



# Extension Note 8

## Effects of Cumulative Disturbance on Endangered Whitebark Pine – Lichen Woodland Ecosystems of West Central B.C.

---

The Whitebark pine – Lichen woodland ecosystems of west central British Columbia (classified as ESSFmk/02 and ESSFmk/03 biogeoclimatic site series, and blue-listed by the BC Conservation Data Centre) lie at the northern end of the range of whitebark pine (*Pinus albicaulis*) and at the southern end of the circumpolar range of boreal pine-lichen woodlands.

### Prepared for:

Bulkley Valley Centre  
for Natural Resources  
Research &  
Management,  
Box 4274, Smithers,  
BC V0J 2N0

These open woodland ecosystems contribute to the biodiversity of a landscape that is otherwise dominated by dense, closed subalpine fir forest. Because whitebark pine seeds (pine nuts) are exceptionally rich in oils and protein, the woodland ecosystems serve as resource hotspots that attract a wide range of wildlife, from birds and rodents to grizzly bears. Whitebark pine – lichen woodlands also have important cultural values as traditional hunting and gathering sites for First Nations.

### Project Leader

**Sybille Haeussler,**  
PhD, RPF

Recently, several new Class A provincial parks and protected areas were created in the mountains of west central B.C. within the territories of the Wet'suwet'en First Nation to protect subalpine wilderness areas with large areas of Whitebark pine forest and woodland. These new parks include Neníkëkh/Nanika-Kidprice Park, Burnie-Shea Park, Morice Lake Park, Atna River Park, Nadina Mountain Park and the Burnie River Protected Area. Unfortunately, creating these reserves is not sufficient to protect the distinctive and highly scenic Whitebark pine – Lichen woodlands which are under threat from the cumulative effects of climate change, mountain pine beetle, the introduced white pine blister rust and fire exclusion.

### FIA-FSP Project M085168

**Prepared:**  
October, 2009

The Bulkley Valley Research Centre, in collaboration with the Forest Sciences Department of UBC and the B.C. Ministry of Forests and Range and with funding and support from the B.C. Forest Sciences Program, the Office of the Wet'suwet'en and Westland Resources, recently completed a preliminary study to investigate how the endangered Whitebark Pine – Lichen woodland ecosystems have changed over the past 30 years in response to cumulative environmental change.

## **Key Findings and Recommendations**

- There has been massive mountain pine beetle mortality of mature whitebark pine in low elevation ESSFmk forests (800-1100 m) of west central B.C. amounting to 80-85% of whitebark pine basal area at these elevations.
- These unusual ecosystems contain exceptionally old whitebark (500 yr +) and lodgepole pine (400 yr +) trees that have survived low severity wildfires. These are the oldest known trees in fire-dominated interior forests of west central B.C..
- To date, occurrences within Provincial Parks have not been disturbed or damaged by machinery, but portions of one large Whitebark Pine – Lichen woodland ecosystem and several smaller occurrences are threatened by proposed pipeline corridors within the Burnie River Protected Area. Outside the new parks and protected areas, these ecosystems have been widely impacted by road and gravel pit construction and pine beetle salvage logging.
- At this time, we have no evidence that cumulative disturbances to blue-listed Whitebark Pine – Lichen woodland ecosystems (ESSFmk/02 & /03 site series) have reached a tipping point (i.e., exceeded a resilience threshold), whereby vegetation and soil processes have shifted abruptly to become indistinguishable from processes occurring on the much more common Subalpine fir – Mountain hemlock – Moss forest ecosystem (ESSFmk/01). If this were to take place, we would expect a significant long-term loss of biodiversity at the landscape scale.
- Instead, we now believe that submesic ESSFmk/03 sites may be shifting gradually towards zonal ESSFmk/01 ecosystems whereas xeric to subxeric ESSFmk/02 sites may be more resilient and retain distinctive vegetation and soil characteristics, despite having much less whitebark and lodgepole pine. Additional vegetation and soils monitoring was undertaken in summer 2009 to confirm this.
- Low intensity wildfires appear to create and maintain the open canopies of Whitebark Pine – Lichen woodland ecosystems and should be reintroduced to these ecosystems through prescribed fire and/or a let-burn policy to maintain subalpine biodiversity.
- Wildfire alone is unlikely to restore Whitebark pine – Lichen woodland ecosystems that have been heavily affected by mountain pine beetle and white pine blister rust. Seed collections from apparently rust-resistant whitebark pine trees should begin immediately to allow future restoration planting.

**For more information on this project**, please contact Sybille Haeussler, PhD, RPF, Project Leader, at [haeussl@unbc.ca](mailto:haeussl@unbc.ca)

**For project reports, photos and updates, see:**

[http://bvcentre.ca/research/project/testing\\_ecological\\_resilience\\_theory\\_in\\_pine-lichen\\_ecosystems\\_of\\_west\\_cent/](http://bvcentre.ca/research/project/testing_ecological_resilience_theory_in_pine-lichen_ecosystems_of_west_cent/)

**For more information on whitebark pine, please see**

[http://www.for.gov.bc.ca/HTI/whitebark/WhitebarkPine\\_Bulletin-July08.pdf](http://www.for.gov.bc.ca/HTI/whitebark/WhitebarkPine_Bulletin-July08.pdf)

*THIS DOCUMENT HAS RECEIVED AN INDEPENDENT PEER REVIEW*

---

### **The Bulkley Valley Centre for Natural Resources Research & Management**

*The Bulkley Valley Centre for Natural Resources Research & Management (the BV Research Centre) is a registered not-for-profit society based in Smithers, British Columbia, that conducts high quality interdisciplinary research on temperate, montane, and boreal ecosystems, including their human dimensions.*

*Visit our website, [www.bvcentre.ca](http://www.bvcentre.ca) for more information on the Centre and our projects.*