

ALCS Lichen Collection, Handling, Storage & Feeding Handbook

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(Adapted from RCRW Handbook, Dec 2016 revision)

Introduction

The ALCS is a non-profit organization based in the Arrow Lakes area, designed to provide a local voice in land use decision-making regarding caribou recovery efforts of the Southern Mountain Central Selkirk caribou herd.

The ALCS is made up of local groups, organizations and individuals who use the backcountry and/or are dependent upon access to the backcountry for their livelihood. Membership includes representation from outdoor recreational groups, such as hiking, snowmobiling, and skiing; local industry, such as forestry, tourism and mining; and the local and regional government.

The ALCS **Vision** is a transparent, cooperative and collaborative approach to land use decision making, where decisions about local land use are evidence-based and result in integrated land use decisions that address caribou recovery while reflecting local values and needs. Our **Mission** is: to build and maintain a local area organization; to facilitate information sharing and involvement during the development and implementation of caribou recovery efforts and activities; and to advocate for ongoing, transparent, and meaningful community and stakeholder communication, consultations and involvement in the federal and provincial governments caribou recovery efforts and activities.

The maternity pen is one of the management actions that can assist with the recovery of caribou populations. Caribou are captured in late winter and placed in the secure enclosure located in the Kuskanax Creek area (near Nakusp Hot Springs), allowing them to bare and raise their calves in a safe environment away from predators. Cows and calves are released back into their habitat in mid-July when calves are three to five weeks old. This method has been shown to increase calf survival to 10 months of age by 2-3 times that of wild born calves.

Newly captured females cannot immediately be fed commercial caribou feed when they are introduced to the maternity pen, but rather must be transitioned from their natural diet of arboreal (tree) lichens at a rate of 10% change/day until they are eating 100% commercial feed (John Cook, pers. comm.).

These Terms of Reference provide details on the collection, handling, storage and feeding of arboreal lichens for the purpose of ALCS's mountain caribou maternity penning project.

Target Lichen Species

Mountain caribou are an ecotype of woodland caribou. They are behaviorally adapted to living in mountainous environments as compared to woodland caribou which inhabit gentler topography in Canada's boreal forest. Mountain caribou exclusively feed on arboreal lichens during late winter when deep snowpacks in the alpine facilitate easy access. The preferred arboreal lichen species for mountain caribou are *Bryoria* spp. (Photo 4) and *Alectoria sarmentosa* (Photo 2) (Kinley et al 2006).

Within the Columbia Mountains Ecosystem (CME), *Bryoria* primarily grows at higher elevations near treeline in old subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmannii*) forests (Kinley et al 2006), also referred to as the ESSF (Engelmann spruce/subalpine fir) biogeoclimatic zone. *Alectoria* is typically found at lower elevations within the Interior Cedar/Hemlock (ICH) biogeoclimatic zone, however both species often grow together with dominance dictated by elevation. *Bryoria* is generally a dark

brown in colour versus *Alectoria* which is typically a light green colour. Mountain caribou are known to prefer *Bryoria* over *Allectoria* although they readily consume both species. When possible, *Bryoria* is the primary species to be targeted for lichen collection for the ALCS project. However, due to the high quantities required either species is acceptable. Terrestrial lichen (e.g. *Cladina* spp.) typically used by boreal woodland caribou was found to be not palatable to mountain caribou and therefore not collected for the ALCS caribou maternity pen.

Lichen Harvesting Locations & Volunteer Coordination

Although nutrition is not deemed to be a contributing factor in the decline of mountain caribou within the Southern Mountain Caribou (McLellan et. al. 2006), lichen should not be picked within current known mountain caribou habitats unless it is from trees that can no longer contribute to lichen production, such as those felled for harvesting purposes or from blowdown events. ALCS will work with forest licensees in the Nakusp area to determine where and when they will be harvesting such that collection field trips can be arranged when possible. The public should not attempt to access recently harvested areas due to extreme safety hazards. Lichen picks in recent cut blocks will be coordinated and led by ALCS, licensees or contractors to ensure that all safety precautions are taken.

Other areas easily accessible area may be the Wensley Creek Recreation Area, mainline Forest Service Roads along Highway 6 between Galena Bay and Fauquier and on the west side of Arrow Lake (cross at Arrow Park ferry). Highway 6 East towards New Denver or anywhere with mature/old coniferous forests may also be good locations.

Those interested in assisting with lichen collection can send an email message to: Arrow Lakes Caribou Society al.caribou.society@gmail.com for assistance in locating and dropping off lichen. All volunteers under the supervision and/or direction of ALCS are required to complete and sign the attached waiver form (Appendix A). The ALCS will track names and hours of volunteer lichen collectors for project funding information.

Collection & Handling Methods & Guidelines

- It is preferred that harvesters use latex or nitrile gloves to reduce the possibility of the transfer of scent and potentially disease or other contaminants to the lichen;
- Lichen can be picked directly from lower tree branches or from fallen trees with ease (Photo 1);
- Higher branches can be pruned using a pole saw and the lichen subsequently removed from the branches;
- Natural blowdown or recently felled trees provide substantial quantities in one location;
- Large branches should be removed from the lichen. Small quantities of twigs are not considered to be a problem but high concentrations of twigs are not palatable;
- Excess water and/or snow should be shaken off as much as possible;
- Lichen can be placed directly into Low Density Polyethylene (LDPE) garbage bags but should not remain there for extended periods. Lichen should be removed from garbage bags as soon as possible (i.e. within 24 hrs) in order to inhibit the conditions that foster the growth of mold and fungus.

Drying & Storage of Lichen

Lichen needs to be air dried in order to reduce the likelihood of mold and fungus growth as well as to facilitate weighing in a consistent manner. The ALCS is storing lichen in Nakusp (Photo 5). General procedures to follow are:

- Remove lichen from the collecting bags within 24 hours of picking, sooner if temperatures are warm (e.g. >10 C);

- Evenly spread the lichen in a layer onto wooden pallets, not exceeding approximately 15 cm depth. The pallets permit air movement underneath the lichen to facilitate drying. If weather permits, the lichen can be dried outside on a deck or anywhere else with good air flow and dry conditions (Photo 3);
- Allow the lichen to air dry for a minimum of 48 hours at approx. 20 C or until the lichen feels very light in weight and is evenly dried. Turn the lichen over if the bottom is still damp. Fans can be used to expedite drying, especially if the lichen is very wet;
- Remove any large contaminants such as sticks or concentrations of small twigs, etc;
- Transfer the dried lichen into mesh soccer ball bags (or equivalent). The mesh bags allow for good air flow which is critical to lichen survival and the prevention of mold and fungus growth;
- Weigh the bags of lichen. Tag the bags and label them with the weight (kg), as well as the harvest location and date. Full soccer ball bags of lichen weigh approximately 3-4 kg each;
- Hang the dried, labelled bags of lichen outdoors under cover in an area with good air ventilation, ensuring that there is air flow between the bags (Photo 5);
- Keep an inventory of the quantities and species of lichen in storage.

The shelf life of properly dried and stored lichen is indefinite. The State of Alaska uses lichen that is occasionally several years old for captive caribou. Surplus lichen that was collected for a caribou transplant in the South Purcell Mountains in 2012 was analyzed for nutritional content in 2014 along with fresh samples collected in the same area and there was no significant difference in the nutritional analysis between the 2 samples. This permits the collection of lichen year-round and even years in advance if necessary.

Feeding Lichen to Caribou

Adult caribou consume approximately 3.2 kg of food/adult/day (John Cook, pers. comm.). In order to transition new captives onto commercial caribou feed, the rate of change should not exceed 10%/day (e.g. on day 1 in captivity their food would be comprised of 90% lichen:10% commercial feed, day 2 would be 80% lichen:20% commercial feed, etc until on day 9 they are being fed 100% commercial feed). This allows the bacteria in their rumens to adjust accordingly without causing gastric issues. It may be beneficial to firstly feed new captives *Bryoria* as it was likely the dominant lichen species being consumed at the time of capture.

Excessively dry lichen can be unpalatable to caribou. Naturally high humidity levels at capture time (end of March) would normally result in soft textured lichen that caribou readily eat. However, if the lichen feels very dry and especially if it “crunches” in the hand, it is advised that it be re-hydrated by allowing it to soak in clean water for a couple of hours.

Literature Cited

Kinley T.A., T. Goward, B. McLellan, and R. Serrouya. 2006. The Influence of Variable Snowpacks on Habitat Use by Mountain Caribou. The Eleventh Mountain Caribou Workshop, Jasper, AB.

McLellan B.N., R. Serrouya, and J. Flaa. 2006. Mountain caribou censuses in the North Columbia Mountains. B.C. Ministry of Forests and Canadian Parks Service, Revelstoke, British Columbia, Canada.



Photo 1: Volunteers collecting lichen.



Photo 2: *Alectoria sarmentosa*



Photo 3: Drying collected lichen.



Photo 4: *Bryoria* ssp.



Photo 5: Dried lichen hanging in storage.