



Smoker's Lung Lichen

Photo: © Stephen Sharnoff



Scientific name

Lobaria retigera

Taxon

Lichens

COSEWIC status

Threatened

Canadian range

British Columbia

Reason for designation

This lichen is strongly associated with humid old growth forests in British Columbia and is a “flagship” species for a suite of rare and uncommon lichens and bryophytes. More than 50% of the North American range is in Canada. The Canadian population comprises three subpopulations; however, nearly all remaining individuals (>90%) are found in the Northwestern subpopulation (Kispiox and Skeena valleys). The threats to this species in Canada are extensive forest harvesting, both past and present, leading to declines in the population from the direct impacts (removal of host trees), as well as indirect impacts (edge effects) in adjacent habitats. Predicted climate change may lead to further declines in the remaining populations of this lichen.

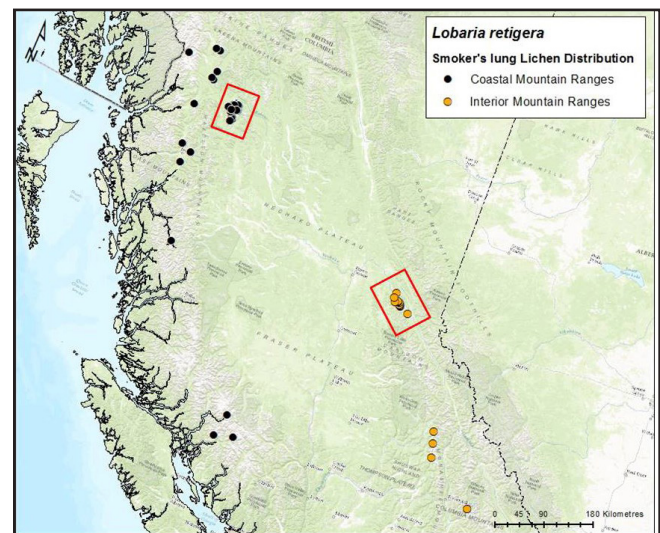
Wildlife species description and significance

The Smoker's Lung Lichen is a rare cyanolichen, strongly associated with humid mature to old growth forests and is characterized by a net-ridged/reticulate

dark upper surface and abundant grain-like vegetative propagules called isidia. The lower surface is tomentose (dark pigmented tangled hyphae), and the tomentum is interrupted by white patches that give a characteristic contrasting dark-light pattern. The spore-bearing fruit bodies, apothecia, are unknown in North American populations. Smoker's Lung Lichen is a “flagship” species among a suite of rare and uncommon epiphytic lichens and bryophytes that depend on humid, old growth forests in British Columbia (B.C.), many of which exhibit an unusual coastal-inland disjunct distribution.

Distribution

The North American distribution of Smoker's Lung Lichen is wholly within the geographic boundaries of Alaska and British Columbia. The Canadian portion of the range accounts for more than 50% of the total spatial distribution in North America. Smoker's Lung Lichen is also found in tropical and subtropical areas of Asia, the Indian subcontinent, Oceania, and Africa. Within Canada, the core range for Smoker's Lung Lichen falls within the Kispiox region of northwestern British Columbia.



Smoker's Lung Lichen (*Lobaria retigera*) occurrences in British Columbia.

Source: COSEWIC, 2018. COSEWIC assessment and status report on the Smoker's Lung Lichen *Lobaria retigera* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 61 pp.

Habitat

In Canada, Smoker's Lung Lichen is confined to moist mature to old forests at elevations below 1000 m. Avoidance of summer drought is a key attribute of Smoker's Lung Lichen habitat. In British Columbia, this requirement is met in mature to old growth forests growing in oceanic and humid continental regions. The three Canadian subpopulations occur in the Coastal Western Hemlock (CWH) and the Interior Cedar-Hemlock (ICH) biogeoclimatic zones. The lichen colonizes twigs and branches of Western Hemlock, as well as leaning snags and dead trunks, but can be found on other coniferous species, including Western Redcedar, Subalpine Fir, and Amabilis Fir. It is occasionally found on older alder and willow trees, especially those that have rough bark.

Biology

Smoker's Lung Lichen produces asexual propagules, isidia, which are thought to be locally dispersed by rain and animals. Dispersal of isidia may be a limiting factor for Smoker's Lung Lichen as in North America it does not form sexual structures (apothecia), so long distance dispersal of the fungal component by ascospores does not occur. In coastal forests, the lack of available substrata, due to the competing cover of mosses and/or liverworts, is also a major constraint. The photosynthetic partner of the Smoker's Lung Lichen is *Nostoc*, a cyanobacterium.



Photo: © Stephen Sharnoff

Population Sizes and Trends

The Canadian distribution of Smoker's Lung Lichen is limited to three geographic regions in B.C.: (1) ICH biogeoclimatic zone of interior B.C., (2) the ICH biogeoclimatic zone of northwestern B.C.,

and (3) the CWH biogeoclimatic zone in Coastal B.C. The estimated number of thalli in the three subpopulations is ca. 150, 58,000 and 100 respectively, based on enumerated thalli and habitat modelling. The number of thalli at each occurrence varied from single thalli to over 2000 thalli at the most abundant site in northwestern B.C., which is the core range for this lichen. Evidence suggests that extirpation has occurred at three occurrences, with another 21, mostly in northwestern B.C. being at risk within the next two to three generations (40-60 years) due to logging and associated edge effects. Many trees on which the Smoker's Lung Lichen was found to be abundant in the 2015 and 2016 preharvest surveys of planned cut blocks in the Kispiox valley have been designated for placement in wildlife tree patches (with a 35 m buffer placed around the trees). However, the survival of these thalli is uncertain, as this lichen species is highly sensitive to microclimate changes associated with edge effects.

Threats and Limiting Factors

Smoker's Lung Lichen is limited by the availability of suitable habitat (humid mature and old growth forests) and poor dispersal efficiency. Humid, wet, mature or old growth, cedar-hemlock forests have diminished in abundance with the progressive expansion of forest harvesting. Additional threats are from Hemlock-looper infestations and fire which are predicted to increase in severity and frequency due to rising mean annual temperatures as a result of global warming. The cumulative effects of these threats: harvesting, climate change, insect infestations and fire, are expected to lead to a decline in the number of mature individuals of Smoker's Lung Lichen over the next two to three generations.

Protection, Status and Ranks

Smoker's Lung Lichen is a Blue-listed species in British Columbia. Fifteen extant Canadian occurrences of Smoker's Lung Lichen are situated within parks or protected areas, eight of which are found in the newly designated Ancient Forest/Chun T'oh Whudujut Provincial Park in the upper Fraser River watershed. The remaining forty-one occurrences are on Crown Land, where most do not have long-term protection from forest harvesting or other disturbances. Some have limited protection

in designated Old Growth Management Areas (OGMAs) and/or Wildlife Tree Retention patches. The Smoker's Lung Lichen also occurs in Alaska where it is ranked S2S3 (Imperilled or Vulnerable).

Source: COSEWIC. 2018. COSEWIC assessment and status report on the Smoker's Lung Lichen *Lobaria retigera* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 61 pp.

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