SUSTAINABLE FORESTRY INITIATIVE
WESTERN CANADA
SFI-01150

drax

WOOD PRODUCER INFORMATION PACKAGE

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Contents

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 producers 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 their website: 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/.

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

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 procuring raw material from sustainably managed forests & 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 Biomass Producer (BP) and for internal and external auditing purposes.

- 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 then Drax may:
    - Determine the wood supplied is non-eligible input SFI products
    - Withhold the supplier's deliveries to the BP's facilities
    - Non-renewal of purchase agreements upon expiry
    - Termination of the purchase agreement
    - 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 (Page 18) 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) 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-practique-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. The full list of species & ecological communities included in the WCSIC FECV Assessment can be found in Appendix E: FECVs.

Along with the WCSIC's FECV Assessment, Drax is a certificate holder for the Sustainable Biomass Program. Part of this certification scheme requires a risk assessment & mitigation of any identified risk as it relates to several indicators relating to biodiversity. In the company's supply base, risk has been identified relating to the following:

- Old Growth Forests in British Columbia
- Old Forests in Alberta
- Landscape Level Species (Caribou) in BC & Alberta
- Local Species at Risk in BC & Alberta
- Ecological Communities in Alberta
- Intact Forest Landscapes in BC & Alberta
- White Spruce Floodplain Forests in Alaska

See Appendix C: Sustainable Biomass Program for more information on specified risk identified in Drax's supply base.

For Species at Risk, the assessments of British Columbia & Alberta identify extensive legislation relating to SAR in the provinces but have Specified Risk assigned as a precautionary evaluation concerning the monitoring aspect of forest management practices. Drax has used public & private datasets to identify a list of focus species. These datasets include the provincial lists of Species at Risk (public) - https://a100.gov.bc.ca/pub/eswp/ & the Integrated Biodiversity Assessment Tool (IBAT) (private) - https://www.ibat-alliance.org/.

The focused list was generated from a cross reference of the provincial lists of Species at Risk with a Red List label with the data available in IBAT to identify species to focus on for monitoring exercises. From this process, the following species were identified.

1. Caribou (*Rangifer tarandus)*

Current Status: Threatened [Schedule 1, *Species at Risk Act* (AB & BC)]

Description: Caribou, ancient members of the deer family (Cervidae), are one of Canada's most widely distributed large mammals. The name caribou is probably a corruption of the Micmac name "xalibu" — which means "the one who paws." Caribou are unique among Cervids in that both sexes have antlers; however, some females have only one antler or lack them altogether. The antlers grow so rapidly that an adult male may show velvety lumps on his head in March and have a rack more than a metre in length by August. By February, all the caribou have lost their antlers. The Woodland Caribou's coat is mostly brown in summer (more grey in winter), but the neck, mane, shoulder stripe, underbelly, underside of the tail, and patch just above each hoof are creamy white. The caribou is 1.0 to 1.2 m high at the shoulder, and mature individuals weigh 110 to 210 kg. The average weight for bulls is 180 kg; for cows, it is 135 kg. The antlers of the Woodland Caribou are flattened, complex, and compact relative to those of the Barren-ground Caribou.

Habitat: Terrestrial
Caribou use mature and old-growth coniferous forests that contain large quantities of terrestrial and arboreal (tree-inhabiting) lichens. These forests are generally associated with marshes, bogs, lakes, and rivers. In summer, the caribou occasionally feed in young stands, after fire or logging. The average interval for habitats to return to their pre-fire state ranges from 40 to 80 years in the southern boreal forest in Alberta and Saskatchewan to 200 to 350 years in British Columbia. Many subpopulations of the Woodland Caribou Boreal population show a preference for peatlands; they generally avoid clear cuts, shrub-rich habitat, and aspen-poplar dominated sites. The most common tree species in preferred habitats are Black Spruce, White Spruce, and Tamarack.

Figure 6. Boreal Caribou

Threats: Habitat destruction, hunting, disturbance by humans (including construction of roads and pipelines), and predation (by wolves, coyotes, and bears) have all contributed to the decline of Woodland Caribou. In many parts of Woodland Caribou range, forestry practices and the spread of agriculture and mining have resulted in the loss, alteration, and fragmentation of important caribou habitat. Fragmentation facilitates proximate drivers of Caribou species decline. Factors beyond our control, such as weather and climate change, are also influential.

One of the current challenges in caribou management is to learn more about how these factors interact and how to decrease their threat to Caribou populations.

Recommended Management Strategies: Identify threats and develop mitigation techniques to ensure availability of suitable habitat, including the encouragement of flowering plants. Follow recovery strategy recommendations within your jurisdiction.
British Columbia Boreal Caribou Protection and Recovery
Albertas Approach to Achieve Caribou Recovery

2. Northern Myotis (*Myotis septentrionalis*)

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

Figure 7. Northern Myotis

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 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).

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.

3. Whooping Crane (*Grus americana*)

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

Figure 8. Whooping Crane

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.

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). 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 15th & October.
- Having suitable spill response procedures to avoid impact to habitat & food sources in riparian areas

4. Hudsonian Godwit (*Limosa haemastica*)

Current Status: G1G2 (S1 in AB, S1B in BC)

Description: Hudsonian Godwit is a large, long-legged shorebird with a long, slightly upturned bill. The species exhibits sexual dimorphism in both size and plumage, with females larger and heavier than males and paler overall in breeding plumage. Males have distinctive red chest colouring during the breeding season, while females are a lighter rufous colour. Both males and females are greyish-brown in non-breeding plumage.

Figure 9. Hudsonian Godwit

Habitat: Wetlands
Hudsonian Godwit breeds in wetland habitats (sedge meadows and muskeg) in sub-Arctic and Boreal regions. It uses a wide variety of habitats on migration, including freshwater marshes, saline lakes, flooded fields, shallow ponds, coastal wetlands and mudflats. On the wintering grounds, Hudsonian Godwit mainly forages in large shallow bays, lagoons, or estuaries with extensive intertidal mudflats, and roosts in a range of habitats, such as upper tidal flats, sand spits, rocky shorelines, salt marshes, and grasslands. The species faces habitat loss and degradation at all stages of its annual cycle, primarily through climate change and development.

Recommended Management Strategies: Three primary types of actions need to be taken: protection of habitat during all parts of the annual cycle, implementation of management practices beneficial for godwits, and education of target audiences about godwits and their conservation

Sources
https://whsrn.org/wp-content/uploads/2019/02/conservationplan_hugo_v1.1_2010.pdf

5. **Short-billed Dowitcher (*Limnodromis griseus*)**

Current Status: G1G3 (S1S2B / S2S3M in BC, S2 in AB & SK)

Description: Somewhat different to the long-billed dowitcher, is a medium-sized, stocky, long-billed shorebird in the family Scolopacidae.

Habitat: Wetlands
Only the Short-billed Dowitcher breeds in British Columbia, one of three disjunct areas of North America where it nests: the coast and mountains of northwest British Columbia and southern Alaska; the Boreal Forest-Taiga interface from northern Manitoba to Alberta; and muskegs from Labrador westward to the coast of James and Hudson Bays. Each of these three areas has a different subspecies; L. g. caurinus breeds in British Columbia (Jehl et al. 2001).


Figure 10. Short-billed Dowitcher

Breeding habitat is characterized as "wet, boggy muskeg" in the subalpine of the Haines Triangle and a "brackish estuarine marsh with sphagnum, sedges and rushes" on Haida Gwaii (Campbell et al. 1990).

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: As for many shorebirds, ongoing protection of key staging and wintering sites is a management priority for this species. The species is a candidate wildlife species for assessment by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). This species has been identified as a priority for conservation and/or stewardship in one or more Bird Conservation Region Strategies in Canada.

Sources
Fraser, D.F. 2015. Short-billed Dowitcher *in* Davidson, P.J.A., R.J. Cannings, A.R. Couturier, D. Lepage, and C.M. Di Corrado (eds.). *The Atlas of the Breeding Birds of British Columbia, 2008-2012*. Bird Studies Canada. Delta, B.C. http://www.birdatlas.bc.ca/accounts/speciesaccount.jsp?sp=SBDO&lang=en [15 Apr 2025]

The Black Swift is the largest swift in North America. Canada is home to over 80% of the population. It has an almost entirely blackish plumage, has long, pointed wings and is the only North American swift with a notched tail. As well as having many unusual lifehistory traits compared to other landbird species (single egg clutch, extended maturation, remote waterfall and cave-nesting sites), the Black Swift may be a sensitive indicator for climate change. This is because its waterfall nesting sites are likely to be impacted by decreased snow pack and glacial melt. The Black Swift feeds exclusively on flying insects.

6. Black Swift (*Cypseloides niger*)

Current Status: G1 (S2S4B in BC, SU in AB & SK)

Figure 11. Black Swift

Description: The Black Swift is the largest swift in North America. Canada is home to over 80% of the population. It has an almost entirely blackish plumage, has long, pointed wings and is the only North American swift with a notched tail. As well as having many unusual lifehistory traits compared to other landbird species (single egg clutch, extended maturation, remote waterfall and cave-nesting sites), the Black Swift may be a sensitive indicator for climate change. This is because its waterfall nesting sites are likely to be impacted by decreased snow pack and glacial melt. The Black Swift feeds exclusively on flying insects.

Habitat: Cliff-side habitats (often associated with waterfalls)

Often foraging at high altitude, Black Swifts fly over open country and forests in mountainous areas and lowlands, pursuing aerial insects. They nest near or behind waterfalls and in caves, located in canyons and sometimes on sea cliffs. Their nest sites are characterized by presence of flowing water, high relief, inaccessibility, darkness, and an unobstructed flight path.

Black swift has a summer breeding range across northwestern BC, southwestern Alberta and the northwestern U.S., with scattered populations through the southwestern U.S., Mexico and the Caribbean. This species migrates to spend winters in South America.

Threats: The most important threats to the Black Swift are largely unknown but are believed to be: 1) airborne pollutants that reduce aerial insect food availability and/or potentially cause reproductive failure in swifts; and 2) climate change that could reduce stream flow at nest sites or lead to temporal mismatches between aerial arthropod phenology and the swift's breeding cycle. Other threats such as problematic native species, logging, annual and perennial non-timber crops, livestock farming and ranching, hydroelectric dams and water management, and recreational activities were considered as being negligible.

Recommended Management Strategies: None

Source

COSEWIC. 2015. COSEWIC assessment and status report on the Black Swift Cypseloides niger in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 50 pp. (www.registrelepsararegistry.gc.ca/default_e.cfm)

7. Chestnut-collared Longspur (*Cypseloides niger*)

Current Status: G1 (SU in AB & SK)

Description: Chestnut-collared Longspur is a medium-sized songbird. It is one of two longspurs (family Calcariidae) that nest in grassland. Breeding males are boldly marked, with a black breast, belly, crown, and eye-line contrasting with a buffy-yellow throat, whitish supercilium, and chestnut patch on the nape; in winter the pattern is heavily muted and more similar to the year-round overall buffy, streaked appearance of females. In all plumages, Chestnut-collared Longspur has an inverted dark triangle at the tip of its tail which distinguishes it from all other longspurs. Chestnut-collared Longspur is one of six passerine species endemic to the Great Plains of North America; five of them occur in Canada, and all have been assessed as at risk.

Figure 12. Chestnut-collared Longspur. © May Haga

Habitat: Grassland, prairie

Nests are placed on the ground in a depression excavated by the female (COSEWIC 2009), and are located in areas characterized by short, sparse vegetation with bare ground, little dead vegetation with bare ground, and intermediate forb density (Harris 1994, Davis 2005), resulting in nests that are more exposed to other grassland songbirds (Jones and Dieni 2005). They may select these areas to avoid small nest predators (e.g. voles) that themselves rely on cover to escape predation. This species uniquely associates its nests with dried out, intact pats of cow dung.

Threats: Predation, inclement weather, and severe ectoparasite infection have all been documented as increasing mortality in nesting populations. Tillage regimes can also longspur productivity. Graduate studies in southern Alberta have documented lower survivorship with increasing shallow gas well density.

Recommended Management Strategies: There are no specific management activities targeting chestnut-collard longspurs. However, conservation of this species depends on the preservation of shortgrass and mixed grass prairie landscapes.

Source

Alberta Environment and Sustainable Resource Development and Alberta Conservation Association. 2015. Status pf the Chestnut-collared Longspur (*Calciarius ornatus*) in Alberta. Alberta Wildlife Status Report No. 67. Edmonton, AB. 46 pp.

COSEWIC. 2019. COSEWIC assessment and status report on the Chestnut-collared Longspur Calcarius ornatus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 46 pp. (Species at risk public registry).

8. General Management for Migratory Birds

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 13. 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 14. 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.zimmfor.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	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. - Forest Professionals British Columbia: https://fpbc.ca - Association of Alberta Forest Management Professionals: https://aafmp.ca/ - Association of Saskatchewan Forestry Professionals: https://www.asfp.ca/
Biologists	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. - The College of Applied Biology – British Columbia: https://www.cab-bc.org/ - Alberta Society of Professional Biologists: https://www.aspb.ab.ca/
Engineers	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. - The Association of Professional Engineers and Geoscientists of British Columbia: https://www.egbc.ca/ - The Association of Professional Engineers, Geologists, and Geophysicists of Alberta: https://www.apega.ca/ - The Association of Professional Engineers and Geoscientist of Saskatchewan: https://www.apegs.ca/
Seedling Nurseries & Seed Procurement 	Forest tree seedlings can be procured for reforesting 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. A list of forest tree seedling nurseries for British Columbia, Alberta and Saskatchewan can be found at: - Canadian Forests Directory of Silviculture Contractors and Forest Nurseries: https://www.canadian-forests.com/silviculture-nurseries.html - The Forest Nursery Association of BC website: https://www.fnabc.com/

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
  - Completion of a risk assessment for values & hazards on site
  - Identification of muster stations
  - Completion of a spill response plan
  - 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 documented grazing management plan. These plans typically include considerations for:

- Grazing locations
- Location or types of fencing
- Number of livestock on site (animal units / ha of grazing area)
- Reforestation efforts on the site
- Silviculture management & mitigation of damage to seedlings
- Control of invasive species & weeds

- 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 with a documented Grazing Management Plan.

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.

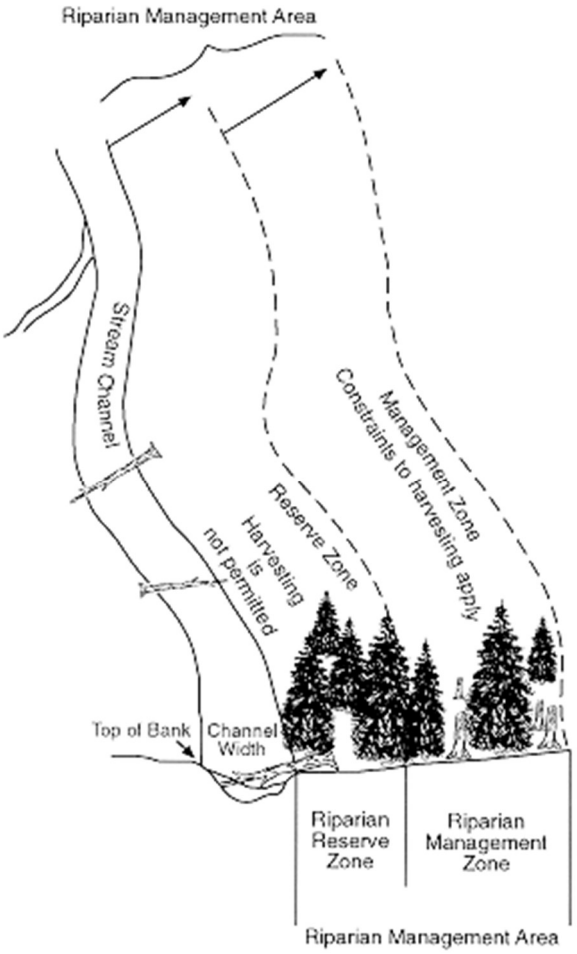

Figure 15. Visualization of a riparian management area on a stream.

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:

Classifying Streams

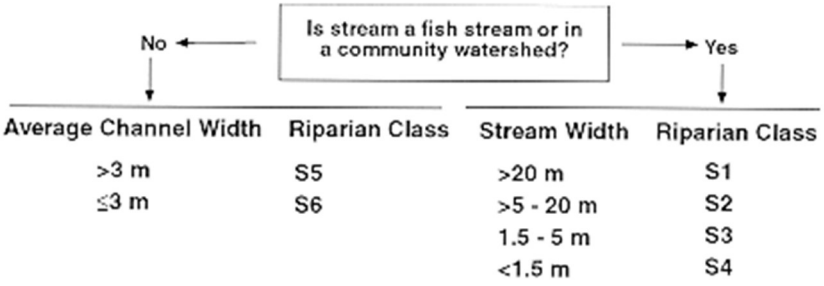

Figure 16. Stream classification chart from the BC Riparian Management Area Guidebook

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 17. 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 classified wetlands that are not wetland complexes.

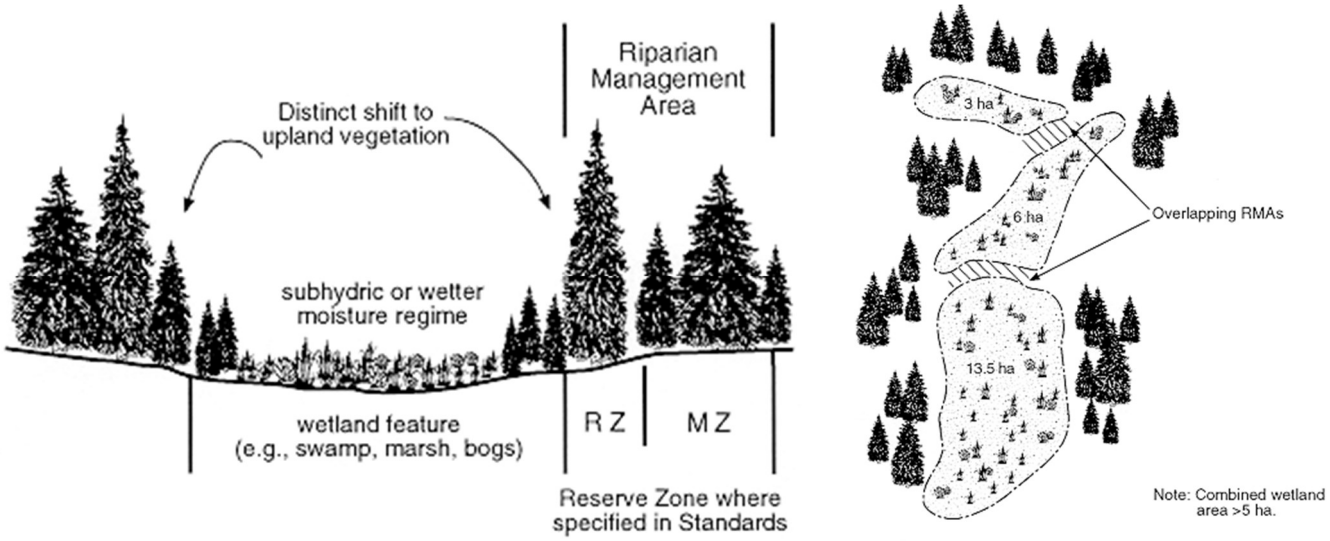

Figure 18. Left - Illustration of a simple wetland & riparian management area. Right - Illustration of a complex wetland system.

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

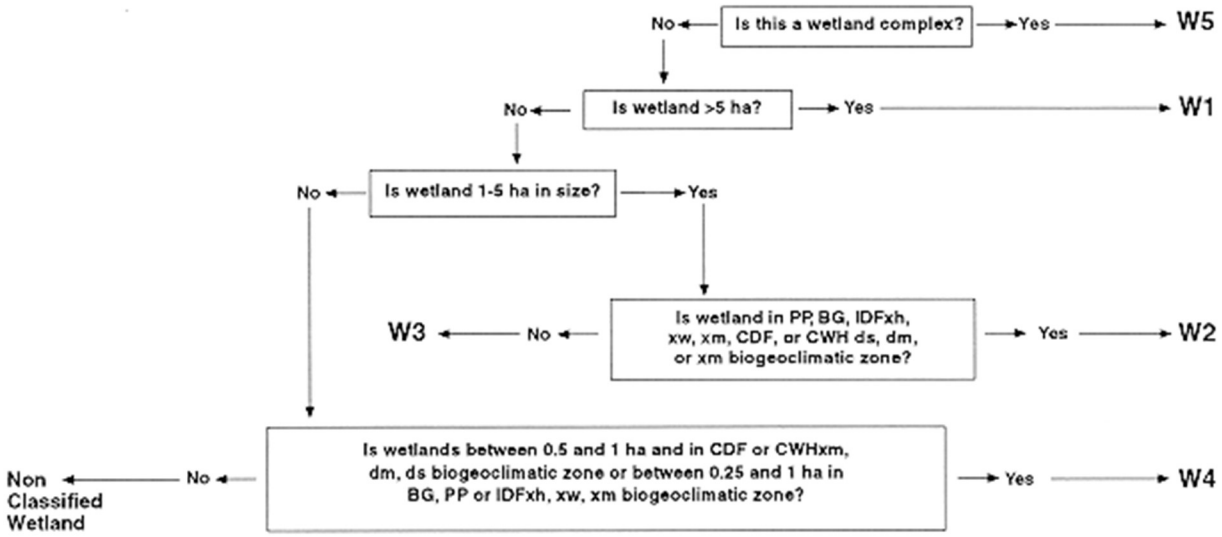

Figure 19. Flowchart for identifying wetland classifications.

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 hypermaritime 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 20. 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

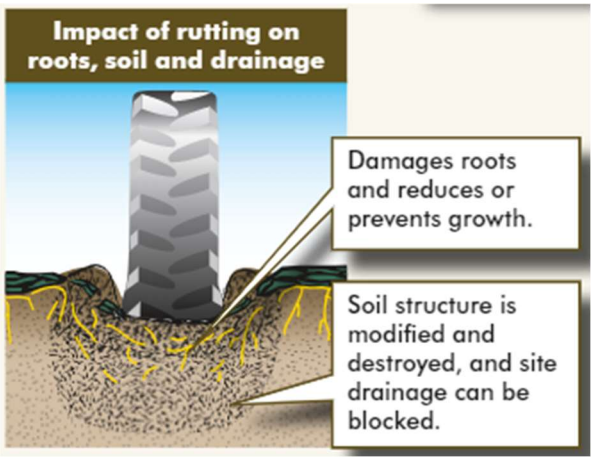

Figure 21. Illustration for impact of soil rutting.

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

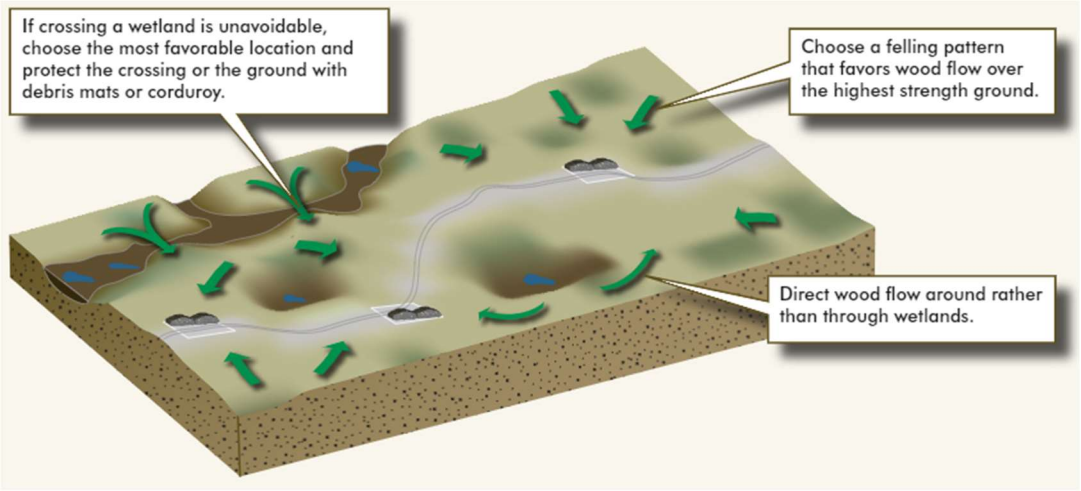

Figure 22. Illustration for considerations of road locations to minimize impacts to wetlands.

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

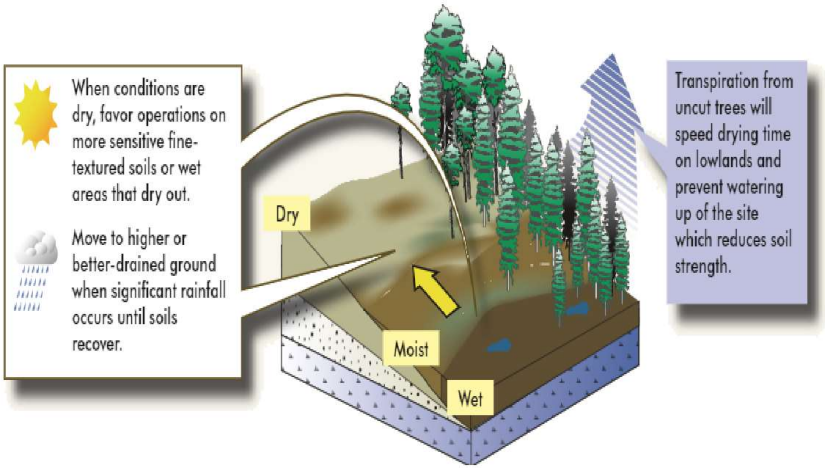

Figure 23. Illustration for considerations in wet conditions.

operations accordingly to prevent soil damage.

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 24. 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

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, nationals, 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 that contribute to regional declines in habitat conservation and species protection, including:
    a. Biodiversity & special sites
    b. Alliance for Zero Extinction Sites & Key Biodiversity Areas
    c. Threatened & Endangered Species
E. Activities where ecologically important forest areas are not identified, protected, conserved, or set aside.
F. Converting forest to non-forest or other vegetation type, including conversions of primary forests to forest plantations (As defined in Section 3.7, PEFC ST 2002:2020)
G. Activities where the spirit of the ILO Declaration on Fundamental Principles and Rights at Work (1998) is not met.
H. Activities where the spirit of the United Nations Declaration on the Rights of Indigenous Peoples (2007) is not met.
I. Conflict timber*
J. Genetically modified trees via forest tree biotechnology

*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

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:

Figure 25. Wildfire Prevention - (Mobile grapple skidder water tank / pump unit)

- Work Safe BC: https://www.worksafebc.com/en
- BC Forest Safety Council: https://www.bcforestsafe.org/
- BC Employment Standards Branch:
- https://www2.gov.bc.ca/gov/content/employment-business/employment-standards-advice/employment-standards
- BC Employers' Advisors Office: https://www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries- organizations/ministries/labour
- Work Safe Alberta: https://www.wcb.ab.ca/
- Alberta Safety Council: https://www.safetycouncil.ab.ca/
- Alberta Human Services – Employment Standards: https://www.alberta.ca/labour-and- immigration.aspx
- Work Safe Saskatchewan: https://www.worksafesask.ca/
- Saskatchewan Safety Council: https://www.sasksafety.org/
- Saskatchewan Labour Relations & 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.

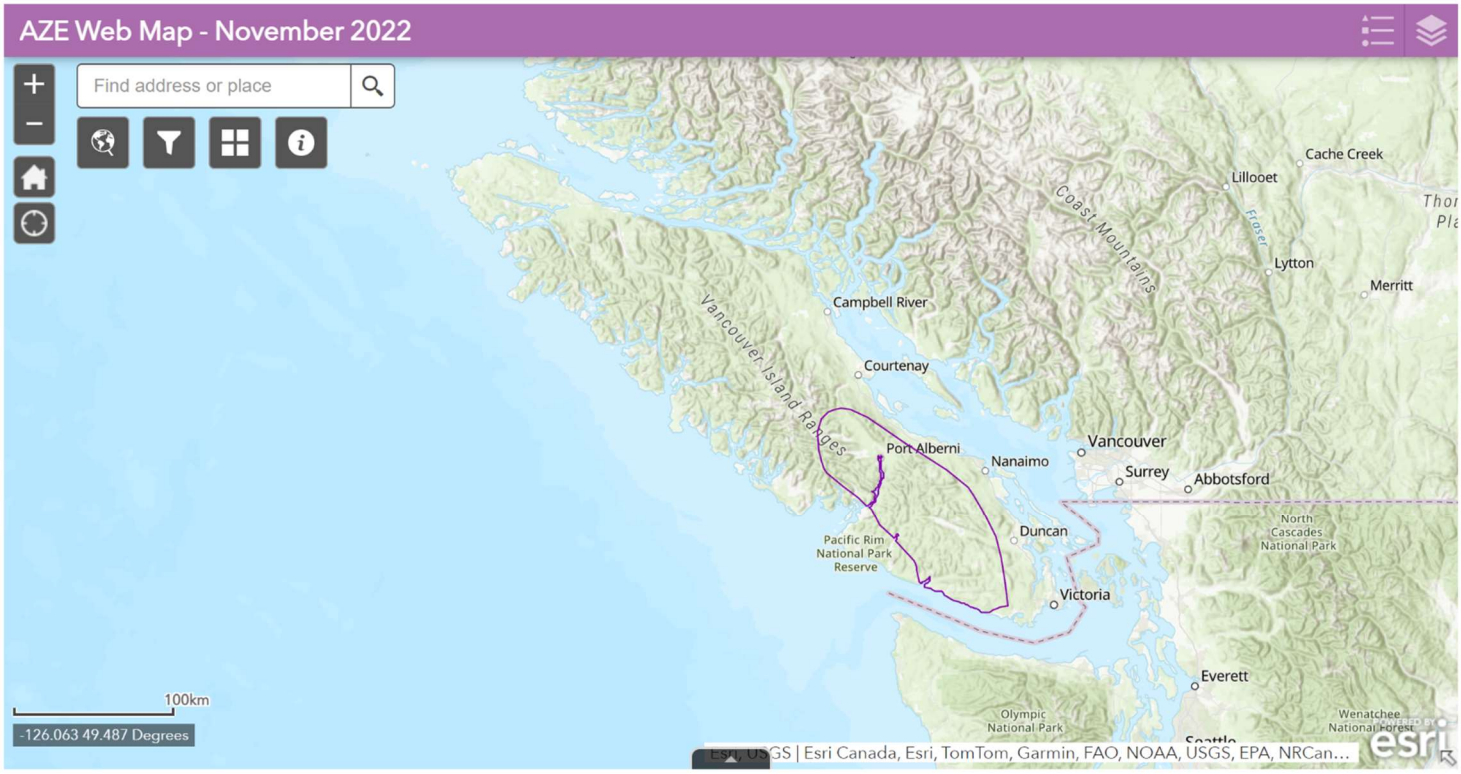

Figure 26. Showing specified risk areas on Vancouver Island for the VIM.

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 ad 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, through 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.

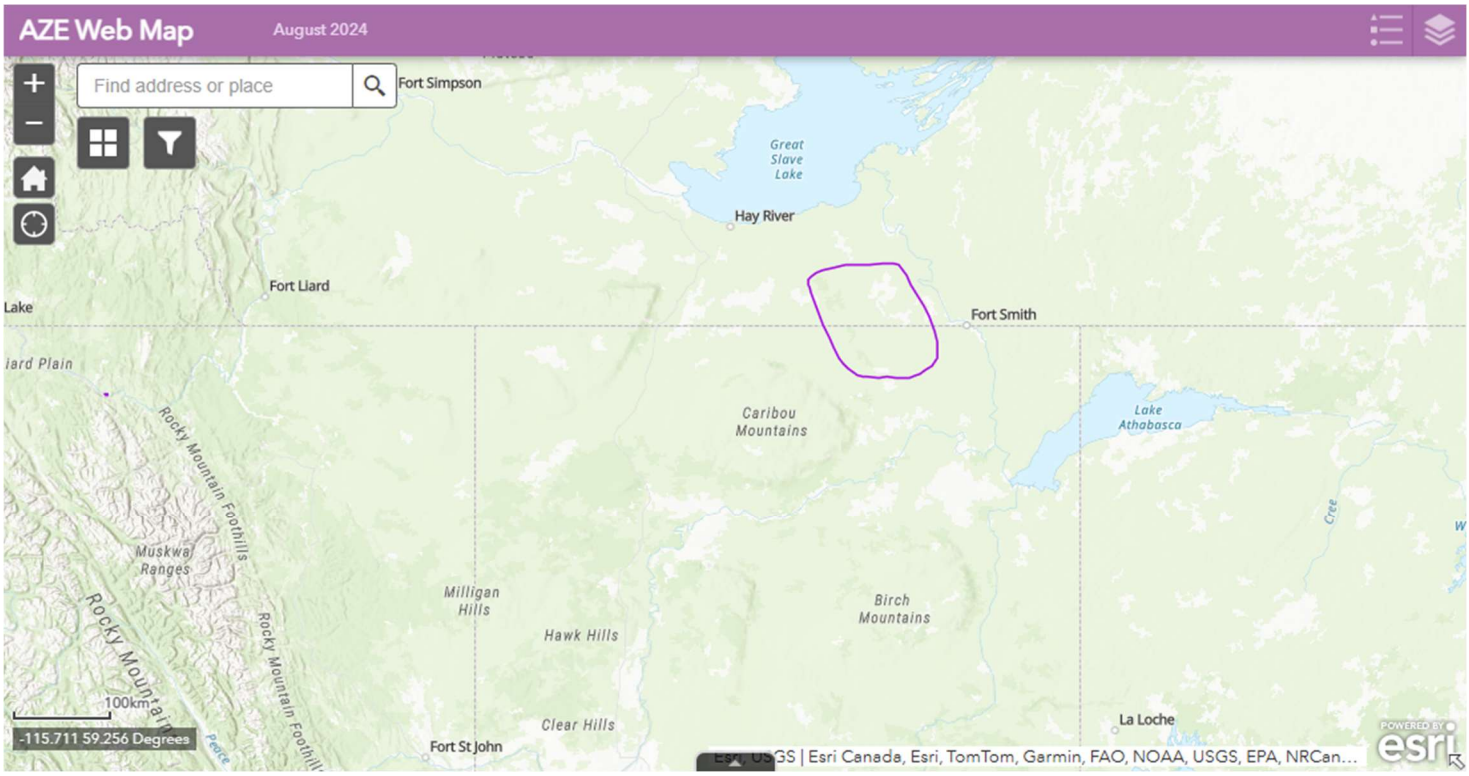

Figure 27. Showing specified risk areas relating to Whooping Crane Nesting Area and Summer Range

Castleguard Cave

Castleguard Cave is a limestone cave located in Banff National Park, AB. Featuring over 21.3 km of surveyed passages, it is currently Canada's longest known cave system (Ford DC, Smart CC. 2017. Castleguard Cave and Karst, Columbia Icefield, Alberta and British Columbia, in Slaymaker, O., ed., Landscapes and Landforms of Western Canada: Springer, Switzerland, 227–239.) and a globally significant solutional cave complex. Formed by glacial drainage from the overlying Columbia Icefield, the cave lies within the Cathedral Formation limestone with a portion in the overlying Stephen Formation (a shale-dominated rock formation with interbedded limestone). The entrance zone of the cave has a high risk of flooding. For safety reasons, expeditions are limited to early to mid-winter and access typically requires a 20 km remote ski journey. Parks Canada has restricted access to the cave since the early 1970s (Vokáč, M. 2006. Castleguard Cave 2005. First ascent of the 200-foot aven. The Canadian Caver.).

The Castleguard Cave Stygobromid (Stygobromus canadensis) is a freshwater amphipod crustacean found only in the subterranean environment of Castleguard Cave, where it evidently survived glaciation of the surrounding landscape during the last ice age (the Wisconsinan glaciation) (Zacharda M, Pugsley CW. 1988. Robustocheles occulta sp.n., a new troglobitic mite (Acari: Prostigmata: Rhagidiidae) from North American caves. Can. J. Zool. 66, 646–650.). Entirely blind and unpigmented, the Castleguard Cave Stygobromid is a unique and special part of Alberta's invertebrate fauna, and lives in a very cold, nutrient impoverished aquatic environment fed by glacial melt waters. While its evolutionary history, life cycle, diet, and other habits are still poorly understood, chronological studies of speleothems (solutional features that include stalagmites and stalactites) demonstrate that the cave's interior has remained intact and ice-free for at least 700,000 years (Zacharda M, Pugsley CW. 1988. Robustocheles occulta sp.n., a new troglobitic mite (Acari: Prostigmata: Rhagidiidae) from North American caves. Can. J. Zool. 66, 646–650.), suggesting that its very long and stable geological history may have facilitated adaptation and speciation of its fauna. Protecting this species is important to preserve and augment our knowledge of Pleistocene refugia and glacial relics (Holsinger JR. 1980. Stygobromus canadensis, a new subterranean amphipod crustacean (Crangonyctidae) from Canada, with remarks on Wisconsin refugia. Can. J. Zool. 58, 290–297.). A potential national KBA trigger species, a cave obligate isopod (Salmasellus steganothrix), is suspected from the cave as well as several others in Canada (Greg Horne, pers. comm.). However, this taxon may actually be conspecific and further surveys of Castleguard and elsewhere would likely be necessary to

clarify the situation and potentially elevate this cave obligate isopod to trigger species status (Jerry Lewis, pers. comm.).

Source: keybiodiversityareas.org

Risk Designation in the Supply Base
Banff National Park was the first established national park in Canada. Being a federally managed park, the harvest of forests & forest resources is strictly prohibited. Since the entirety of the Castleguard Cave polygon, as defined by Alliance for Zero Extinction, is within the Banff National Park, there is a negligible risk of impacting these sites.

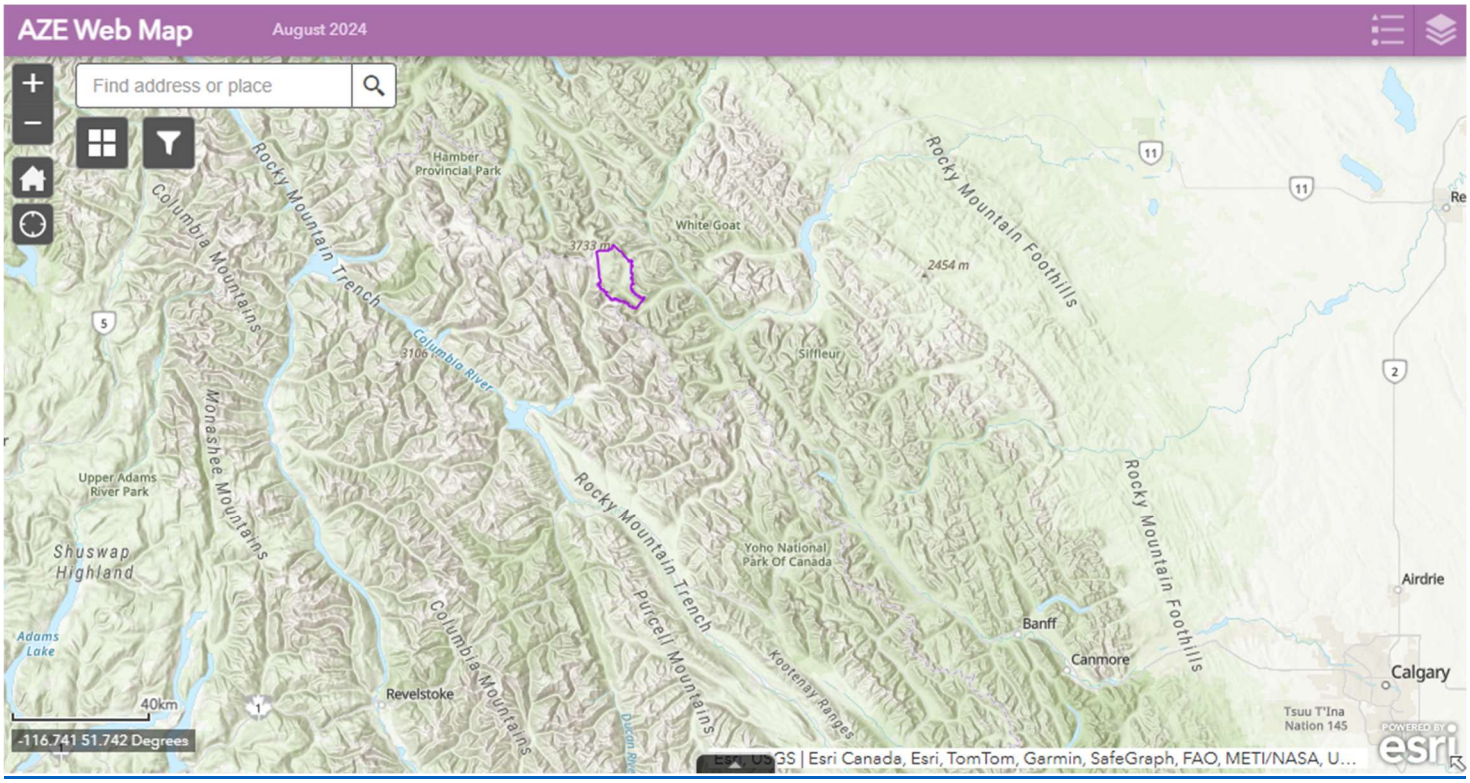

Figure 28. Showing specified risk areas for Castleguard Cave within the Banff National Park

Liard River Hot Springs

Situated in northern British Columbia's Boreal White and Black Spruce biogeoclimatic zone, the Liard River Hot Springs form a 'natural river of hot water' that flows between pools and drains into a warm-water swamp. These unique conditions create a unique assemblage of vegetation of more than 250 plant species, 14 of which are thermally influenced, and 104 species of birds and 28 species of mammals have been observed at the site. Liard River Hot Springs is one of Canada's largest hot springs and is a popular stop over for travelers passing through.

The Liard River Hot Springs contain the entire global population of the Hotwater Physa (Physella wrighti), a thermally-adapted freshwater snail that is listed as Critically Endangered (CR) on the IUCN Red List (Cordeiro J, Ormes M. 2017. Physella wrighti. The IUCN Red List of Threatened Species 2017: e.T69624623A69633133; [accessed 2024 Mar 19]. https://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T69624623A69633133.en.), thus meeting global A1 and B1 KBA criteria. Additionally, these hot springs contain the entire population of a unique, thermally-adapted Lake Chub (Liard Hot Springs populations) (Couesius plumbeus pop. 2) and meet national A1 and B1 KBA criteria. This freshwater fish has been recognized by NatureServe as nationally Critically Imperiled (N1) and by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Threatened.

Source: keybiodiversityareas.org

The site is almost entirely within Liard River Hot Springs Provincial Park, managed by BC Parks. Most of the KBA is in an area that receives high visitor and recreational use. A small portion of the west end of the KBA is outside the provincial park to be consistent with the BC Vegetation Resource Inventory linework (BC Ministry of Forests. 2023. Vegetation Resources Inventory (VRI). BC Ministry of Forests; [accessed 2023 May 12]. https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-inventory.).

Risk Designation in the Supply Base
With the Liard River Hot Springs KBA located almost solely within a managed provincial park, the harvest of forests & forest resources from within the park are strictly prohibited. Due to the park's remote location in northern British Columbia (>1000 km drive to the closest Drax facility), the logistics of procuring fiber that originates from the sliver of area outside the park is highly unlikely. Although unlikely, the KBA section located outside of the park is considered specified risk.

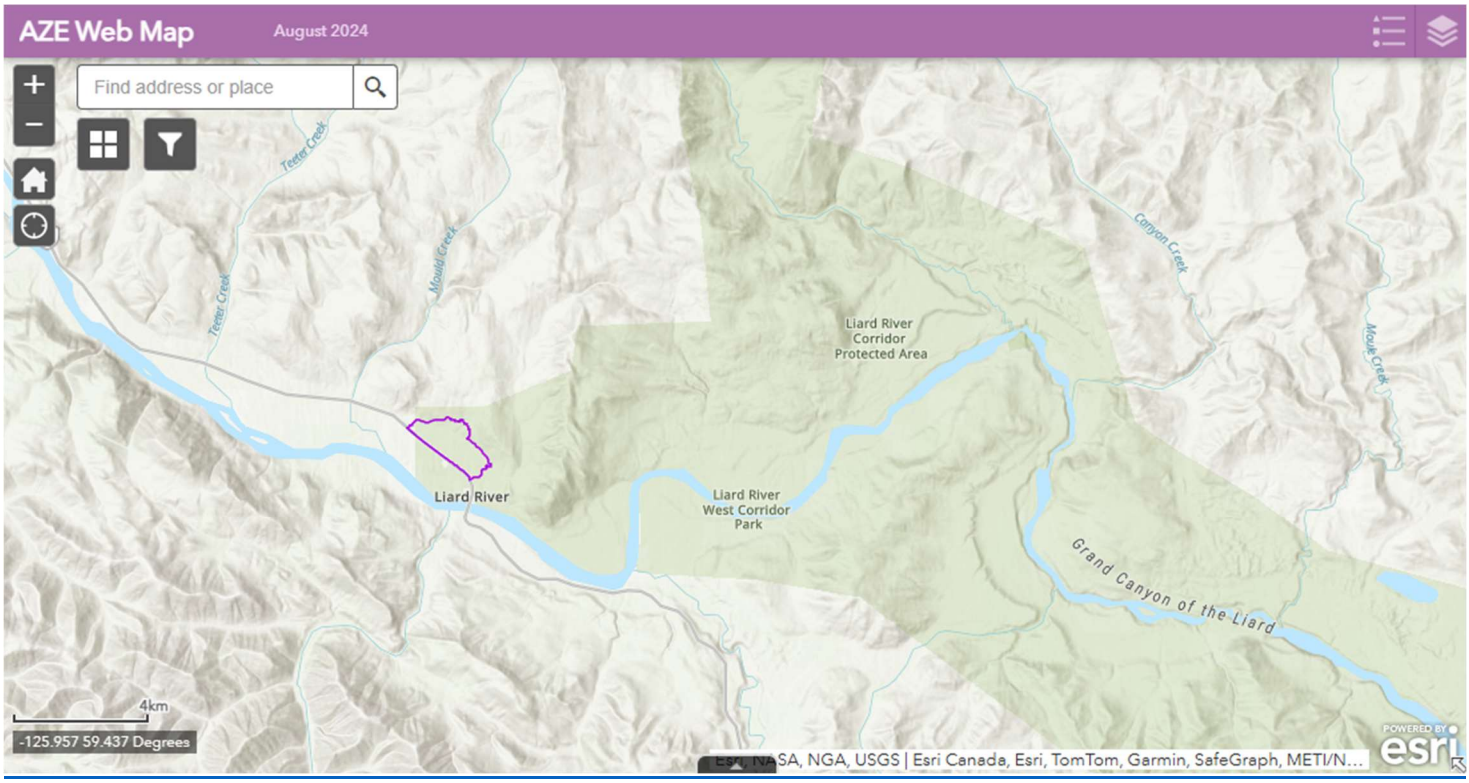

Figure 29. Showing the specified risk area for the Liard River Hot Springs.

- 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., CO2). Accounting for GHG takes place through the entirety of the supply chain from forest to fuel.

SBP & Renewable Energy Directive (REDIII)

The Renewable Energy Directive (EU) 2023/2413, often referred to as RED III, is a major update to the EU's energy policy aimed at accelerating the transition to renewable energy across all sectors. It raises the binding target for renewables in the EU's overall energy mix to 42.5% by 2030, with an aspirational goal of 45%, reflecting the bloc's ambition to reduce greenhouse gas emissions and enhance energy security. The directive introduces faster permitting procedures for renewable projects, strengthens sustainability criteria for biomass, and sets specific targets for sectors like transport, heating and cooling, and industry—including binding quotas for green hydrogen and other renewable fuels of non-biological origin.

Sustainability criteria for biomass under Directive (EU) 2023/2413 (RED III)

These rules are designed to ensure that biomass used for energy contributes meaningfully to climate goals without harming ecosystems or undermining resource efficiency.

No-Go Areas:

Biomass cannot be sourced from land with high biodiversity value, including:

- Primary forests
- Peatlands
- Wetlands
- Highly biodiverse grasslands

These restrictions aim to prevent deforestation and protect carbon-rich ecosystems.

Forest Biomass:

- Must be harvested in line with national laws and forest management practices that ensure regeneration and long-term productivity.
- Residue use (e.g., branches, bark) is preferred over whole trees, especially in electricity-only generation.
- The cascading principle applies: biomass should only be used for energy when higher-value uses are not viable.

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

- Risk assessments for forest feedstock relating to the EU RED indicators for:
  - Legality of harvest
  - Forest regeneration of harvested areas
  - Protection of nature (primary forest, wetlands, highly biodiverse grasslands, peatlands, & heathland)
  - Maintenance of soil & water values
  - Long-term forest capacity
  - LULUCF Criteria (Land-use, land-use change & forestry)
- 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 requirement of SBP's EU RED mass balance system. For more information on SBP EU RED (REDIII) & the associated risk assessments, see the following link to SBP's website (https://sbp-cert.org/documents/normative-documents/version-2/eu-rediii-documents/).

SBP Risk Assessments

The SBP certification scheme provides assurance to stakeholders that biomass is sourced both legally and sustainably, and it provides a means to collect and communicate reliable and verified data throughout the supply chain, including energy data, allowing companies in the biomass sector to demonstrate their responsible sourcing achievement and compliance with regulatory requirements, and to calculate their Greenhouse Gas (GHG) footprint.

There are six SBP Standards, which collectively represent the SBP certification scheme, against which Organisations can be assessed (as applicable) for certification by independent third-party accredited Certification Bodies (CBs). The Standards were developed and revised following a rigorous process aligned with ISEAL Standard-Setting Code of Good Practice, considering and building on existing regulatory requirements, peer voluntary certification standards and stakeholders' input.

The SBP certification scheme provides assurance to End-users that biomass is sourced from legal and sustainable feedstock, as defined in SBP Standard 1. SBP certification relies on a third-party, independent certification process carried out by accredited CBs.

SBP Standard 1 sets the out the requirements for feedstock sourced for SBP-certified biomass. It is designed to be used as a reference for the biomass sector in consistently defining and managing sourcing risks and driving continuous improvement. It covers the most relevant sustainability aspects of feedstock production, including social, environmental, legal, and carbon stock related elements.

The SBP certification scheme follows a risk-based approach. BPs assess the risk of non-conformance against the principles and criteria of SBP Standard 1, when deciding which feedstock to source for biomass production. Using SBP Standard 2, BPs will identify, evaluate and mitigate the risks of sourcing feedstock, for the purposes of biomass production, that does not conform with the criteria set in SBP Standard 1.

Risks are rated as 'low' or 'specified'. Organisations need to ensure that all specified risks are managed and thus reduced to a low level, or otherwise exclude the feedstock associated with specified risks from SBP supply chains. Organisations gain certification against SBP Standard 2 by conforming with the requirements set in SBP Standard 1 and demonstrating that any specified risks of sourcing feedstock not in conformance with SBP Standard 1 have been adequately reduced to low risk, following Standard 2 requirements.

To generate SBP-Compliant claims for the wood pellets produced by Drax, the company utilizes SBP Standard 1 & the risk assessments associated. This includes an assessment of the 42 indicators of SBP Standard 1, either completed by a third party & endorsed by SBP (Regional Risk Assessment / RRA), if available, or a company

risk assessment (Supply Base Evaluation / SBE), where a RRA is not available.

The following table is a summary of the SBP Standard 1 indicators, with an indication of risk designation (Low or SP / Specified Risk) & risk assessment used to designate the risk rating.

Table 2. Summary of risk designations as it relates to all the SBP Risk Assessments used by Drax's Canadian operations.

SBP Risk Assessment Summary		Risk Assessment Used									
		SBP Endorsed Regional Risk Assessment			Company Supply Base Evaluation						
Criterion	Indicator	BC	AB	US National Forests	AK	ID	MT	Northern CA	Northwest WY	OR	WA
Operators & Operations are Legal	1.1.1 - Operations related to feedstock sourcing and biomass production shall comply with all existing applicable laws and regulations	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	1.1.2 - Legal ownership of land and resource use rights shall be respected.	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	1.1.3 - Feedstock shall be legally harvested, supplied and produced, including in compliance with CITES, EUTR and other applicable legal trade requirements.	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	1.1.4 - Payments for harvest rights and feedstock, including duties, relevant royalties, and taxes related to timber harvesting, shall be complete and up-to-date	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	1.1.5 - There shall be adequate protection of the Supply Base from unauthorised and illegal activities, such as illegal logging, mining, and encroachment	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
Biodiversity is Maintained or Enhanced	2.1.1 - Key species, habitats, ecosystems, and areas of high conservation value (HCV) pertaining to biodiversity in the Supply Base shall be identified	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	2.1.2 - Threats to and impacts on the identified key species, habitats, ecosystems, and areas of high conservation value (HCV) pertaining to	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk

	biodiversity in the Supply Base shall be identified and evaluated										
	2.1.3 - Key species, habitats, ecosystems, and areas of high conservation value (HCV) pertaining to biodiversity in the Supply Base shall be maintained or enhanced	**SP Risk**	**SP Risk**	Low Risk	**SP Risk**	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
Ecosystem Productivity, Functions, & Services are Maintained or Enhanced	2.2.1 - Feedstock shall not be sourced from land that had one of the following statuses in January 2008 and no longer has that status due to land conversion: a. Forests b. Wetlands c. Peatlands d. Highly biodiverse grasslands	**SP Risk**	**SP Risk**	Low Risk	Low Risk	**SP Risk**	**SP Risk**	**SP Risk**	**SP Risk**	**SP Risk**	**SP Risk**
	2.2.2 - Ecosystems, their health, vitality, functions and services in the Supply Base shall be maintained or enhanced	**SP Risk**	**SP Risk**	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	2.2.3 - Soil quality in the Supply Base shall be maintained or enhanced	**SP Risk**	**SP Risk**	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	**SP Risk**	Low Risk	Low Risk
	2.2.4 - Where the removal of harvest forest residues and / or stumps occurs, this shall not lead to irreversible negative impacts to the ecosystem	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	**SP Risk**	Low Risk	Low Risk
	2.2.5 - Quality and quantity of ground water, surface water and water downstream shall be maintained or enhanced	**SP Risk**	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	**SP Risk**	Low Risk	Low Risk
	2.2.6 - Air emissions shall comply with national legislation or in the absence of national legislation with industry best practice	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	2.2.7 - Pesticides shall only be used as part of an Integrated Pest Management (IPM) plan in compliance with national legislation, chemical safety data sheets and industry best practice. Banned pesticides shall not	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk

	be used										
	2.2.8 - Waste shall be disposed in an environmentally appropriate manner	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	2.2.9 - Harvesting levels shall be justified as to how they can be sustained with reference to inventory and growth data for the Supply Base	**SP Risk**	**SP Risk**	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	2.2.10 - Harvested areas shall be regenerated	**SP Risk**	**SP Risk**	Low Risk	**SP Risk**	**SP Risk**	**SP Risk**	**SP Risk**	**SP Risk**	**SP Risk**	**SP Risk**
	2.2.11 - The impacts of natural processes such as fires, pests and diseases shall be managed	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	2.2.12 - Genetically modified trees shall not be used	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
Feedstock Sourcing is Consistent with International Requirements for Land Use, Land-use Change, & Forestry (LULUCF) Emissions	3.1.1 - LULUCF emissions shall be accounted for through one of the following routes: Route A – Feedstock may be sourced from a country of origin which is party to the Paris Agreement, and which has submitted a Nationally Determined Contribution to the United Nations Framework Convention on Climate Change (UNFCCC) covering carbon emissions and removals from agriculture, forestry and land use which ensure the changes in carbon stock associated with biomass harvest are counted towards the country's commitment to reduce or limit greenhouse gas emissions, or Route B – Feedstock may be sourced from a country of origin which is party to the Paris Agreement and has national or sub-national laws in place, in accordance	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk

	with Article 5 of the Paris Agreement, applicable in the area of harvest, to conserve and enhance carbon stocks and sinks, and providing evidence that reported LULUCF-sector emissions do not exceed removals, or Route C – Feedstock may be sourced from a Supply Base where an assessment demonstrates that both the carbon stocks is stable, and the forests' capacity to act as a carbon sink is stable or increasing over the long term										
Carbon Stocks in the Forest Area of the Supply Base are Stable or Increasing in the Long Term	3.2.1 - All feedstock sourcing shall be consistent with either of these two options: Option A. Feedstock may be sourced from Supply Bases where an assessment of the Supply Base shows that the forest carbon stocks are stable or increasing, or Option B. Feedstock may be sourced, if the assessment shows that the forest carbon stocks are declining in the Supply Base, provided that the decline is due to natural processes (fire, pests etc.) and sourcing of feedstock has the aim to recover feedstock otherwise lost or assist regeneration	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	3.2.2 - Primary feedstock shall not be sourced from forest areas where site productivity is low and, according to local definitions or	**SP Risk**	**SP Risk**	Low Risk	**SP Risk**	Low Risk	**SP Risk**	Low Risk	**SP Risk**	Low Risk	Low Risk

	norms, the areas are classified as low-productive or difficult to regenerate										
	3.2.3 - Primary feedstock shall not be sourced from forest areas in the Supply Base which, according to local definitions or norms, are classified as having combined attributes of high carbon stocks and high conservation value (HCV)	**SP Risk**	**SP Risk**	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
Feedstock Sourcing Shall Not Compete with Wood Sourcing for Long-Lived Wood Products	3.3.1 - Feedstock sourcing shall be in compliance with the principles of cascading use; high quality stem wood shall not be used as feedstock if it is in substantial demand for long-lived products in the Supply Base.	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
Decent Working Conditions are Provided, and Labour Rights are Safeguarded	4.1.1 - Freedom of association and the right to collective bargaining shall be respected in the workplace	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	4.1.2 - Forced or compulsory labour shall not be used	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	4.1.3 - Child labour shall not be used	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	4.1.4 - Workers shall not be discriminated in hiring, remuneration, access to training, promotion, termination or retirement	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	4.1.5 - Wages paid to workers shall meet or exceed the legal minimum wage or, where there is no statutory minimum wage, industry norms shall be met or exceeded	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	4.1.6 - Working hours shall comply with legal requirements	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	4.1.7 - Workers shall have access to health care provisions, sickness benefits, retirement benefits, invalidity benefits, death benefits, workers' compensation	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk

	4.1.8 - Training shall be provided for all workers to allow them to implement the conditions set out in all elements of the SBP Standards relevant to their responsibilities	Low Risk	**SP Risk**	Low Risk	**SP Risk**	**SP Risk**	**SP Risk**	**SP Risk**	**SP Risk**	**SP Risk**	**SP Risk**
	4.1.9 - Mechanisms shall be in place for resolving grievances and disputes in the workplace	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	4.1.10 - Safeguards shall be put in place to protect the health and safety of workers by developing, communicating and implementing policies and procedures	**SP Risk**	**SP Risk**	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
Feedstock Sourcing Benefits Communities	4.2.1 - Negative social and community impacts shall be identified and avoided	**SP Risk**	**SP Risk**	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	4.2.2 - Feedstock sourcing shall positively contribute to the local economy, including employment	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	4.2.3 - Food, water supply or high conservation values (HCV) that are essential for the fulfilment of basic needs of communities shall be maintained or enhanced	**SP Risk**	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	4.2.4 - Legal, customary, and traditional tenure and use rights of Indigenous Peoples and local communities related to the Supply Base shall be identified, documented, and respected	**SP Risk**	**SP Risk**	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	4.2.5 - Mechanisms shall be in place for resolving grievances and disputes, relating to tenure and use rights of the forest and other land management practices	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
	4.2.6 - Where the rights of Indigenous Peoples are identified in the Supply Base, and Free Prior and Informed Consent (FPIC) has not been achieved for the	**SP Risk**	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk

	proposed and planned activities, a consultation and, if required, accommodation process shall be put in place										
	4.2.7 - Designated cultural heritage sites shall be preserved	Low Risk	**SP Risk**	Low Risk	**SP Risk**	**SP Risk**	**SP Risk**	Low Risk	**SP Risk**	Low Risk	Low Risk

More information on the SBP Standards Documents can be found at the following link (https://sbp-cert.org/documents/normative-documents/version-2/standards-v2/)

SBP Specified Risk Designations

The following section expands on the Specified Risk designations that have been identified in the relevant SBP Risk Assessments (RRA & SBE) for regions included in the Drax supply base. Indicators with a Low Risk designation have been identified as having effective measures in place that result in feedstock sourcing to have a negligible risk to the value of the SBP Standard 1 indicator. For more information on Low Risk designations in the Drax supply base, see the Supply Base Report for relevant Drax sites in the SBP Certificate Holders website (https://sbp-cert.org/certifications/certificate-holders/).

2.1.3 - Key species, habitats, ecosystems, and areas of high conservation value (HCV) pertaining to biodiversity in the Supply Base shall be maintained or enhanced

Relevant Region & Scale of Assessment:

- Alberta (AB Regional Risk Assessment)
  - Private Lands
  - Public Lands
- British Columbia (BC Regional Risk Assessment)
  - Public Lands
  - Private Lands
- Alaska (AK Supply Base Evaluation)
  - State Lands
  - Private Lands

Specified Risk Designation Rationale

Alberta:
Biodiversity is a complex issue; it contains elements both at the landscape- level and stand-level, and sufficiency of maintenance or enhancement is difficult to evaluate within a risk assessment process. Indicator 2.1.3 is focused on how effectively threats to key species, habitats, ecosystems and areas of high conservation value are mitigated to maintain or enhance biodiversity values. In most cases, mitigation results from some level of protection or permanence of sustenance.

The federal and provincial regulatory framework governing the management and maintenance of biodiversity values is extensive. Legislative requirements, controls and guidance are in place to provide protection and/or allow the implementation of practices that maintain or enhance both landscape-level and stand-level biodiversity values.

It should be noted that this risk assessment does not evaluate the sufficiency of the regulatory framework but evaluates its implementation for the elements of biodiversity values that are in place (See Indicator 2.1.1 Context section for details.)

Crown Land

The Crown licensees' FMP, and subsequent operational plans are the primary implementation mechanism of legislation related the management and maintenance of biodiversity values. In evaluating implementation mechanisms there are sections where FMP guidance is to "retain" or "maintain" or "recruit" specific elements without specific targets set in legislation or strategic level guidance. Without legislative direction or government guidance (i.e., target area, percent target or minimum requirements), there is uncertainty about the sufficiency/uniformity of implementation vis-a-vis maintenance and enhancement of biodiversity values across diverse Crown Land timber disposition holders.

Government programs provide oversight and monitor regulatory planning and practices for biodiversity values. There is no indication of widespread or systemic legal noncompliance. However, government oversight is focused on legal compliance with legislation for biodiversity values but not on sufficiency relative to the maintenance and enhancement of biodiversity values. This reinforces uncertainty with respect to sufficiency/uniformity of implementation across diverse Crown Land timber disposition holders. The Alberta government and other organisations have, and continue to, assess the maintenance and enhancement of landscape-level and stand- level biodiversity values.

There are many assessments and reports covering different spatial and temporal scales. The results of this data, assessments, and reports are wide and varied, making it difficult to provide a definitive conclusion. Based on the extensive results, this risk assessment is unable to draw a sufficiency conclusion on the maintenance or enhancement of specific biodiversity values.

This risk assessment does identify areas of uncertainty. In the evaluation of Crown land, the most evident areas of uncertainty for the maintenance of biodiversity values are related the following:

- Woodland Caribou habitat due to the incomplete recovery plan development and/or implementation (only 2 of the 11 sub-regional plans had been completed);
- SAR recovery plans and critical habitat for identified species-at-risk are at various stages of completion;
- Intact Forest Landscapes due to lack of provincial recognition and implementation mechanism;
- RTE ecosystems due to no minimum protection targets; and
- Old forests do not have government minimum targets and are not spatially permanent.
- Incomplete regional land use plans

Based on evidence reviewed and applying the precautionary approach, this Indicator is designated as specified risk for Crown land in Alberta.

Private Land

There is an extensive federal and provincial regulatory framework governing biodiversity values. On private land, due to a lack of evidence to support implementation mechanisms, a monitoring framework and/or results of current condition of the maintenance of landscape-level and stand-level biodiversity values, and a precautionary approach is applied. As such, this Indicator is designated as specified risk for private land in Alberta.

Biodiversity Values – Maintained / Enhanced		Crown Land	Other Private Land
Landscape Level	SAR – wide-ranging / regionally significant	Specified risk	Specified risk
	Large landscapes	Low risk	Low risk
	Intact Forest Landscapes	Specified risk	Specified risk
Stand Level	SAR – local / endemic	Specified risk	Specified risk
	RTE Ecosystems	Specified risk	Specified risk
	Woodland Caribou habitat & Old Forests	Specified risk	Specified risk

British Columbia:
Biodiversity is a complex issue; it contains elements both at the landscape-level and stand-level, and sufficiency of maintenance or enhancement is difficult to evaluate within a risk assessment process. Indicator 2.1.3 Key Eco/HCV Maintained or Enhanced is focused on how effectively threats to key species, habitats, ecosystems and areas of high conservation value are mitigated to maintain or enhance biodiversity values. In most cases, mitigation results from some level of protection or permanence of sustenance.

The federal and provincial regulatory framework governing the management and maintenance of biodiversity values is extensive. Legislative requirements, controls and guidance are in place to provide protection and/or allow the implementation of practices that maintain or enhance both landscape-level and stand-level biodiversity values. It should be noted that this risk assessment does not evaluate the sufficiency of the regulatory framework but evaluates its implementation for the elements of biodiversity values that are in place (See Indicator 2.1.1 Key Eco/HCV Identified Context section for details.)

Public (Crown) Land
The Crown licensees' FSPs, and subsequent operational plans are the primary implementation mechanism of legislation related the management and maintenance of biodiversity values. Government programs provide oversight and monitor regulatory planning and practices for biodiversity values. There is no indication of widespread or systemic legal non-compliance. However, government oversight is focused on legal compliance with legislation for biodiversity values but not on sufficiency relative to the maintenance and enhancement of biodiversity values. This reinforces uncertainty with respect to sufficiency/uniformity of implementation across diverse Crown Land timber disposition holders. The BC government and other organisations have, and continue to, assess the maintenance and enhancement of landscape-level and stand-level biodiversity values. There are many assessments and reports covering different spatial and temporal scales.

The results of this data, assessments, and reports are wide and varied, making it difficult to provide a definitive conclusion. Based on the extensive results, this risk assessment is unable to draw a sufficiency conclusion on the maintenance or enhancement of specific biodiversity values.

This risk assessment does identify areas of uncertainty. In the evaluation of Crown land, the most evident areas of uncertainty for the maintenance of biodiversity values are related the following:
- Woodland Caribou habitat due to the incomplete recovery plan development and/or implementation;
- SAR recovery plans and critical habitat for identified species-at-risk are at various stages of completion;
- Intact Forest Landscapes due to lack of provincial recognition and implementation mechanism; and
- Priority old growth forest deferral areas and protection have not been completed and finalized.

Based on evidence reviewed and applying the precautionary approach, this Indicator is designated as specified risk for Crown land in British Columbia.

Private Managed Forest Land and Other Private Land
There is federal and provincial regulatory framework for maintaining biodiversity values. On private managed forest land and other private land, due to a lack of evidence to support implementation mechanisms, a monitoring framework and/or results of current condition of the maintenance of landscape-level and stand-level biodiversity values, a precautionary approach is applied. As such, this Indicator is designated as specified risk for private managed forest land and other private land in British Columbia.

Biodiversity Values – Maintained / Enhanced		Crown Land	Private Managed Forest Land	Other Private Land
Landscape Level	SAR – Caribou	S	S	S
	Large landscapes	L	L	L
	Intact Forest Landscapes	S	S	S
Stand Level	SAR – local /endemic	S	S	S
	RTE Ecosystems	L	L	L
	Key Habitat Attributes &Old Growth	S	S	S

Alaska:
The Endangered Species Act (ESA) of 1973 outlines a process for identifying, classifying, and protecting the most vulnerable species and ecosystems in the United States on a federal level. All forest management activities must comply with ESA requirements for listed species. Violations of federal endangered species provisions carry a variety of punishments, ranging from fines to imprisonment.

The US Fish & Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) work in cooperation with federal and state agencies to ensure protection of vulnerable species and their respective habitats. These agencies create—and regularly update—Recovery Plans for all species listed under the ESA.

In addition to the National Environmental Policy Act (NEPA) , which requires that federal agencies identify environmental impacts of activities they carry out, fund, or permit, federal agencies must also comply with Section 7 of the ESA. This article stipulates that any activities carried out with involvement of a federal agency must have an associated biological opinion (BO) which identifies endangered species in the ecosystem and outlines mitigation measures. BOs are also required on private and state land if a federal agency is involved in the project. If a federal agency is not involved in the project, Section 10 of the ESA still requires that a habitat conservation plan (HCP) be created to mitigate impacts to endangered species from activities on private and state lands.

Many believe the ESA has been successful in maintaining biodiversity in the United States, with 99% of the 1,600 species listed under it still extant. The Center for Biological Diversity found in 2012 that 90% of listed species are recovering at the rate specified in their Recovery Plans. While it is difficult to precisely measure biodiversity on the national (or even regional) scale, these statistics are positive indicators for the future of biodiversity in the supply base.

The Forest Stewardship Council (FSC) has established a methodology for identifying HCV areas. In their Alaska and Hawaii risk assessment, they identified specific areas in the supply base which qualify as HCV 1: Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g., endemism, endangered species, refugia) and HCV 3: Forest areas that are in or contain rare, threatened or endangered ecosystems. HCV 3 areas are addressed in Indicator 3.2.3. Two different types of HCV 1 areas (Figure 4) with specified risk are identified by FSC: old growth Sitka spruce forests and old growth white spruce floodplain forests.

FSC notes that old growth Sitka spruce forests are mostly protected by existing regulations on federal and state lands, but that there are no specific laws which prohibit the harvest of these forests on private lands. These private lands present the source of specified risk. However, as FSC also notes, the vast majority of old growth Sitka spruce on private lands have already been harvested. Therefore, even if limited harvest does occur in such forests, the overall ecosystem health of old growth Sitka spruce forests will be preserved or enhanced. Regarding white spruce floodplain forests, FSC associates risk with this species from a specific area around Fairbanks and does not identify specified risk for most of the state.

There are multiple layers of legislation that require forest managers to consider and mitigate the impacts of their activities on vulnerable species and ecosystems. Additionally, data on the efficacy of the Endangered Species Act for preserving biodiversity in the supply base are promising. However, conservation values are threatened in old growth white spruce forests near Fairbanks.

2.2.1 - Feedstock shall not be sourced from land that had one of the following statuses in January 2008 and no longer has that status due to land conversion: a. Forests b. Wetlands c. Peatlands d. Highly biodiverse grasslands

Relevant Region & Scale of Assessment:

- Alberta (AB Regional Risk Assessment)
  - Private Lands
  - Public Lands
- British Columbia (BC Regional Risk Assessment)
  - Public Lands
  - Private Lands
- Idaho (PNW Supply Base Evaluation)
  - State Lands
  - Private Lands
- Montana (PNW Supply Base Evaluation)
  - State Lands
  - Private Lands
- Northern California (PNW Supply Base Evaluation)
  - State Lands
  - Private Lands
- Northwest Wyoming (PNW Supply Base Evaluation)
  - State Lands
  - Private Lands
- Oregon (PNW Supply Base Evaluation)
  - State Lands
  - Private Lands
- Washington (PNW Supply Base Evaluation)
  - State Lands
  - Private Lands

Specified Risk Designation Rationale

Alberta:

Data shows Canada's annual rate of deforestation is low and Canada has contributed a fraction of a per cent to global deforestation since 1990. National data also shows that non-forest industry sectors (i.e., agriculture, built-up, hydro & hydro lines, mines, oil & gas, and transportation) are the economic drivers of deforestation and ultimately land conversion. Although the deforestation rate is low, this Indicator is to evaluate the risk of land conversion, not the rate.

Public (Crown) Land

On Crown land for licensees with forest management tenures, there is a comprehensive regulatory framework governing reforestation requirements and limited conversion to non-forest use. FOMP data verified timber disposition holders comply with reforestation requirements. On Crown land for the industry sectors that do not have forest management type tenures, legislation does not restrict land conversion. Due to a lack of evidence to support implementation mechanisms, a monitoring framework, and/or results of current condition of deforestation, a precautionary approach is applied. As such, this Indicator is designated as specified risk for Crown land in Alberta.

Private Land

Due to a lack of a regulatory framework, evidence to support implementation mechanisms, a monitoring framework, and/or results of current condition of deforestation, a precautionary approach is applied. As such, this Indicator is designated as specified risk for private land in Alberta.

British Columbia:

Data shows Canada's annual rate of deforestation is low and Canada has contributed a fraction of a per cent to global deforestation since 1990. National data also shows that non-forest industry sectors (i.e., agriculture, built-up, hydro & hydro lines, mines, oil & gas, and transportation) are the economic drivers of deforestation and ultimately land conversion. Although the deforestation rate is low, this Indicator is to evaluate the risk of land conversion, not the rate.

Public (Crown) Land

On Crown land for licensees with forest management tenures, there is a comprehensive regulatory framework governing reforestation requirements and limited conversion to non-forest use. The Forest Planning and Practices Regulation sets measurable practice requirements. Government programs and independent auditing boards monitor forest management practices and provide recommendations for improvement. Results verify compliance with reforestation requirements. On Crown land for the industry sectors that do not have forest management type tenures, legislation does not restrict land conversion. Due to a lack of evidence to support implementation mechanisms, a monitoring framework, and/or results of current condition of deforestation, a precautionary approach is applied. As such, this Indicator is designated as specified risk for Crown land in British Columbia.

Private Managed Forest Land and Other Private Land

Due to a lack of a regulatory framework, evidence to support implementation mechanisms, a monitoring framework, and/or results of current condition of deforestation, a precautionary approach is applied. As such, this Indicator is designated as specified risk for private managed forest land and other private land in British Columbia.

US Pacific Northwest:

Federal forestlands in the supply base are owned and managed mostly by the US Forest Service and Bureau of Land Management (BLM). Both entities manage their lands under 'multiple use' management concepts; the Forest Service commits to 'Advocating a conservation ethic in promoting the health, productivity, diversity, and beauty of forests and associated lands,' while the BLM has 'Conservation' and 'Restoration' as two of their five key priorities. In addition, federal land management agencies develop area specific management plans, such as the 1994 Northwest Forest Plan, and management plans for individual National Forest or BLM units. Collectively, these policies mean that converting federal lands out of forest use is a low probability action.

Conversely, conversion of private forestlands to non-forest use is permitted in all states in the supply base. However, in California, Idaho, Oregon, and Washington, permits must be filed with the state prior to a conversion.

Any discharge of dredged or fill material into a wetland or peatland is regulated under Section 404 of the Clean Water Act (CWA). This includes fill for development, water resource projects, infrastructure development, and mining projects. To successfully be permitted under the CWA, the applicant must demonstrate that all potential impacts to water quality have been minimized, and that any unavoidable impacts will be compensated.

Laws in the US do not prohibit the conversion of grasslands, however incentive programs do exist to encourage the protection of grasslands from agricultural expansion via programs like Grassland Easements through the US Fish and Wildlife Service.

Actions on federal land, including conversions of forestland, are subject to review under NEPA. NEPA is enforced via litigation from environmental non-profits, with an average of 129 NEPA lawsuits filed annually. The median Environmental Impact Statement produced by these land managing agencies under NEPA guidelines takes 3-4 years to complete, indicating a rigorous investigative process. The US Department of Agriculture publishes factsheets on each state which quantify forest gain and loss.

Of the states in the supply base, California, Oregon, and Washington show a small net loss of forested acreage

on an average year, while Idaho and Montana show small net increases. All states in the supply base convert some private acres out of forest use each year. Additionally, the Forest Stewardship Council has identified several counties in the supply base as being at high risk of conversion due to urban development.

Violations of the CWA are investigated by the US Environmental Protection Agency (EPA) and can carry hefty fines. Additionally, if the violation resulted in negative impacts to endangered wildlife, additional penalties and mitigation may be required by FWS and state wildlife management agencies, such as the California Department of Fish and Wildlife. Grasslands in the US are often converted to agricultural use, however no publicly available information exists suggesting that they are often (or ever) intentionally converted to forestland, which would be necessary for feedstock to be harvested from them.

Federal lands are well protected against conversion of all types, both by overarching policies and by specific management plans for each forest unit and region. On private lands, conversion of wetlands and peatlands is strongly limited by the Clean Water Act, and conversion of grasslands to forestland is not a common occurrence. However, conversion of private forestland to other uses is relatively common.

2.2.2 - Ecosystems, their health, vitality, functions and services in the Supply Base shall be maintained or enhanced

Relevant Region & Scale of Assessment:

- Alberta (AB Regional Risk Assessment)
  - Private Lands
  - Public Lands
- British Columbia (BC Regional Risk Assessment)
  - Public Lands
  - Private Lands

Specified Risk Designation Rationale

Alberta

The assessment of this Indicator focuses on the maintenance of healthy and vital ecosystem functions and services. To maintain health and vital, ecosystems must maintain functions and services. Functions and services have been evaluated more specifically in other Criterion 2.2 Indicators, including:

- Maintaining productivity:
  - Indicator 2.2.4 – Residue Removal Minimizes Neg Impact to Ecosystem
  - Indicator 2.2.9 – Long-term Production Capacity
  - Indicator 2.2.10 – Regen After Harvest
- Maintaining soil productivity:
  - Indicator 2.2.3 – Soil Quality Maintained or Enhanced
- Maintaining water quality and quantity:
  - Indicator 2.2.5 – Water Quality/Quantity Maintained or Enhanced
- Managing natural disturbances:
  - Indicator 2.2.11 – Natural Processes are Managed

All six Indicators which detail the functions and services that must be maintained to have a healthy and vital ecosystem (2.2.3, 2.2.4, 2.2.5, 2.2.9, 2.2.10, 2.2.11) have low risk designations for Crown land in Alberta. As such, this Indicator also has a low risk designation for Crown land in Alberta. Three of the six Indicators which detail the functions and services that must be maintained to have a healthy and vital ecosystem, (2.2.3 – Soil Quality Maintained or Enhanced; 2.2.9 – Long-term Production Capacity and 2.2.10 – Regen After Harvest) have a specified risk designation for private land in Alberta. As such, this Indicator also has a specified risk designation for private land in Alberta.

British Columbia

The assessment of this Indicator focuses on the maintenance of healthy and vital ecosystem functions and services. To maintain health and vital, ecosystems must maintain functions and services. Functions and services have been evaluated more specifically in other Criterion 2.2 Indicators, including:

- Maintaining productivity:
  - Indicator 2.2.4 – Residue Removal Minimizes Neg Impact to Ecosystem
  - Indicator 2.2.9 – Long-term Production Capacity
  - Indicator 2.2.10 – Regen After Harvest
- Maintaining soil productivity:
  - Indicator 2.2.3 – Soil Quality Maintained or Enhanced
- Maintaining water quality and quantity:
  - Indicator 2.2.5 – Water Quality/Quantity Maintained or Enhanced
- Managing natural disturbances:
  - Indicator 2.2.11 – Natural Processes are Managed

All six Indicators which detail the functions and services that must be maintained to have a healthy and vital ecosystem (2.2.3, 2.2.4, 2.2.5, 2.2.9, 2.2.10, 2.2.11) have low risk designations for Crown land and private managed forest land in British Columbia. As such, this Indicator also has a low risk designation for Crown land and private managed forest land in British Columbia. Four of the six Indicators which detail the functions and services that must be maintained to have a healthy and vital ecosystem, (2.2.3 – Soil Quality Maintained or Enhanced; Indicator 2.2.5 – Water Quality/Quantity Maintained or Enhanced; 2.2.9 – Long-term Production Capacity, and 2.2.10 – Regen After Harvest) have a specified risk designation for other private land in British Columbia. As such, this Indicator also has a specified risk designation for other private land in British Columbia.

2.2.3 - Soil quality in the Supply Base shall be maintained or enhanced

Relevant Region & Scale of Assessment:

- Alberta (AB Regional Risk Assessment)
  - Public Lands
- British Columbia (BC Regional Risk Assessment)
  - Unmanaged Private Lands
- Northwest Wyoming (PNW Supply Base Evaluation)
  - Private Lands

Specified Risk Designation Rationale

Alberta:

In the context of this Indicator, soil quality is equivalent to soil productivity, which is defined as the ability of forest soil to allow forests to grow, produce crops and function with minimal human intervention. This evaluates soil quality on an individual site level. Cumulative impacts on soil quality on the landscape from harvesting and road construction are beyond the scope of this Indicator. Soil quality as it affects water quality via sedimentation is further discussed in Indicators 2.2.5 Water Quality & Quality Maintenance or Enhanced and 4.2.3 Basic Needs of Community Maintained or Enhanced. Forest residue and coarse woody debris retention are discussed in Indicator 2.2.4 Residue Removal Minimises Neg Impact to Ecosystem.

Potential impacts 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.

Public (Crown) Land

There is a comprehensive regulatory framework governing soil quality for Crown land. There are well described operational guidelines for harvesting related to soil erosion, compaction, and rutting. The government monitors harvest blocks for compliance. MFP FOMP data verify compliance with practice requirements related to soil

quality. Based on the evidence reviewed, this Indicator is designated as low risk for Crown land in Alberta.

Private Land

Due to a lack of a regulatory framework, evidence to support implementation mechanisms, a monitoring framework and/or results of current condition of soil quality, a precautionary approach is applied. As such, this Indicator is designated as specified risk for private land in Alberta.

British Columbia:

In the context of this Indicator, soil quality is equivalent to soil productivity, which is defined as the ability of 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 on soil quality on the landscape from harvesting and road construction are beyond the scope of this Indicator. Soil quality as it affects water quality via sedimentation is further discussed in Indicators 2.2.5 Water Quality/Quality Maintained or Enhanced and 4.2.3 Basic Needs of Community Maintained or Enhanced. Forest residue and coarse woody debris retention are discussed in Indicator 2.2.4 Residue Removal Minimises Neg Impact to Ecosystem.

Potential impacts 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.

Public (Crown) Land

There is a comprehensive regulatory framework governing soil conservation on Crown land. The FPPR sets measurable practice requirements regarding soil disturbance limits, the number of permanent access structures, road deactivation and rehabilitation requirements, and maintenance of natural drainage patterns. Government programs and independent auditing boards monitor forest management practices and provide recommendations for improvement. Inspection results verify compliance with practice requirements related to soil quality. Based on the evidence reviewed, this Indicator is designated as low risk for Crown land in British Columbia.

Private Managed Forest Land

Audits and inspection reports completed by the MFC verified landowners comply with regulatory requirements for soil disturbance and road construction and maintenance. Based on the evidence reviewed, this Indicator is designated as low risk for private managed forest land in British Columbia.

Other Private Land

Due to a lack of a regulatory framework, evidence to support implementation mechanisms, a monitoring framework and/or results of current condition of soil quality, a precautionary approach is applied. As such, this Indicator is designated as specified risk for other private land in British Columbia.

US Pacific Northwest:

Federal and state law pertaining to BMPs are enforced by agencies including the US Environmental Protection Agency, US Army Corps of Engineers and state forestry agencies. Failure to comply with state and federal law can result in litigation and penalties. In Wyoming, use of BMPs on state lands is required, with audits showing BMPs successfully mitigated impacts to soil. Use of BMPs on Wyoming private lands is voluntary, and limited data exists on levels of compliance. However, non-industrial private forestland comprises less than 15% of forests.

Soil quality is maintained or protected by federal and state regulations which are enforced by multiple regulatory agencies. Forest activities on federal lands are assessed under NEPA and follow various management plans. State and private activities follow state-level forest practices regulations or recommended BMPs. Operations on private lands on Wyoming, however, are not legally required to comply with BMPs, and limited data exists on the extent of active compliance.

2.2.4 - Where the removal of harvest forest residues and / or stumps occurs, this shall not lead to irreversible negative impacts to the ecosystem

Relevant Region & Scale of Assessment:

- Northwest Wyoming (PNW Supply Base Evaluation)
  - Private Lands

Specified Risk Designation Rationale

US Pacific Northwest:

Logging residues, or "slash," can be a serious fire hazard in certain ecosystems. Wildfires can cause irreversible negative impacts to ecosystems, and feedstock harvesting should not contribute to them. Wyoming does not have laws relating to slash management on state and private lands but does publish best management practices (BMPs) which include slash treatment recommendations.

Federal and state law pertaining to BMPs are enforced by agencies including the US Environmental Protection Agency, US Army Corps of Engineers, and state forestry agencies. Failure to comply with state and federal law can result in litigation and penalties. In Wyoming, while use of BMPs on state lands is required, it is voluntary on private lands, and limited data exists on levels of compliance. Notably, non-industrial private forestland comprises less than 15% of forests.

Unmanaged slash can contribute to catastrophic wildfires. Therefore, laws have been passed which require slash management for wildfire mitigation on state and federal lands. The same is true on private lands, except for those in Wyoming.

2.2.5 - Quality and quantity of ground water, surface water and water downstream shall be maintained or enhanced

Relevant Region & Scale of Assessment:

- British Columbia (BC Regional Risk Assessment)
  - Unmanaged Private Lands
- Northwest Wyoming (PNW Supply Base Evaluation)
  - Private Lands

Specified Risk Designation Rationale

British Columbia:

The intent of this Indicator is to maintain or enhance water quality and quantity by managing ecosystem functions and services. Maintenance of drinking water is addressed in Indicator 4.2.3 Basic Needs of Community Maintained or Enhanced. Spills and waste requirements are addressed in Indicator 2.2.8 Waste Disposal.

Forest management activities may negatively affect water resources directly and indirectly by changing ecosystem functions and services. Impacts include sedimentation, disturbance of site's hydrology above and underground, modification of the site's capacity to control seasonal precipitation fluctuances (i.e., flooding), spawning habitat, hinder fish's capability to move up or downstream, water temperature, water quality (i.e., turbidity) and/or quantity, and loss of riparian habitat and function.

Public (Crown) Land

There is a comprehensive legislative framework governing water quality and quantity maintenance on Crown land. The FPPR sets measurable practice requirements. There are operational guidelines and government programs monitor forest management practices. Compliance monitoring of water quality and quantity is completed and verifies conformance. FREP data indicates that current forest management practices are

effective in maintaining riparian function and water quality on majority of streams. Based on the evidence reviewed, this Indicator is designated as low risk for Crown land in British Columbia.

Private Managed Forest Land
On private managed forest land, federal legislation is comprehensive. Requirements for water are legislated in the PMFLA. MFC annual inspection results verify conformance with the water requirements. Based on the evidence reviewed, this Indicator is designated as low risk for private managed forest land in British Columbia.

Other Private Land
Due to a lack of a regulatory framework, evidence to support implementation mechanisms, a monitoring framework and/or results of current condition of water quality and quantity, a precautionary approach is applied. As such, this Indicator is designated as specified risk for other private land in British Columbia.

US Pacific Northwest:
Forest management can impact water quality in a range of ways including changes to sediment delivery, nutrient losses, carbon transport, metal and base cation releases, acidity and temperature. Implementing Best Management Practices (BMPs) is a critical part of managing these impacts.

Federal and state law pertaining to BMPs are enforced by agencies including the US Environmental Protection Agency, US Army Corps of Engineers, and state forestry agencies. Failure to comply with state and federal law can result in litigation and penalties. In Wyoming, while use of BMPs on state lands is required, it is voluntary on private lands, and limited data exists on levels of compliance. Notably, non-industrial private forestland comprises less than 15% of forests.

Water quality and quantity is maintained or protected by federal and state regulations which are enforced by multiple regulatory agencies. Forest activities on federal lands are assessed under NEPA and follow various management plans. State and private activities follow state-level forest practices regulations or recommended BMPs. Operations on private lands on Wyoming, however, are not legally required to comply with BMPs, and limited data exists on the extent of active compliance.

2.2.9 - Harvesting levels shall be justified as to how they can be sustained with reference to inventory and growth data for the Supply Base

Relevant Region & Scale of Assessment:
- Alberta (AB Regional Risk Assessment)
  - Public Lands
- British Columbia (BC Regional Risk Assessment)
  - Unmanaged Private Lands

Specified Risk Designation Rationale

Alberta:
The assessment of this Indicator considers whether long-term sustainable harvest levels have been determined using appropriate information and assumptions and whether actual harvests are below these levels. Forest inventory and yield curves are key determinants of the long-term sustainable harvest levels used in forest estate modelling.

Long-term sustainable harvest levels cannot exceed the annual net growth rate of the forest, with losses due to natural disturbances considered. An annual allowable cut (AAC) is determined from this long-term sustainable harvest level. The AAC represents the upper annual harvest limit during the management plan term. Biomass Producers in Alberta source most of the fibre from mill residues. The balance is obtained by grinding roadside harvesting slash or chipping low-grade roundwood. Fibre from these sources is not volume that counts against the AAC. See Section 4.8 – Overview of the Biomass Sector as well as Indicator 2.2.4 – Residue Removal

Minimises Neg Impact to Ecosystem.

Timber harvesting that exceeds the long-term sustainable harvest level of the forest is unsustainable and will erode the productivity of the forest, ecosystem services and the timber supply it produces.

Public (Crown) Land
There is a comprehensive regulatory framework governing the determination of long-term sustainable harvest levels and regulating actual harvest volumes. Government legislation and guidance demonstrate long-term sustainable harvest levels are calculated based on applicable inventory and growth data. MFP approves long term sustainable harvest levels, as well as monitors actual harvest levels. MFP reports and databases provide data to verify actual harvest volumes are below the long-term sustainable harvest levels. Based on evidence reviewed, this Indicator is designated as low risk for Crown land in Alberta.

Private Land
Due to a lack of a regulatory framework, evidence to support implementation mechanisms, a monitoring framework and/or results of current condition of harvest levels, a precautionary approach is applied. As such, this Indicator is designated as specified risk for private land in Alberta.

British Columbia:
The assessment of this Indicator considers whether long-term sustainable harvest levels have been determined using appropriate information and assumptions and whether actual harvests are below these levels. Forest inventory and yield curves are key determinants of the long-term sustainable harvest levels used in forest estate modelling.

Long-term sustainable harvest levels cannot exceed the annual net growth rate of the forest, with losses due to natural disturbances considered. An allowable annual cut (AAC) is determined from this long-term sustainable harvest level. The AAC represents the upper annual harvest limit during the management plan term. Biomass Producers in British Columbia (BC) source most of the fibre from mill residues. The balance is obtained by grinding roadside harvesting slash or chipping low-grade roundwood. Fibre from these sources is not volume that counts against the AAC. This fibre can contribute to other manufactured forest products through BC Ministry of Forests (FOR) Residual Fibre Utilization Program. The intent of this initiative is to encourage greater use of roadside slash by the biomass industry (i.e., increased fibre utilisation). (See Section 4.8 – Overview of the Biomass Sector as well as Indicator 2.2.4 – Residue Removal Minimises Neg Impact to Ecosystem). Timber harvesting that exceeds the long-term sustainable harvest level of the forest is unsustainable and will erode the productivity of the forest, ecosystem services and the timber supply it produces.

Crown Land
There is a comprehensive regulatory framework governing the determination of long-term sustainable harvest levels and regulating actual harvest volumes. Government legislation and guidance demonstrate long-term sustainable harvest levels are calculated based on applicable inventory and growth data. FOR sets long-term sustainable harvest levels. FOR monitors actual harvest levels. FOR reports and databases provide data to verify actual harvest volumes are below the long-term sustainable harvest levels. Based on evidence reviewed, this Indicator is designated as low risk for Crown land in British Columbia.

Private Managed Forest Land
On private managed forest land, Regulations and an associated reporting and monitoring system is in place. While the long-term sustainable harvest level on private managed forest land is not publicly available, the compliance rate for re- planting harvested and disturbed areas is high. Based on evidence reviewed, this Indicator is designated as low risk on private managed forest land in British Columbia.

Other Private Land
Due to a lack of a regulatory framework, evidence to support implementation mechanisms, a monitoring framework and/or results of current condition of harvest levels, a precautionary approach is applied. As such, this Indicator is designated as specified risk for other private land in British Columbia.

2.2.10 - Harvested areas shall be regenerated

Relevant Region & Scale of Assessment:

- Alberta (AB Regional Risk Assessment)
  - Private Lands
- British Columbia (BC Regional Risk Assessment)
  - Unmanaged Private Lands
- Idaho (PNW Supply Base Evaluation)
  - Private Lands
- Montana (PNW Supply Base Evaluation)
  - Private Lands
- Northern California (PNW Supply Base Evaluation)
  - Private Lands
- Northwest Wyoming (PNW Supply Base Evaluation)
  - Private Lands
- Oregon (PNW Supply Base Evaluation)
  - Private Lands
- Washington (PNW Supply Base Evaluation)
  - Private Lands

Specified Risk Designation Rationale

Alberta:

To ensure future forests, regeneration with natural or planted seedlings following harvest must be prompt and adequate. Sufficiency is a measure of species selection, seedling distribution, and time of establishment. Species selection needs to be consistent with site ecology (i.e., original stand composition, ecosite, and natural disturbance) and considerate of future climate change risks. Distribution must be sufficient to allow future crop trees to occupy the site in a free-growing state, and timing needs to be prompt enough to allow early establishment unhindered from competing vegetation. The terms regeneration and reforestation are interchangeable for this Indicator. See Indicator 2.2.1 Conversion – a, b, c, d and Indicator 2.2.12 Genetically Modified Trees are Not Used. Inadequate regeneration can result in a considerable time delay following harvest, unacceptable species, inadequate control of competing vegetation, and significantly uneven density. These will compromise future forest fibre harvest volume and value, as well as ecosystem functions and related productivity.

Public (Crown) Land

There is a comprehensive regulatory framework governing regeneration on Crown land. Silviculture activities are reported annually and are monitored by MFP. The Annual Reforestation Report in Alberta and FOMP data verified timber disposition holders comply with regeneration requirements. Based on evidence reviewed, this Indicator is designated as low risk for Crown land in Alberta.

Private Land

Due to a lack of a regulatory framework, evidence to support implementation mechanisms, a monitoring framework and/or results of current condition of regeneration following timber harvesting, a precautionary approach is applied. As such, this Indicator is designated as specified risk for private land in Alberta.

British Columbia:

To ensure future forests, regeneration with natural or planted seedlings following harvest must be prompt and adequate. Sufficiency is a measure of species selection, seedling distribution, and time of establishment. Species selection needs to be consistent with site ecology (i.e., original stand composition, ecosite, and natural disturbance) and considerate of future climate change risks. Distribution must be sufficient to allow future crop trees to occupy the site in a free-growing state, and timing needs to be prompt enough to allow early establishment unhindered from competing vegetation. The terms regeneration and reforestation are

interchangeable for this Indicator. See Indicator 2.2.1 Conversion – a, b, c, d. See Indicator 2.2.12 Genetically Modified Trees not Used. Inadequate regeneration can result in a considerable time delay following harvest, unacceptable species, inadequate control of competing vegetation, and significantly uneven density. These will compromise future forest fibre harvest volume and value, as well as ecosystem functions and related productivity.

Public (Crown) Land
There is a comprehensive regulatory framework governing regeneration on Crown land. Stocking standards, and annual declarations provide evidence that licensees are complying with regeneration legislation. Government programs and independent auditing boards monitoring forest management practices and provide recommendations for improvement. Inspection and audit results verify compliance with practice requirements related to regeneration. Based on evidence reviewed, this Indicator is designated as low risk for Crown land in British Columbia.

Private Managed Forest Land
Audits and inspection reports completed by the MFC verify landowners are complying with reforestation requirements. Based on the evidence reviewed, this Indicator is designated as low risk for private managed forest land in British Columbia.

Other Private Land
Due to a lack of a regulatory framework, evidence to support implementation mechanisms, a monitoring framework and/or results of current condition of regeneration following timber harvesting, a precautionary approach is applied. As such, this Indicator is designated as specified risk for other private land in British Columbia

US Pacific Northwest:
Historically, harvest of forest products has contributed to decreasing forest cover and forest biomass worldwide. Harvest levels of feedstock should not contribute to deforestation.

Federal lands are subject to regional forest plans, such as the Sierra Nevada Forest Plan in California and the Northwest Forest Plan in Washington and Oregon. These plans ensure for the proper regeneration and maintenance of forest cover during harvest operations. Additionally, in 1976, the Federal Land Policy and Management Act established the policy of retaining lands in federal ownership, meaning that these lands will not be sold to into the hand of private owners who may decline to maintain forest cover. Laws relevant to this indicator which apply to state and private lands in the supply base include:

- California Forest Practice Act
- Idaho Forest Practices Act
- Montana Forestry Best Management Practices Notification Law
- Oregon Forest Practices Act
- Washington Forest Practices Act

Wyoming does not have forest practice laws but does publish BMPs for forestland operations. The Montana law requires that operators be informed of BMPs prior to beginning operations. BMPs for both Wyoming and Montana include reforestation recommendations. Meanwhile, California, Idaho, Oregon, and Washington laws require that land be regenerated to ecologically sound stocking levels after harvest, unless being converted to non-forest use. Notably, none of these states have provisions prohibiting the conversion of private lands to non-forest use. Land which is converted for commercial or residential development would not be regenerated. This issue is covered separately in Indicator 2.2.1.

Actions on federal land are also subject to review under NEPA. NEPA is enforced via litigation from environmental non-profits, with an average of 129 NEPA lawsuits filed annually. The median Environmental Impact Statement produced by these land managing agencies under NEPA guidelines takes 3-4 years to complete, indicating a rigorous investigative process.

The California, Oregon, and Washington forest practice acts require the creation of harvest plans which require regeneration for all state and private timberland operations. Harvest plans and associated operations are reviewed by state agencies, both in the office and in the field. Idaho and Montana do not require the creation of harvest plans but do conduct field audits on operations. Violations of state BMPs carry harsh penalties in Idaho, while compliance is voluntary in Montana. Regardless, recent audits in both found compliance exceeding 98%.

While use of BMPs on Wyoming state lands is mandatory, on Wyoming private lands it is voluntary, with limited data available on levels of compliance. However, natural regeneration is a normal ecological component of Wyoming forests, meaning that a lack of BMP implementation would not necessarily prevent regeneration. All six states are actively engaged in updating and revising their BMPs to keep up with changing attitudes and scientific research.

The US Department of Agriculture publishes factsheets on each state which quantify forest gain and loss. Of the states in the supply base, California, Oregon, and Washington show a small net loss of forested acreage on an average year, while Idaho and Montana show small net increases. All states in the supply base convert some acres out of forest use each year.

All lands in the project area that are maintained in forest are likely to be regenerated after feedstock harvesting, whether due to federal policies, state laws, or natural processes. However, intentional conversion of stands out of forest use does occur on private lands throughout the project area.

3.2.2 - Primary feedstock shall not be sourced from forest areas where site productivity is low and, according to local definitions or norms, the areas are classified as low-productive or difficult to regenerate

Relevant Region & Scale of Assessment:

- Alberta (AB Regional Risk Assessment)
  - Private Lands
  - Public Lands
- British Columbia (BC Regional Risk Assessment)
  - Private Lands
- Montana (PNW Supply Base Evaluation)
  - Private Lands
- Northwest Wyoming (PNW Supply Base Evaluation)
  - Private Lands

Specified Risk Designation Rationale

Alberta:

Primary feedstock is fibre delivered directly from the forest to a wood pellet facility. Typically, this includes low grade roundwood, logging slash, and ground or chipped material. This Indicator only pertains to the sourcing of primary feedstock. Processing residue feedstock (mill residuals) and post-consumer feedstock are excluded from the requirements of this Indicator. The Indicator is intended to ensure primary feedstock is not sourced from the least productive forest sites, which usually support slow-growing forests.

In Alberta, such sites could include bogs, fens, and other peatlands, as well as forests growing on thin or poor soils or with other site characteristics that inhibit tree growth. Many such forests would be considered inoperable and would not be part of the forest that contributes to the long-term sustainable harvest levels. See Indicator 2.2.9 – Long-Term Production Capacity, for more details on long-term production capacity. The Indicator also stipulates that primary feedstock will not be sourced from sites that are difficult to regenerate. See Indicator 2.2.10 – Regen After Harvest, for more details on regeneration.

Harvesting from slow-growing forests result in an extended time before the renewed stand accumulates sufficient carbon stocks to replace those removed. Similarly, harvesting from forests that are difficult to

regenerate results in uncertain renewal prospects and therefore uncertain future carbon stocks.

Public (Crown) Land

There is a comprehensive regulatory framework governing the determination of long-term sustainable harvest levels. Government legislation and guidance demonstrates long-term sustainable harvest levels are calculated based on applicable inventory and growth data, excluding low-productivity sites. FOMP data verifies compliance with regeneration. Based on evidence reviewed, this Indicator is designated as low risk for Crown land in Alberta.

Private Land

Due to a lack of a regulatory framework, evidence to support implementation mechanisms, a monitoring framework and/or results to verify the identification of low-productive or difficult to regenerate sites as well as the avoidance of timber harvesting from these sites, a precautionary approach is applied. As such, this Indicator is designated as specified risk for other private land in Alberta.

British Columbia:

Primary feedstock is fibre delivered directly from the forest to a wood pellet facility. Typically, this includes low grade roundwood, logging slash, and ground or chipped material. This Indicator only pertains to the sourcing of primary feedstock. Processing residue feedstock (mill residuals) and post-consumer feedstock are excluded from the requirements of this Indicator. The Indicator is intended to ensure primary feedstock is not sourced from the least productive forest sites, which usually support slow-growing forests. In British Columbia (BC), such sites could include sub-alpine and alpine forests and forests with thin, wet, or poor soils or with other limiting site characteristics that inhibit tree growth. Many such forests would be considered inoperable and would not be part of the forest that contributes to the long-term sustainable harvest levels. See Indicator 2.2.9 – Long-Term Production Capacity, for more details on long-term production capacity. The Indicator also stipulates that primary feedstock will not be sourced from sites that are difficult to regenerate. See Indicator 2.2.10 – Regen After Harvest, for more details on regeneration.

Harvesting from slow-growing forests result in an extended time before the renewed stand accumulates sufficient carbon stocks to replace those removed. Similarly, harvesting from forests that are difficult to regenerate results in uncertain renewal prospects and therefore uncertain future carbon stocks.

Public (Crown) Land

There is a comprehensive regulatory framework governing the determination of long-term sustainable harvest levels. Government legislation and guidance demonstrate long-term sustainable harvest levels are calculated based on applicable inventory and growth data, excluding low-productivity sites. Timber Supply Review examples demonstrate that significant areas of low-productivity sites are removed from the timber harvesting land base on Crown land in BC. Sites of low productivity are correlated with sites that have renewal challenges. Based on evidence reviewed, this Indicator is designated as low risk for Crown land in British Columbia.

Private Managed Forest Land

On private managed forest land, there are no regulatory or process requirements which remove low productivity sites from harvest eligibility, and no evidence of the management of low productivity sites. However, MFC monitoring results verifies compliance with regeneration requirements on harvested blocks. Based on evidence reviewed, this Indicator is designated as low risk for private managed forest land in British Columbia.

Other Private Land

Due to a lack of a regulatory framework, evidence to support implementation mechanisms, a monitoring framework and/or results to verify the identification and avoidance of timber harvesting from low-productive or difficult to regenerate sites, a precautionary approach is applied. As such, this Indicator is designated as specified risk for other private land in British Columbia

US Pacific Northwest:

Federal agencies follow regional forest plans which are meant to ensure ecologically sound forestry and would not permit harvest from low-productive areas on federal lands. Meanwhile, California, Idaho, Oregon, and

Washington have laws that require regeneration of forests after harvest, which would make harvest from areas that are difficult to regenerate a violation of state law. Montana and Wyoming do not have regulations in place which pertain to the harvest of feedstock from low productivity sites on private lands.

3.2.3 - Primary feedstock shall not be sourced from forest areas in the Supply Base which, according to local definitions or norms, are classified as having combined attributes of high carbon stocks and high conservation value (HCV)

Relevant Region & Scale of Assessment:

- Alberta (AB Regional Risk Assessment)
  - Private Lands
  - Public Lands
- British Columbia (BC Regional Risk Assessment)
  - Public Lands
  - Private Lands

Specified Risk Designation Rationale

Alberta:

Primary feedstock is fibre delivered directly from the forest to a wood pellet facility. Typically, this includes low grade roundwood, logging slash, and ground, or chipped material. This Indicator only pertains to the sourcing of primary feedstock. Processing residues feedstock (mill residuals) and post- consumer feedstock are excluded from the requirements of this Indicator. SBP's Standard 1 Guidance document indicates "high carbon stock forests as forests that have significant amounts of carbon stored in their above-ground biomass, belowground biomass, and soil. The exact threshold for what constitutes a high carbon stock forest will vary depending on the context. Forests that stand at the top 10% of the volume per ha in the region, with adjustment to reflect normal range for species or mix, would normally be considered 'high carbon' and warrant further examination and justification." The European Union (EU) indicates "high carbon stocks to be in wetlands, peatlands and forests (EU RED II, EU Glossary Item: "Land with high carbon stock"). In the context of forest ecosystems, mature and old-growth forests have the highest carbon stocks, and are also important for biodiversity, especially those with a higher degree of naturalness" (e.g. Molina-Valero et al. 2021, Ķēniņa et al. 2019, Nord-Larsen et al. 2019, Seedre et al. 2015, Luyssaert et al. 2008). SBP's Standard 1 Guidance document indicates "high conservation value forests are forests that are of exceptional ecological, social, or cultural value. These forests may contain rare or threatened species, provide critical ecosystem services, or support the livelihoods and cultural practices of indigenous or local communities. The definition of high conservation value forests is often context-specific and may vary depending on the location and the stakeholders involved." High conservation value forests were evaluated thoroughly in Indicators 2,1,1 Key Eco/HCV Identified, 2.1.2 Key Eco/HCV Threats ID and Eval, and 2.1.3 Key Eco/HCV Maintained or Enhanced. For those Indicators, the HCV proxies used were:
Landscape-level: wide ranging species-at-risk, large landscape, and Intact Forest Landscapes.
Stand-level: small home range species-at-risk, rare, threatened and endangered ecosystems, and key habitat attributes, including old forests.

Indicator 3.2.1 Forest Carbon Stocks Stable or Increasing assessed carbon stock a trend of the total forest carbon in the supply base but did not delineate and/or classify or identify specific high carbon stocks. A proxy for high carbon stocks in the forests of Canada are forests at the maximum of carbon sequestration in standing fibre (e.g., top 10% of inventoried volume per hectare). In the absence of inventoried volume per hectare these would in most cases be the oldest and densest forests (top 10% as a target). In addition, these forests typically have a high concentration of biodiversity values. This Indicator is intended to ensure primary feedstock is not sourced from forests that have combined attributes of high levels of carbon stocks and high conservation values. The areas where these proxies (high carbon and HCV) overlap are focus of Indicator 3.2.3 No Primary Feedstock from HCS & HCV.

This Indicator is intended to ensure primary feedstock is not sourced from forests that have combined attributes of high levels of carbon stocks and high conservation values. The areas where these proxies (high carbon and

HCV) overlap are focus of Indicator 3.2.3 No Primary Feedstock from HCS & HCV. Sourcing primary feedstock from forests with the combined attributes of high carbon stocks and high conservation values (as defined above) will reduce the carbon stocks and conservation values present. As well, the forest that regrows is unlikely to reach the same levels of carbon stocks, leading to a net emission of carbon into the atmosphere when these stands are harvested.

Crown Land & Private Land
The federal and provincial regulatory framework governing the management and maintenance of biodiversity values is extensive (Details provided in Indicator 2.1.3 Key Eco/HCV Maintained or Enhanced). There is no regulatory framework specific to the management of high carbon stocks. A specified risk designation was applied to Indicator 2.1.3 Key Eco/HCV Maintained or Enhanced for Crown land, and private land. Additionally, there is a lack of evidence to support implementation mechanisms, an oversight/monitoring framework, and/or results to verify the identification and the subsequent avoidance of harvesting of primary feedstock from forests that have combined attributes of high carbon stocks and high conservation values on Crown land and private land. Given the lack of evidence, a precautionary approach is applied. As such, this Indicator is designated as specified risk for Crown land and private land in Alberta.

British Columbia:
Primary feedstock is fibre delivered directly from the forest to a wood pellet facility. Typically, this includes low grade roundwood, logging slash, and ground, or chipped material. This Indicator only pertains to the sourcing of primary feedstock. Processing residues feedstock (mill residuals) and post- consumer feedstock are excluded from the requirements of this Indicator. SBP's Standard 1 Guidance document indicates "high carbon stock forests as forests that have significant amounts of carbon stored in their above-ground biomass, belowground biomass, and soil. The exact threshold for what constitutes a high carbon stock forest will vary depending on the context. Forests that stand at the top 10% of the volume per ha in the region, with adjustment to reflect normal range for species or mix, would normally be considered 'high carbon' and warrant further examination and justification." The European Union (EU) indicates "high carbon stocks to be in wetlands, peatlands and forests (EU RED II, EU Glossary Item: "Land with high carbon stock"). In the context of forest ecosystems, mature and old-growth forests have the highest carbon stocks, and are also important for biodiversity, especially those with a higher degree of naturalness" (e.g. Molina-Valero et al. 2021, Ķēniņa et al. 2019, Nord-Larsen et al. 2019, Seedre et al. 2015, Luyssaert et al. 2008). SBP's Standard 1 Guidance document indicates "high conservation value forests are forests that are of exceptional ecological, social, or cultural value. These forests may contain rare or threatened species, provide critical ecosystem services, or support the livelihoods and cultural practices of indigenous or local communities. The definition of high conservation value forests is often context-specific and may vary depending on the location and the stakeholders involved." High conservation value forests were evaluated thoroughly in Indicators 2,1,1 Key Eco/HCV Identified, 2.1.2 Key Eco/HCV Threats ID and Eval, and 2.1.3 Key Eco/HCV Maintained or Enhanced. For those Indicators, the HCV proxies used were:

- Landscape-level: wide ranging species-at-risk, large landscape, and Intact Forest Landscapes.
- Stand-level: small home range species-at-risk, rare, threatened and endangered ecosystems, and key habitat attributes, including old forests.

Indicator 3.2.1 Forest Carbon Stocks Stable or Increasing assessed carbon stock a trend of the total forest carbon in the supply base but did not delineate and/or classify or identify specific high carbon stocks. A proxy for high carbon stocks in the forests of Canada are forests at the maximum of carbon sequestration in standing fibre (e.g., top 10% of inventoried volume per hectare). In the absence of inventoried volume per hectare these would in most cases be the oldest and densest forests (top 10% as a target). In addition, these forests typically have a high concentration of biodiversity values. This Indicator is intended to ensure primary feedstock is not sourced from forests that have combined attributes of high levels of carbon stocks and high conservation values. The areas where these proxies (high carbon and HCV) overlap are focus of Indicator 3.2.3 No Primary Feedstock from HCS & HCV.

Sourcing primary feedstock from forests with the combined attributes of high carbon stocks and high conservation values (as defined above) will reduce the carbon stocks and conservation values present. As well, the forest that regrows is unlikely to reach the same levels of carbon stocks, leading to a net emission of carbon

into the atmosphere when these stands are harvested.

Crown Land, Private Managed Forest Land & Other Private Land
The federal and provincial regulatory framework governing the management and maintenance of biodiversity values is extensive (Details provided in Indicator 2.1.3 Key Eco/HCV Maintained or Enhanced). There is no regulatory framework specific to the management of high carbon stocks. A specified risk designation was applied to Indicator 2.1.3 Key Eco/HCV Maintained or Enhanced for Crown land, private managed forest land and other private land. Additionally, there is a lack of evidence to support implementation mechanisms, an oversight/monitoring framework, and/or results to verify the identification and the subsequent avoidance of harvesting of primary feedstock from forests that have combined attributes of high carbon stocks and high conservation values on Crown land, private managed forest land and other private land. Given the lack of evidence, a precautionary approach is applied. As such, this Indicator is designated as specified risk for Crown land, private managed forest land and other private land in British Columbia.

4.1.8 - Training shall be provided for all workers to allow them to implement the conditions set out in all elements of the SBP Standards relevant to their responsibilities

Relevant Region & Scale of Assessment:

- Alberta (AB Regional Risk Assessment)
  - Public Lands
  - Private Lands
- Idaho (PNW Supply Base Evaluation)
  - State Lands
  - Private Lands
- Montana (PNW Supply Base Evaluation)
  - State Lands
  - Private Lands
- Northern California (PNW Supply Base Evaluation)
  - State Lands
  - Private Lands
- Northwest Wyoming (PNW Supply Base Evaluation)
  - State Lands
  - Private Lands
- Oregon (PNW Supply Base Evaluation)
  - State Lands
  - Private Lands
- Washington (PNW Supply Base Evaluation)
  - State Lands
  - Private Lands

Specified Risk Designation Rationale

Alberta:
Workers, which includes employees and contractors who work in the forest, need to be trained to make appropriate decisions and to implement best management practices related to specific job functions. The intent of this Indicator is to ensure workers are provided the knowledge, skills, and abilities required to perform jobs effectively and safely through proper training and certificates. Proper training can improve worker productivity, reduce errors and accidents, increase job satisfaction, and ultimately contribute to the success of the business.

At the professional level, mandatory requirements are set for academic standards of entry, standards of conduct, continuing competency development, and annual competence assessments. AAFMP's regulatory framework ensures the ongoing training and competence of forest professionals registered to practice in Alberta. At the forest worker level, due to a lack of a legislative framework, evidence to support implementation mechanisms, a monitoring framework and/or results to verify training for forest workers related to roles and responsibilities, a

precautionary approach is applied. As such, this Indicator is designated as specified risk at the provincial level in Alberta.

US Pacific Northwest:

Not all requirements in the SBP standards require employee training to ensure compliance. For those that do, feedstock suppliers are incentivized by law to conduct such training. However, if the SBP standard is stricter than the legal standard such that specified risk is present, training may not occur. Specified risk that insufficient training may occur regarding indicators in which specified risk exists already.

4.1.10 - Safeguards shall be put in place to protect the health and safety of workers by developing, communicating and implementing policies and procedures

Relevant Region & Scale of Assessment:

- Alberta (AB Regional Risk Assessment)
  - Public Lands
- British Columbia (BC Regional Risk Assessment)
  - Private Lands

Specified Risk Designation Rationale

Alberta:

Systems of training, monitoring, and mandatory use of protective equipment are some of the measures taken to improve occupational health and safety. In Canada, federal legislation covers federally regulated workers, while the provinces develop and manage health and safety infrastructure for other workers, which includes forest workers. Worker training related to occupational health and safety will be described in this Indicator. See Indicator 4.1.8 Training to Workers for all other forest worker training.

Health and safety are important for ensuring the well-being of workers. Workers in an unsafe and unhealthy environment will increase lost time. An effective health and safety program reduces costs and liabilities that firms would incur associated with accidents and the result of following unsafe practices.

Provincial
Alberta has closely regulated, controlled, and enforced occupational health and safety laws and regulations. It is concluded that appropriate health and safety safeguards are in place for WCB Alberta registered companies.

Crown Land
Most companies who harvest on Crown land are WCB Alberta registered. As such, are required to follow WCB Alberta rules. MJET conducts audit and site visits to ensure these companies are compliant. Based on evidence reviewed, this Indicator is designated as low risk for Crown land in Alberta.

Private Land
As private land in Alberta is owned by individuals or small businesses, there is no requirement to be WCB Alberta registered. Due to a lack of evidence to support implementation mechanisms, a monitoring framework and/or results to verify safeguards are in place to protect the health and safety of workers, this Indicator is designated as specified risk for private land in Alberta.

British Columbia:

Systems of training, monitoring, and mandatory use of protective equipment are some of the measures taken to improve occupational health and safety. In Canada, federal legislation covers federally regulated workers, while the provinces develop and manage health and safety infrastructure for other workers, which includes forest workers. Worker training related to occupational health and safety will be described in this Indicator. See Indicator 4.1.8 Training to Workers for all other forest worker training.

Health and safety are important for ensuring the well-being of workers. Workers in an unsafe and unhealthy

environment will increase lost time. An effective health and safety program reduces costs and liabilities that firms would incur associated with accidents and the result of following unsafe practices.

Provincial
BC has closely regulated, controlled, and enforced occupational health and safety laws and regulations. It is concluded that appropriate health and safety safeguards are in place for WorkSafeBC registered companies.

Crown Land and Private Managed Forest Land
The majority of companies who harvest on Crown land and private managed forest land are WorkSafeBC registered. As such, are required to follow WorkSafeBC rules. WorkSafeBC conducts audits and site visits to ensure companies are compliant. Based on evidence reviewed, this Indicator is designated as low risk for Crown land and private managed forest land in British Columbia.

Other Private Land
As other private land in BC is owned by individuals or small businesses, there is no requirement to be WorkSafeBC registered. Due to a lack of evidence to support implementation mechanisms, a monitoring framework and/or results to verify safeguards are in place to protect the health and safety of workers, this Indicator is designated as specified risk for other private land in British Columbia.

4.2.1 - Negative social and community impacts shall be identified and avoided

Relevant Region & Scale of Assessment:
- Alberta (AB Regional Risk Assessment)
  - Private Lands
- British Columbia (BC Regional Risk Assessment)
  - Private Lands

Specified Risk Designation Rationale

Alberta:
Negative impacts to communities may occur if sustainable and responsible forestry management are not conducted, including loss of tenure and use rights, loss of access to areas with cultural, social, heritage, and economic values used by communities, loss of employment and economic opportunities, health and welfare impacts on communities, and loss of adequate access for recreation.

Public (Crown) Land
There is a comprehensive legal framework with appropriate controls governing consultation requirement during forest management planning on Crown land. Consultation to identify and avoid negative social and community impacts is required prior to plan approval. Based on the evidence reviewed, this Indicator is designated as low risk for Crown land in Alberta.

Private Land
Due to a lack of a legislative framework, evidence to support implementation mechanisms, a monitoring framework and/or results to verify the identification and avoidance of negative social and community impacts, a precautionary approach is applied. As such, this Indicator is designated as specified risk for other private land in Alberta.

British Columbia:
Negative impacts to communities may occur if sustainable and responsible forestry practices are not conducted, including loss of tenure and use rights, loss of access to areas with cultural, social, heritage, and economic values used by communities, loss of employment and economic opportunities, health and welfare impacts on communities, and loss of adequate access for recreation.

Public (Crown) Land

There is a comprehensive legal framework with appropriate controls governing consultation requirement during forest management planning on Crown land. Consultation to identify and avoid negative social and community impacts is required prior to plan approval. Based on the evidence reviewed, this Indicator is designated as low risk for Crown land in British Columbia.

Private Managed Forest Land
Due to a lack of a legislative framework, evidence to support implementation mechanisms, a monitoring framework and/or results to verify the identification and avoidance of negative social and community impacts, a precautionary approach is applied. As such, this Indicator is designated as specified risk for private managed forest land in British Columbia.

Other Private Land
Due to a lack of a legislative framework, evidence to support implementation mechanisms, a monitoring framework and/or results to verify the identification and avoidance of negative social and community impacts, a precautionary approach is applied. As such, this Indicator is designated as specified risk for other private land in British Columbia.

4.2.3 - Food, water supply or high conservation values (HCV) that are essential for the fulfilment of basic needs of communities shall be maintained or enhanced

Relevant Region & Scale of Assessment:

- British Columbia (BC Regional Risk Assessment)
  - Private Lands

Specified Risk Designation Rationale

British Columbia:
This Indicator assesses the impacts on the ability of rural communities, both Indigenous and non-Indigenous, to meet basic needs. Sustainable Biomass Program's (SBP) glossary defines basic necessities as “Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc.), identified through engagement with these communities or indigenous peoples. A site or resource is fundamental for satisfying basic necessities if the services it provides are irreplaceable (i.e., if alternatives are not readily accessible or affordable), and if its loss or damage would cause serious suffering or prejudice to affected stakeholders. Basic necessities in the context of HCV 5 may cover any or all of the provisioning services of the environment including tangible materials that can be consumed, exchanged or used directly in manufacture, and which form the basis of daily life.” Forests, on a daily basis provide both food and drinking water. Food from forests typically falls into two categories: hunting/fishing (ungulates, freshwater, and anadromous fish) and foraging (mushroom, berry, and herbaceous plant collection). Drinking water supply is from surface water (lakes and rivers), as well as sub-surface ground water. Impacts on the rights of Indigenous communities, including hunting, fishing, and gathering are considered in Indicator 4.2.4 Legal, Customary, & Traditional Tenure & Use Rights and Indicator 4.2.6 Consultation/Accommodation. Negative impacts on non-Indigenous communities are considered under Indicator 4.2.1 Negative Social & Community Impact ID & Avoided). Maintaining ecosystem functions and services of water resources is considered under Indicator 2.2.5 Water Quality/Quantity Maintained or Enhanced. The protection of drinking water via community watersheds and licensed water intakes is the focus of this Indicator.

Forestry operations and related activities can potentially have a negative impact on the quality or quantity of the local or community water supply, negatively affecting the health and quality of life of water users.

Public (Crown) Land
There is a regulatory framework and implementation mechanisms for the protection of drinking water on Crown land. CEB Natural Resources Database and Forest Practices Board reports verify compliance with FRPA and FPPR for the protection of human drinking water. Based on evidence reviewed, this Indicator is designated as low risk for Crown land in British Columbia.

Private Managed Forest Land
There is a legislative framework, implementation mechanisms and a monitoring framework in place on private managed forest land. MFC annual reports verify compliance with the protection of human drinking water as per PMFLA requirements. Based on evidence reviewed, this Indicator is designated as low risk for private managed forest land in British Columbia.

Other Private Land
There are provincial legislative requirements for the protection of human drinking water on other private land. However, there is no publicly available information describing implementation mechanisms, a monitoring framework, and/or results of the current condition for the protection of human drinking water. Due to a lack of evidence, a precautionary approach is applied, and this Indicator is designated as specified risk for other private land in British Columbia.

4.2.4 - Legal, customary, and traditional tenure and use rights of Indigenous Peoples and local communities related to the Supply Base shall be identified, documented, and respected

Relevant Region & Scale of Assessment:
- Alberta (AB Regional Risk Assessment)
  - Private Lands
  - Public Lands
- British Columbia (BC Regional Risk Assessment)
  - Private Lands

Specified Risk Designation Rationale

Alberta:
Sustainable Biomass Program's (SBP) glossary defines customary rights as “Rights that arise from a behaviour or act that is repeated over time under the belief that it is obligatory and due to repetition and acceptance, acquire the force of law within a geography or society (also known as customary law).” Cornell University’s Faculty of Law defines customary and traditional use as a “means a long-established, consistent pattern of use, incorporating beliefs and customs which have been transmitted from generation to generation.” SBP defines respected as “being mindful of and appropriately considering the rights of Indigenous Peoples.” SBP’s glossary does not define traditional tenure or use rights. This Indicator evaluates if Indigenous rights have been identified, documented and respected.

In Alberta, Indigenous Peoples identify as First Nations, Métis, Inuit or multiple Indigenous ethnicities. The collective term is Indigenous Peoples unless stated otherwise. This Indicator is assessed from the perspective of Indigenous Peoples/communities. Indicator 4.2.1 Negative Social & Community Impacts ID & Avoided, which covers similar topics, was evaluated from the standpoint of non-Indigenous communities. Indicator 4.2.6 Consultation/Accommodation demonstrates whether there is a consultation process and, if necessary, an accommodation process. Indicator 4.2.7 Designated Cultural Heritage Sites Preserved demonstrates the protection of cultural heritage sites identified and designated. Section 4.3 provides an overview of Indigenous Peoples in Alberta.

Negative impacts include the possibility that customary and traditional tenure and use rights may not be identified or only partially identified. This could lead to the unidentified rights being violated or becoming a source of contention. Another threat is that identified rights are not documented. For example, rights may be identified in court but if the documentation of these rights is insufficient to reach relevant practitioners, the rights may not be respected. Rights that the courts have not identified may not be respected. Rights that are identified and appropriately documented may not be respected. These potential scenarios could lead to violations of legal, customary, and traditional tenure and use rights.

In alignment with the UN Declaration on the Rights of Indigenous Peoples (UNDRIP) and the principles of the

Reconciliation Strategy, the Government recognizes the right of Indigenous Peoples to participate in decision-making on matters that affect their rights, through their own representative institutions. It also acknowledges the obligation to consult and cooperate in good faith with the aim of securing their free, prior, and informed consent (FPIC). The importance of FPIC, as outlined in the UN Declaration, extends beyond titled lands and encompasses broader issues related to Indigenous rights, governance, and stewardship responsibilities. Therefore, this Indicator is designated as specified risk for Crown land in Alberta. In addition, Indigenous Peoples have not asserted tenure and use rights on private land. As such, this Indicator is also designated as specified risk for private land in Alberta.

British Columbia:

Sustainable Biomass Program's (SBP) glossary defines customary rights as “Rights that arise from a behaviour or act that is repeated over time under the belief that it is obligatory and due to repetition and acceptance, acquire the force of law within a geography or society (also known as customary law).” Cornell University’s Faculty of Law defines customary and traditional use as a “means a long-established, consistent pattern of use, incorporating beliefs and customs which have been transmitted from generation to generation.” SBP defines respected as “being mindful of and appropriately considering the rights of Indigenous Peoples.” SBP’s glossary does not define traditional tenure or use rights.

In British Columbia, Indigenous people identify as First Nations, Métis, Inuit or multiple Indigenous ethnicities. The collective term is Indigenous Peoples unless stated otherwise. This Indicator is assessed from the perspective of Indigenous Peoples/communities. Indicator 4.2.1 Negative Social & Community Impact ID & Avoided, which covers similar topics, was evaluated from the standpoint of non- Indigenous communities. Indicator 4.2.6 Consultation/Accommodation demonstrates whether there is a consultation process and, if necessary, an accommodation process. Indicator 4.2.7 Designated Cultural Heritage Sites Preserved demonstrates the protection of cultural heritage sites identified and designated. Section 4.3 provides an overview of Indigenous Peoples in BC. This Indicator evaluates if Indigenous rights have been identified, documented and respected.

Negative impacts include the possibility that customary and traditional tenure and use rights may not be identified or only partially identified. This could lead to the unidentified rights being violated or becoming a source of contention. Another threat is that identified rights are not documented. For example, rights may be identified in court but if the documentation of these rights is insufficient to reach relevant practitioners, the rights may not be respected. Rights that the courts have not identified may not be respected. Rights that are identified and appropriately documented may not be respected. These potential scenarios could lead to violations of legal, customary, and traditional tenure and use rights.

A legal framework exists in BC to identify, document, and respect traditional tenure and use rights of Indigenous Peoples. The BC government has passed DRIPA, has a Declaration Act Action Plan, and works collaboratively with Indigenous leadership. There are Consultation and Revenue Sharing Agreements that identify consultation processes. There are a range of programs to advance First Nations participation in forestry and forest management. Based on evidence reviewed, this Indicator is designated as low risk for Crown land in British Columbia. Indigenous Peoples have not asserted tenure and use rights on private managed forest land and other private land. As such, this Indicator is designated as specified risk on private managed forest land and other private land in British Columbia.

4.2.6 - Where the rights of Indigenous Peoples are identified in the Supply Base, and Free Prior and Informed Consent (FPIC) has not been achieved for the proposed and planned activities, a consultation and, if required, accommodation process shall be put in place

Relevant Region & Scale of Assessment:

- Alberta (AB Regional Risk Assessment)
  - Private Lands
  - Public Lands
- British Columbia (BC Regional Risk Assessment)
  - Private Lands

Specified Risk Designation Rationale

Alberta:

The Sustainable Biomass Program (SBP) defines free, prior and informed consent (FPIC) as “a collective human right of indigenous peoples and local communities to give and withhold their consent prior to the commencement of any activity that may affect their rights, land, resources, territories, livelihoods, and food security. It is a right exercised through representatives of their own choosing and in a manner consistent with their own customs, values, and norms.” This Indicator evaluates whether there is a consultation process and, if necessary, an accommodation process before proposed and planned activities. Under this Indicator, using lawsuits to protect and recognise rights is not considered a consultation process. In Alberta, Indigenous Peoples identify as First Nations, Métis, Inuit or multiple Indigenous ethnicities. The collective term is Indigenous Peoples unless otherwise stated. Refer to Indicator 4.2.4 Legal, Customary & Traditional Tenure & Use Rights regarding the respect, identification, and documentation of legal, customary, and traditional tenure and use rights, Indicator 4.2.7 Designated Cultural Heritage Sites Preserved regarding the protection of cultural heritage sites which have been identified and designated and Section 4.3 for an overview of Indigenous Peoples in Alberta. In the absence of FPIC or a consultation process, existing Indigenous rights may not be respected, potentially leading to violations of tenure and use rights.

In alignment with the UN Declaration on the Rights of Indigenous Peoples (UNDRIP) and the principles of the Reconciliation Strategy, the Government recognizes the right of Indigenous Peoples to participate in decision-making on matters that affect their rights, through their own representative institutions. It also acknowledges the obligation to consult and cooperate in good faith with the aim of securing their free, prior, and informed consent (FPIC). The importance of FPIC, as outlined in the UN Declaration, extends beyond titled lands and encompasses broader issues related to Indigenous rights, governance, and stewardship responsibilities. Therefore, this Indicator is designated as low risk for Crown land in Alberta. In addition, Indigenous Peoples have not asserted tenure and use rights on private land. As such, this Indicator is designated as specified risk for private land in Alberta.

British Columbia:

The Sustainable Biomass Program (SBP) defines free, prior and informed consent (FPIC) as “a collective human right of indigenous peoples and local communities to give and withhold their consent prior to the commencement of any activity that may affect their rights, land, resources, territories, livelihoods, and food security. It is a right exercised through representatives of their own choosing and in a manner consistent with their own customs, values, and norms.” This Indicator evaluates if there is a consultation process and, if necessary, an accommodation process before proposed and planned activities. Under this Indicator, using lawsuits to protect and recognize rights is not considered a consultation process. In British Columbia (BC), Indigenous people identify as First Nations, Métis, Inuit or multiple Indigenous ethnicities. The collective term is Indigenous Peoples unless stated otherwise. Refer to Indicator 4.2.4 Legal, Customary & Traditional Tenure & Use Rights regarding the respect, identification, and documentation of legal, customary, and traditional tenure and use rights, Indicator 4.2.7 Designated Cultural Heritage Sites Preserved regarding the protection of cultural heritage sites which have been identified and designated and Section 4.3 for an overview of Indigenous Peoples in BC. In the absence of

FPIC or a consultation process, existing Indigenous rights may not be respected, potentially leading to violations of tenure and use rights.

In alignment with the UN Declaration on the Rights of Indigenous Peoples (UNDRIP), The BC Declaration of the Rights of Indigenous Peoples Act (DRIPA) and the principles of the Reconciliation Strategy, the Government recognizes the right of Indigenous Peoples to participate in decision-making on matters that affect their rights, through their own representative institutions. It also acknowledges the obligation to consult and cooperate in good faith with the aim of securing their free, prior, and informed consent (FPIC). The importance of FPIC, as outlined in the UN Declaration, extends beyond titled lands and encompasses broader issues related to Indigenous rights, governance, and stewardship responsibilities. Therefore, this Indicator is designated as Low risk for Crown land in British Columbia. In addition, Indigenous Peoples have not asserted tenure and use rights on private land. As such, this Indicator is also designated as specified risk for private land in British Columbia.

4.2.7 - Designated cultural heritage sites shall be preserved

Relevant Region & Scale of Assessment:

- Alberta (AB Regional Risk Assessment)
  - Private Lands
- Idaho (PNW Supply Base Evaluation)
  - Private Lands
- Montana (PNW Supply Base Evaluation)
  - Private Lands
- Northwest Wyoming (PNW Supply Base Evaluation)
  - Private Lands

Specified Risk Designation Rationale

Alberta:

Sustainable Biomass Program's (SBP's) glossary defines cultural values as "sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples." This Indicator assesses if identified and designated cultural heritage sites are protected. Designation implies that a site has met specified criteria for it to be recognized as a cultural heritage site. Cultural heritage sites that are not identified and protected are at risk of being damaged or destroyed, resulting in the loss of cultural heritage and history and causing cultural and environmental harm.

Provincial

Protection and conservation of designated cultural heritage resources is a legislated requirement, with responsibilities placed on timber disposition holders, private landowners, professional archaeologists, and Ministry of Arts, Culture and Status of Women. A registry of designated cultural heritage sites is publicly available and is updated. Due to the requirement of confidentially, the registry is not publicly available.

Public (Crown) Land

There is legislation, implementation mechanisms, and a monitoring framework for the protection of cultural heritage resources on Crown land in Alberta. Qualified cultural resource management consultants are responsible for implementation mechanisms and oversight framework to manage and preserve historic resource values through screening and field verification of potential high value cultural heritage sites on proposed harvesting activities in the AOP. All permit applications and final reports submitted by cultural resource management consultants are reviewed and approved by Ministry of Arts, Culture and Status of Women. Reporting of historic resources sites is mandatory on Crown land. Based on evidence reviewed, this Indicator is designated as low risk for Crown land in Alberta.

Private Land

There are provincial legislative requirements for the protection of cultural heritage sites on private managed forest land and other private land. However, there is no publicly available information describing implementation mechanisms, a monitoring framework, and/or results of the current condition for the protection of cultural heritage sites. Due to a lack of evidence, a precautionary approach is applied, and this Indicator is designated as specified risk for private land in Alberta.

US Pacific Northwest:

Historic sites that can be found in the forests of the United States include ancient villages, rock art, travel routes and markers, military forts, and abandoned mines and mills. It is important that these sites are preserved and unaffected by feedstock harvesting to the greatest extent possible.

According to section 2360 of the US Forest Service Manual, the following laws pertain the protection of cultural heritage sites on public lands: the Organic Act of 1897, the Antiquities Act of 1906, the Historic Sites Act of 1935, the Natural Historic Preservation Act of 1966, the National Environmental Policy Act of 1969, The Archeological and Historic Preservation Act of 1974, the Federal Land Policy and Management Act of 1976, the Archaeological Resources Protection Act of 1979, The Native American Graves Protection and Repatriation Act of 1990, and the Federal Lands Recreation Enhancement Act of 2004. Collectively, these acts require that all activities on federal lands undertake the necessary steps to preserve and protect cultural resources. State laws also exist to protect cultural resources on private and state lands during forestry operations, including the California Forest Practice Act, the Oregon Forest Practices Act, and the Washington Forest Practices Act.

In Idaho, Montana, and Wyoming, state historic preservation offices (SHPOs) help educate and encourage private landowners to preserve the cultural resources on their properties. Tax incentives are sometimes available to landowners who rehabilitate these sites. If a cultural or historic site on private or state land is not listed with the state SHPO, it would not be considered “registered” per the requirements of this indicator.

Given that SHPOs are administered by state governments, they are most likely to be successful in protecting heritage sites on state-owned lands versus privately owned lands. This is especially true in Wyoming, which has a separate department dedicated to preserving cultural resources on state lands. Privately owned lands pose a greater challenge; ultimately, cultural resources in these three states are considered the property of the landowner, and no laws exist which explicitly require their preservation. The exception to this is human remains and burial sites, which are protected under federal law on both private and public lands.

According to the 2021 Preserve America Report, the US Forest Service has implemented several improvements to its heritage protection program in recent years. In addition to continued collaboration with tribal authorities to identify, protect, and study cultural heritage sites, modern tools have recently been implemented to locate new sites. These include the use of LIDAR and Ground-Penetrating Radar.

The California, Oregon, and Washington forest practice acts require the creation of harvest plans that identify and outline protection measures for historic sites during all state and private timberland operations. Harvest plans and associated operations are reviewed by state agencies, both in the office and in the field. If a site on private land is registered with a SHPO, this does not confer legal protections onto it. Landowners who voluntarily register a site would be unlikely to damage it during timber operations. However, if their land is sold to a different owner who does not wish to protect the site, the site could be damaged.

The federal government has a long history of passing laws to protect and preserve historic sites on its own lands. Some states in the supply base have extended these protections to private lands, but others have not.

7. Appendix E: FECVs

Species relating to British Columbia

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

Ecological Communities relating to British Columbia

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

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

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

Species relating to Alberta

Scientific Name	English Name	Category	Global Status
Acerpenna akataleptos	Out-of-reach Small Minnow Mayfly	Invertebrate Animal	G1G2
Acronicta falcula	Corylus Dagger Moth	Invertebrate Animal	G2G4
Allomyia hector	Holdfast Mountain Caddisfly	Invertebrate Animal	G1G2
Amanita armillariiformis	fungus	Fungus	G2?
Anepeorus rusticus	Rustic Flat-headed Mayfly	Invertebrate Animal	G2
Apobaetis futilis	Futile Small Minnow Mayfly	Invertebrate Animal	G1G3
Aspicilia arctica	sunken disk lichen	Fungus/Lichen	G2G4

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

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

Ecological Communities relating to Alberta

Scientific Name	English Name	Global Status
Abies bifolia - Picea engelmannii / Menziesia ferruginea - Vaccinium scoparium forest	subalpine fir - Engelmann spruce / false azalea - grouseberry forest	G2G4
Abies bifolia - Picea engelmannii / Streptopus amplexifolius - Luzula hitchcockii woodland	subalpine fir - Engelmann spruce / clasping-leaved twisted-stalk - smooth wood rush woodland	G2G3
Abies bifolia - Picea engelmannii / Valeriana	subalpine fir - Engelmann spruce /	G2?

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

Species relating to Saskatchewan

Scientific Name	English Name	Category	Global Status
Acaulon triquetrum	Triangular Earth Moss	Nonvascular Plant	G2G4
Anepeorus rusticus	Rustic Flat-headed Mayfly	Invertebrate	G2

		Animal	
Animomyia hardwicki	a geometrid moth	Invertebrate Animal	G1G3
Anisota manitobensis	Manitoba Oakworm Moth	Invertebrate Animal	G2Q
Arthonia mediella	Dot lichen	Lichen	G2G4
Baetisca columbiana	Columbia Armored Mayfly	Invertebrate Animal	G2G4
Bombus suckleyi	Suckley's Cuckoo Bumble Bee	Invertebrate Animal	G2G3
Cladonia luteoalba	Lemon pixie lichen	Lichen	G2G3
Deschampsia mackenzieana	Mackenzie Hairgrass	Vascular Plant	G2
Elymus vulpinus	Rydberg's Wild Rye	Vascular Plant	G1G3Q
Entosthodon rubiginosus	Rusty Cord-moss	Nonvascular Plant	G1G3
Ephydatia muelleri	Mueller's Freshwater Sponge	Invertebrate Animal	G2G4
Grus americana	Whooping Crane	Vertebrate Animals	G1
Heptagenia whitingi	Whiting's Flat-headed Mayfly	Invertebrate Animal	G2G3
Hesperia dacotae	Dakota Skipper	Invertebrate Animal	G2
Lecanora geophila	Shrubby rim-lichen	Lichen	G2G4
Megachile fortis	Robust Sunflower Leafcutter Bee	Invertebrate Animal	G2
Melaporphyria immortua	Dark-banded Flower Gem	Invertebrate Animal	G1?
Mustela nigripes	Black-footed Ferret	Vertebrate Animals	G1
Myotis septentrionalis	Northern Myotis	Vertebrate Animals	G2G3
Neotrichia ersitis	Dew Microcaddisfly	Invertebrate Animal	G1G3
Nymphaea loriana	Waterlily	Vascular Plant	G1G2
Oecetis albescens	Whitish Long-horned Caddisfly	Invertebrate Animal	G1G3
Oreohelix stantoni	Cypress Hills Mountainsnail	Invertebrate Animal	G1G2
Oxyethira allagashensis	Allagash Microcaddisfly	Invertebrate Animal	G2G4
Philocasca demita	Terrestrial Northern Caddisfly	Invertebrate Animal	G2G3
Physcomitrium hookeri	Hooker's Urn Moss	Nonvascular Plant	G2G4
Placidium californicum	California Stipplescale Lichen	Lichen	G2G3
Porpidia thomsonii	Boulder lichen	Lichen	G2G4
Rhizoplaca haydenii	Wanderlust lichen	Lichen	G2G3
Rinodina terrestris	a pepper-spore lichen	Lichen	G2G4
Salix turnorii	Turnor's Willow	Vascular Plant	G2
Sarcogyne hypophaea	Stepdaughter Grain-spored Lichen	Lichen	G2G4

Schinia avemensis	Gold-edged Gem	Invertebrate Animal	G1G3
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