Feb. 4, 2011

Director General
Canadian Wildlife Service
Environment Canada
Ottawa, ON K1a 0H3
sararegistry@ec.gc.ca

Dear Sir/Madam:
Re: Amending SARA List of Species at Risk to include Whitebark Pine (*Pinus albicaulis*)

The Bulkley Valley Centre for Natural Resources Research & Management (BVRC), located in Smithers BC, at the northwest range limit of *Pinus albicaulis*, has an active program of research on the whitebark pine ecosystems of west central British Columbia in collaboration with the BC Ministry of Natural Resource Operations (formerly BC Forest Service), BC Ministry of Environment (BC Parks), the University of Northern BC and the Office of the Wet'suwet'en within whose territories our research takes place (see their attached letter of support). The results of our scientific research, summarized below, lead us to strongly support amending the SARA List of Species at Risk to include *Pinus albicaulis* as an Endangered species.

Documents describing our research program on whitebark pine are posted on the BVRC website: http://bvcentre.ca/research/project/testing_ecological_resilience_theory_in_pine-lichen_ecosystems_of_west_cent/. Our research program includes several recently published reports, a thesis and manuscripts in preparation, not cited in the COSEWIC Assessment and Status Report on Whitebark Pine in Canada (2010), that support COSEWIC's assessment and provide additional scientific evidence that the status of "Endangered" is warranted.

Although the range and population size of mature whitebark pine trees are both very large (estimated in the status report at over 190,060 km^2 and 200 million, respectively), it is the rapid rate of decline that warrants the status of Endangered under Criterion A. The COSEWIC website defines criterion A4 as:

*"An observed, estimated, inferred, projected or suspected reduction of >50% in total number of mature individuals over any 10 year or 3 generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased **or** may not be understood **or** may not be reversible…."*

By this definition, our research data indicate that whitebark pine is certainly endangered in west central BC. Beyond the decline of mature individuals there is an equal, if not greater, decline in the recruitment of young whitebark pine seedlings and saplings.

Highlights of BVRC research:

1. Rapid Mortality of Mature Whitebark Pine in west central BC since 1978-85:
In 2007 and 2009 we revisited 9 sites on the eastern slopes of the Coast Range where whitebark pine stands were first inventoried by the BC Forest Service between 1978 and 1985 (Figure 1). At all sites, the majority of mature whitebark pine trees are now dead (Figure 2). Measured as basal area (m^2/ha; which assigns more value to the largest

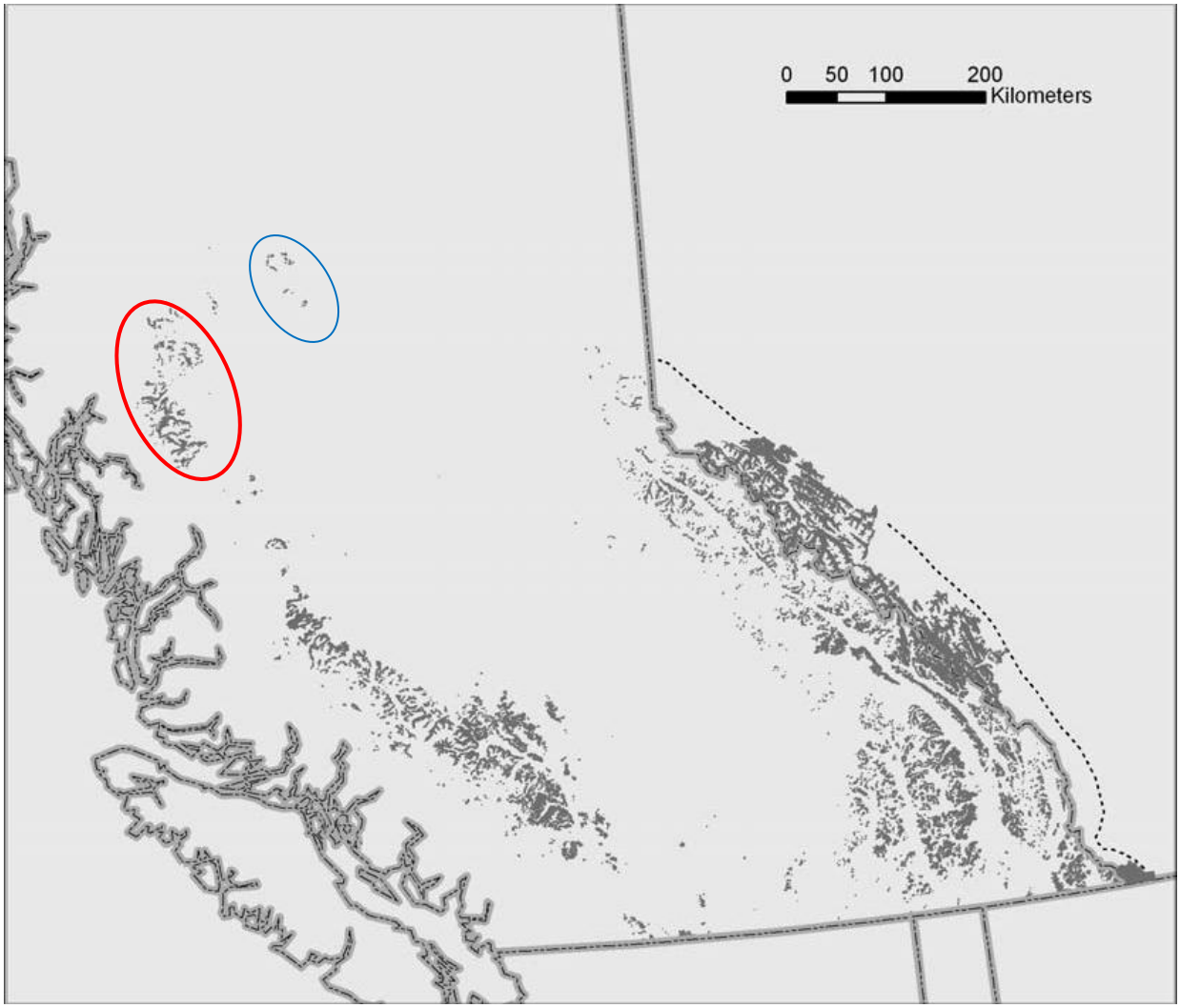

Figure 1. Location of whitebark pine ecosystems studied by the Bulkley Valley Research Centre near Smithers (red oval), and those near Fort St. James observed by J. Vinnedge (blue oval), superimposed on the whitebark pine range map from the COSEWIC (2010) assessment report (their Fig. 3).

a)

b)

Figure 2. Mortality of mature whitebark pine in west central BC. (a) Coles Lake study area with mortality mostly from late-1980s beetle outbreak and succession to mountain hemloc. (b) Bergeland Lake study area with mortality mostly from the still-active 2000s beetle outbreak. (S. Haeussler photos, taken in 2009 and 2007).

cone-bearing trees) the loss of live whitebark pine between the two time periods averaged **81%** (Haeussler et al. 2009). Measured as the number of stems per hectare (which values small, suppressed mature individuals trees as equal to large, cone-bearing dominants) the loss of live whitebark pine trees greater than 10 cm in diameter averaged **72%,** and the number of dead whitebark pine **snags increased by 308%** (Clason 2010; Clason et al. 2010). Regardless of how this mortality is measured, it is evident that **substantially more than 50%** of mature whitebark pine trees have died over the past 3 decades.

At several sites, most mortality of mature trees was caused by a mountain pine beetle (*Dendroctonus ponderosae*) outbreak that began in the late 1980s and extended into the 1990s (Figure 2a). This outbreak was not reported by Zeglen (2002) or Campbell and Antos (2000), cited in the COSEWIC report, because these remote unroaded sites were not included in their studies. A second major round of mountain pine beetle mortality began around 2004 and continues to the present day (Figure 2b).

Some mature trees died from other causes, including the non-native white pine blister rust (*Cronartium ribicola*). At our intensively-studied Burnie River site, **75% percent** of all whitebark pine trees were **visibly infected with white pine blister rust,** and **33% of all mortality** (among trees of all size classes) was attributed to blister rust (Haeussler et al. 2009). These infection rates are comparable to the highest rates reported by Campbell and Antos (2000) and Zeglen (2002), whose fieldwork included west central BC.

2. Lack of Persistence of Whitebark Pine following Canopy Mortality

Our work in west central BC has shown dramatic increases in the abundance of shade tolerant conifers in stands formerly dominated by whitebark pine. We have documented an **increase of mountain hemlock** from **34% cover** in the 1970/80's **to 53%** in 2007 & 2009) and **increasing subalpine fir from 32% to 42%** over this 20-30 year time period (Clason 2010, Clason et al. *in prep*). These increases, accompanied by low levels of healthy regeneration, raise concerns about successional replacement in stands where whitebark pine may historically have persisted due either to more frequent fire or harsher climate conditions. Altered successional trajectories and changing competitive dynamics between species were present across all sites BVRC researchers re-visited in 2007 and 2009, representing a significant loss and ongoing threat to whitebark pine in west central BC that we expect to continue under climate change.

3. Low Recruitment and Poor Forest Health in Wildfires

Because whitebark pine regenerates best and grows most vigorously after wildfires, we studied recruitment within excellent whitebark pine habitat at three relatively recent wildfires near Smithers. At the McKendrick Pass Fire (burned ~1967) the original stocking rate of whitebark pine seedling/sapling clumps was quite good, but subsequent mortality from white pine blister rust was extremely high (see below). At the Clore Canyon Fire (burned ~1974) we recorded just 3 whitebark pine tree clumps totalling 19 saplings per hectare. 50% of the trees had active blister rust cankers, 22% had inactive cankers and 27% were rust-free (Haeussler et al. 2009). At the Nanika Fire (burned 2004), we located just 4 whitebark pine seedling clumps in a 3 hectare search area (Haeussler 2010). These data indicate that **whitebark pine is not regenerating successfully on wildfires** in west central BC.

4. High Mortality Rate of Young Trees from White Pine Blister Rust.
Alex Woods, forest pathologist for the BC Ministry of Natural Resource Operations in Smithers, established a white pine blister rust monitoring study in the McKendrick Pass wildfire in 1996. The trial was measured 6 times between 1996 and 2007 and thus provides one of the best estimates of blister rust mortality rates in Canada. We found that **89%** of all whitebark pine trees were **infested with blister rust** and that the **mortality rate** of seedlings and saplings was **10% per year** (Haeussler et al. 2009)**.** These mortality rates substantially exceed those reported in the COSEWIC status report.

5. Projecting Effects of Climate Change on High Elevation Whitebark Pine
The results presented above are from the low elevations of the range of whitebark pine in west central BC (800 – 1200 m elev.). At these elevations we might expect both mountain pine beetle and blister rust to be somewhat more virulent (Campbell and Antos 2000; Logan et al. 2010) than at the upper elevations of the tree's range near timberline (ca. 1800 m elev.). We have not conducted inventories or forest health surveys at timberline elevations where the whitebark trees tend to be stunted and produce fewer cones with relatively low seed viability (McLane 2011). Our informal observations suggest that so far, mountain pine beetle mortality is low at timberline elevations and that white pine blister rust (although very abundant) may not be causing mortality at the very high rates recorded at the McKendrick Pass Fire (elev. 1100 m).

BVRC researchers are, however, developing climate change projections for the ecosystems of west central BC (Daust 2010). These projections suggest that the temperature regimes currently experienced in montane to subalpine forests at the low end of whitebark pine's elevation range (800-1100 m) will be approached or even exceeded at the upper end of its current range (1500-1800 m) by 2085. Thus, if the mortality rates we are currently recording are driven to some extent by temperature, there is reason to expect similarly high rates of mortality in timberline elevation populations within 100 years.

6. Minor Comments on Information in the COSEWIC (2010) Assessment Report

- Page 10 of the report cites the elevation range of whitebark pine in north central BC as ca. 1000 m to ca. 1600 m. Our fieldwork indicates that a more precise range is 800 m to 1800 m, although the tree is sparse at these extreme elevations.
- Page 10. At the very northern limit of its range near Fort St. James, whitebark pine seems to be associated with unusual ultramafic (peridotite, dunite, serpentine) bedrock.
- Page 10. Zeglen (2002) observed that blister rust infestation rates increased from west to east. He found lower rates of infestation in the Coast Range than in the Rocky Mountains. Campbell and Antos' (2000) study observed some of their highest rates in our northwest BC study area. Our rates of infection more closely resemble those reported by Campbell and Antos than the lower rates reported by Zeglen in the west.
- Page 12. We note that although about 26% of whitebark pine range in British Columbia occurs in protected areas, federally protected areas (National Parks) are restricted to the eastern, Rocky Mtns portion of the range. In the western Coast Mountains portion of the range, protected areas are exclusively under provincial jurisdiction, where SARA designation and blue-list status provide no legal protection.
- Page 22. Our informal observations of Clark's nutcracker and red squirrel behaviour along with low rates of seedling recruitment reported on wildfires concur with the

statement that red squirrels and Clark's nutcrackers consume an increased proportion of the reduced seed production. We observe that virtually all cones are harvested or picked over by August, before the seeds are likely to be fully mature.

Conclusions

In summary, research in whitebark pine stands of west central BC indicates clearly that the mortality estimates provided by the COSEWIC status report are conservative for our study area. Our data indicate that whitebark pine has declined and/or continues to decline at rates that exceed 50% over 100 years. No control methods exist that can address the combined scope of the mountain pine beetle and white pine blister rust epidemics and no control efforts are underway. Yet, these stands at the northwest limit of the species' range are the very stands that ought to provide the seed source for migration as the species' climate envelope shifts northward under climate change (Hamann and Wang 2006; McLane 2011). We strongly recommend that SARA list *Pinus albicaulis* as Endangered under the Species at Risk Act.

The importance of listing whitebark pine goes well beyond the fate of a single species. Because of whitebark pine' keystone importance in subalpine forest ecosystems, the future health of a complex ecological network may be at stake. The relationships between whitebark pine and other trophic groups (grizzly bears, Clark's nutcrackers, small mammals, salmon, berries) are not well understood in British Columbia. Research is indicating that whitebark pine may provide a critical alternative food source to berry or salmon resources undergoing significant oscillations, perhaps due to climate change (Tony Hamilton, Large Carnivore Specialist, BC Ministry of Environment, personal communication; Figure 3). Listing *Pinus albicaulis* as endangered could provide the stimulus to improve management efforts for grizzly bear (SARA listed as Special Concern) particularly in Threatened Grizzly Bear Population Units (such as the South Chilcotin) that also support extensive stands of whitebark pine.

Figure 3. Bear scat composed of whitebark pine seedcoats from Mt. Sidney Williams, north of Fort St. James, BC. (S.C. McLane photo, 2007).

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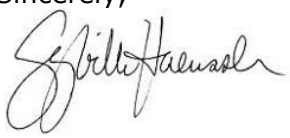
Please feel free to contact us if you have any questions about this research or about whitebark pine populations and ecosystems in west central BC.

Sincerely,



Sybille Haeussler PhD, RPF
Director, Bulkley Valley Research Centre
Ecosystem Science and Management Program
University of Northern BC, Smithers, BC haeussl@unbc.ca

Alana Clason MSc
Research Associate, Bulkley Valley Research Centre
and PhD student
University of Northern BC, Smithers, BC

Joanne Vinnedge MSc, RPBio
Ecosystem Biologist
Ministry of Natural Resource Operations
Fort St. James, BC

Attach: Office of Wet'suwet'en letter of support

Location Address:
3873 – 1st Avenue
Smithers, BC
V0J 2N1
Telephone: (250) 847-3630
Facsimile: (250) 847-5381

To: Sybille Haeussler

RE: Support Letter

The Wet'suwet'en have been supportive of Bulkley Valley Research Centre (BVRC) efforts of protecting the Whitebark Pine ecosystems. The Office of the Wet'suwet'en (OW) will continue to work collaboratively towards the protection for Whitebark Pine ecosystems within the Wet'suwet'en Territory and agree to the findings that are presented within this application for Whitebark Pine SARA Listing. The OW wants to continue working collaboratively with the Scientific community and governmental agencies, in ensuring that our valued ecosystems are there for the future generations to enjoy based on discussions by the Wet'suwet'en Hereditary Leaders.

Therefore the Office of the Wet'suwet'en support:

1. The amending SARA List of Species At Risk to include Whitebark Pine (*Pinus albicaulis*) to protect this keystone species of importance move ahead within Wet'suwet'en Traditional Territories.
2. To continue the support the efforts of Dr. Sybille Haeussler and her research team
3. Our long term goal of contributing to the combined efforts of protecting valued ecosystems within Wet'suwet'en Territory and assurance of our resource needs
4. To increasing Whitebark Pine densities to sustainable levels and to allow them to be harvested again on a food, social and ceremonial levels by Wet'suwet'en Nation.

This support approval comes from the Natural Resources department of the Office of the Wet'suwet'en , which acts in accordance with the needs of the Wet'suwet'en community on Land and Water related issues as related through the Wet'suwet'en Hereditary system.

The Natural Resources department recognizes the Bulkley Valley Research Centre as an organization which manages the current Whitebark Pine monitoring project. It has been successful and helpful in supporting monitoring of the Wet'suwet'en community's endeavors in protecting our territories. Protection of our valued resources is of the utmost importance in order for the Nation to continue thriving with our culture, and way of life.

Sincerely,

For:

David de Wit

Office of the Wet'suwet'en
Natural Resource Manager