

DIRECTOR'S MESSAGE - WHITEBARK PINE RESTORATION IN WILDERNESS



Diana F. Tomback

A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation...

-- U.S. Wilderness Act, Sec. 2c, 1964.

In the last issue of Nutcracker Notes, I discussed the significant contribution of the Wilderness Act, on the occasion of its 50th anniversary, to the American conservation movement. The Wilderness Act established the only system of reserves in the U.S. with the objective of maintaining a truly natural state. It still represents one of the most powerful and important pieces of environmental legislation in the United States, and a global model.

The Wilderness Act has benefited whitebark pine. Among the first wilderness areas established, three had extensive whitebark pine communities: the Bob Marshall Wilderness, Montana; the Bridger Wilderness, Wyoming; and the Ansel Adams Wilderness, California. In fact, in my previous message I pointed out that whitebark pine is a “wilderness species” with more than 2 million hectares (nearly 5 million acres) or nearly 40% of all whitebark pine habitat in the United States protected by wilderness designation.

But, I also pointed out some of the failings of the Act. Fifty years ago, the thoughtful and earnest authors of the Wilderness Act could not begin to imagine how humans could impact or “trammel” the most remote and pristine wilderness areas from afar, although evidence was growing. Their concern was to protect natural areas from the changes imposed by a growing human population, and to keep these areas in pristine condition for the enjoyment of future generations. The major activities they noted and prohibited included road-building, use of motorized vehicles or equipment, aircraft, and permanent installations or structures. These activities, or human “trammeling”, clearly alter the wilderness character and experience, and prohibition was vital for protection of these lands.

But, human activities outside wilderness now have serious, larger-scale, and burgeoning impacts within wilderness and are degrading wilderness character. In the case of whitebark pine, human activities outside wilderness have resulted in a precipitous decline of whitebark pine almost everywhere across its range, including inside wilderness. I argue that we should “untrammel” the indirect “trammeling” within our current capabilities.

Indirect trammeling with direct consequences

Whitebark pine is declining across its range from several hazards, all connected to human activities:

Fire exclusion policies that have altered natural fire regimes. The suppression of fires both inside and directly outside wilderness in general eliminates the natural mosaic pattern of different successional stages across the landscape. Whitebark pine prevalence has declined in some wilderness areas in response to successional replacement.

Invasive species and disease. Globalization has resulted in worldwide transport of plants, pests, and diseases that can profoundly alter community composition and structure. *Cronartium ribicola*, the pathogen that causes white pine blister rust was inadvertently transported to the U.S. West in the early 20th century. If all other threats to whitebark pine disappeared, white pine blister rust would still extirpate the species in many areas, and could even lead to its range-wide extinction.

Climate change. Rising levels of greenhouse gases are altering our global climate, with local impact. Major outbreaks of bark beetles, which include mountain pine beetles, during the last 15 years are attributed to rising temperatures, and especially higher

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winter minimum temperatures. Mountain pine beetles have killed cone-bearing whitebark pine across more than 190,000 hectares (470,000 acres) in the western U.S. since 1998. Whitebark pine range and elevational distribution are predicted to shift northwards and upwards as temperatures increase.

Whitebark pine restoration

These threats to whitebark pine do not stop at wilderness boundaries. They are destroying entire ecosystems in wilderness areas—something that the human activities specifically prohibited by the Wilderness Act could never do. These indirect threats are resulting in an existential crisis for whitebark pine across its range, with serious impacts on the species that evolved with it. We are, in real time, seeing a loss of important ecosystem services from whitebark pine that impact biodiversity, ecological function, indigenous cultural heritage, and even human well-being.

The experts acknowledge that the invasive pathogen *Cronartium ribicola*, the most serious threat to whitebark pine, is becoming “naturalized” in North America. After more than a century, the pathogen is well on its way across the range of all western five-needle white pines, and will likely spread south into Central America. We speculate that warming climates will accelerate its spread. Five-needle white pines, *Cronartium ribicola*, and its alternate hosts must be honestly acknowledged for what they now represent: a continent-wide pathosystem, with the potential for immense loss of biodiversity and unique products of biogeography and evolutionary history, including the iconic interaction between whitebark pine and Clark’s nutcracker.

Ironically, we have tools and techniques that could restore whitebark pine communities within several human generations. Planting seedlings that have resistance to blister rust would increase the frequency of these genes in regional populations. This comprises one of the most important restoration tools for whitebark pine. It is key to the survival of whitebark pine communities through the extreme genetic and population bottleneck that the species is now experiencing. Other tools are more intrusive and include prescribed burns to reset advancing succession or thinning to increase the vigor of cone-bearing trees. Allowing fires to burn into wilderness could help recreate successional mosaics on the landscape that can reduce the hazard of future mountain pine beetle outbreaks.

Most federal wilderness experts state that the conventional

interpretation of “trammeling” in wilderness prohibits the use of the restoration activities in our toolkit. We are told that planting seedlings, even those from seeds from trees in wilderness, constitutes unacceptable “trammeling.” The problem is that 40% of whitebark pine is in wilderness, and that means that 40% of the species is off-limits for restoration.

Let’s “untrammel”

It is time to revisit these interpretations. Let’s acknowledge that human activities were responsible for the current plight of whitebark pine. What we did and are doing constitutes trammeling at a massive scale, threatening the future of a widespread keystone and foundation species. In particular, the pristine world that the architects of the Wilderness Act wanted to preserve no longer exists for wilderness areas with whitebark pine.

On behalf of the Whitebark Pine Ecosystem Foundation, I am asking that the federal stewardship agencies administering whitebark pine in wilderness—the U.S. Forest Service and the National Park Service—reevaluate their interpretation and begin the process of planting blister rust-resistant whitebark pine seedlings in their wilderness areas, and consider other restoration activities to save the species.

The expression is trite, but the sentiment is honest: “We broke it. We must fix it.”

WPEF news

We are pleased to note the launch of a new addition to our website, the result of a partnership between the U.S. Forest Service Forest Health Protection (FHP) and the WPEF: “Restoring Whitebark Pine—One Project at a Time.” These web pages make available information on completed whitebark pine restoration projects, from 2007 to 2013 (2014 in progress), funded by the FHP Whitebark Pine Restoration Fund. This is an important resource for any federal agency or organization planning to do restoration projects for whitebark pine. Please note the accompanying article in this issue of Nutcracker Notes. This year, the annual WPEF Whitebark Pine Science and Management Workshop will be held in Ashland, OR, September 17 to 20. Information is posted on our website http://whitebarkfound.org/?page_id=18. Our workshop theme is “Genetics and restoration of whitebark pine on the Pacific Coast.” In addition to a great line-up of speakers, the organizers have planned three field trips: Crater Lake, a foxtail pine site, and Dorena Genetic Resource Center. This meeting promises to

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China mountains should be targeted for monitoring plots in the future.

4. Klamath/Shasta Trinity National Forest: Gooseneast Ranger District - the Cascade Mountains to the north and east of Mount Shasta plus Mount Shasta – The Cascades

This area was a major focus of the 2013 summer field work based on the relative shortage of previously collected data. Several permanent plots have been set up in the northern part of this area, including on Ball Mountain and Gooseneast, but other data for the southern Gooseneast RD was absent. In addition to being quite remote, often only accessible with 4wd, the southern Gooseneast is under heavy pressure by the logging industry. A checkerboard of private in-holdings mix with National Forest and logging was often either occurring or had recently occurred within whitebark pine habitat. Often, remnant whitebark pines were left with the completion of logging activities (which took hemlock, western white pine and lodgepole pine instead). There was also salvage logging of lodgepole pine that have been killed by mountain pine beetle in the Whaleback region.

On mountaintops and ridgelines, north-facing slopes were often decimated by mountain pine beetle. These stands were always a mix of lodgepole and whitebark pine with occasional Shasta fir and mountain hemlock. The common pattern is that low species diversity and smaller individual trees are invoked by mesic south-facing slopes with higher species diversity and most vigorous and larger trees inhabiting the mesic north-slopes. MPB are commonly infesting trees on north-slopes because they provide the most concentrated and exploitable resources. This pattern of mortality was found on the Whaleback, the unnamed ridge to the north of Antelope Creek Lakes (private property), as well as the ridgeline between Antelope Creek Lakes and Rainbow Mountain. These areas had mortality reaching and

often exceeding 50%. To a lesser degree the Haight Mountain region was exhibiting this pattern but mortality was lower on average. The Ash Creek Butte region appears to be generally unaffected by rust or mountain pine beetles at the time of this writing but this may be due to most of the trees here being smaller and only surviving on the south-facing slopes with north-facing slopes being steep and generally uninhabitable.

5. Mount Shasta: Shasta-Trinity National Forest - The Cascades

The whitebark pine on Mount Shasta explore the highest elevation habitat for the species in California outside of the Sierra Nevada. The populations on Mount Shasta compose the second largest in northern California at almost 12,000 nearly contiguous acres. At the lower elevational limits around 2135m (7,000'), whitebark pines associate with mountain hemlocks (*Tsuga mertensiana*), western white pines (*Pinus monticola*), and Shasta firs (*Abies magnifica var. shastensis*). But just upslope at 2,600m (8,500ft) other species become less common and pure stands of whitebark pine become the norm on ridgelines above swales created by streams and avalanches. A shift in vegetation type is occurring in the swales which are being pioneered by whitebark pine because growing season lengthening and snowpack is decreasing. Conversely, along ridges in the Brewer Creek region, once Krummholz specimens are sending leaders skyward through ecological release but many of these leaders are dying back, most likely because of xerification. I recommend monitoring the extent of the WBP across the elevational spectrum on Mount Shasta, from the region of overlap with montane conifers to the current upper elevational limits.

Learn more and see full reports:
<http://pacslope-conifers.com/conifers/pine/wbp>

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be a major event. We are also looking for donations of items for auction. Please see the accompanying announcement in this issue of Nutcracker Notes. I look forward to seeing you there!

Transitions

It is somewhat shocking when long-term whitebark pine folks retire. Our good wishes go to Art Zack, Forest Silviculturist

with the Idaho Panhandle National Forest, who is retiring as I write this message. Art has been a major supporter of the WPEF from its inception, attending many of our meetings, and has advocated for attention to whitebark pine. He has included whitebark pine in his work whenever he has the opportunity, and implemented restoration projects. After Art has had his fill of fun and leisure, we are hoping to recruit him to help with some of our projects!