophaea	stepdaughter grain-spored lichen	Fungus/Lichen	G2G4	AB / SK
Schinia avemensis	Gold-edged Gem	Invertebrate Animal	G1G3	AB / SK
Schinia verna	Verna's Flower Moth	Invertebrate Animal	G2G3	AB / SK
Tortula nevadensis	Nevada Screw Moss	Nonvascular Plant	G2G3	AB / SK
Xanthoparmelia idahoensis	Idaho xanthoparmelia lichen	Fungus/Lichen	G1	AB / SK
Yukonodelphax kendallae	a delphacid planthopper	Invertebrate Animal	G1G3	AB / SK

Species of highlighted importance in this assessment are as follows, information has been collected from NatureServe & the Government of Canada (ECCC):

Identified in all three jurisdictions

**1. Northern Myotis (*Myotis septentrionalis*)**

**Current Status:** G2G3 (S2 in BC & AB, S3 in SK)

**Description:** The Northern Myotis (or Northern long-eared bat) has dull yellow-brown fur with pale grey bellies. They are typically about eight centimeters long, with a wingspan of about 25 centimeters. Northern long-eared bats usually weigh between six and nine grams

**Habitat:** Woodland - Mixed, Urban/edificarian, Woodland - Conifer, Forest - Mixed, Woodland - Hardwood, Forest - Conifer, Aerial, Forest – Hardwood

This bat generally is associated with old-growth forests composed of trees 100 years old or older. It relies on intact interior forest habitat, with low edge-to-interior ratios. Relevant late-successional forest features include a high percentage of old trees, uneven forest structure (resulting in multilayered vertical structure), single and multiple tree-fall gaps, standing snags, and woody debris. These late successional forest characteristics may be favored for several reasons, including the large number of partially dead or decaying trees that the species uses



Figure 6. Northern Myotis

for breeding, summer day roosting, and foraging. [Source: USFWS 2011]

Small, highly fragmented, or young forests that provide limited areas of subcanopy foraging habitat may not be suitable. Young forests may also lack appropriate nursery sites. However, recent studies indicate that these bats can exploit relatively isolated and small forest fragments (Caceres and Barclay 2000, Henderson et al. 2008, Johnson et al. 2008).

**Threats:** The most serious threat is white-nose syndrome (WNS), an often (but not always) lethal condition caused by a fungal pathogen (*Pseudogymnoascus destructans*). WNS was first noticed in 2006 in New York. Since its initial discovery, WNS has spread rapidly (confirmed in more than 100 bat hibernacula) and now has been documented throughout northeastern North America and as far west as Missouri and Arkansas, and south to northern Alabama and northern Georgia (as of May 2014; [www.whitenosesyndrome.org](http://www.whitenosesyndrome.org)).

Loss, degradation, and fragmentation of mature forest habitat (associated with various kinds of human activities, such as logging; oil, gas, and mineral development; and wind energy development) also may be a significant threat (Center for Biological Diversity 2010, USFWS 2011). However, the general lack of genetic structure at both watershed and regional scales indicates that forest disturbances such as prescribed fire or timber harvest at watershed scales do not appear to disrupt northern myotis gene flow across the landscape (Johnson et al. 2014).

**Recommended Management Strategies:** from <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/kamloops/northernlongearedmyotisguide.pdf>

- Protect hibernacula and maternity sites from disturbance, bat-friendly gates can be used to stop the public from entering these sites
- If the area of forestry operations includes sites with cliffs or rock outcroppings which have openings or crevices (especially those which have sunny aspects), then these sites should be incorporated into wildlife tree patches (WTPs) where possible, or some other retention strategy which preserves the integrity of the site.
- Create a buffer zone such as a wildlife tree patch around identified hibernacula and maternity sites. The size of WTPs or other retention patches around hibernaculum or maternity roosts should be a minimum of 3.0 ha (approximately 100 m radius or equivalent area), and if possible be centered on the habitat feature. The WTP may be larger depending on other site factors (e.g., presence of nearby wetlands, lakes, or streams as foraging habitat; presence of potential movement corridors for feeding and dispersal to alternate roosts). This will reduce disturbance from machinery as well as maintaining canopy cover near roosting sites.
- Retain forest patches that include large numbers of suitable cavity trees for bat roosting habitat.
- Do not harvest or salvage trees within the WTP or other retention patch surrounding the hibernaculum or maternity roost.
- Retain a selection of stand structural elements, such as large green trees, snags, logs on the forest floor, and canopy gaps. Where available, snags should have cracks, peeling bark, bird holes, broken tops, and hollow interiors.
- Do not use pesticides, particularly near wetlands and riparian areas.

## G1 Listed Species Identified in Multiple Jurisdictions

1. Whooping Crane (*Grus americana*)

**Current Status:** G1 (S1 in AB, SX in SK)

**Description:** The most noticeable characteristic of the whooping crane is the large red patch on the head. The red patch extends from the cheek along the bill and over the top of the head. The red patch is made of skin and is almost featherless. Aside from the patch of red, whooping cranes are almost entirely white. The body and wing feathers are a bright white, except on the tips of the outer wings. The tips of the primary feathers are black. Whooping cranes have yellow eyes and thin, black legs.



Figure 7. Whooping Crane

With a height of approximately five feet (1.5 meters), whooping cranes are the tallest birds in North America. Whooping cranes have a 7.5-foot (2.3-meter) wingspan. They are lean birds, and despite their height, weigh only about 15 pounds (6.8 kilograms).

**Habitat:** Herbaceous wetland, Lagoon, Tidal flat/shore, Grassland/herbaceous, Cropland/hedgerow  
Nesting occurs in dense emergent vegetation (sedge, bulrush) in shallow (often slightly alkaline) ponds (Kuyt 1995), freshwater marshes, wet prairies, or along lake margins. Pothole breeding sites in Canada are separated by narrow ridges vegetated by black spruce, tamarack, and willow. The nest is a mound of marsh vegetation rising about 20-50 centimeters above the surrounding water level. Whooping cranes occur only in North America. They breed in a unique wetland complex in Wood Buffalo National Park, characterized by relatively small ponds with a soft substrate. A substrate amount of open water is present, allowing for easy detection of predators.

Habitat during migration and winter includes marshes, shallow lakes, lagoons, salt flats, grain and stubble fields, and barrier islands (AOU 1983, Matthews and Moseley 1990). Radio-marked migrants roosted primarily in palustrine wetlands, many of which were smaller than 0.5 hectares (Howe 1989). Migration habitat includes mainly sites with good horizontal visibility, water depth of 30 centimeters or less, and minimum wetland size of 0.04 hectares for roosting (Armbruster 1990, which see for further details).

Boreal marsh complexes that meet the requirements outlined in Timoney (1999) can be deemed as essential for Whooping Cranes to establish territories, build nests, and raise their young. Timoney (1999) describes nesting wetlands as visually open patchy wetland complexes containing semi-permanent and permanent wetlands with water depths averaging 25 cm; this diverse mosaic of wetlands contains a high proportion of bulrush marsh associated with mixed marsh (sedge and cattail), shrubby marsh (willow and birch) and diatomaceous ponds with bulrush. The quantity of suitable habitat identified as the whooping crane nesting area within the boundaries of Wood Buffalo National Park appears to be sufficient to support a growing population of Whooping Cranes (Olson and Olson Planning & Design Consultants Inc. 2003; Tischendorf 2003).

**Threats:** Potential threats to Whooping Cranes include habitat loss and degradation, disturbance on breeding grounds (from aircraft flights, logging, human foot traffic and ATV traffic), and predators on breeding grounds (black bear, wolverine, grey wolf, red fox, mink, lynx and ravens). Accidental shooting and collisions with power lines are also potential threats.

**Recommended Management Strategies:** The federal government of Canada currently has a recovery plan in place for the whooping crane, which can be found at the following link ([https://www.sararegistry.gc.ca/virtual\\_sara/files/plans/rs\\_whooping\\_crane\\_final\\_1007\\_e.pdf](https://www.sararegistry.gc.ca/virtual_sara/files/plans/rs_whooping_crane_final_1007_e.pdf)). Strategies for management of the species include:

- Education on identification to avoid accidental shooting
- Create a 100m riparian management zone around boreal marshes to avoid habitat degradation.

- Restricting operations to fall outside of critical timing windows for nesting, breeding, & wintering. Critical timing windows are between April 15<sup>th</sup> & October.
- Having suitable spill response procedures to avoid impact to habitat & food sources in riparian areas

## 2. Dark-banded Flower Gem Moth (*Melaporphyria immortua*)

**Current Status:** G1? (SU in AB & SK)

**Description:** A small chocolate black moth with purplish overtones and few prominent markings. The forewing is crossed by thin pale brown antemedian, postmedian and subterminal lines, the area inside the antemedian and outside the postmedian lines darker and appearing as a wide black band. Some specimens have both wings with a wide, paler brown terminal band. Fringes dark.



Figure 8. Dark-banded Flower Gem Moth

**Habitat:** Terrestrial

Over its extensive range all known dates for adults are from mid-May to mid-June. All Heliiothinae overwinter as pupae, the egg stage is generally only a few days, so larvae occur with and slightly beyond the adult season.

The larval foodplants are unknown but there has been a fairly persistent rumor, of unknown origin, that this is a lupine feeder. The spring phenology, the localities of the syntypes (Cambridge, Massachusetts and Albany, New York), its persistence into the mid-20th century but not beyond in eastern Connecticut, and its apparent extirpation east of the prairie region by about that time are all highly consistent with, or even suggestive of, a lupine feeder. In most cases high quality occurrences will be metapopulations with several large patches of the foodplant with some scattered individuals between the main patches, usually within in a large prairie, savanna, woodland etc.

**Threats:** Threats to this species are consistent across many species of moth. The primary threats are those which contribute to the damage or loss of the larval host plants. This primarily occurs in the prairies through the loss and fragmentation of native, grazed grasslands because of crop production (COSEWIC 2005). Other secondary threat factors identified are severe over-grazing, invasion and establishment of exotic plants, and alteration or suppression of natural grazing and/or fire regimes (COSEWIC 2005). However, given the scant information about the distribution and occurrence of this species, these secondary threats are largely speculative, based on the assumption that the species could occur in native pasture across much of the Prairie Ecozone.

**Recommended Management Strategies:** Identify threats and develop mitigation techniques to ensure availability of suitable habitat, including the encouragement of flowering plants.

### 3. Cypress Hills Mountainsnail (*Oreohelix stantoni*)

**Current Status:** G1G2 (S1 in AB, SU in SK)

**Description:** The shell is opaque, greyish-white or brown with usually one or two darker, brown spiral bands; these bands are absent in some individuals, or additional bands might be present. The spire is conical and variable in height. The shell surface has irregular incremental wrinkles and striae. The aperture height of adults is equal to or slightly more than the shell width. Very young snails have a flattened, keeled shell with coarse sculpture and scaly periostracal ridges. Subadult shells differ from adults by being flatter and with a spiral keel on the last whorl. The animal is beige. The foot is rather short and not as slender as in many terrestrial snails.



Figure 9. Cypress Hills Mountainsnail

**Habitat:** Forest - Hardwood, Bare rock/talus/scree

Globally, this small (shell width about 1 cm) land snail is confined to four mountainous “sky islands” on the Great Plains of North America. In Canada, it occurs only in the Cypress Hills of Alberta and Saskatchewan. Known from this area since 1905, albeit under a different name, this species occurs on ridges, hilltops, cliffs, and slopes at or near the sand, silt, cobbles, and conglomerates of the Cypress Hills Formation. The snails are patchily distributed within these habitats. It is absent from the gently sloping southern exposure of the Cypress Hills and seldom occurs in the valley bottoms.

Forested habitats especially with a secondary deciduous component present (usually ponderosa pine but others), and varying presence of rocky substrate from dense talus slopes to grassy roadsides with scattered rocks (Frest and Johannes, 2002, Anderson, 2004; Anderson et al., 2007). Cypress Hills, southeastern Alberta and southwestern Saskatchewan, Canada, population is closely associated with outcroppings of conglomerate rock (Dempsey et al. (2019)

**Recommended Management Strategies:** The current management strategy is a hands-off approach whereby known snail colonies are avoided during management activities that might potentially disturb the snails (e.g., prescribed burns, road building, grazing, timber removal, weed spraying). Specific activities to consider when operating include:

- eliminating any management activities within the boundaries of the known snail colonies
- fencing colonies or restricting activities in areas where motorized off-road recreation is common
- educating the public on low impact recreation practices

#### 4. Gold-edged Gem Moth (*Schinia avemensis*)



Figure 10. Gold-edged Gem Moth

**Current Status:** G1G3 (S2 in AB & SK)

**Description:** The Gold-edged Gem is a small (16-20 mm wingspan), day-flying, noctuid (cutworm or owlet) moth in the subfamily Heliothinae (Flower Moths). These moths have greenish-brown and maroon, or mostly maroon, forewings crossed by two partial, ochre yellow bands. There is also a prominent yellow band along most of the distal edge of the forewing, hence the common name.

**Habitat:** Sand/dune

In Canada, Gold-edged Gems always occur within active sand dunes and blowouts, in close association with the presumed larval host plant, Prairie Sunflower. Most of the 35 known occurrences are in small dunes or blowouts less than 1 ha in size, with the remaining portions of the dunes now stabilized by vegetation. Over the last 100 years, the active dune habitat on which they depend has significantly declined.

Threats

**Threats:** The primary limiting factor is availability of active sand dunes or blowouts that support colonies of the presumed larval host plant. The major threat to the long-term survival of the species appears to be the loss of habitat resulting from the stabilization of active sand dunes by both native and introduced vegetation. This natural process is largely driven by regional climate trends, but has accelerated over the last 150 years, in part due to reduced wildfire, extirpation of Bison, and other factors.

**Recommended Management Strategies:** The largest threat to this species is the loss of active dunes. Strategies to help mitigate risk to this species includes avoiding the conversion of dunes to agriculture or forested areas.

## 5. Idaho Rock-shield Lichen (*Xanthoparmelia idahoensis*)

**Current Status:** G1 (SU in AB & SK)

**Description:** This species grows in bunches and is found on soil. Its lobes are firm but can break apart when collected. Samples collected have been 2–4 cm in diameter with broad yellowish green lobes which are approximately 1.5-4 mm wide and are contorted or twisted. It has very sparse simple rhizines on the underside that are 0.2-0.3mm long.



Figure 11. Idaho Rock-shield Lichen

**Habitat:** Barrens, Shrubland / chaparral

*Xanthoparmelia idahoensis* is found in four widely scattered areas: southern Saskatchewan, central Idaho, central Colorado, and northern New Mexico. Range extent was estimated using NatureServe Network occurrences and herbarium specimens collected between 1993 and 2024 (GBIF 2024, SEINet 2024, NatureServe 2024).

Calcareous badlands, barren to sparsely covered with vascular vegetation. Slopes are approximately 45% or less. Surrounding vascular vegetation is shrub-steppe, dominated by *Artemisia* or *Atriplex* (Thor 1996).

**Threats:** It is threatened by off-road vehicles, livestock trampling, and other surface disturbance activities. In Idaho, off-road vehicles are a major threat to this species. Other threats include the conversion of native shrub-steppe to exotic annual grasslands due to overgrazing livestock and, as a result, increasing fire frequency (Thor 1996).

### Recommended Management Strategies:

- Ensuring areas with livestock are being monitored for over grazing
- Not introducing species to areas where the lichen is present to avoid the conversion of native shrubs
- Fencing colonies or restricting activities in areas where motorized off-road recreation is common

### J. Special Sites:

The SFI Standard requires Certified Organizations to manage lands that are ecologically, geologically, or culturally important in a manner that considers their unique qualities. Identification and management of special sites covers a broad range of values: ecological, geological, historical, cultural, and spiritual. Landowners may consult with local historians, archeologists, First Nations, local governments, and others to determine significance to map and manage for their unique features.



Figure 12. Special Sites

### K. Coarse woody debris/ harvest residue:

The SFI Standard requires participants to manage harvest residue (e.g., slash, limbs, tops) with consideration given to economic, social, and environmental factors (e.g., organic and nutrient value to future forests, smoke management and carbon emissions) and other utilization needs.

In the absence of landowner harvest residue management plans, landowners should contact SFI Certified Organizations or qualified resource professionals in their area for suggested management practices for their forest lands.



**L. Landscape Aesthetics:**

Managing harvesting operations to minimize visual impact is an important part of sustainable forestry. Operations may impact the views of many individuals and communities. The WCSIC recommends that the visual impact of harvesting be considered within visually sensitive areas. For guidance or advice landowners are encouraged to contact a qualified resource professional knowledgeable in visual management assessment and planning.



Figure 13. Visual Quality Landscape

**M. Qualified Logging Professionals:**

The WCSIC encourages wood producers to utilize the services of Qualified Logging Professionals (QLP's). QLP's will have successfully completed a training program recognized by the WCSIC. The WCSIC has created an online portal for landowners to complete training to become a registered QLP, which can be found at the following website: <https://elearn.zimfor.com/courses/wcsic-logger-training>


A list of local qualified logging professionals can be obtained from a SFI Certified Organization, or inquiry through the WCSIC website: <https://wcsic.ca>

**N. Qualified Resource Professionals:**

The WCSIC and SFI Certified Organizations do not endorse specific professionals or companies as to their appropriateness to landowners. The following lists are intended to inform landowners seeking assistance from qualified resource professionals to further manage and or develop their lands consistent with SFI Principles. The WCSIC or SFI Certified Organizations may assist landowners in contacting qualified resource professionals.

Table 1. Qualified Resource Professional Resources

Qualified Resource Professional Category	Resources
Forestry	<p>BC, Alberta, and Saskatchewan have respective Associations of Forest Professionals where membership directories can help you identify forestry consultants to assist you in planning aspects of forest management, including reforestation plans, visual management, riparian management, soil conservation and wildlife management.</p> <ul style="list-style-type: none"> <li>- Forest Professionals British Columbia: <a href="https://fpbc.ca">https://fpbc.ca</a></li> <li>- Association of Alberta Forest Management Professionals: <a href="https://aafmp.ca/">https://aafmp.ca/</a></li> <li>- Association of Saskatchewan Forestry Professionals: <a href="https://www.asfp.ca/">https://www.asfp.ca/</a></li> </ul>
Biologists	<p>Each province within the WCSIC has a membership database for professional biologists. Members could assist you with planning for riparian management and wildlife management. An SFI Program Participant can also assist you in identifying biologist consultants in your area.</p> <ul style="list-style-type: none"> <li>- The College of Applied Biology – British Columbia: <a href="https://www.cab-bc.org/">https://www.cab-bc.org/</a></li> <li>- Alberta Society of Professional Biologists: <a href="https://www.aspb.ab.ca/">https://www.aspb.ab.ca/</a></li> </ul>

<p>Engineers</p>	<p>The following websites have a member's section that provides information on qualified professionals to assist in such areas as operations on potentially unstable or steep terrain and engineered structures such as bridges.</p> <ul style="list-style-type: none"> <li>- The Association of Professional Engineers and Geoscientists of British Columbia: <a href="https://www.egbc.ca/">https://www.egbc.ca/</a></li> <li>- The Association of Professional Engineers, Geologists, and Geophysicists of Alberta: <a href="https://www.apega.ca/">https://www.apega.ca/</a></li> <li>- The Association of Professional Engineers and Geoscientist of Saskatchewan: <a href="https://www.apegs.ca/">https://www.apegs.ca/</a></li> </ul>
<p>Seedling Nurseries &amp; Seed Procurement</p> 	<p>Forest tree seedlings can be procured for reforestation British Columbia, Alberta and Saskatchewan Forest sites from several nurseries located in their respective province. Specialists within those nurseries, as well as SFI Certified Organizations, can be consulted for advice on obtaining appropriate seed and seedlings for your specific reforestation site. Larger nurseries often grow certain amounts of locally suitable seedlings for small “spot purchases” each year.</p> <p>A list of forest tree seedling nurseries for British Columbia, Alberta and Saskatchewan can be found at:</p> <ul style="list-style-type: none"> <li>- Canadian Forests Directory of Silviculture Contractors and Forest Nurseries: <a href="https://www.canadian-forests.com/silviculture-nurseries.html">https://www.canadian-forests.com/silviculture-nurseries.html</a></li> <li>- The Forest Nursery Association of BC website: <a href="https://www.fnabc.com/">https://www.fnabc.com/</a></li> </ul>

## O. Guidance and Best Management Practices

Drax & the WCSIC supports small forest landowners' forestry operations through promotion of sustainable forestry management. Wood producers are expected to conduct harvesting operations in compliance with applicable provincial and/ or federal legislation. The intent of sustainable forestry practices for these lands is to maintain or protect, where practical, forest resource values. The WCSIC provides and/ or directs small private landowners to information about sustainable forestry practices for reforestation, riparian management, soil conservation, wildlife management and visual or scenic quality. The following best management practices should be followed where applicable.

### Planning

Appropriate planning of a harvest unit is an essential part of responsible forest management. On public lands in Canada, a harvest authority is legislated to assess the harvest unit to ensure the identification & protection of applicable resource values. With the lack of this legislation & monitoring for private landowners who conduct forest operations, the following should be considered by private landowners.

The best way to identify potential risks & areas of concern within a harvest unit or parcel of land is to complete a walkthrough of the site prior to harvesting. This is a common practice on public lands due to the accuracy of mapping software. Landowners are encouraged to assess their site to plan for the management of features that may be present.

Other examples of appropriate planning include:

- Identification of harvest boundaries, either spatially or on the ground with ribbon.
- Identification of road locations or skid trails for accessing timber prior to harvest
- Creating a map of the site with any identified riparian areas, wildlife habitat areas, or planned retention
- Completing a prework meeting with anyone expected to be on site during harvest, including contractors if applicable

- Appropriate choice of harvest equipment
- Identifying Stop Work Procedures, including but not limited to
  - o Completion of a risk assessment for values & hazards on site
  - o Identification of muster stations
  - o Completion of a spill response plan
  - o Completion of a fire preparedness plan

### **Livestock Grazing & Forest Management**

Many private forest owners utilize their land for the management of livestock. If a landowner is considering grazing with their forest management strategies, considerations for responsible forest management should be applied. Grazing BMPs are designed to help prevent overgrazing and pasture degradation and to improve biodiversity and protect riparian areas and surface water. Proper management of the available pasture can allow for a sustainable increase in pasture forage production and improved forage quality. Using a proper pasture management plan based on your environment will also help improve impacts on the surrounding environment including water quality, wildlife habitats and other surrounding natural areas which helps protect biodiversity, improves sustainability, and provides benefits for the area.

To avoid damage to the forest resources, landowners should develop a grazing management plan. These plans typically include considerations for:

- Grazing locations
- Location or types of fencing
- Number of livestock on site
- Identification of riparian areas & sensitive soils
- Grazing management system to be used

There are three general types of grazing management systems:

- Continuous Grazing (one pasture providing livestock unrestricted access throughout the grazing season)
- Simple Rotational Grazing (more than one pasture, or one pasture divided into paddocks where livestock are moved to allow for periods of grazing & resting)
- Intensive Rotational Grazing (many pastures where livestock are continuously moved based on forage growth & utilization)

To minimize impacts to growing stands, Drax recommends the use of rotational grazing systems.

More information on grazing can be found at the following link (<https://www.cdnangus.ca/wp-content/uploads/Grazing-Management-Plan.pdf>)

### **Riparian Area Management**

An important aspect of responsible forest management includes management of riparian areas. Riparian areas occur next to the banks of streams, lakes, and wetlands and include both the area dominated by continuous high moisture content and the adjacent upland vegetation that exerts an influence on it. Riparian ecosystems contain many of the highest value non-timber resources in the natural forest. Streamside vegetation protects water quality and provides a "green zone" of vegetation that stabilizes streambanks, regulates stream temperatures, and provides a continual source of woody debris to the stream channel.

Riparian areas frequently contain the highest number of plant and animal species found in forests, and provide critical habitats, home ranges, and travel corridors for wildlife. Biologically diverse, these areas maintain ecological linkages throughout the forest landscape, connecting hillsides to streams and upper headwaters to lower valley bottoms. There are no other landscape features within the natural forest that provide the natural linkages of riparian areas.

The RMA consists of a riparian management zone and, where required by regulation on public lands, a reserve zone. Within the management zone constraints to forest practices are applied. The width of these zones is determined by attributes of streams, wetlands or lakes, and adjacent terrestrial ecosystems.

**Drax encourages all private land suppliers to manage riparian areas to the same standards that are required on public lands.**

The [BC Riparian Management Area Guidebook](#) describes and refers to standard approaches and methodologies that can aid in developing prescriptions for riparian areas. In the absence of government approved permits and plans, the approaches and guidelines described here will be used by government to assess riparian classification, management, and mapping. Information from this section is taken from the referenced guidebook.

Riparian management area objectives are implemented:

- to minimize or prevent impacts of forest and range uses on stream channel dynamics, aquatic ecosystems, and water quality of all streams, lakes, and wetlands
- to minimize or prevent impacts of forest and range use on the diversity, productivity, and sustainability of wildlife habitat and vegetation adjacent to streams, lakes, and wetlands with reserve zones, or where high wildlife values are present
- to allow for forest and range use that is consistent with 1 and 2 above

To achieve riparian management area objectives, forest practices within the management zone should:

Where a riparian management area has both a management zone and a reserve zone:

- reduce the risk of windthrow to the reserve zone
- retain important wildlife habitat attributes including wildlife trees, large trees, hiding and resting cover, nesting sites, structural diversity, coarse woody debris, and food sources characteristic of natural riparian ecosystems

Where a riparian management area has only a management zone:

- retain sufficient vegetation along streams to provide shade, reduce bank microclimate changes, maintain natural channel, and bank stability and, where specified, maintain important attributes for wildlife
- adjacent to wetlands and lakes, retain key wildlife habitat attributes characteristic of natural riparian ecosystems

Any riparian features that are identified on the site should be assessed & classified as per guidance below:

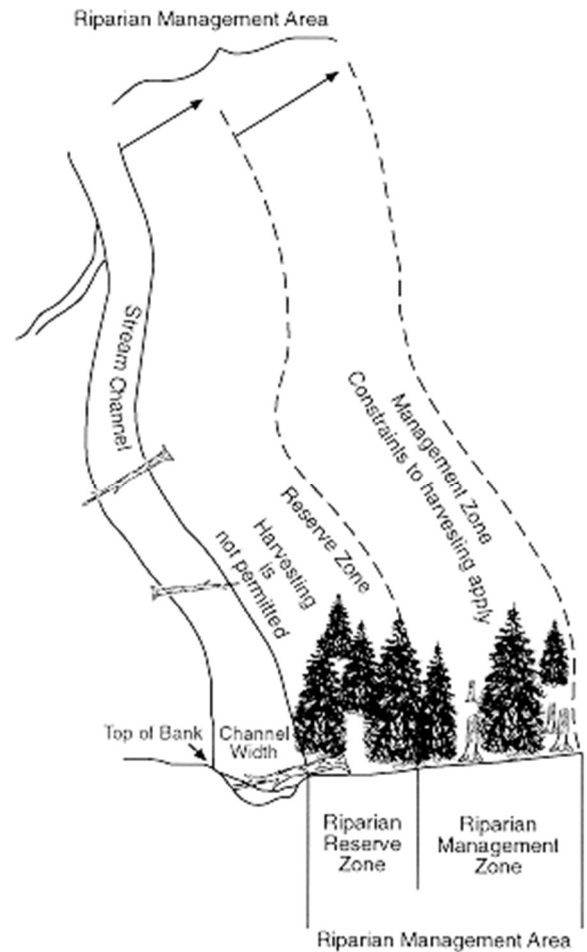


Figure 14. Visualization of a riparian management area on a stream.

Classifying Streams

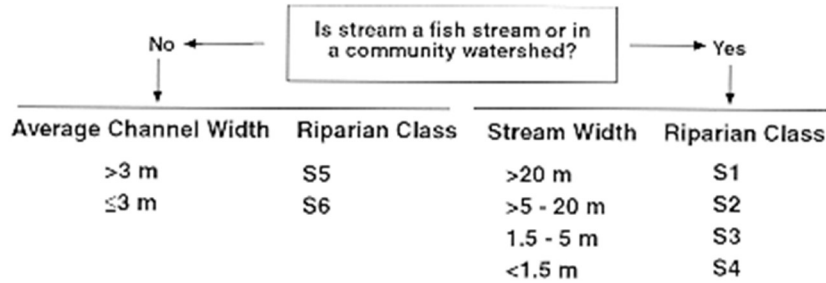


Figure 15. Stream classification chart from the BC Riparian Management Area Guidebook

Once streams are assessed, the following reserves (if applicable) and management zones should be applied to the areas surrounding the stream.

Riparian class	Average channel width (m)	Reserve zone width (m)	Management zone width (m)	Total RMA width (m)
S1 large rivers	≥100	0	100	100
S1 (except large rivers)	>20	50	20	70
S2	>5 ≤20	30	20	50
S3	1.5 ≤5	20	20	40
S4	<1.5	0	30	30
S5	>3	0	30	30
S6	≤3	0	20	20

- Fish stream or community watershed
- Not fish stream and not in community watershed

Figure 16. Reserve & management zone descriptions for streams based on classification.

## Wetlands

A wetland is a swamp, marsh, or other similar area that supports natural vegetation that is distinct from the adjacent upland areas. More specifically, a wetland is an area where a water table is at, near, or above the surface or where soils are water-saturated for a sufficient length of time that excess water and resulting low oxygen levels are principal determinants of vegetation and soil development. Simple wetlands include all

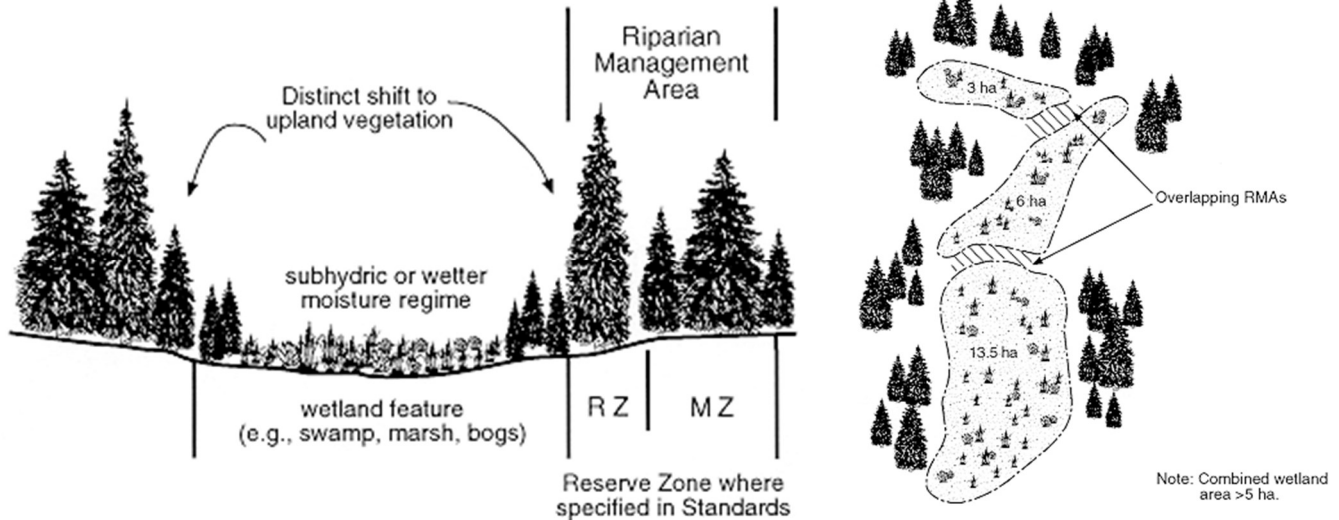


Figure 17. Left - Illustration of a simple wetland & riparian management area. Right - Illustration of a complex wetland system.

classified wetlands that are not wetland complexes.

A wetland complex consists of two or more individual wetlands with overlapping riparian management areas and a combined wetland area of 5 ha or more. Two wetlands have overlapping riparian management areas if they are:

- separated by 60 m or less and both are <5 ha, or
- separated by 80 m or less if one is <5 ha and the other is >5 ha, or
- separated by 100 m or less if both are >5 ha

The individual wetlands of a wetland complex should be sufficiently large that they would otherwise be classed as W1, W2, W3, or W4. Wetland complexes have a riparian class of W5.

Wetland complexes are areas of wetland and upland terrain where wildlife and biodiversity values of RMAs adjacent to individual wetlands are enhanced due to the close proximity to other wetlands. The RMA separating two or more closely associated wetlands provides a frequent travel corridor between the individual wetlands and links them into a larger wetland habitat unit. Forest practices adjacent to these wetlands are especially challenging due to their complexity and value.

## Classifying wetlands

There are five riparian classes of wetlands (W1 to W5) based on:

- whether the wetland is a simple wetland or wetland complex
- wetland size
- biogeoclimatic unit in which the wetland occurs
- W1 to W4 wetlands are simple wetlands while W5 is a wetland complex. A key to riparian classification of wetlands is illustrated below

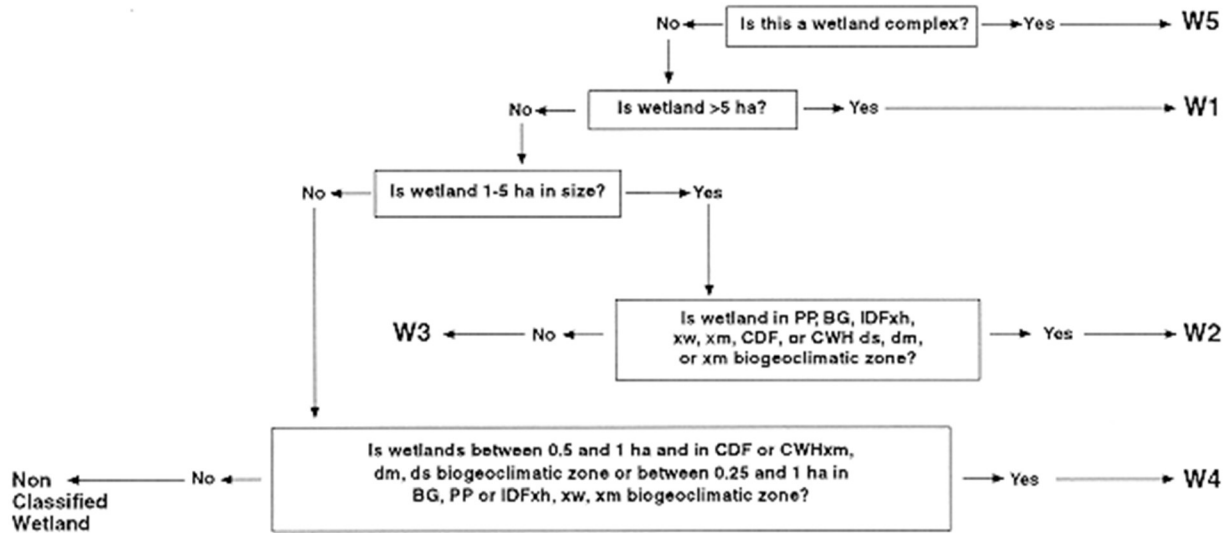


Figure 18. Flowchart for identifying wetland classifications.

Once wetlands are classified, the following reserves (if applicable) and management zones should be applied to the areas surrounding the wetland.

Riparian class	Reserve zone width (m)	Management zone width (m)	Total RMA width (m)
W1*	10	40	50
W2	10	20	30
W3	0	30	30
W4	0	30	30
W5*	10	40	50

\* No riparian reserve or riparian management zone is required for upland terrain within a bog dominated or muskeg dominated wetland larger than 1000 ha in boreal, sub-boreal, or hypemaritime climates. However, where a reserve or management zone is established by the district manager, the RMA should reflect the landscape level management strategy as outlined in the *Biodiversity Guidebook*.

Figure 19. Reserve & management zone descriptions for wetlands based on classification.

## Soil Management

Information taken from the FpInnovations [Guide for Preventing Soil Damage During Harvesting Operations](#)

If not properly performed, harvest operations can damage forest soils by compaction, rutting, erosion, and nutrient loss. Forest harvesting equipment moving across a cutblock may directly or indirectly impact water quality and future tree growth. To maintain soil health during harvesting, landowners should know when there is a risk of damage and understand how equipment operations affect the soil.

Soil is made up of mineral particles surrounded by air space called pore space. This air space is important to enable roots to exchange gases and water to drain properly. Soils are susceptible to damage from equipment travel if the air space, or porosity, is significantly reduced causing a loss in soil structure. This damage can lead to reduced plant growth and limit the regeneration of certain species such as aspen.

Organic soils, medium-, and fine-textured soils are most easily damaged. Increasing soil moisture decreases soil strength. Damage due to soil compaction and rutting can result from repeated travel across low-strength soils.

As a supervisor or team leader, you will need to evaluate the risk of soil damage prior to entering the block, and plan operations to minimize soil damage and maintain natural drainage patterns:

- Match equipment to site conditions. For example, consider cut-to-length harvesting and forwarding versus full-tree harvesting and skidding and the use of wide tires or tracks to increase flotation
- When there are numerous wetlands in a block, consider harvesting the area in the winter. Be sure to set aside an appropriate amount of area to make reentry feasible
- Walk harvest units to identify unmapped sensitive areas
- Ideally provide a plan indicating the preferred direction of wood flow to avoid or minimize travel through sensitive areas
- Consider the terrain and location of sensitive areas on a block when choosing the pattern of wood flow and the location of roads and landings or processing areas
- Select an extraction trail pattern that is suited to the ground conditions and minimizes soil damage

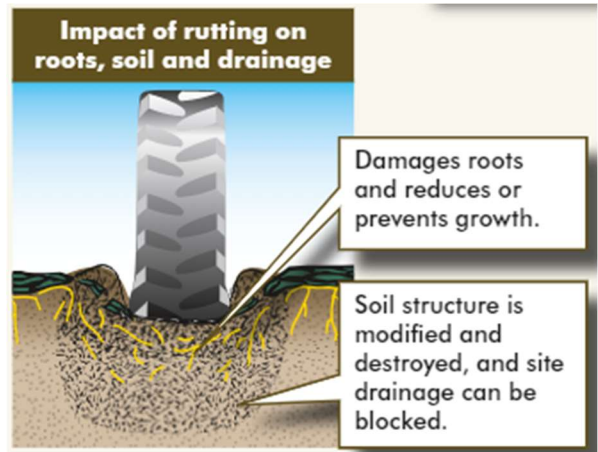


Figure 20. Illustration for impact of soil rutting.

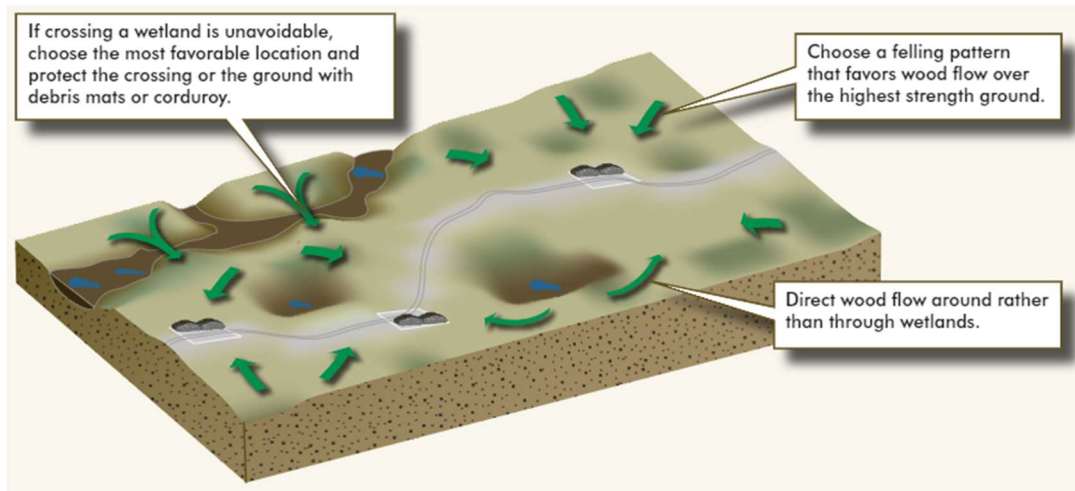


Figure 21. Illustration for considerations of road locations to minimize impacts to wetlands.

Wetlands are composed of drainage ways, seepages and organic pockets that are usually saturated and have low soil strength. When equipment is working near wetlands, consider the following tips to avoid soil damage and the disruption of natural drainage patterns:

- Use skidders or forwarders with high-flotation tires or tracks, or bogie axles with tracks and articulated loading booms or swing grapples to reduce ground disturbance adjacent to wetlands
- Do not locate pile sites or bunches in a wetland
- Monitor conditions constantly when operating equipment near wetlands and take preventive measures when ground strength diminishes. Stabilize exposed mineral soil by using locally approved methods such as spreading woody debris, hay, or erosion-control seed mixes



- Revisit post-harvest areas to ensure that drainage structures are functional and that revegetation/stabilization efforts have been successful

### Considerations for Adverse Weather Conditions

Rainfall can shut down operations if soils become temporarily saturated. Plan to avoid shutdowns with the following considerations:

- Complete enough in block access roads in advance of harvesting so that operations can be shifted to a dryer area if weather conditions reduce soil strength
- Operate when conditions are favorable. When possible, schedule maintenance and vacation when rainfall forces a shutdown
- Be aware of changing conditions and ensure that all operators understand the local rules for shutdown or modify operations accordingly to prevent soil damage.

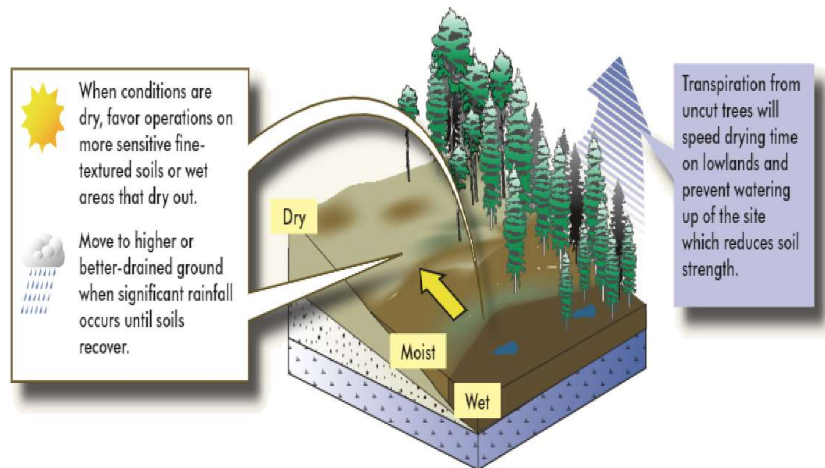


Figure 22. Illustration for considerations in wet conditions.

If harvesting in winter conditions, check if low-strength ground is sufficiently frozen to offer protection from machine traffic. Harvesters should expect insufficient frost depths when:

- Frost depths are not adequate prior to sufficient snowfall
- Soils are dry because freezing may not occur
- Temperatures rise above freezing point because thawing of previously frozen ground may occur
- On a lower slope position or on a wetter site



Figure 23. Illustration for winter harvest management.

More resources for landowners can be found with the following organizations and on their websites:

- British Columbia's Private Forest Landowners Association Best Management Practices Handbook
- British Columbia's Managed Forest Council Field Practices Guide: <https://www.mfcouncil.ca/legislation-policy/policies-and-procedures/>
- Woodlot Management Guide for Alberta: <https://open.alberta.ca/publications/9780773261150>
- BC Small Woodland Partnership Outreach: [http://www.woodlot.bc.ca/swp/SWP/SWP\\_Partners.html](http://www.woodlot.bc.ca/swp/SWP/SWP_Partners.html)

Drax will not purchase wood from unknown sources, sources / areas associated from controversial sources, or from wood producers whose practices are illegal.

## 4. Appendix A: Definitions

**Deforestation:** The direct human-induced conversion of forested land to non forested land use. The definition of deforestation encompasses permanent conversion of natural forest to non-forest because of any anthropogenic-caused change in land use.

**Forest:** A minimum area of land of 1 ha with tree crown cover of more than 25%, and with trees having the potential to reach a minimum height of 5 m at maturity in situ. Young natural stands and all plantations that have yet to reach a crown density of 25% or tree height of 5 m are included, as are areas that normally form part of the forest area which are temporarily un-stocked because of human intervention such as harvesting or natural causes but that are expected to revert to forest.

**Controversial Sources:** are defined as forest activities which are:

- A. Not complying with local, national, or international legislation, applying to forest related activities, in particular the following areas but not limited to:
  - a. Forest management practices
  - b. Nature and environmental protection
  - c. Protected and endangered species, including requirements of CITES
  - d. Health and labour issues relating to forest workers
  - e. Indigenous peoples' property, tenure, and land use rights
  - f. Anti-corruption
  - g. Third parties' property, tenure, and use rights, and
  - h. Payment of taxes and royalties
- B. Activities where the capability of forests to produce a range of wood and non-wood forest products and services on a sustainable basis is not maintained or harvesting levels exceed a rate that can be sustained in the long term.
- C. Activities where forest management does not contribute to the maintenance, conservation or enhancement of biodiversity on landscape, ecosystem, species or genetic levels.
- D. Activities where ecologically important forest areas are not identified, protected, conserved, or set aside.
- E. Converting forest to other vegetation type, including conversions of primary forests to forest plantations (As defined in Section 3.7, PEFC ST 2002:2020)
- F. Activities where the spirit of the ILO Declaration on Fundamental Principles and Rights at Work (1998) is not met.
- G. Activities where the spirit of the United Nations Declaration on the Rights of Indigenous Peoples (2007) is not met.
- H. Conflict timber\*
- I. Genetically modified trees

\*Conflict Timber is defined as "Timber that has been traded at some point in the chain of custody by armed groups, be they rebel factions or regular soldiers, or by a civilian administration involved in armed conflict or its representatives, either to perpetuate conflict or take advantage of conflict situations for personal gain. (...) Conflict timber is not necessarily illegal." The exploitation of timber may itself be a direct cause of conflict. (As defined in section 3.6, PEFC ST 2002:2020)

## 5. Appendix B: Other Considerations

### Spill Response Plan

Fuel and other material spills have the potential to cause environmental damage. Wood producers are encouraged to become familiar with spill reporting requirements and to have an action plan and a supply of spill containment and mop up equipment available on site.

Reportable spills must be communicated to the relevant provincial authority. To Report a Spill:

- British Columbia - Emergency Management BC – 1-800-663-3456
- Alberta Environmental Protection – 1-800-222-6514
- Saskatchewan - Spill Report Centre – 1-800-667-7525

### Applicable Forestry Legislation

Wood producers are encouraged to become familiar with applicable forestry legislation in their province. Provincial legislation will dictate the requirements of forest operations in each jurisdiction. A summary of applicable forestry legislation in each province can be found at the following link:

- [https://www.ncasi.org/wp-content/uploads/2021/06/NCASI18\\_CanForestReg\\_2021rev1\\_web.pdf](https://www.ncasi.org/wp-content/uploads/2021/06/NCASI18_CanForestReg_2021rev1_web.pdf)

### Fire Preparedness

Wood producers are encouraged to become familiar with applicable wildfire legislation in their province. Provincial legislation will dictate what type of preparedness plan and firefighting equipment must be on hand when harvesting wood. The legislation also includes provisions for monitoring fire danger ratings (due to weather conditions) and specific restrictions on activities that apply under certain conditions (e.g., fire watch, early shifts, shutdowns). To Report a Wildfire:

- British Columbia – 1-800-663-5555 (\*5555)
- Alberta – 310-3473 (310-FIRE)
- Saskatchewan – Forest Fire Control Centre at 1-800-667-9660

It is a best practice to have staff trained in wildfire suppression activities (and a legal requirement that they are trained before responding to a wildfire), to have the fire tools and suppression equipment on site during the spring/summer harvest season and an action plan to deal with a wildfire.

Wood producers should also be aware of the requirement of post-harvest wildfire hazard abatement requirements. Guidance on wildfire hazard abatement is available at the following sources:

- BC Wildfire Management Branch: <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/wildfire-management>
- BC Wildfire Management Branch: A Guide to Fuel Hazard Assessment and Abatement in British Columbia: <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/for-industry-commercial-operators/hazard-assessment-abatement>
- Alberta Environment and Sustainable Resource Development: Wildfire Prevention & Enforcement: <https://wildfire.alberta.ca/firesmart/default.aspx>
- Alberta Fire Smart Program: <https://wildfire.alberta.ca/firesmart/default.aspx>
- Saskatchewan Environment Ministry: Wildfire Management: <https://www.saskpublicsafety.ca/emergencies-and-response>

### Health & Safety

British Columbia, Alberta and Saskatchewan have acts and regulations for, Worker Compensation and Employment Standards. The regulations set minimum standards regarding occupational health, safety and employment. These agencies offer direction on the implementation and interpretation of the regulations through periodic training sessions, self- education guides and site visits. Information and training opportunities can be found at the following websites:

- [Work Safe BC: https://www.worksafebc.com/en](https://www.worksafebc.com/en)
- [BC Forest Safety Council: https://www.bcforestsafety.org/](https://www.bcforestsafety.org/)
- [BC Employment Standards Branch: https://www2.gov.bc.ca/gov/content/employment-business/employment-standards-advice/employment-standards](https://www2.gov.bc.ca/gov/content/employment-business/employment-standards-advice/employment-standards)



Figure 24. Wildfire Prevention - (Mobile grapple skidder water tank / pump unit)

standards

- [BC Employers' Advisors Office: https://www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries-organizations/ministries/labour](https://www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries-organizations/ministries/labour)
- [Work Safe Alberta: https://www.wcb.ab.ca/](https://www.wcb.ab.ca/)
- [Alberta Safety Council: https://www.safetycouncil.ab.ca/](https://www.safetycouncil.ab.ca/)
- [Alberta Human Services – Employment Standards: https://www.alberta.ca/labour-and-immigration.aspx](https://www.alberta.ca/labour-and-immigration.aspx)
- [Work Safe Saskatchewan: https://www.worksafesask.ca/](https://www.worksafesask.ca/)
- [Saskatchewan Safety Council: https://www.sasksafety.org/](https://www.sasksafety.org/)
- [Saskatchewan Labour Relations & Workplace Safety: https://www.saskatchewan.ca/government/government-structure/ministries/labour-relations-and-workplace-safety](https://www.saskatchewan.ca/government/government-structure/ministries/labour-relations-and-workplace-safety)

## **Alliance for Zero Extinction**

Formed in 2000 and launched globally in 2005, the Alliance for Zero Extinction (AZE) comprises 100 non-governmental biodiversity conservation organizations working to prevent species extinctions by identifying and safeguarding sites where species evaluated to be Endangered or Critically Endangered under International Union for Conservation of Nature (IUCN) criteria only exist at one location on earth.

Within Drax's supply base of Western Canada & NW USA, there are two species identified within the AZE dataset.

## **Mountains of Southern Vancouver Island**

This site qualifies as a Key Biodiversity Area of international significance that meets the threshold for at least one criterion described in the Global Standard for the Identification of KBAs. Alliance for Zero Extinction (2018): site confirmed as an AZE site during the AZE project (2015-2018). Taxonomy, nomenclature and Red List category follow IUCN 2016 Red List.

Assessment details: Biodiversity elements triggering KBA criteria is the Vancouver Island Marmot (*Marmota vancouverensis*).

The following information was taken from the Cosewic report for the Vancouver Island Marmot:

The Vancouver Island Marmot (VIM) is a colonial ground squirrel related to the hoary marmot *M. caligata*. It is notable for its chocolate brown fur, unique vocalizations, atypical skull characteristics, and highly social nature. The VIM is endemic to Vancouver Island, British Columbia, Canada.

The natural habitat of VIM consists of sub-alpine meadows, usually at 900-1500 metres above sea level. Such meadows are believed to have been created and maintained by avalanches, snow-creep or fire, or a combination of processes. Patches of natural habitat on Vancouver Island tend to be both smaller and located farther apart than those occupied by marmots in the BC mainland or the Olympic peninsula. VIM also use man-made habitats. Numerous colonization events occurred in habitats created by clearcut logging of high elevation forests, mining and ski-run developments.

The natural habitat of VIM is limited. Sub-alpine meadows are small (1-10 ha) and occur infrequently in the otherwise forested landscape. Habitat created by logging is only temporary as forest regeneration makes conditions unsuitable for marmots. All 10 colonies found in clearcuts in the 1980s and 1990s became extinct by 2000. The major threat to VIM is predation. At least 80% of marmot mortality since 1992 was attributable to predation, largely by wolves (*Canis lupis*), cougars (*Puma concolor*) and golden eagles (*Aquila chrysaetos*).

According to the BC provincial government, the wild population has been increasing in recent years. At its lowest point in 2003, fewer than 30 marmots remained in the wild, but as of 2021, numbers have increased to over 200. As populations of Vancouver Island Marmots are found west of Nanaimo within private forest lands managed by Mosaic Forests, its member companies have been key in supporting the marmot recovery. This is done by making significant annual financial contributions for research and management, as well as altering logging schedules in marmot habitat on Mt. Washington and in other areas. Another key partner, Mount Washington Alpine Resort, has also donated land for the Foundation's Tony Barrett Mount Washington Marmot

Recovery Center and supports the maintenance of the Centre and the surrounding area. Also, the resort has been working with the Marmot Recovery Foundation to maintain marmot-friendly ski runs and avoid development in areas that would negatively affect the marmots. Because of the marmot's small population size, many colonies are vulnerable to small natural weather and predation variations. To help the population grow, pups born through the captive breeding program at the Calgary and Toronto Zoos and the Tony Barrett Centre are released into the wild by the Marmot Recovery Foundation. Since 2003, over 500 captive-bred marmots have been released into the wild, and this has re-introduced the species to parts of its historic range in Strathcona Provincial Park and the Nanaimo Lakes area.

### The Future for Marmots

While much of the Vancouver Island Marmot's habitat is in good condition, tree in-growth is becoming a greater concern at many sites; a side effect of climate-change-induced milder winters. This 'tree-creep' replaces the open meadow habitat with young forest ecosystems. Marmots are more likely to be eaten by predators that can hide among the small trees. The Nature Trust of BC has restored marmot habitat through tree clearing at Green Mountain. The Marmot Recovery Foundation has conducted similar work at several other colonies on private land. Supplementary food is provided at some of the colonies in the spring, as extra feeding may improve wild marmots' reproductive success.

The Marmot Recovery Foundation monitors the wild population through radio-telemetry, wildlife cameras, and visual surveys. The information gathered as a part of this monitoring is used to guide recovery efforts. Marmot sightings from the public are welcome and can provide valuable information, especially on marmots outside their normal habitat. Anyone seeing a marmot on Vancouver Island is encouraged to report their observation to the Marmot Recovery Foundation.

### Risk Designation in the Supply Base

Although resources are being put towards recovery, critical habitat of the Vancouver Island Marmot are considered as specified risk in the supply base.

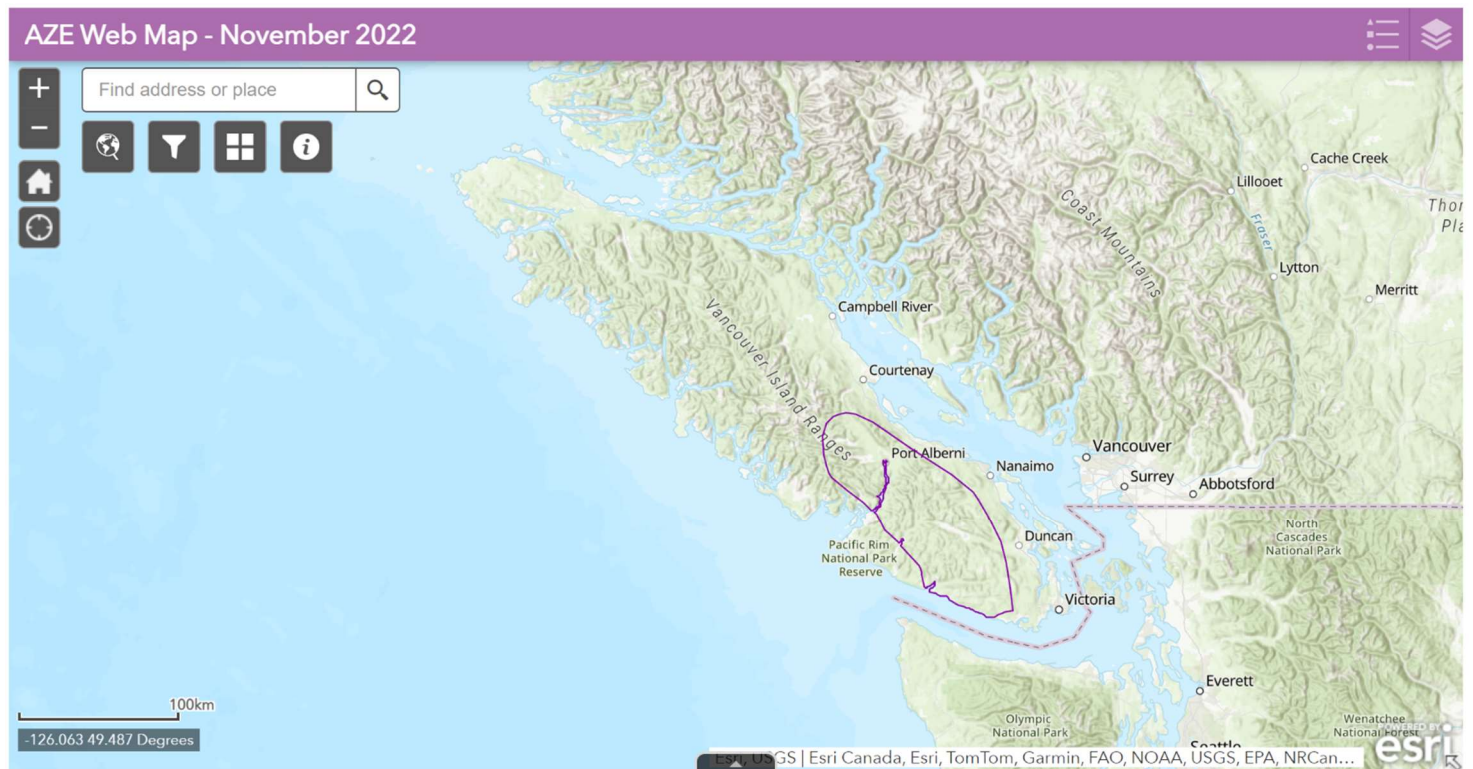


Figure 25. Showing specified risk areas on Vancouver Island for the VIM.

### **Whooping Crane Nesting Area and Summer Range**

The Whooping Crane nesting area and summer range is located approximately 75 km west of Fort Smith, Northwest Territories. The site, which straddles the border between the Northwest Territories and Alberta, encompasses the northeastern portion of Wood Buffalo National Park and adjacent wetlands. Habitats within this area are poorly drained and interspersed with numerous shallow water wetlands, most with marl bottoms. The wetlands are generally separated by narrow ridges that support black spruce, tamarack, willows and dwarf birch. Within the wetlands, the dominant species are bulrush, sedge and cattail. The large upland areas between the marsh complexes support coniferous and mixed forests dominated by white spruce, black spruce and aspen.

Whooping Crane Nesting Area and Summer Range was initially identified as an important Bird and Biodiversity Area. Recent analysis shows that this site qualifies as a Key Biodiversity Area of global significance for one threatened bird species (Whooping Crane).

Source: COSEWIC

Whooping cranes occur only in North America. They breed in a unique wetland complex in Wood Buffalo National Park, characterized by relatively small ponds with a soft substrate. A substrate amount of open water is present, allowing for easy detection of predators. Bulrush is the preferred nesting material, though sedge and cattail are also present. Common terrestrial vegetation includes Black Spruce, White Spruce, Tamarack and Labrador Tea.

#### **Risk Designation in the Supply Base**

Wood Buffalo National Park is the largest national park in Canada. Being a federally managed park, the harvest of forests & forest resources is strictly prohibited. Since the entirety of the Whooping Crane nesting sites polygon, as defined by Alliance for Zero Extinction is within the Wood Buffalo National Park, there is a negligible risk to impacting these sites.

- Alliance for Zero Extinction:  
<https://zeroextinction.org/site-identification/2023-global-aze-map/>

## **6. Appendix C: The Sustainable Biomass Program**

### **Introduction**

The Sustainable Biomass Program (SBP) is a certification system designed for woody biomass, mostly in the form of wood pellets and woodchips, used in industrial, large-scale energy production. The Sustainable Biomass Program (SBP) began as an industry-led initiative. It was formed in 2013 by major European utilities using biomass, mainly in the form of wood pellets, in large thermal power plants.

SBP's purpose is to facilitate the economically, environmentally, and socially responsible use of biomass enabling climate goals to be met.

The SBP Framework is designed as a clear statement of principles, standards, and processes necessary to demonstrate such compliance. Wherever possible, use is made of the FSC® and PEFC standards and processes already applied to other forest product streams. Further refinement and strengthening of these SBP standards will follow, as necessary.

SBP specifically addresses the accounting and reporting of Green House Gas Emissions (i.e., CO<sub>2</sub>). Accounting for GHG takes place through the entirety of the supply chain from forest to fuel.

## SBP & Renewable Energy Directive (REDII)

The Renewable Energy Directive is the legal framework for the development of clean energy across all sectors of the European Union (EU) economy, supporting cooperation between EU countries towards this goal. The Directive entered into force in December 2018, as part of the “Clean energy for all Europeans” package, aimed at maintaining the EU’s status as a global leader in renewables and, more broadly, helping it to meet its emissions reduction commitments under the Paris Agreement. It established a new binding renewable energy target for the EU for 2030 of at least 32%, with a clause for a possible upwards revision by 2023. This target is a continuation of the 20% target for 2020.

To help EU countries deliver on this target, the directive introduced new measures for various sectors of the economy, particularly on heating and cooling and transport, where progress has been slower (for example, an increased 14% target for the share of renewable fuels in transport by 2030). It also includes new provisions to allow citizens to play an active role in the development of renewables by enabling renewable energy communities and self-consumption of renewable energy and established better criteria to ensure bioenergy's sustainability.

To meet this requirement for the sale of wood pellets into the EU, the SBP certification scheme had developed an additional scope in the standard where BPs could be verified against the REDII requirements. Additional requirements of the certification include:

- Risk assessments for forest feedstock relating to the REDII indicators for
  - o legality of harvest
  - o forest regeneration
  - o protection of nature
  - o maintenance of soil & water
  - o long term forest capacity
- verification of processing residue feedstocks
- implementation of a mass balance system for accounting fiber

Drax’s Northern Operations has included this document within the scope of its SBP certification program. As part of this certification, Drax’s Northern Operations are committed to maintaining the requirements of SBP’s REDII mass balance system.

## British Columbia Regional Risk Assessment (BC RRA)

The sustainable biomass program (SBP) certification scheme endorsed a Regional Risk Assessment (RRA) for BC in August of 2021. The RRA was designed to identify risks within British Columbia associated with the 38 indicators that form [Standard 1 – Feedstock Compliance Standard](#) of the SBP certification scheme. The RRA process was completed in accordance with [SBP’s Regional Risk Assessment Procedure](#) and is required that biomass producers who operate with a supply base evaluation to consider the findings and develop mitigation measures to address any associated risk. British Columbia’s regional risk assessment report can be found [here](#) for reference.

The BC RRA statement of scope is as follows:

“Feedstock certified at the forest level through FSC® or PEFC-endorsed schemes such as SFI and CSA is considered SBP-compliant which represent a significant portion of the public and private forest lands in British Columbia. Uncertified feedstock must be evaluated using a risk-based approach if it is to count towards an SBP-compliant claim. The RRA-BC scope is the uncertified harvestable forest land base of BC.”

Within the main Scope of this RRA are three Sub-Scopes pertaining to different land designations within British Columbia:

- Sub-Scope 1: Uncertified Crown (Public) Forest Lands
- Sub-Scope 2: Uncertified Private Managed Forest Lands
- Sub-Scope 3: Other Private Lands, including agricultural land designations

The 38 indicators associated with the SBP certification scheme were measured separately against each Sub-Scope, resulting in specified risk designations being defined in the table below.

Threat due to forest mgt	Yes	Yes	Yes	Yes
Legislation Framework	Met	Met	Met	Gap
Mechanism of Implementation	Met	Met	Gap	Gap
Current Condition / Situation	Met	Gap	Gap	Gap
• FREP Program	• Monitoring Data			
• C&E Program	• Analysis			
• FPB Program	• Reports			
Risk Designation	Low	Specified	Specified	Specified
Crown Land			2.1.2 - HCV1 - Caribou 2.2.4 - Old Growth	2.1.2 - HCV2 - IFL
PMFL			2.1.2 - HCV1 - Caribou	2.1.2 - HCV2 - IFL 2.2.4 - Old Growth
OPL			2.1.2 - HCV1 - Caribou 2.1.2 - HCV3 - RTE 2.2.3 - Rare Eco/Habitat 2.2.6 - Water 2.4.1 - Health, Vitality	2.1.2 - HCV2 - IFL 2.1.3 - Conversion 2.2.1 - Planning 2.2.2 - Soil 2.2.4 - Old Growth 2.3.1 - Productivity 2.9.2 - Carbon

### Indicator 2.1.2 – High Conservation Values

This indicator assesses whether, once identified, appropriate actions are being taken to identify and address potential threats to the areas with high conservation values from forest management activities.

While there are numerous regulations for the management and protection of HCVs in BC, they provide a variable and inconsistent level of stewardship. For example, the Federal Species at Risk Act only applies to Federal lands within the province. As another example, Government Actions Regulation (GAR) orders are generally issued for local or regional areas creating gaps where the GAR orders are not applicable.

A forest manager who is unable to identify and address threats to HCVs from forestry operations is at risk of approving and undertaking activities that damage, degrade, or destroy the HCVs, in some cases irreversibly. Forestry operations ranging from access construction, harvesting, site preparation, and herbicide application may all threaten HCVs if they are undertaken in the wrong place, at the wrong time or in an inappropriate manner.

#### HCV 1 – Caribou – Sub-Scope 1, 2, & 3

On Crown land, Forest Stewardship Plans (FSPs) are required to meet the two wildlife and biodiversity objectives that are among the mandatory objectives in the Forest Planning and Practices Regulation (FPPR). One of these is a landscape level objective that can be addressed through the Landscape Unit Plans, Land and Resource Management Plans (LRMPs), and/or SLRMPs. The second objective is addressed at the stand-level by leaving wildlife trees. In addition, Section 7 of the FPPR sets out additional required wildlife objectives for FSPs, and Section 8 mandates conservation of biodiversity in riparian areas.

In 2013, the BC Auditor General evaluated the effectiveness of the provincial government’s implementation of policies and practices to conserve biodiversity and concluded that:

- significant gaps existed in government’s understanding of biodiversity in BC
- the government did not know whether its actions are resulting in the conservation of biodiversity, and
- the government was not adequately measuring and reporting on its progress in the conservation of biodiversity

A 2015 Forest Practices Board report on the effectiveness of Forest Stewardship Plans considered how well the objectives in FSPs were measurable and verifiable, based on the logic that objectives that could not be measured could not be verified and enforced. The FPB found a high level of measurability and enforceability associated with the wildlife and stand level biodiversity objectives, and moderate measurability of the riparian and landscape biodiversity objectives. However, these objectives do not deal specifically with species at risk and especially those which require landscape level management/recovery plans.



On Private Managed Forest Land (PMFL), the Minister has the authority to establish critical wildlife habitat zones. The Minister may also list SAR in Schedule C of the PMFL Regulation; as of 2018, 36 species are listed. Further, PMFL is managed under a results-based regulatory model that allows forest owners to develop and use management strategies most appropriate to the scale and location of their operations. The Managed Forest Council, which oversees PMFLs, monitors and enforces those requirements, which include provisions for protecting critical wildlife habitat, species at risk, water systems and riparian areas.

Inspections of PMFL conducted by the Managed Forest Council have resulted in a 99% compliance rate. Council's policy is to inspect every PMFL area at least once every five years and new entrants within three years of joining the program. Since 2007, a total of 623 annual inspections have been undertaken and nine instances of contravention have been identified, including one related to riparian areas.

No formal program for effectiveness monitoring of forest operations on other private land currently exists in the province. Monitoring is at the discretion of individual landowners and subject to their individual goals and objectives for the property.

HCV1 is assessed as specified risk on all ownerships due to the patchwork of protective measures that presently exists for several SAR, especially caribou. While protection orders can be issued, they are not issued systematically and there is considerable variation from District to District. The province does not yet have a provincial species at risk act that would consolidate direction. The province has also not managed to develop and implement a management approach that is generally maintaining caribou herds, and the boreal caribou recovery program is currently in draft form and has not yet been implemented, although significant changes have been indicated.

### **HCV 2 - Intact Forest Landscapes (IFLs) – Sub-Scope 1, 2, & 3**

Intact Forest Landscapes (IFLs) are defined by the Forest Stewardship Council as a territory within today's global extent of forest cover which contains forest and non-forest ecosystems minimally influenced by human economic activity, with an area of at least 500 km<sup>2</sup> (50,000 ha) and a minimal width of 10 km (measured as the diameter of a circle that is entirely inscribed within the boundaries of the territory).

The province of BC does not officially recognize Intact Forest Landscapes (IFLs) or an equivalent value in provincial planning and management requirements. As a result, there are no goals or objectives related to them, mechanism for implementation or monitoring or reporting for any of the ownership types. Since they are not recognized provincially, & there are no requirements for conservation, IFLs have been designated with specified risk on all forest ownership types.

### **HCV 3 – Rare, Threatened, & Endangered Ecosystems (RTE) – Sub-Scope 3**

The federal government maintains the Species at Risk Public Registry for species that fall under SARA and is available to all ownership types. BC has a great deal of information on species at risk and rare or endangered ecosystems, available through the Conservation Data Centre (CDC). The CDC maintains records of the species and ecosystems that occur in BC, assesses their conservation status, maps known locations and makes these data available on-line. Note that maps of some species at risk are not publicly available to protect their locations. This data is available to all ownership types.

Rare ecosystems are generally small in size, by their nature, and identified and mapped by the CDC. As a result, they are identified and protected in FSPs, as well as in plans on PMFL because the PMFLR requires the identification of critical wildlife habitat, and the government may direct how those areas are managed.

The minimum protections in SARA are in force, however only the province can regulate activities that have the potential to harm SAR and/or their habitat, and there is little regulatory action in this regard. BC has embarked on discussions with stakeholders and Indigenous communities as part of the process for developing a provincial species at risk act, but this process is in its early stages. At this point in time there is no consistent verifiable mechanism of implementation (i.e., BMPs) in place on other private land.

Monitoring/inspection results indicate verifiable evidence for crown land and PMFL ownership types and therefore low risk for HCV3. With the absence of legislation, best management practices, monitoring and/or data for HCV3 on other private land, a specified risk designation is determined.

To quantify areas of with potential risk for this indicator, the BP has spatially defined RTEs as either:

- Red & Blue listed ecological communities; or
- WWF Global 200 Terrestrial Ecoregions

To spatialize the ecological communities, the BP used all Biogeoclimatic (BEC) Zones that have one of the identified listed communities affiliated & overlap with private lands. For more information on all Red & Blue listed ecological communities, please see the [BC Species & Ecosystems](#) Explorer portal.

WWF has spatially defined the G200 ecoregions for terrestrial, marine, & freshwater ecosystems. In BC, only terrestrial ecoregions exist on this list. The BP used ecoregions that overlap with private lands to address this indicator.

### **The Muskwa-Slave Lake Taiga**

One of the two ecoregions identified in this exercise is the Muskwa-Slave Lake Taiga ecoregion. Lying at the junction of northern Alberta, northeastern British Columbia, southwestern Northwest Territories (including the Mackenzie River Valley), and a small corner of southeastern Yukon Territory, the ecoregion encompasses about half of Great Slave Lake and its southern shore, all of Wood Buffalo National Park, and westward to the foothills of the northern Rocky Mountains and southern Mackenzie Mountains.

The climate of the Muskwa-Slave Lake Taiga ecoregion is subhumid mid to high boreal with cool to warm summers and very cold winters. The average winter temperature ranges from -24.5°C to -18°C and the average summer temperature is about 12.5°C. Average annual precipitation ranges from 250 mm to 500 mm. The dominant forest vegetation is relatively tall and closed stands of quaking aspen, white spruce, and balsam fir, with smaller amounts of balsam poplar and black spruce.

About 20–50% of a typical landscape is covered by bogs and other wetlands. Lightning fire is a significant factor across the ecoregion and maintains a shifting mosaic of post-fire successional stages. This ecoregion supports one of the most intact and diverse large mammal communities in North America, including woodland caribou, wood bison, moose, wolf, grizzly bear, black bear, wolverine, and lynx, in addition to smaller-bodied species such as snowshoe hare, marten, and beaver. The park also contains the northernmost known population of red-sided garter snakes, which winter together in huge communal dens.

Notable birds include whooping crane, sandhill crane, ruffed grouse, and great grey owl. Nine species of colonial water birds breed on Great Slave Lake. In order of declining abundance, they are California gull, herring gull, common tern, mew gull, Arctic tern, Ring-billed gull, Caspian tern, parasitic jaeger, and Bonaparte's gull, in addition to black tern in nearby marshes. The Great Slave Lake is the only location in North America where these ten species occur together.

About 20% of this ecoregion is protected, and an additional 46% of habitat outside protected areas is still basically intact. However, land conversion, logging, and oil & gas production are serious threats.

The priority conservation actions for the next decade are to:

1. protect remaining intact blocks of forest, roadless areas, and undeveloped rivers and lakes;
2. greatly increase federal and provincial designation of conservation lands, and
3. reduce the intensity of logging and oil and gas exploration and production outside protected areas.

### **Central Pacific Northwest Coastal Forests**

The Central Pacific Northwest Coastal Forests ecoregion is a thin but long ecoregion extending from the southern Oregon coast in the south, northward through coastal Washington (including most of the Olympic peninsula), and British Columbia (including the western and northern two-thirds of Vancouver Island) to the

border with Alaska.

These forests are especially rich in epiphytes (plants growing on trees), fungi, amphibians, birds, and soil and canopy invertebrates. Major habitats include sea stacks, coastal headlands, sand dunes, tide pools, mud flats, salt marshes and estuaries, streams and rivers, and several types of forests.

The forests of this region, being very moist, are less affected by fire than more inland forests of the Pacific Northwest, but windstorms are a major disturbance. All but a few precious pockets of old-growth forest have been lost in the Oregon Coast Range, southern Washington, and much of the southern coastal zone of British Columbia, but large stands remain in the Olympic Peninsula and in the Great Bear Rainforest region north of Vancouver Island on the mainland coast of British Columbia.

The Great Bear Rainforest is noteworthy for having both grizzly bears and a white color form of black bear known as Kermode or Spirit bear, which occurs in approximately 10% of the bear population. Other wildlife includes the endangered seabird, marbled murrelet, as well as several other seabird species, sea otters, salmon, elk, black-tailed deer, puma, the threatened Oregon silverspot butterfly, many rare plants, the Olympic marmot and Vancouver Island marmot (both endemic species with very small ranges), and in the northern portion of the ecoregion, wolves and mountain goats.

Priority conservation actions for the next decade are to:

1. increase federal, state, provincial, and local acquisition of conservation lands, particularly to better represent the middle and lower elevation coastal rain forest communities and to connect coastal and upland forests;
2. improve forest management on public and private lands, with no more logging of old-growth or naturally disturbed early seral forest; and
3. where possible, reintroduce populations of locally extirpated species such as the wolf and grizzly bear.

### **Indicator 2.1.3 – Forest Conversion to Non-Forest**

This indicator in the RRA is intended to reduce the incentives for extensive conversion of natural forest to non-forest types. Criteria for conversion in the RRA is that feedstock was not sourced from forest converted into plantations or non-forest lands after January 2008. This includes harvest for agricultural clearings, municipal projects, and oil & gas projects.

Conversion of natural forest to plantations managed for fibre production and deforestation following harvesting are both practices that reduce or eliminate the biological diversity associated with the natural forest and reduce or eliminate any social benefits from the area. Extensive deforestation continues to be an important global contributor to climate change.

The definition of deforestation encompasses permanent conversion of natural forest to non-forest as a result of any anthropogenic-caused change in land use. SBP concurs with NDMS and the Forest Stewardship Council that forest roads do not contribute to conversion and therefore such roads were ignored in the assessment of this indicator.

The SBP Standard describes production plantation forests as *“forests of exotic species ... that are subject to intensive stand management, are fast growing, and are subject to short rotations”*. There has been very little conversion of forest to production plantations in BC since 2008. Treed areas that are predominantly under agricultural or urban land use are not forest. Area of forest, therefore, is not the same as area of tree cover. Consequently, area of forest is not easily mapped using satellite imagery.

Because the scale and rate of conversion in a region depends on local factors, the assessment of this indicator considers the provincial rate of deforestation, the economic drivers of deforestation and the cumulative impacts of deforestation caused by activities of all sectors.

### **Conversion to Plantations – Sub-Scope 1 (TFL43 ONLY)**

There have been experimental plantations of species such as native willow and larch planted in BC, however there is little commercial establishment of plantations in BC that would be considered production plantation forests. The Poplar and Willow Council of Canada identified 3,411 ha of hybrid poplar plantations in 2011 in BC, and Catalyst Paper reported 200 ha in 2007, with none reported subsequently. These plantations were established on TFL 43, which was unique in BC because the forest management objective was “to convert existing mixed or low quality deciduous and coniferous [natural] stands to productive cottonwood and hybrid poplar stands.” This objective is considered to violate this indicator.

### **Conversion to Non-Forest – Sub-Scope 3**

An overview of national deforestation rates and causes is provided before looking more specifically at rates in BC. Canada is among the nations with the lowest rate of deforestation in the world. The Food and Agriculture Organization’s (FAO) most recent Global Forest Resources Assessment (2015) reported a 0% rate of change to forest cover (2010 – 2015) in Canada. (Note that this means that any deforestation was balanced by afforestation, not necessarily that there was no deforestation. However, the result is suggestive of a low rate of deforestation.)

For Canada, NRCan (2018) reported an annual rate of 0.02% deforestation from all sources and states that the rate has been declining over the last 26 years, falling from 64,000 ha/yr in 1990 to 37,000 ha/yr in 2016. Annual deforestation caused by forestry declined from 3,682 ha in 1990 to 1,368 ha in 2016. In 2016 (current available data), forestry accounted for less than 4% of deforestation. Major contributors were agriculture (33%), mining, and oil and gas (33%), urbanization (18%) and hydro-electric developments (12%).

NRCan’s 2018 State of Canada’s Forests Report states that:

- Canada’s overall deforestation rate is expected to decline further over time.
- Deforestation resulting from activity in Canada’s oil and gas sector has increased since 1990, but conversion of forest to agricultural land uses will likely remain the largest cause of deforestation in Canada. These conversions are small relative to the overall size of Canada’s forests.

The data presented above indicates that the rate of deforestation in BC is low and has been declining. Forestry is a minor contributor to deforestation, with an average annual deforestation rate of 513 ha/yr between 2012 and 2016, and the amount of deforestation caused by the sector has also been declining. This is the hallmark of an industry that is largely meeting the intent of this indicator, as it is certainly not a driver of deforestation.

On private land, specifically on treed lands being converted for agricultural purpose, the downed fibre is often left to decompose or burned. Both these actions result in increased GHG emission, as well as poor utilization of a resource. Conversion to non-forest lands is more likely to occur on ‘other private land’ due to changes in land use. The indicator requires no sourcing from converted stands. There is no legislation restricting conversion, or Best Management Practices at the local level, or data on conversion to non-forest lands nor readily available conformance data. Based on this, the designation for ‘other private land’ is specified risk.

### **Indicator 2.2.1 – Forestry Planning – Sub-Scope 3**

There is no provincial legislation specific to forest management practices on other private land. Landowners are subject to some sections of some Federal and provincial acts such as the Federal Species at Risk Act, Federal Fisheries Act, Water Sustainability Act, and the Wildlife Act. The Riparian Areas Regulation (RAR) (enacted under Section 12 of the Fish Protection Act) provides the legislated direction needed by local governments to achieve improved protection of fish and fish habitat. The regulation is limited as it applies only to riparian habitat in association with new residential, commercial, and industrial developments on land under local jurisdiction.

Regardless of ownership type, all timber harvested in BC must comply with the Forest Act provisions dealing with timber scaling, marking and transportation. FLNRORD staff are responsible for assessing and ensuring compliance with the Forest Act.

Local municipalities and regional districts may have bylaws regulating tree cutting and/or may require that

development permits be obtained prior to tree removal in riparian areas, however requirements vary by jurisdiction. Development permit area policies and requirements are generally specified in official community plans with approvals subject to review by local governments.

No formal program for effectiveness monitoring of forest operations on other private land currently exists in the province. Monitoring is at the discretion of individual landowners and subject to their individual goals and objectives for the property. All Land Enforcement of federal government regulations on Crown and private forest land is conducted by other regulatory agencies, including Environment Canada and Fisheries & Oceans Canada.

Enforcement of development permit area requirements and other bylaws are responsibility of municipal/ regional district bylaw officers. Enforcement of applicable legislation on other private land is responsibility of designated authorities.

As a result of the absence of legislation governing forest management planning, best management practices and monitoring on other private land, and the range of variance in local bylaws surrounding development in riparian areas, a specified risk is designated.

### **Indicator 2.2.2 – Soil Quality & Health – Sub-Scope 3**

In the context of this indicator, soil quality is equivalent to soil productivity which is defined as the ability for a forest soil to allow forests to grow, produce crops and function with minimal human intervention. This indicator evaluates soil quality on an individual site level; cumulative impacts to soil quality on the landscape from harvesting and road construction is beyond the scope of this indicator.

Potential threats from forest management activities (i.e., harvesting, and roadbuilding) can include on and off-site negative impacts to soil productivity, hydrology, watersheds, and ecological values. Disturbances such as landslides, erosion and sedimentation can result in public safety and/or infrastructure damage.

Currently there is no provincial legislation that addresses soil conservation on other private land in British Columbia. Local governments may pass bylaws requiring the application for development permits prior to development (including timber removal) on steep terrain (ex: slopes >25%), however exact requirements vary by jurisdiction. Terrain stability or other forms of geomorphological assessments may be required in obtaining a development permit. No formal program for effectiveness monitoring of forest operations on other private land currently exists in the province. Monitoring is at the discretion of individual landowners and subject to their individual goals and objectives for the property.

As a result of the lack of regulation, best management practices, monitoring and/or data on other private land, a specified risk is designated.

### **Indicator 2.2.3 – Rare Ecosystems & Habitat – Sub-Scope 3**

This indicator is similar to HCV 3 but differs where the requirement for 2.2.3 is that “key” ecosystems & habitats are conserved or set aside in their natural state. The primary question in assessing this indicator is how to identify which ecosystems and habitats are “key”. Important ecosystems and habitats occur at both the landscape level and the stand level – the indicator wording provides no spatial context. The language of the indicator speaks to the conservation or preservation of these “key” lands, which suggests that rare or threatened ecosystems can be considered “key”. The interpretation notes provided in the SBP standard states that key ecosystems and habitats include areas with statutory designations or high conservation values, and that the conserved or set aside areas must be of sufficient size or connected with other areas to ensure their long-term viability.

According to British Columbia Conservation Data Centre (CDC) and the Standards for Mapping Ecosystems at Risk in BC, key ecosystems include:

- Ecosystems at risk, including ecological communities listed as special concern, threatened, or endangered by the British Columbia Conservation Data Centre (CDC)

- Sensitive ecosystems, including those that are at-risk or are ecologically fragile in the provincial landscape

Forest operations activities, as well as the activities by other sectors, may pose a threat to key ecosystems and habitats through fragmentation, the direct and indirect effects associated with access, and loss or degradation of key ecological attributes for ecosystems and habitats sensitive to logging disturbance.

Other private land is the least regulated form of ownership considered within the RRA. There are currently few required forest management practices on other private land; for example, there is no formal requirement for wildlife or habitat protection. There is minimal direction surrounding working within riparian areas other than what may be present in applicable official community plans and bylaws. As a result of the absence of legislation, best management practices, monitoring and/or data a specified risk designation is assigned to other private land in BC.

To quantify areas of with potential risk for this indicator, the BP has spatially defined Rare Eco & Habitat as either:

- Red & Blue listed ecological communities; or
- WWF Global 200 Terrestrial Ecoregions

To spatialize the ecological communities, the BP used all Biogeoclimatic (BEC) Zones that have one of the identified listed communities affiliated & overlap with private lands. WWF has spatially defined the G200 ecoregions for terrestrial, marine, & freshwater ecosystems. In BC, only terrestrial ecoregions exist on this list. The BP used ecoregions that overlap with private lands to address this indicator.

### **Indicator 2.2.4 – Old Growth Management – Sub-Scope 1, 2, & 3**

This indicator assesses that biodiversity in the province is protected; The conservation of key habitats and ecosystems, as well as the extent to which areas with high conservation values were protected.

The BC Auditor-General defined biodiversity as including “the variety of ecosystems, genes and species on earth, as well as the natural processes that maintain them”. Management and conservation of biodiversity is recognized by governments and practitioners alike as very complex. How land management is planned and implemented is key to adequately conserving, managing, and protecting biodiversity. In BC, biodiversity is managed and protected at:

- Landscape Level: retaining habitat patterns and seral stages that are like those of natural landscapes; and
- Stand Level: retaining wildlife trees, coarse woody debris, and wildlife habitat features.

#### **Landscape-level Approach**

The provincial government’s approach to maintaining landscape-level biodiversity, as set out in the FPPR, is to arrange harvest blocks in a way that emulates natural disturbance patterns to the extent practicable. Landscape level planning for biodiversity conservation relies on higher level plans to guide landscape management and provide direction on biodiversity, old growth forest retention, wildlife habitat maintenance, etc. Land use, landscape and watershed level plans have been completed at a regional or sub-regional scale for most areas of the province, although they are of varying vintages and have usually not been updated since they were developed. These plans include:

- Landscape Unit Plans
- Land and Resource Management Plans (LRMPs)
- Strategic Land & Resource Management Plans (SLRMPs)

It is intended that FSPs incorporate land use and other relevant direction from these higher-level plans to manage operations from a landscape perspective. FSPs are also required to reflect the direction in GARs for areas such as ungulate winter range.

Old growth is an important component of biodiversity – it is mature forests that are harvested and many of the

province's species at risk favour or exclusively inhabit exclusively old forests. The province requires Old Growth Management Areas (OGMAs) to be spatially identified in FSPs where old growth orders are in effect. However, where there is not an old growth order in force, plan authors have the option of including "non-legal" OGMAs in their FSPs. Some do this and protect the OGMAs, despite having no legal obligation to do so, while others do not. Licensees are also permitted to move OGMAs around over the landscape. More significantly, most of the province's old forest consists of small trees in areas with low productivity, such as alpine areas. A recent report (April 2020) indicated that only 3% of BC's old forest supports large trees, most of which is on the BC Coast. In summary, the level of protection provided by OGMAs does not recognize different types of old forest and is applied on a variable and inconsistent basis across the landscape.

### Stand-level Approach

At the stand level, retaining wildlife trees, coarse woody debris and wildlife habitat features such as stick nests and bear dens is the biodiversity objective. The maintenance of riparian reserves is also a requirement. Wildlife tree patches and riparian reserves are designated in operational plans; wildlife trees and coarse woody debris is retained by the operators who are trained to be able to leave appropriate types and amounts of each.

Resource based activities can potentially "have a negative impact on several components of biodiversity such as functioning ecosystems, species and genetic diversity and habitat protection". Forest operations, as well as activities by other sectors (i.e. energy, agriculture), can potentially pose a threat to the sustenance of biodiversity. Harvesting disturbance, the direct and indirect effects (e.g. fragmentation) associated with access, and the loss or degradation of key ecological attributes can influence the abundance and distribution of biological richness.

A recent report (April 2020) found that the amount of old forest was highly variable by biogeoclimatic zone, with several of the most productive zones having less than 1% old forest. There are clear indications that there is a high level of public concern with the way that old growth is being managed in BC, most notably the provincial government's appointment of a two-person panel to lead an Old Growth Strategic Review (results and recommendation unavailable at the time of RRA-BC public consultation).

Protected areas are a part of the approach to conserving biodiversity however with protected areas representing approximately 15% of the land base, measures must be taken on the unprotected lands to conserve biological diversity.

There is a considerable body of legislation, regulations, standards, and guidelines intended to protect / conserve biodiversity values. FRPA contains required indicators that must be implemented to conserve landscape-level and stand-level biodiversity; however, these define biodiversity very narrowly. The Auditor-General and the Forest Practices Board have identified numerous problems that are limiting the province's efforts to conserve biodiversity, to track the implementation of the associated measures, and to assess their effectiveness. The Forest and Range Evaluation Program (FREP) has been found to be limited in its ability to assess the effectiveness of mandated practices in achieving the province's biodiversity goals. The management of old growth in BC, which is a substantial component of biodiversity, also suffers from several weaknesses which limit its effectiveness, including the province's lack of ability to track implementation and compliance. The conservation of biological diversity at the stand level is in general better implemented and appears more likely to be effective than the measures in place to conserve biodiversity at the landscape level.

Based on the evidence reviewed and the pending changes to planning and management of Old Growth in BC, it has been determined that feedstock coming from uncertified Crown Land be assessed as specified risk.

The Private Managed Forest Land Act has the following requirements relevant to protecting biodiversity:

- Critical habitat, as defined through section 5 of the provincial Wildlife Act and identified through the Federal Critical habitat for Species at Risk list; and
- Riparian tree retention, defined in the PMFL Field Guide

In 2012, the Managed Forest Council undertook an effectiveness audit to assess whether the forest

management objectives established under the PMFL Act were being achieved. This is the first audit that evaluated the effectiveness of the Private Managed Forest Land Council regulation. The audit found that forest management objectives were being met and, in many cases, the regulatory standards were exceeded. However, no critical wildlife habitat had yet been identified on private managed forest land.

There are few requirements in place to implement biodiversity conservation measures on PMFL. The PMFLA requires registered landowners to meet objectives regarding soil conservation, water quality, fish habitat and critical wildlife habitat; these objectives support biodiversity but are too narrow to protect existing levels. In addition, while the legal means exists to designate all or part of a PMFL area as critical wildlife habitat, however this is not done. Other than these requirements, and compliance with the federal Fisheries Act and the BC Water Sustainability Act, PMFL owners face little in the way of requirements to conserve biological diversity.

There are no requirements related to old forest, patch or wildlife tree retention, or maintenance of other structural and compositional elements that support biodiversity. Based on the evidence reviewed, biodiversity protection related to Old Growth on private managed forest land has been rated as specified risk.

Regarding forest management, landowners are subject to federal laws such as the Species at Risk Act and Fisheries Act, as well as other provincial acts including the Water Sustainability Act, and the Wildlife Act.

On other private land, there are no additional requirements to protect biodiversity. There may be requirements in Regional District planning guidelines, Official Community Plans, or municipal bylaws. No formal program for effectiveness monitoring of forest operations on other private land currently exists in the province as monitoring is at the discretion of individual landowners and subject to their individual goals and objectives for the property. As a result of the absence of legislation governing forest management planning, best management practices, monitoring and/or data on other private land a specified risk is designated.

### **Indicator 2.2.6 – Water Quality – Sub-Scope 3**

This indicator aims at ensuring negative impacts on ground water, surface water, and water downstream from forest management are minimised. Forest management activities may negatively affect water quality and/or quantity through increased sedimentation, loss of riparian habitat and function, loss/degradation of fish habitat, loss of water quality for domestic use and alteration of peak flows that may result in increased flooding.

Under the Riparian Areas Protection Act and Regulation, local government bodies develop and implement the following that may be applicable to other private land:

- Development Permit Areas (DPAs)
- Zoning Bylaw provisions
- Watercourse or Environmental Protection bylaws
- Municipal policies

In 2017 a multi-association guidebook for professional practice for implementing the Riparian Areas Protection Act and Regulation was published. An online report submission system called the 'Riparian Areas Regulation Notification System' is the online portal to where assessment reports are submitted and where notifications to appropriate levels of government are made. Outside of development permits, very little information was found which related to mechanisms for this indicator on other private land.

The Riparian Areas Protection Act and Regulation uses a 'professional reliance' model to meet its objectives. A 2014 Office of the Ombudsperson report found that FLNRORD did not have the ability to ensure local governments were implementing the Riparian Areas Protection Act and Regulation. Many of the recommendations made in the 2014 report were considered and integrated into the 2019 amendment to the Riparian Areas Protection Act, however, no other results of compliance and enforcement of this Act could be found. Enforcement of development permit area requirements and other bylaws are the responsibility of municipal/ regional district bylaw officers and are often complaints driven. Outside of specific municipal bylaw monitoring, no formal program for effectiveness monitoring of forest operations on other private land currently exists in the province.

As a result of the limited regulation and lack of best management practices, monitoring and/or data on other



private land, a specified risk is designated.

### **Indicator 2.3.1 – Forest Productivity – Sub-Scope 3**

This indicator is intended to show that harvest levels are justified by inventory and growth data. Adding onto this, the SBP identifies the need to show that feedstock harvesting does not exceed the long-term production capacity of the forest, avoids significant negative impacts on forest productivity and ensures long-term economic viability.

Biomass producers in British Columbia source most of their fibre from mill residues and grinding roadside logging slash. Salvage of timber killed by the mountain pine beetle (MPB) and large fires is a source of fibre depending on several logistics, enabling these stands to be reforested and contribute to productivity. Forest productivity can be reduced if harvesting causes levels of site disturbance that reduce future growth capacity or if excessive amounts of biomass are removed from the site.

Management practices that lead to overharvesting of the forest, damages the soil, or removes excessive amounts of biomass from the harvest block will erode the sustainability of the forest and the timber supply it produces. Private land is unregulated with respect to harvest sustainability. As private land is often either agricultural or intended for development, there is little information available regarding the timber land base and/or forest management on other private land.

Forest management is not regulated on other private land and there is no allowable harvest calculated. Consequently, there is nothing that requires a private landowner to maintain the productivity of his or her lands, and activities are not monitored or reported on. Therefore, this indicator is assessed as specified risk for the other private land sub-scope.

### **Indicator 2.4.1 – Forest Health, Vitality – Sub-Scope 3**

The intent of this indicator is for health, vitality, and other services provided by forest ecosystems are maintained or improved.

The SBP standard states that health and vitality relate to a forest ecosystem's ability to withstand change. Suggested indicators include the level of disturbance, changes in biodiversity, and /or the presence or absence of key indicator species. The standard also identified several relevant functions:

- Forest regeneration and succession,
- Genetic, community and species diversity; and
- Natural cycles affecting the productivity of the ecosystem.

The overall thrust of forest regulation in BC is to manage the forests to maintain their biodiversity and productivity while supporting a substantial timber harvest. During the past decades, the regulatory shifts have extended and tightened protections for a wide range of values and benefits and reduced the amount of area available for commercial harvesting. This trend remains in place. At the same time, there is strong resistance to the idea of planting fast-growing exotic tree species or intensively managing native species to the extent that the plantations provide little ecological value. There are regulations in place to use seed of native species sourced from appropriate locations for growing tree seedlings, and there are considerable areas where renewal is natural. Even where trees are planted, there are usually numerous conifer and deciduous natural seedlings that also germinate, providing both diversity as well as a more diverse structure to the forest as it develops and contributing to resilience.

Management that reduces the resilience of forests or impedes, alters, or disrupts ecological functions makes forests more susceptible to degradation and irreversible losses or damage. On other private land, there are few regulatory requirements, and these are specific in nature (most apply to water quality), hence there is no overall direction or requirement that other private forest land should be managed to create a resilient forest. This is the reason why Sub-Scope 3 is assessed as specified risk for this indicator.

### Indicator 2.9.2 – Forest Carbon – Sub-Scope 3

This indicator references the capability of the forest to store carbon, and while forest carbon budget models are available for assessing carbon budgets over time, the level of the annual allowable cut (AAC) also serves as a reasonable surrogate for forest carbon balance. If the AAC is stable or increasing over time, that suggests that this indicator is being met for the entire forest estate.

It is notable that 81% biomass feedstock in BC is derived from residue from sawmills (e.g. sawdust, bark, etc.) and the grinding of logging slash (5%) left at landings after processing. Low-quality timber that otherwise is unmerchantable is also used as pellet furnish. The utilization of this fibre is not considered to count against the AAC.

The threat implicit in this indicator is that overharvesting or conducting harvest and related operations in such a manner that the productivity of the site is damaged, or renewal is delayed has the potential to reduce the productivity of the forest and its capacity to sequester carbon.

In BC there is no legislation specific to forest carbon on any ownership. Related legislation is focused on maintaining a sustainable long-term harvest and sustaining forest productivity within the range of natural variability. The Provincial Government has, and is continuing to, integrate climate change considerations into its policies and programs; FLNRORD released a Climate Change Strategy in 2015 and a Forest Carbon Strategy in 2016. The carbon strategy outlines six broad approaches, including increasing the carbon density at stand level and at the landscape level. BC’s Climate Leadership Plan includes a Forest Carbon Initiative that will enhance the potential of BC’s forests to store carbon and increase the amount of tree planting, however these initiatives have not led to any requirements.

Forest management is very lightly regulated on other private land and there is no allowable harvest. Therefore, there is nothing that requires a private landowner to maintain the productivity of his or her lands, and activities are not monitored or reported on. This is the reason that the indicator is assessed as specified risk for the other private land sub-scope.

## 7. Appendix D: Contacts

Fiber Procurement Contacts	Relevant Sites	
Rob Sweeney Biomass Supervisor <a href="mailto:Robert.Sweeney@drax.com">Robert.Sweeney@drax.com</a>	<b>Smithers Pellet Limited Partnership</b> 1723 Dahlie Road PO Box 699, Smithers, BC V0J 2N0  <b>Burns Lake Division</b> 22975 Hwy 16 East Burns Lake, BC V0J 1E3	<b>Houston Pellet Limited Partnership</b> Km#1 North Road, PO Box 1180 Houston, BC V0J 1Z0  <b>Meadowbank Division</b> 41180 Hwy 97 N. Strathnaver, BC V0K 1S1
Josh McQuillin Superintendent of Biomass <a href="mailto:Josh.McQuillin@drax.com">Josh.McQuillin@drax.com</a>	<b>Smithers Pellet Limited Partnership</b> 1723 Dahlie Road PO Box 699, Smithers, BC V0J 2N0  <b>Burns Lake Division</b> 22975 Hwy 16 East Burns Lake, BC V0J 1E3	<b>Houston Pellet Limited Partnership</b> Km#1 North Road, PO Box 1180 Houston, BC V0J 1Z0  <b>Entwistle Division</b> 7317 Twp. Rd. 534 Box 660, Entwistle, AB, T0E 0S0
Michael Thomas	<b>Meadowbank Division</b>	<b>Lavington Pellet Limited</b>

**Western Canada SFI Implementation Committee (WCSIC)**

<p>Biomass Purchaser  <a href="mailto:Michael.Thomas@drax.com">Michael.Thomas@drax.com</a></p>	<p>41180 Hwy 97 N.                  Strathnaver, BC V0K 1S1</p> <p><b>Williams Lake Division</b>                  1160 South Lakeside Drive                  Williams Lake, BC V2G 3A6</p> <p><b>Armstrong Division</b>                  PO Box 280, 3480 Pleasant                  Valley Road</p>	<p><b>Partnership</b>                  9900 School Road                  Coldstream, BC V1B 3C7</p> <p><b>Princeton Division</b>                  301 Old Hedley Road                  Princeton, BC V0X 1N0</p>
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Sustainability Contacts	Relevant Sites
<p>Gage Wasylyshen                  Sustainability Certification Lead  <a href="mailto:Gage.Wasylyshen@drax.com">Gage.Wasylyshen@drax.com</a></p>	<p>All</p>
<p>Sean Ellens                  Sustainability Forester  <a href="mailto:Sean.Ellens@drax.com">Sean.Ellens@drax.com</a></p>	<p>All</p>

## 8. Appendix E: FECVs

### Species relating to British Columbia

Scientific Name	English Name	Category	Global Status
<i>Claytonia washingtoniana</i>	Washington springbeauty	Vascular Plant	G2G4
<i>Collema coniophilum</i>	crumpled tarpaper	Lichen	G2
<i>Cryptomastix devia</i>	Puget Oregonian	Invertebrate Animal	G2
<i>Dendroscosticta oroborealis</i>	lesser green moon	Lichen	G1G2
<i>Deroceras hesperium</i>	Evening Fieldslug	Invertebrate Animal	G2Q
<i>Apantesis complicata</i>	Island Tiger Moth	Invertebrate Animal	G2
<i>Limnanthes macounii</i>	Macoun's meadow-foam	Vascular Plant	G2?
<i>Lupinus rivularis</i>	streambank lupine	Vascular Plant	G2G4
<i>Meconella oregana</i>	white meconella	Vascular Plant	G2
<i>Myotis septentrionalis</i>	Northern Myotis	Vertebrate Animal	G2G3
<i>Rana pretiosa</i>	Oregon Spotted Frog	Vertebrate Animal	G2
<i>Salix raupii</i>	Raup's willow	Vascular Plant	G2
<i>Spiranthes diluvialis</i>	Ute lady's tresses	Vascular Plant	G2G3
<i>Staala gwaii</i>	Haida Gwaii Slug	Invertebrate Animal	G2?

### Ecological Communities relating to British Columbia

Scientific Name	English Name	Global Status
<i>Abies amabilis</i> - <i>Thuja plicata</i> / <i>Tiarella trifoliata</i> Moist Maritime 1	amabilis fir - western redcedar / three-leaved foamflower Moist Maritime 1	G2
<i>Abies grandis</i> / <i>Mahonia nervosa</i>	grand fir / dull Oregon-grape	G1
<i>Abies grandis</i> / <i>Tiarella trifoliata</i>	grand fir / three-leaved foamflower	G1
<i>Alnus rubra</i> / <i>Carex obnupta</i> [ <i>Populus trichocarpa</i> ]	red alder / slough sedge [ black cottonwood ]	G1
<i>Amelanchier alnifolia</i> / <i>Elymus trachycaulus</i>	saskatoon / slender wheatgrass	G2
<i>Anaphalis margaritacea</i> - <i>Symphyotrichum foliaceum</i>	pearly everlasting - leafy aster	G2
<i>Arbutus menziesii</i> / <i>Arctostaphylos columbiana</i>	arbutus / hairy manzanita	G2
<i>Artemisia campestris</i> - <i>Festuca rubra</i> / <i>Racomitrium canescens</i>	northern wormwood - red fescue / grey rock-moss	G1
<i>Artemisia campestris</i> - <i>Hesperostipa curtisetata</i>	northern wormwood / short-awned porcupinegrass	G2
<i>Artemisia tridentata</i> / <i>Pseudoroegneria spicata</i>	big sagebrush / bluebunch wheatgrass	G2
<i>Artemisia tridentata</i> / <i>Pseudoroegneria spicata</i> - <i>Balsamorhiza sagittata</i>	big sagebrush / bluebunch wheatgrass - arrowleaf balsamroot	G2
<i>Artemisia tripartita</i> / <i>Pseudoroegneria spicata</i> - <i>Balsamorhiza sagittata</i>	threetip sagebrush / bluebunch wheatgrass - arrowleaf balsamroot	G1
<i>Carex lasiocarpa</i> - <i>Rhynchospora alba</i>	slender sedge - white beak-rush	G2
<i>Carex macrocephala</i> Herbaceous Vegetation	large-headed sedge Herbaceous Vegetation	G1G2

<i>Carex sitchensis</i> / <i>Sphagnum</i> spp.	Sitka sedge / peat-mosses	G2
<i>Danthonia intermedia</i> Herbaceous Vegetation	timber oatgrass Herbaceous Vegetation	G2G3
<i>Deschampsia cespitosa</i> - <i>Sidalcea hendersonii</i>	tufted hairgrass - Henderson's checker-mallow	G2
<i>Festuca roemerii</i> - <i>Koeleria macrantha</i>	Roemer's fescue - junegrass	G1
<i>Myosurus minimus</i> - <i>Montia</i> spp. - <i>Limnanthes macounii</i>	tiny mousetail - montias - Macoun's meadow-foam	G2
<i>Picea engelmannii</i> x <i>glauca</i> / <i>Stereocaulon</i> spp.	hybrid white spruce / foam lichens	G1
<i>Picea sitchensis</i> / <i>Carex obnupta</i>	Sitka spruce / slough sedge	G2G3
<i>Picea sitchensis</i> / <i>Maianthemum dilatatum</i> Very Wet Hypermaritime 1	Sitka spruce / false lily-of-the-valley Very Wet Hypermaritime 1	G1G2
<i>Picea sitchensis</i> / <i>Maianthemum dilatatum</i> Wet Hypermaritime 1	Sitka spruce / false lily-of-the-valley Wet Hypermaritime 1	G2G3
<i>Picea sitchensis</i> / <i>Rubus spectabilis</i> Dry	Sitka spruce / salmonberry Dry	G1G2
<i>Picea sitchensis</i> / <i>Trisetum canescens</i>	Sitka spruce / tall trisetum	G1G2
<i>Pinus contorta</i> / <i>Carex pauciflora</i> / <i>Sphagnum</i> spp.	lodgepole pine / few-flowered sedge / peat-mosses	G2G3
<i>Pinus contorta</i> / <i>Polystichum kruckebergii</i> - <i>Aspidotis densa</i>	lodgepole pine / Kruckeberg's holly fern - dense lace fern	G1
<i>Pinus contorta</i> / <i>Rhododendron macrophyllum</i>	lodgepole pine / Pacific rhododendron	G2
<i>Plantago maritima</i> - <i>Puccinellia pumila</i>	sea plantain - dwarf alkaligrass	G2
<i>Populus tremuloides</i> / <i>Achnatherum richardsonii</i> - <i>Geum triflorum</i>	trembling aspen / spreading needlegrass - old man's whiskers	G2
<i>Populus tremuloides</i> / <i>Malus fusca</i> / <i>Carex obnupta</i>	trembling aspen / Pacific crab apple / slough sedge	G2
<i>Populus tremuloides</i> / <i>Philadelphus lewisii</i>	trembling aspen / mock-orange	G1
<i>Populus trichocarpa</i> - <i>Pseudotsuga menziesii</i> / <i>Symphoricarpos albus</i> - <i>Cornus sericea</i>	black cottonwood - Douglas-fir / common snowberry - red-osier dogwood	G1G2
<i>uva-ursi</i> Dry Submaritime	Douglas-fir - lodgepole pine / kinnikinnick Dry Submaritime	G2G4
<i>Pseudotsuga menziesii</i> - <i>Pinus contorta</i> / <i>Holodiscus discolor</i> / <i>Cladina</i> spp.	Douglas-fir - lodgepole pine / oceanspray / reindeer lichens	G2G3
<i>Pseudotsuga menziesii</i> / <i>Acer glabrum</i> / <i>Hylocomium splendens</i>	Douglas-fir / Douglas maple / step moss	G2
<i>Pseudotsuga menziesii</i> / <i>Mahonia nervosa</i>	Douglas-fir / dull Oregon-grape	G2
<i>Pseudotsuga menziesii</i> / <i>Melica subulata</i>	Douglas-fir / Alaska oniongrass	G1
<i>Pseudotsuga menziesii</i> / <i>Polystichum munitum</i>	Douglas-fir / sword fern	G2G4
<i>Purshia tridentata</i> / <i>Hesperostipa comata</i>	antelope-brush / needle-and-thread grass	G2
<i>Quercus garryana</i> - <i>Acer macrophyllum</i> - <i>Prunus</i> spp.	Garry oak - bigleaf maple - cherries	G1
<i>Quercus garryana</i> - <i>Arbutus menziesii</i>	Garry oak - arbutus	G1
<i>Quercus garryana</i> / <i>Bromus carinatus</i>	Garry oak / California brome	G1
<i>Quercus garryana</i> / <i>Holodiscus discolor</i>	Garry oak / oceanspray	G1

<i>Rhododendron macrophyllum</i> / <i>Gaultheria ovatifolia</i> / <i>Cladonia</i> spp.	Pacific rhododendron / Oregon wintergreen / clad lichens	G1
<i>Salix exigua</i> - <i>Salix amygdaloides</i>	narrow-leaf willow - peach-leaf willow	G1Q
<i>Salix lasiandra</i> var. <i>lasiandra</i> / <i>Cornus sericea</i> / <i>Equisetum</i> spp.	Pacific willow / red-osier dogwood / horsetails	G2
<i>Salix sitchensis</i> - <i>Salix lasiandra</i> var. <i>lasiandra</i> / <i>Lysichiton americanus</i>	Sitka willow - Pacific willow / skunk cabbage	G2
<i>Sidalcea hendersonii</i> Tidal Marsh	Henderson's checker-mallow Tidal Marsh	G1
<i>Sporobolus cryptandrus</i> - <i>Hesperostipa comata</i>	sand dropseed - needle-and-thread grass	G2
<i>Thuja plicata</i> - <i>Picea sitchensis</i> / <i>Oplopanax horridus</i> Very Wet Hypermaritime 1	western redcedar - Sitka spruce / devil's club Very Wet Hypermaritime 1	G1G3
<i>Thuja plicata</i> - <i>Pseudotsuga menziesii</i> / <i>Acer circinatum</i>	western redcedar - Douglas-fir / vine maple	G2G3
<i>Thuja plicata</i> / <i>Achlys triphylla</i>	western redcedar / vanilla-leaf	G1
<i>Thuja plicata</i> / <i>Oemleria cerasiformis</i>	Western Redcedar / Osoberry	G1
<i>Thuja plicata</i> / <i>Oplopanax horridus</i>	western redcedar / devil's club	G2G4
<i>Thuja plicata</i> / <i>Polystichum munitum</i> Dry Maritime	western redcedar / sword fern Dry Maritime	G2G3
<i>Trichophorum alpinum</i> / <i>Scorpidium revolvens</i>	Hudson Bay clubrush / rusty hook-moss	G2
<i>Trichophorum cespitosum</i> / <i>Campylium stellatum</i>	tufted clubrush / golden star-moss	G2G3
<i>Tsuga heterophylla</i> - <i>Abies amabilis</i> / <i>Hylocomium splendens</i>	western hemlock - amabilis fir / step moss	G2G3
<i>Tsuga heterophylla</i> - <i>Pinus contorta</i> / <i>Pleurozium schreberi</i>	western hemlock - lodgepole pine / red-stemmed feathermoss	G2G3
<i>Tsuga heterophylla</i> - <i>Pseudotsuga menziesii</i> / <i>Hylocomiadelphus triquetrus</i> Dry Submaritime 1	western hemlock - Douglas-fir / electrified cat's-tail moss Dry Submaritime 1	G2G3
<i>Tsuga heterophylla</i> - <i>Pseudotsuga menziesii</i> / <i>Hylocomiadelphus triquetrus</i> Dry Submaritime 2	western hemlock - Douglas-fir / electrified cat's-tail moss Dry Submaritime 2	G2G3
<i>Tsuga heterophylla</i> - <i>Thuja plicata</i> / <i>Struthiopteris spicant</i>	western hemlock - western redcedar / deer fern	G2G3

## Species relating to Alberta

Scientific Name	English Name	Category	Global Status
<i>Acerpenna akataleptos</i>	Out-of-reach Small Minnow Mayfly	Invertebrate Animal	G1G2
<i>Acronicta falcula</i>	Corylus Dagger Moth	Invertebrate Animal	G2G4
<i>Allomyia hector</i>	Holdfast Mountain Caddisfly	Invertebrate Animal	G1G2
<i>Amanita armillariiformis</i>	fungus	Fungus	G2?
<i>Anepeorus rusticus</i>	Rustic Flat-headed Mayfly	Invertebrate Animal	G2
<i>Apobaetis futilis</i>	Futile Small Minnow Mayfly	Invertebrate Animal	G1G3
<i>Aspicilia arctica</i>	sunken disk lichen	Fungus/Lichen	G2G4
<i>Aspicilia caesiopruinosa</i>	a lichen	Fungus/Lichen	G2G4
<i>Baetis rusticans</i>	Rusty Small Minnow Mayfly	Invertebrate Animal	G2G3
<i>Baetisca columbiana</i>	Columbia Armored Mayfly	Invertebrate Animal	G2G4

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<i>Bellemeria subsorediza</i>	brown sunken disk lichen	Fungus/Lichen	G2G4
<i>Biatora subduplex</i>	disk lichen	Fungus/Lichen	G2G4
<i>Bolshecapnia sasquatchi</i>	sasquatch snowfly	Invertebrate Animal	G2
<i>Bombus suckleyi</i>	Suckley's Cuckoo Bumble Bee	Invertebrate Animal	G2G3
<i>Caloplaca tornuensis</i>	a lichen	Fungus/Lichen	G2G4
<i>Catillaria subnegans</i>	lichen	Fungus/Lichen	G1
<i>Chaenotheca nitidula</i>	a lichen	Fungus/Lichen	G2G4
<i>Cladonia imbricarica</i>	Imbricaric Pixie-cup Lichen	Fungus/Lichen	G2G3
<i>Collema coniophilum</i>	Tarpaper Lichen	Fungus/Lichen	G2
<i>Crataegus aquacervensis</i>	Elkwater hawthorn	Vascular Plant	G2
<i>Crataegus rivuloadamensis</i>	Adams Creek hawthorn	Vascular Plant	G2
<i>Crataegus rivulopugnensis</i>	Battle Creek hawthorn	Vascular Plant	G1
<i>Crataegus rubibracteolata</i>	red bracteole hawthorn	Vascular Plant	G2
<i>Ephydatia muelleri</i>	Mueller's Freshwater Sponge	Invertebrate Animal	G2G4
<i>Eurynorhynchus pygmeus</i>	Spoonbill Sandpiper	Vertebrate Animal	G2G3
<i>Fuscoboletinus weaverae</i>	a fungus	Fungus	G1?
<i>Grapholita edwardsiana</i>	San Francisco Tree Lupine Moth	Invertebrate Animal	G1G2Q
<i>Grus americana</i>	Whooping Crane	Vertebrate Animal	G1
<i>Gymnomitrium commutatum</i>	Liverwort	Nonvascular Plant	G2G4
<i>Haplodontium macrocarpum</i>	Porsild's bryum moss	Nonvascular Plant	G2G3
<i>Hemimycena pseudocrispula</i>	a fungus	Fungus	G2?
<i>Homophylax baldur</i>	Baldur's Northern Caddisfly	Invertebrate Animal	G2G3
<i>Iswaeon rubrolaterale</i>	Milk River Small Minnow Mayfly	Invertebrate Animal	G2
<i>Lecidea leucothallina</i>	disk lichen	Fungus/Lichen	G2G4
<i>Lednia tumana</i>	mist forestfly	Invertebrate Animal	G1G2
<i>Megachile fortis</i>	Robust Sunflower Leafcutter Bee	Invertebrate Animal	G2
<i>Megaleuctra stigmata</i>	giant needlefly	Invertebrate Animal	G2G3
<i>Melaporphyria immortua</i>	Dark-banded Flower Gem	Invertebrate Animal	G1?
<i>Micarea denigrata</i>	dot lichen	Fungus/Lichen	G2G4
<i>Microbryum vlassovii</i>	nugget moss	Nonvascular Plant	G2?
<i>Mycena hudsoniana</i>	Mycena mushroom	Fungus	G2G3
<i>Myotis septentrionalis</i>	Northern Myotis	Vertebrate Animal	G2G3
<i>Myriolecis straminea</i>	a lichen	Fungus/Lichen	G2G4
<i>Nodobryoria subdivergens</i>	alpine foxtail lichen	Fungus/Lichen	G2G3
<i>Ophraella nuda</i>	a leaf beetle	Invertebrate Animal	G1G2
<i>Oreohelix stantoni</i>	Cypress Hills Mountainsnail	Invertebrate Animal	G1G2
<i>Osmia pulsatillae</i>	Pasqueflower Mason Bee	Invertebrate Animal	G2G3
<i>Oxyloma kanabense</i>	Kanab Ambersnail	Invertebrate Animal	G1Q
<i>Pertusaria trochiscea</i>	pore lichen	Fungus/Lichen	G2G4
<i>Physcomitrium hookeri</i>	bladder-cap moss	Nonvascular Plant	G2G4
<i>Physella johnsoni</i>	Banff Springs Snail	Invertebrate Animal	G1Q
<i>Placynthium subradiatum</i>	radiant ink lichen	Fungus/Lichen	G2G4
<i>Pohlia brevinervis</i>	small-nerved Pohlia moss	Nonvascular Plant	G1G2
<i>Pohlia obtusifolia</i>	Bluntleaf Threadmoss	Nonvascular Plant	G2G4
<i>Porpidia thomsonii</i>	Thomson's Boulder Lichen	Fungus/Lichen	G2G4
<i>Protolophozia elongata</i>	Elongated Notchwort	Nonvascular Plant	G2G3

<i>Pseudaleuria quinaultiana</i>	a fungus	Fungus	G2
<i>Psychoglypha rossi</i>	Herbert's Northern Caddisfly	Invertebrate Animal	G1G2
<i>Pycnora sorophora</i>	clam lichen	Fungus/Lichen	G2G4
<i>Rhizocarpon intermediellum</i>	ice map lichen	Fungus/Lichen	G2G4
<i>Rhizoplaca haydenii</i>	Hayden's Rimmed Navel Lichen	Fungus/Lichen	G2G3
<i>Rhyacophila belona</i>	Needle-like Free-living Caddisfly	Invertebrate Animal	G2G4
<i>Rhyacophila donaldi</i>	Donald's Free-living Caddisfly	Invertebrate Animal	G2G3
<i>Rhyacophila ophrys</i>	Eyebrow Free-living Caddisfly	Invertebrate Animal	G1G3
<i>Rhyacophila robusta</i>	Hard Free-living Caddisfly	Invertebrate Animal	G2G3
<i>Rinodina terrestris</i>	pepper-spore lichen	Fungus/Lichen	G2G4
<i>Robustocheles occulta</i>	A Cave Obligate Mite	Invertebrate Animal	G2G3
<i>Salix turnorii</i>	Turnor's willow	Vascular Plant	G2
<i>Salmasellus steganothrix</i>	Cave Isopod	Invertebrate Animal	G2G3
<i>Sanfilippodytes bertae</i>	Bert's Predaceous Diving Beetle	Invertebrate Animal	G1
<i>Sarcogyne hypophaea</i>	stepdaughter grain-spored lichen	Fungus/Lichen	G2G4
<i>Schaereria cinereorufa</i>	lichen	Fungus/Lichen	G2G4
<i>Schinia avemensis</i>	Gold-edged Gem Moth	Invertebrate Animal	G1G3
<i>Schinia verna</i>	Verna's Flower Moth	Invertebrate Animal	G2G3
<i>Schistidium atrofusum</i>	Black Mountain Bloom Moss	Nonvascular Plant	G2G3
<i>Schistidium trichodon</i>	Black Bloom Moss	Nonvascular Plant	G2G4
<i>Siphonurus autumnalis</i>	Autumn Primitive Minnow Mayfly	Invertebrate Animal	G2G4
<i>Soyedina potteri</i>	Idaho forestfly	Invertebrate Animal	G2
<i>Stygobromus canadensis</i>	Castleguard Cave Stygobromid	Invertebrate Animal	G1
<i>Stygobromus secundus</i>	Cordilleran Stygobromid	Invertebrate Animal	G1
<i>Succinea oregonensis</i>	A Terrestrial Snail	Invertebrate Animal	G2G4
<i>Tayloria splachnoides</i>	splachnoid trumpet moss	Nonvascular Plant	G2G3
<i>Tetramelas terricolus</i>	button lichen	Fungus/Lichen	G1G3
<i>Tortula bartramii</i>	moss	Nonvascular Plant	G2G4
<i>Tortula nevadensis</i>	Nevada screw moss	Nonvascular Plant	G2G3
<i>Umbilicaria hirsuta</i>	Granulating rock tripe lichen	Fungus/Lichen	G2G4
<i>Xanthoparmelia idahoensis</i>	Idaho xanthoparmelia lichen	Fungus/Lichen	G1
<i>Yukonodelphax kendallae</i>	a delphacid planthopper	Invertebrate Animal	G1G3
<i>Zapada glacier</i>	glacier forestfly	Invertebrate Animal	G1

## Ecological Communities relating to Alberta

Scientific Name	English Name	Global Status
<i>Abies bifolia</i> - <i>Picea engelmannii</i> / <i>Menziesia ferruginea</i> - <i>Vaccinium scoparium</i> forest	subalpine fir - Engelmann spruce / false azalea - grouseberry forest	G2G4
<i>Abies bifolia</i> - <i>Picea engelmannii</i> / <i>Streptopus amplexifolius</i> - <i>Luzula hitchcockii</i> woodland	subalpine fir - Engelmann spruce / clasping-leaved twisted-stalk - smooth wood rush woodland	G2G3
<i>Abies bifolia</i> - <i>Picea engelmannii</i> / <i>Valeriana sitchensis</i> woodland	subalpine fir - Engelmann spruce / mountain valerian woodland	G2?
<i>Achnatherum nelsonii</i> - <i>Lupinus sericeus</i> Grassland	Columbia needle grass - silky perennial lupine herbaceous vegetation	G2G3
<i>Arctostaphylos uva-ursi</i> / <i>Pseudoroegneria spicata</i>	common bearberry / bluebunch wheat	G2G3



<i>Dwarf-shrubland</i>	grass dwarf shrubland	
<i>Bromus marginatus - Pseudoroegneria spicata</i> <i>Grassland</i>	large mountain brome - bluebunch wheatgrass grassland	G2?
<i>Carex albonigra - Myosotis asiatica</i> <i>Alpine Fell-field</i>	black-and-white sedge - alpine forget-me- not herbaceous vegetation	G2G3
<i>Elaeagnus commutata</i> <i>Wet Shrubland</i>	silverberry riparian shrubland	G2Q
<i>Larix lyallii / Vaccinium membranaceum / Luzula</i> <i>hitchcockii</i> <i>woodland</i>	subalpine larch / tall bilberry / smooth wood-rush woodland	G2G3
<i>Phacelia hastata - (Penstemon ellipticus)</i> <i>Sparse</i> <i>Vegetation</i>	silver-leaved scorpionweed- (creeping beardtongue) scree slope sparse vegetation	G2G3
<i>Phyllodoce glanduliflora / Sibbaldia procumbens</i> <i>Dwarf-shrubland</i>	yellow heather / sibbaldia dwarf shrubland	G2G3
<i>Pinus albicaulis - Picea engelmannii / Dryas</i> <i>hookeriana</i> <i>woodland</i>	whitebark pine - Engelmann spruce / white mountain avens woodland	G2G3
<i>Pinus contorta / Cornus stolonifera</i> <i>woodland</i>	lodgepole pine / red-osier dogwood woodland	G2G3
<i>Populus balsamifera ssp. trichocarpa - Picea</i> <i>engelmannii / Equisetum arvense</i> <i>Riparian Forest</i>	black cottonwood - Engelmann spruce / common horsetail forest	G2?
<i>Populus balsamifera ssp. trichocarpa /</i> <i>Calamagrostis canadensis</i> <i>Riparian Forest</i>	black cottonwood / bluejoint forest	G2?
<i>Populus deltoides / Cornus stolonifera</i> <i>forest</i>	plains cottonwood / red-osier dogwood forest	G2G3
<i>Populus deltoides / Symphoricarpos occidentalis</i> <i>Floodplain Woodland</i>	plains cottonwood / buckbrush woodland	G2G3
<i>Populus tremuloides - Abies bifolia - Picea</i> <i>engelmannii / Streptopus amplexifolius</i> <i>forest</i>	aspen - subalpine fir - Engelmann spruce / clasping-leaved twisted-stalk forest	G2G3
<i>Populus tremuloides / Rubus parviflorus</i> <i>Forest</i>	aspen / thimbleberry forest	G2
<i>Populus tremuloides / Urtica dioica</i> <i>Forest</i>	aspen / stinging nettle forest	G2G3
<i>Populus trichocarpa - (Populus tremuloides) /</i> <i>Heracleum maximum</i> <i>forest</i>	black cottonwood - (aspen) / cow parsnip forest	G2
<i>Populus trichocarpa - Picea engelmannii / Cornus</i> <i>stolonifera</i> <i>forest</i>	black cottonwood - Engelmann spruce / red-osier dogwood forest	G2G3
<i>Pseudotsuga menziesii / Heracleum maximum</i> <i>Forest</i>	Douglas-fir / cow-parsnip forest	G2?
<i>Salicornia rubra</i> <i>Salt Flat</i>	samphire emergent marsh	G2G3
<i>Salix arctica - (Salix petrophila, Salix nivalis) /</i> <i>Polygonum bistortoides</i> <i>Dwarf-shrubland</i>	arctic willow / western bistort dwarf shrubland	G2G3Q
<i>Vaccinium (myrtilus, scoparium) / Luzula glabrata</i> <i>var. hitchcockii</i> <i>Dwarf-shrubland</i>	low bilberry - grouseberry / smooth wood- rush shrubland	G2G3

## Species relating to Saskatchewan

Scientific Name	English Name	Category	Global Status
<i>Acaulon triquetrum</i>	Triangular Earth Moss	Nonvascular Plant	G2G4
<i>Anepeorus rusticus</i>	Rustic Flat-headed Mayfly	Invertebrate Animal	G2
<i>Animomyia hardwicki</i>	a geometrid moth	Invertebrate Animal	G1G3
<i>Anisota manitobensis</i>	Manitoba Oakworm Moth	Invertebrate	G2Q

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		Animal	
<i>Arthonia mediella</i>	Dot lichen	Lichen	G2G4
<i>Baetisca columbiana</i>	Columbia Armored Mayfly	Invertebrate Animal	G2G4
<i>Bombus suckleyi</i>	Suckley's Cuckoo Bumble Bee	Invertebrate Animal	G2G3
<i>Cladonia luteoalba</i>	Lemon pixie lichen	Lichen	G2G3
<i>Deschampsia mackenzieana</i>	Mackenzie Hairgrass	Vascular Plant	G2
<i>Elymus vulpinus</i>	Rydberg's Wild Rye	Vascular Plant	G1G3Q
<i>Entosthodon rubiginosus</i>	Rusty Cord-moss	Nonvascular Plant	G1G3
<i>Ephydatia muelleri</i>	Mueller's Freshwater Sponge	Invertebrate Animal	G2G4
<i>Grus americana</i>	Whooping Crane	Vertebrate Animals	G1
<i>Heptagenia whitingi</i>	Whiting's Flat-headed Mayfly	Invertebrate Animal	G2G3
<i>Hesperia dacotae</i>	Dakota Skipper	Invertebrate Animal	G2
<i>Lecanora geophila</i>	Shrubby rim-lichen	Lichen	G2G4
<i>Megachile fortis</i>	Robust Sunflower Leafcutter Bee	Invertebrate Animal	G2
<i>Melaporphyria immortua</i>	Dark-banded Flower Gem	Invertebrate Animal	G1?
<i>Mustela nigripes</i>	Black-footed Ferret	Vertebrate Animals	G1
<i>Myotis septentrionalis</i>	Northern Myotis	Vertebrate Animals	G2G3
<i>Neotrichia ersitis</i>	Dew Microcaddisfly	Invertebrate Animal	G1G3
<i>Nymphaea loriana</i>	Waterlily	Vascular Plant	G1G2
<i>Oecetis albescens</i>	Whitish Long-horned Caddisfly	Invertebrate Animal	G1G3
<i>Oreohelix stantoni</i>	Cypress Hills Mountainsnail	Invertebrate Animal	G1G2
<i>Oxyethira allagashensis</i>	Allagash Microcaddisfly	Invertebrate Animal	G2G4
<i>Papaipema cerina</i>	Golden Borer Moth	Invertebrate Animal	G2G4
<i>Philocasca demita</i>	Terrestrial Northern Caddisfly	Invertebrate Animal	G2G3
<i>Physcomitrium hookeri</i>	Hooker's Urn Moss	Nonvascular Plant	G2G4
<i>Placidium californicum</i>	California Stipplescale Lichen	Lichen	G2G3
<i>Porpidia thomsonii</i>	Boulder lichen	Lichen	G2G4
<i>Rhizoplaca haydenii</i>	Wanderlust lichen	Lichen	G2G3
<i>Rinodina terrestris</i>	a pepper-spore lichen	Lichen	G2G4
<i>Salix turnorii</i>	Turnor's Willow	Vascular Plant	G2
<i>Sarcogyne hypophaea</i>	Stepdaughter Grain-spored Lichen	Lichen	G2G4
<i>Schinia avemensis</i>	Gold-edged Gem	Invertebrate Animal	G1G3

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Schinia verna	Verna's Flower Moth	Invertebrate Animal	G2G3
Tortula nevadensis	Nevada Screw Moss	Nonvascular Plant	G2G3
Xanthoparmelia idahoensis	Idaho Rock-shield Lichen	Lichen	G1
Xanthoparmelia norchlorochroa	Xanthoparmelia Lichen	Lichen	G1G2
Yukonodelphax kendallae	Kendall's Planthopper	Invertebrate Animal	G1G3