

At-Risk Lichens–Special Management Practices

May 23, 2018

1) Purpose

Many types of lichen have adapted to live in specific – often harsh – environments. These lichens are habitat specialists – they exist and thrive in a unique set of environmental conditions, but are intolerant of change or physical disturbance. For forest dwelling lichens, air quality and moisture regulation are key concerns. Many of the rare species of lichens in Nova Scotia require stable moist conditions, combined with air quality that is relatively free of contaminants. Consequently, any land use activity that significantly alters the microclimate surrounding a forest lichen can pose a threat to that lichen’s long term survival.

The purpose of this Special Management Practice (SMP) is to maintain the health of existing At-Risk lichen occurrences and promote the recovery of these species while enabling compatible land uses. This document provides procedures to be followed on Crown lands. In some instances, and locations, it may be necessary for staff of provincial agencies to modify recommendations presented here to respond to site specific conditions to effectively protect habitat for these species or to accommodate for necessary land uses.

The Nova Scotia Department of Natural Resources (NSDNR) is responsible, under the Nova Scotia Endangered Species Act (NSES) (1998, c.11, s.1), for the protection, designation and other relevant aspects of the conservation of species at risk in the Province, including habitat protection. Land use activities on crown and private lands have the potential to damage and destroy lichen populations and their habitat.

To ensure the protection of species at risk, the NSES contains prohibitions that make it an offence to kill, harm, harass, capture, take, possess, collect, buy, sell or trade an individual of a species listed as endangered, threatened or extirpated. The NSES also makes it an offence to damage or destroy the residence of one or more individuals of a species listed as endangered or threatened.

2) Objectives

The main objectives of these special management practices are to conserve occurrences of At-Risk lichens and to provide the quality and quantity of habitat at levels that enable the populations to be self-sustaining over the long term. This is to be accomplished through a combination of protected and restricted activity zones around lichen occurrences. A secondary goal of these directives and guidance is to assist land users to identify planning issues prior to development and to present feasible solutions to avoid negative effects on lichens and their habitat. Careful observation of the directives and guidance will enable users to avoid unnecessary delays and costly mitigations or prosecution under the N.S. Endangered Species Act.

3) **Application**

a) These procedures apply to the following species:

- i) Boreal Felt Lichen: This species was provincially listed as Endangered in 2003 and Special Management Practices were put in place. This procedure updates and replaces the previous SMP in response to specific recommendations and newer information about its survival.
- ii) Very rare, and highly sensitive lichens (Table 1): These species merit protection based on their At-Risk status and higher degree of rarity in the province, combined with their high sensitivity to environmental disturbance.
- iii) Rare and sensitive lichens (Table 2): These species are assessed to be either At-Risk in Nova Scotia, and presumed rare and/or sensitive to disturbance, but not to the same degree as Table 1 species. This is a mixed species group with different sensitivities. Three species in this table are cyanolichens, the morphology of which suggests less sensitivity than Table 1 species, but there is data to show population declines and some photobiont sensitivity to desiccation stress.

b) These procedures apply to the following activities

Natural resource development, exploration and harvesting including but not limited to:

- i) Forestry resource development/ harvesting;
- ii) Mineral resource exploration/ development;
- iii) Activities authorized under the Crown Lands Act that may disturb lichen habitat.

4) **Directives**

a) Advanced surveying of potential habitat

- i) Land use activities on Crown land subject to departmental review shall demonstrate adherence with this procedure. Other activities, such as those subject to Environmental Assessment, may utilize this procedure or receive approval for project-specific avoidance and mitigation procedures.
- ii) A predictive habitat model for Boreal felt lichen was developed by Cameron and Neily (2008) that identifies areas in Nova Scotia of potential BFL habitat. A copy of this polygon data layer, as well as any updates, is available from the Nova Scotia Department of Natural Resources, Wildlife Division.
- iii) If the potential area of influence of a proposed activity, comprised of the actual working footprint plus a buffer of 100 metres (the 'buffered disturbance footprint') overlaps any portion of the modelled BFL habitat, a survey for Boreal felt lichen must be completed prior

to the start of any physical work at the site. Occurrences of other lichens listed herein shall be recorded in these surveys if found.

- (1) The modelled habitat layer serves as a guide – not a true predictor – of where BFL may occur. In fact, less than 20% of the known occurrences of BFL are located within the modelled habitat.

b) Survey requirements:

- i) Accepted surveyor: surveyors must have the demonstrated qualifications and experience acceptable to the Director of Wildlife, NSDNR (or designate) in order to perform this function.
- ii) Scope of area required to be considered for possible ground surveying/ scope of area actually surveyed.
 - (1) At a minimum, the complete extent of the buffered disturbance footprint (i.e. the outer perimeter contained by the harvest block plus associated new roads and new trails (outside the harvest area), and then extending outwards by 100 metres) is to be assessed (desktop review and/or site visit) and considered for detailed ground surveys.
 - (2) Based on desktop review and/or a site visit, the licensee or project proponent, in consultation with surveyors, will determine the scope of a ground verification so that it meets the objectives set forth by DNR.
- iii) Information to be provided by project proponent to surveyor:
 - (1) The entire proposed disturbance footprint (e.g. harvest block, associated supporting roads, and hauling trails outside the harvest area) including BFL modelled habitat and area(s) of intersect.
 - (2) To facilitate long term planning, the location and extent of other activities by the same proponent, if known, within one km of target site that are known or anticipated within the next three years.
- iv) Information recorded by surveyor
 - (1) Full extent of area assessed, comprised of areas (GIS-ready polygons):
 - (a) remotely reviewed on desktop, but deemed not suitable (rationale provided) for lichens;
 - (b) deemed not suitable for lichens as determined by site visit (rationale provided); and
 - (c) deemed potentially suitable and ground surveyed.
 - (2) GPS track (.gpx format file) of ground survey route, annotated with survey date(s), observer(s).

- (3) Point locations of BFL and other lichen species (specified herein) occurrences: coordinates (UTM 20, NAD83), host tree species, number of thalli, surrounding habitat (not location) descriptors.
 - (4) If observed, other notable conservation values (e.g. raptor nests, rare species occurrences, unmapped wetlands).
- v) Information reporting by surveyors to the project proponent and NSDNR Wildlife Division will include:
- (1) Digital copies of all information gathered.
 - (2) All new rare species (i.e. lichens, plants, birds, etc.) discoveries, if observed, to be reported within 48 hours of survey completion.

The destination and type of information reported by lichen surveyors shall be specified by DNR.

c) **Conservation of known habitat - Boreal Felt Lichen**

A 500 metre Special Management Zone (SMZ) shall be established around all occurrences* of Boreal Felt Lichen (BFL). Within this 500 metre radius SMZ, there are two sub-zones: a Protected zone and a Restricted zone (Figure 1).

*Occurrences within the scope of this procedure include thalli that are currently present or, if no longer present, had been documented in surveys from 2004 to present.

- i) Protected zone- The area included within the 200 metre radius of an occurrence of BFL is managed for minimal disturbance as follows:
 - (1) Forest harvest (including silvicultural treatments): There is to be no active clearing, removal or disturbance of trees, soil or wetlands.
 - (2) Mineral Exploration: Mineral exploration drill sites may not be situated within the 200 metre Protected Zone. The removal of soil, rock or mineral samples for the purposes of mineral exploration is not subject to this procedure provided sample collection does not require or involve the removal of trees or alter the vegetated canopy, microclimate or hydrology within the 200 metre Protected Zone. Individual soil, rock or mineral samples collected for the purposes of mineral exploration within this zone should not be greater than 2 kilograms (per sample) and may only be collected using non-mechanical methods. Mineral exploration drill sites, trenching and test pitting may be permitted in exceptional situations and will require an approval under DNR's Variance process.
 - (3) Road construction: No construction of new roads or trails. New road construction in Protected zone may be permitted in exceptional situations and will require an approval under DNR's Variance process.
 - (4) Existing roads: If essential for access, any existing road can only be maintained to the standard of the original road. This refers to maintenance or upgrades that may affect

local microclimate or air quality. This does not refer to maintenance or upgrades (i.e. culvert replacement) that have no such effects.

- ii) Restricted Zone -The area included between the 200 metre and 500 metre radius of an occurrence of BFL is managed for activity as follows:
- (1) Partial harvesting will be favoured by using the 'Restoration' pathway in DNR's Forest Management Guides (FMG).
 - (2) Licensees will use the DNR Pre-treatment Assessment procedures and FMG to determine harvest methods and apply partial harvesting methods, including the "Restoration Shelterwood" treatment option, in the FMG when appropriate. This will increase the probability of a partial harvest prescription while still maintaining appropriate forest management techniques.
 - (3) Within the Restricted zone, for the area where the FMG has determined that Clearcutting (overstory removal or seed tree harvests) is the appropriate prescription:
 - (a) Areas of clearcut shall not exceed 10 ha and the distance between clearcuts shall not be less than 100 metres. These restrictions also apply to the second entry of shelterwood harvests if the harvest method is 'Overstory removal' and the regeneration is less than 3 metres tall.
 - (4) In areas that are clearcut, all wetlands, including forested wetlands, and portions thereof occurring within the 500 metre radius SMZ will be buffered by a minimum 20 metre no-disturbance buffer.
 - (5) Only < 30% of the total area of the Restricted zone, excluding open wetlands and including non-crown holdings, can be in a state of regenerating development (i.e. tree height < 3 m; the estimated time after harvest for tree height to attain > 3 metres height is 20 years).
 - (a) When calculating total area for determining the allowable percentage in regeneration: forested wetlands and anthropogenic openings (i.e. agriculture, pits, landings, residential clearings, etc.) will be included in the total area. Open wetlands and other natural openings will be excluded.
 - (b) Unavoidable exceedances of the 30% requirement may be considered for approval under the Variance process.
 - (6) Existing and new roads and trails (greater than six metres in width) outside the harvest area are counted as area within the regenerating age class.
 - (7) All existing roads shall only be maintained to the standard of the original road. New road construction may be permitted within the Restricted zone only after all other practical options have been eliminated. Permission to construct new roads in a Restricted zone will require approval under DNR's Variance process.
 - (8) Mineral exploration is permitted within the Restricted zone. If the exploration occurs in wooded areas where tree height is more than 3 metres and the footprint of the access trail and exploration site are less than 6 metres in width, the footprint will not contribute to the total area in the Restricted zone less than 3 metre in height.

d) **Table 1 Species**

Lichens specified in Table 1 shall be provided with the Protected Zone (200 metre) as described in 4)c)i). A Restricted Zone is not required.

e) **Table 2 Species**

The area included within a 100 metre radius of an occurrence of a Table 2 species is managed for minimal disturbance as follows:

- i) Forest harvest (including silvicultural treatments): There is to be no active clearing, removal or disturbance of trees, soil or wetlands.
- ii) Mineral Exploration: Mineral exploration drill sites may not be situated within the 100 metre zone. The removal of soil, rock or mineral samples for the purposes of mineral exploration is not subject to this procedure provided sample collection does not require or involve the removal of trees, alter the vegetated canopy, microclimate or hydrology within the 100 metre zone. Individual soil, rock or mineral samples collected for the purposes of mineral exploration within this zone should not be greater than 2 kilograms (per sample) and may only be collected using non-mechanical methods.
- iii) Road construction: No construction of new roads or trails. New road construction within the 100 metre zone may be permitted in exceptional situations and will require an approval under DNR's Variance process.
- iv) Existing roads: Upgrades and maintenance may be permitted, subject to IRM review, and with conditions to minimize disturbance.

f) **Management of BFL-related databases-** The following databases will be maintained and updated as part of the implementation of this practice:

- i) Updated lichen occurrence database (including locations where thalli no longer occur)
- ii) Updated survey track database

g) **Auditing and Monitoring:**

- i) The NS Department of Natural Resources and/or its appointed agents will conduct site inspections on Crown lands of lichen occurrences to monitor:
 - (1) Compliance with the SMP by licensees.
 - (2) The effectiveness of these management practices. The intensity and assignment of this monitoring will be determined during the annual DNR Work Planning process.
- ii) DNR Regional staff will have the primary responsibility for ensuring that proponents are complying with the SMP during all phases— planning and active work -- of their project. As well, regional DNR staff or auditing designates (qualified individuals who are approved by Director, Wildlife or designate) will complete post-completion audits of work sites to verify that project -related activities conducted within the SMZ have complied with the directives of the SMP.

iii) Monitoring reporting

Long-term monitoring of lichen health at all SMZs is required to track the effectiveness of the SMP's directives. All monitoring of BFL health within an SMZ will be conducted or overseen by qualified lichenologists, selected by the DNR Director of Wildlife (or designate).

Table 1 Very rare, and highly sensitive lichens

Common name	Scientific name	NSESA status	SARA status	COSEWIC review status	S-Rank */ Other notes
Vole Ears	<i>Erioderma mollissimum</i>	Endangered (2013)	Endangered	Endangered (2009)	S1S2; Sensitive to microclimatic changes; <i>Merits highest protection</i>
Hibernia Jellyskin Lichen	<i>Leptogium hibernicum</i>	Not listed	Not listed	Low priority	S1; Only recently discovered in North America; Status highly uncertain; Only 5 known occurrences in NS;
Powdered Moon Lichen (eastern population)	<i>Sticta limbata</i>	Not listed	Not listed	High priority	S1S2; Leafy lichen that is highly sensitive to air pollution and acid precipitation; Currently 7 known occurrences in NS;
Eastern Waterfan	<i>Peltigera hydrothyria</i>	Threatened (2017)	Not listed	Threatened (2013)	S1; Endemic to eastern NA. Inhabits streams ; as of COSEWIC report only 10 occurrences in Canada with 6 of those in NS. Very sensitive to changes in water chemistry, water level changes and siltation. Changes in hydrology, channeling water through stream crossings, increased run off from harvesting could affect this highly sensitive species.

* Refer to Table 3 for descriptions

Table 2 Rare and sensitive lichens

Common name	Scientific name	NSESA status	SARA status	COSEWIC review status	S-Rank */ Other notes
Wrinkled Shingle Lichen	<i>Pannaria lurida</i>	Threatened (2017)	Not listed	Threatened (2016)	S1S2; Known from 56 occurrences in Canada of which 49 in NS. Rate of decline 32% since 1986. A primary threat is harvesting of hardwood forest.
Frosted Glass-whiskers (NS pop'n)	<i>Sclerophora peronella</i>	Not listed	Special Concern	Special Concern (2014)	S1S2; Tiny stubble lichen that is difficult to locate; Restricted to mature or old-growth hardwood forest; Is very habitat specific, associated with very old forest. Habitat conditions for its occurrence are very rare on the landscape. Like other stubble lichens , it likely takes a long time to develop and

					once disturbed will take a very long time to re-establish.
Black-foam Lichen	<i>Anzia colpodes</i>	Threatened (2017)	Not listed	Threatened (2015)	S3; Known from ON, PQ, NB and NS; NS population appears to be only remaining occurrences; Lichen is widespread, but uncommon; Deforestation is main threat. Declining in northeast US, research indicates it may be associated with old growth forest
Blue Felt Lichen	<i>Degelia plumbea</i>	Vulnerable (2013)	Special Concern	Special Concern (2010)	S3; In Canada only occurs in Atlantic region; NS population is largest in NA.; Requires forest continuity and high humidity; Sensitive to air pollution and acid rain.
Poor-man's Shingles Lichen	<i>Parmeliella parvula</i>	Not listed	Not listed	Mid priority	S1S2; Closely associated with BFL; Evidence to show declining amount of available habitat; Small and inconspicuous lichen; knowledge lacking; Part of amphi-Atlantic, boreal rain forest group which include BFL. In NS has an Atlantic coastal distribution.

* Refer to Table 3 for descriptions

Table 3-State or sub-regional IUCN ranking (S-ranking) definitions.

Status	Definition
S1	Critically Imperiled —Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2	Imperiled —Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3	Vulnerable —Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4	Apparently Secure —Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5	Secure —Common, widespread, and abundant in the nation or state/province.

Approval:

Original signed by

May 23, 2018

Jon Porter

Date

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Figure 1- Special Management Zones: Activities permitted in three sub-zones

