

# Progressive Stewardship of Mountain Ecosystems: Next Practices for Sustainability

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## Vegetation Management Focus Area

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### The Vision

The vision for vegetation management is for operators to be conscious of potential ecological impact on vegetation and operate in a manner that conserves habitat so native species can continue to thrive.

### Background Information

Although much of the helicat industry operates when vegetation is buried deep under snow, paying attention to sensitive vegetation communities in alpine environments during summer operations and maintenance activities is important to maintaining their health.

The alpine and subalpine habitats that the helicat industry operates in are naturally sensitive to disturbance due to climate (they spend a long period under snowpack and have a very short growing season) and shallow soils. In addition, riparian and wetland habitats are also sensitive to human disturbance. In winter these habitats are protected by snow, but any summer activities such as guiding, trail building, glading, and general vegetation maintenance have the potential to impact native vegetation.

It is important to be aware that species at risk can be found in all tenures. Not only are subalpine, wetland, and riparian areas sensitive, but they may also contain species that are threatened, endangered, becoming extinct, or at risk of falling into one of these categories. One prominent species at risk found in many tenures is whitebark pine (*Pinus albicaulis*).

Non-native plant species have the potential to compromise the integrity of and displace native plant communities and species. For the purpose of this document, all non-native plant species that could have potential negative effects will be referred to as invasive plants, except when referencing legislation.

According to the International Union of the Conservation of Nature (IUCN), invasive species are the second-greatest threat contributing to species extinctions worldwide. Invasive plant species can dramatically change the composition and function of native habitats, and contribute to biodiversity loss. Invasive species not only have an environmental cost, but also a social and economic cost. For example, they can reduce water quality and quantity, damage private

property, and some species have negative human health effects (e.g., giant hogweed). In British Columbia, it is estimated the combined cost of damage from only six invasive plant species was at least \$65 million in 2008.

By careful consideration, operations can reduce any impact on native, endemic vegetation in sensitive habitats, including species at risk, and reduce and prevent the spread of invasive plant species, which can provide further negative effects to native plant communities.

## **Sustainability standards**

### **Species at Risk Act (SARA)**

The Species at Risk Act applies on federal lands, however, according to the Accord for the Protection of Species at Risk, it indicates that individual provinces “will establish complementary legislation and programs that provide for the effective protection of species at risk throughout Canada.”

#### **Mandatory actions:**

- Section 32 (1) No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species, or a threatened species.

#### **Resources:**

*Species at Risk Act*

<http://laws-lois.justice.gc.ca/eng/acts/s-15.3/>

*Species at Risk Registry*

Federal species at risk

[http://www.sararegistry.gc.ca/sar/index/default\\_e.cfm](http://www.sararegistry.gc.ca/sar/index/default_e.cfm)

*BC Legislation for Species and Ecosystems at Risk*

<https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk/legislation>

*BC Species & Ecosystem Explorer*

B.C.-listed species at risk

<http://a100.gov.bc.ca/pub/eswp/search.do>

*Accord for the Protection of Species at Risk*

<https://www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=92D90833-1>

*Proposed Recovery Strategy for Whitebark Pine in Canada*

[https://www.sararegistry.gc.ca/virtual\\_sara/files/plans/rs\\_whitebark\\_pine\\_e\\_proposed.pdf](https://www.sararegistry.gc.ca/virtual_sara/files/plans/rs_whitebark_pine_e_proposed.pdf)

## Weed Control Act

### Mandatory actions:

- Section 2 Duty to control noxious weeds  
In accordance with the regulations, an occupier must control noxious weeds growing or located on land and premises, and on any other property located on land and premises, occupied by that person.  
Noxious weed is defined as: “a weed designated by regulation to be a noxious weed, and includes the seeds of the noxious weed”

### Resources:

*Weed Control Act BC*

[http://www.bclaws.ca/Recon/document/ID/freeside/00\\_96487\\_01](http://www.bclaws.ca/Recon/document/ID/freeside/00_96487_01)

*Province of BC - Invasive Species*

<https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species>

*List of Regulated Plants in BC*

Where to find noxious weeds

<https://bcinvasives.ca/invasive-species/about/regulated-invasive-species-in-bc/list-of-regulated-invasive-plants-in-bc/>

*Regional Committee Map*

Contact your local invasive species committee

[https://bcinvasives.ca/documents/Regional\\_Committee\\_Map\\_Contacts\\_10\\_23\\_2015.pdf](https://bcinvasives.ca/documents/Regional_Committee_Map_Contacts_10_23_2015.pdf)

## Forest Range and Practices Act

### Mandatory actions:

- Section 47 A person carrying out a forest practice... must carry out measures that are a) specified in the applicable operation plan...to prevent the introduction or spread of prescribed species of invasives.

### Resources:

*S.47 Forest Range and Practices Act*

[http://www.bclaws.ca/Recon/document/ID/freeside/00\\_02069\\_01#section47](http://www.bclaws.ca/Recon/document/ID/freeside/00_02069_01#section47)

## Next Practice Guidelines

### Native plant communities

Some plant groups are less resilient and resistant to human disturbance, while others are more tolerant. Figure 1 identifies different plant groups that would be helpful to identify when making route choices in subalpine habitat. As a general rule, rocky ground is the most desirable to walk on, followed by bare ground. However, if you need to walk on vegetation, the least sensitive to the most sensitive habitat is: graminoids (least sensitive), herbs and forbs, and woody plants (heather communities, in particular, are most sensitive).

### Invasive plants

In the context of protecting native plant communities, some habitats are more vulnerable to the introduction of invasive plants than others. For example, logging roads, staging areas, or helipads that provide access to lodges in the summer may already have many invasive plants present. However, high elevation habitats where a lodge is located, or where helipads or fuel caches exist in open subalpine meadows are areas that are less likely to have invasive plant and are vulnerable to introductions. Care must be taken to manage invasive plants at low elevation, infested sites to prevent invasive plant establishment in high elevation areas where hiking, glading, trail building, staging areas and helipads exist.



*Spotted knapweed, an aggressive invasive plant.*

### Graminoids

Herbaceous plants with narrow, elongated leaves. Grasses, sedges, rushes. I.e. showy sedge, and woodrush.



### Herbs and forbs

Herbaceous (non-grass-like) flowering plants. I.e. arnica, lupine, paintbrush, and veronica.



### Woody plants

Plants with woody stems. May be very short, or tall. I.e. pink mountain heather, partridgefoot, grouseberry, and black huckleberry.





Preventing invasive plant establishment is the most economical and successful method of management. However, once invasive plants are established, there are a number of methods to manage the current population and prevent transfer of species. The Next Practices and Resource section details these actions.

### Species at Risk

Whitebark pine (Figure 2 and 3) is a keystone species found in high elevation habitats. It plays a key role as a food source to a number of species (Clark's nutcracker, squirrels, grizzly bears), retains early season snow and moisture in its habitat, and stabilizes rocky slopes. It is a prominent and iconic species seen at high elevations, near treeline. This species is federally listed as Endangered under the Species at Risk Act, and blue-listed provincially (is a species of special concern). It is currently threatened by an invasive fungus (*Cronartium ribicola*) that causes white pine blister rust, mountain pine beetle (*Dendroctonus ponderosae*), fire suppression, and climate change.

Despite the current lack of mandatory legislation on provincial lands to protect whitebark pine, operations have an opportunity to recognize whitebark pine, become stewards of these high elevation trees in their tenure and assist with recovery. Operators can reduce direct impacts to whitebark pine, and manage land to directly contribute to whitebark pine recovery.



*A whitebark pine cone. The seeds of these closed cones are dispersed by animals that feed on them - almost exclusively the Clark's nutcracker. Nutcrackers collect seeds in the tree top and cache them on the ground where some are forgotten and establish as seedlings.*



*Whitebark pine trees situated at treeline.*

## **Glading, trail building, construction and maintenance of roads, helipads, and facilities**

- Avoiding laying equipment in vegetation if possible. Choose rocky areas if possible. If equipment must lie in vegetation, choose species like graminoids (grasses) or forbs/herbs, instead of woody plants.
- Avoid cutting wildlife trees.
- Identify where whitebark pine exists in your tenure.
- Choose to prune whitebark pine instead of felling trees to clear runs (pruning branches that are infected with white pine blister rust will also increase chances of survival of some trees if it has not spread further).
- Remove only non-whitebark trees during glading.
- Avoid trampling whitebark pine seedlings.
- Encourage felling in areas where whitebark pine occur to remove competition non-whitebark species (e.g., Engelmann spruce, subalpine fir, etc.) to open the canopy for whitebark pine regeneration.
- When establishing trails, avoid impact to whitebark pine by buffering around the trees to limit damage to rooting zone.
- Avoid choosing a helipad where whitebark or limber pine will be impacted (mature trees, or seedlings in the future).
- Consider moving current helipads that impact whitebark pine to a new location to avoid continued or future impact.
- Avoid cutting or damaging any whitebark pine.
- If a facility affects whitebark pine but the impact can be mitigated (e.g., guidelines for weather station girdle tree), make adjustments to reduce the negative impact (e.g., install a metal rod into the ground to tie the guideline to).
- Identify areas where invasive plants are located and record new infestations.
- Avoid infested sites for staging, and parking. If these sites have invasive plants present, ensure they are treated prior to use.
- Avoid use of areas where invasive plants are present during periods when spreading seed is more likely (when plants have gone to seed).
- Work in un-infested areas before moving to infested areas. For example, high elevation areas should typically have fewer non-native plants than low elevation sites.
- Clean all soil, mud, and plant materials off equipment, boots, and clothing using water and brushes before entering a new work site, especially if travelling from low elevation to high elevation habitat.
- Minimize soil disturbance where possible. Revegetate disturbed sites as soon as possible using an approved native seed mix.
- Monitor and control infestations that result from activities.

**Motorized use (including helicopters, snowmobiling, snow-biking, ATV's)**

- Follow established roads or trails where present.
- Avoid travelling on water-saturated soils.
- Avoid soil disturbance where possible.
- Land in designated pickups and staging areas that are frequently used.
- Prior to entering sensitive habitat, clean all soil, mud, and plant materials from boots, clothing, equipment, and vehicles.
- Identify any invasive plants at staging areas and helipads, particularly low elevation sites and known infestation sites (i.e., staging for access to lodge, at lodge, etc.)
- Treat any invasive plants prior to use of staging area, and before invasive plants go to seed.
- Re-treat the area if necessary.
- Clean all soil, mud, and plant materials from boots, clothing, and equipment prior to accessing staging area.

**Non-motorized use (including skiing/snowboarding, snowshoeing, hiking, trail running, and mountain biking)**

- If a trail is present, travel on trail in single file to avoid damaging neighbouring vegetation.
- Spread out in areas where no trail present to avoid impact to one location.
- Avoid trail braiding.
- Avoid travelling on water-saturated soils.
- Avoid steep slopes where erosion can occur.
- Select resting places that are resistant or durable, like graminoid or forb communities, or rocks.
- Consider current seasonal conditions when making hiking choices to avoid unnecessary negative impacts. For example, north slopes hold snow longer in the winter season. These locations will have saturated soil that is easily degraded, while avoiding snow patches damages vegetation that is "off-trail".
- Avoid picking flowers, cutting vegetation unnecessarily, or uprooting plants.
- Contribute to recovery of whitebark pine by:
  - Establishing permanent monitoring transects
  - Collecting cones for planting
  - Applying semiochemicals to whitebark pine (to discourage mountain pine beetle infestations)
  - Creating educational displays for guests
- Clean all soil, mud, and plant materials from clothing, boots, gear, and equipment using water and brushes before and after recreating/use.
- Remain on trails to minimize soil disturbance.
- Dispose of seeds, soil and plant parts in garbage bags to be sent to the landfill.
- Avoid travelling in areas already infested with invasive plants.

## Conclusion

This section is intended to put HeliCat Canada operators in a position to make informed choices about their impacts to native vegetation and make positive changes within their operations to reduce this impact. Using this information, operators can become stewards in sustainability to show that legislation is understood and followed, the impact of operations is understood and thus the impact is mitigated using best management practices.

## Resources

### Native plant communities and species at risk

Learn to identify Species and Ecosystems at Risk in British Columbia

<https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk>

Recovery Planning - Review recovery planning for species at risk and follow recommendations as they relate to habitats

<https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk/recovery-planning>

Ministry of Environment - What are the sensitive species and habitats in my area? - Learn what sensitive sites are in your tenure that should avoid disturbance

<http://www.env.gov.bc.ca/wld/twg/sensitive.html>

### Species at risk – whitebark pine

E-Flora BC

Train staff to identify whitebark pine. This pine has needles in bundles of five, closed egg-shaped, purple-brown cones (they do not spread open to release seeds), and are found at high elevations (generally, 1600 meters or higher).

<http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Pinus%20albicaulis>

Range Maps

Review range maps and ecosystem maps of your region. Does whitebark pine likely exist in or near your tenure?

<http://whitebarkfound.org/resources/help-update-range-maps/>

Report whitebark locations to the B.C. Conservation Data Centre

<https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/conservation-data-centre>

Ski Area Certification

Certify your operation as whitebark pine friendly

<http://whitebarkfound.org/ski-area-certification/>



#### Whitebark Pine Restoration

B.C. government website on whitebark pine

<https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk/implementation/conservation-projects-partnerships/whitebark-pine-restoration>

Parks Canada background and information about whitebark pine

<https://www.pc.gc.ca/en/nature/science/conservation/feu-fire/feuveg-fireveg/veg-veg/pin-pine>

Become a member of the Whitebark Pine Ecosystem Foundation. Their website has many whitebark resources.

- US Chapter: <http://whitebarkfound.org/>
- Canadian Chapter: <http://www.whitebarkpine.ca/>

### **Invasive plants**

#### B.C. Invasive Species Council

Identify invasives and contact your local Regional Committee for regional priority species list - Identify what invasive plant species are in your tenure (mostly likely along roads, low elevation helipads, around lodges, etc.)

<https://bcinvasives.ca/invasive-species/identify/invasive-plants/>

#### Integrated Pest Management in British Columbia

Follow principles of integrated pest management to manage and control invasive species. Management options described include:

- mechanical control (hand-pulling, mowing, smothering, etc.)
- cultural control
- biological control
- chemical control (herbicide application)

<https://www.for.gov.bc.ca/hra/plants/ipm.htm>

Explore management options through your local invasive species committee [Regional Committee Map](#) and/or with assistance from the B.C. government invasive plant program staff: [Invasive Plant Program Contacts](#).

[https://bcinvasives.ca/documents/Regional\\_Committee\\_Map\\_Contacts\\_10\\_23\\_2015.pdf](https://bcinvasives.ca/documents/Regional_Committee_Map_Contacts_10_23_2015.pdf)

<https://www.for.gov.bc.ca/hra/Plants/contactUs.htm>

Invasive Species Council of B.C.'s Best Practices for Preventing the Spread of Invasive Plants During Forest Management Activities

[https://bcinvasives.ca/documents/Forestry\\_BMP\\_Final\\_WEB\\_04\\_22\\_2015.pdf](https://bcinvasives.ca/documents/Forestry_BMP_Final_WEB_04_22_2015.pdf)

Best Practices for Managing Invasive Plants on Roadsides

[https://bcinvasives.ca/documents/Weeds\\_Roads\\_BMP\\_Guide\\_Final\\_08\\_10\\_2015\\_web.pdf](https://bcinvasives.ca/documents/Weeds_Roads_BMP_Guide_Final_08_10_2015_web.pdf)

TIPS Seed Mixtures

Do not inadvertently plant non-native seeds. Ensure you find a native plant seed mixture.

[https://bcinvasives.ca/documents/Seed\\_Mixtures\\_WEB.pdf](https://bcinvasives.ca/documents/Seed_Mixtures_WEB.pdf)

Play (work) Clean Go program: Stop Invasives in Your Tracks

<http://www.playcleango.org/take-action/stop-invasives>

Columbia Shuswap Invasive Species Society's Guidelines for Trail Users

<https://columbiashuswapinvasives.org/resources/trail-users/>