



## Director's Message

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### The Wilderness Act and Whitebark Pine

#### The importance of wilderness and the Wilderness Act to whitebark pine conservation

Last year, 2014, represented the 50<sup>th</sup> anniversary of the U.S. Wilderness Act, which created the National Wilderness Preservation System. The WPEF recognizes this landmark anniversary and the importance of the Wilderness Act to the protection of whitebark pine ecosystems. More than 2 million hectares (nearly 5 million acres) or nearly 40% of all whitebark pine habitat in the United States is protected by wilderness designation. Wilderness areas are often remote and pristine lands, and these descriptors also apply to most whitebark pine habitat. Given the high proportion of whitebark pine's range under wilderness protection, whitebark pine is truly a 'wilderness species'.

The Wilderness Act of 1964, approved by Congress during the Lyndon B. Johnson administration, was one of the most important laws enacted to protect and preserve our national wildlands, and arguably one of the most important from the perspective of conservation. Although the Forest Reserve Act of 1891 laid the groundwork for establishment of the U.S. Forest Service and management of a national system of forest and grassland reserves, and the creation of the National Park Service in 1916 provided the oversight for a growing portfolio of national parks and monuments, both these agencies were mandated to balance preservation with other societal values, including recreation, tourism, or economic development. The Wilderness Act established the only system of reserves with the objective of maintaining a truly natural state: "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..." Given their "untrammelled" nature, wilderness areas protect charismatic mammals that do not flourish in proximity to humans, such as wolverine, grizzly bears, Canada lynx, and wolves. Wilderness areas protect a vast array of habitat types and their diverse plant and animal communities, allowing unimpeded ecosystem processes. Among tree species, however, few are as strongly associated with wilderness areas as whitebark pine.

Upon approval of the Wilderness Act in 1964, nearly 3.7 million hectares (9.1 million acres) of wildlands in 13 states were immediately protected. These newly-designated wilderness areas included three important regions for white-

bark pine: the Bob Marshall Wilderness in Montana; the Bridger Wilderness in the Wind River Range, Wyoming; and the Ansel Adams Wilderness in the Sierra Nevada, California. The wilderness reserve system today includes more than 44 million hectares (110 million acres) in 44 states, and comprises lands managed by the National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service, and Bureau of Land Management.

The Wilderness Act was written with immense care and dedication by Howard Zahniser, a former federal employee and Washington, D.C.-based executive secretary of the fledgling Wilderness Society, working alongside founder Robert Marshall. Zahniser wrote 66 drafts of the Wilderness Act over nearly two decades and championed the legislation through 18 congressional hearings. He worked closely with notable conservationists and Wilderness Society leaders, including Aldo Leopold, Sigurd Olson, Olaus Murie, and Wallace Stegner, whose ideas and writings helped shape the legislation.

#### Trammeling that the Wilderness Act cannot prevent

Considering the immense thought and care that these towering figures of the American conservation movement invested in the legislation that created the National Wilderness Preservation System, it is disconcerting to realize that the protection offered by the Wilderness Act has been and will be inadequate to prevent "trammeling" by man as we progress into the 21<sup>st</sup> century; and, the problems are just beginning. Whitebark pine has literally been the "canary in the coal mine" as the victim of all of the following:

*Fire suppression and altered fire regimes.* Fire suppression in general eliminates the natural mosaic pattern of varying successional stages across the landscape. Fire suppression outside designated wilderness prevents fires from burning up into wilderness. Fire suppression within wilderness still occurs depending on current conditions, although there are concerted efforts to use wildland fire and prescribed fire to restore landscape heterogeneity within wilderness. Whitebark pine prevalence has declined in some wilderness areas in response to successional replacement from altered fire return intervals.

*Invasive species and disease.* Globalization has resulted in burgeoning worldwide transport of plants, pests, and diseases that can profoundly alter community composition and structure. We have not been able to control their entry into North America and subsequent spread. Aldo Leopold recognized this problem as he described the major changes to a range dominated by non-native cheat grass in his perceptive essay "Cheat takes over" in *A Sand County Almanac*. The pathogens that cause white pine blister rust and chestnut blight were inadvertently brought to the U.S. in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, at the beginning of rapid expansion of international trade and travel. Chestnut blight has virtually eliminated a major forest dominant, the American chestnut, and altered the structure and composition of eastern deciduous forests forever. White pine blister rust has destroyed two major logging economies, based on sugar pine and western white pine, respectively, as the disease spread rapidly in these species. In the Rocky Mountains and the Northwest, which include numerous wilderness areas, whitebark pine is experiencing increasing infection levels and mortality from white pine blister rust, as well as

reduced cone production and little natural regeneration.

*Climate change, native pest outbreaks, and shifts in distribution.* Temperature records since the 1880s have documented an average increase in worldwide temperature of about 0.8°C, with further temperature increases predicted as CO<sub>2</sub> levels continue to rise. Rising temperatures have been greatest at the higher latitudes in the northern hemisphere. Major outbreaks of bark beetles during the last 15 years, which include mountain pine beetles, are attributed to rising temperatures, and especially higher winter minimum temperatures. Mountain pine beetles have killed mature whitebark pine across more than 190,000 hectares (470,000 acres) in the western U.S. since 1998, including wilderness areas in the Greater Yellowstone and elsewhere. Lodgepole pine and other conifers have also experienced high mortality. As temperatures continue to rise, plant species will shift their range, change their phenology, and form new associations. Whitebark pine range and elevational distribution are predicted to shift northwards and upwards.

### Do we intervene?

Whitebark pine declined rapidly during the second half of the 20<sup>th</sup> century and continues on this trajectory. Since 2011, whitebark pine has been a candidate for listing under the U.S. Fish and Wildlife Service Endangered Species Act. It is remarkable that such a widely distributed, formally locally abundant species, could achieve so precarious a status so rapidly, especially with 40% of its range within wilderness.

The Wilderness Act protects very well against traditional human activities, such as development, habitat alteration, the use of motorized vehicles and equipment, and small-scale disturbance. But, Howard Zahniser and his distinguished colleagues could not foresee the global challenges that we face today. Some forms of trampling cannot be controlled by designating wilderness boundaries. This raises a timely question: Should we begin to discuss ecosystem restoration in wilderness areas, or do we allow whitebark pine to go the way of the American chestnut?

### Milestones and reminders

Dr. Steve Arno has been editor of *Nutcracker Notes* since 2001. Over the last year or two, he hinted that the time had come for us to find a new editor, but we called his bluff and stalled as long as we could. We finally had an ultimatum from Steve, and agreed to find another editor. This is the first issue without Steve at the helm, and we thank JoAnn Grant and Bob Keane for stepping in to help. The Board of Directors has made Steve an Honorary Member of the WPEF, and we look forward to his attendance at our annual Whitebark Pine Science and Management Workshops. On behalf of the Board of Directors, I would like to offer our sincere thanks to Steve Arno for making *Nutcracker Notes* an important feature of the WPEF, and a recognized publication for dissemination of the latest news about whitebark pine.

The Board of Directors of the WPEF has arrived at an historic conclusion: We cannot accomplish all our goals with just a volunteer board. We are seeking to hire a part-time staff member. Please see the ad here in *Nutcracker Notes* and feel free to recommend potential applicants for the position.

Finally, please donate to the **Whitebark Pine Forever 2015** restoration campaign. It really is a matter of life or death for whitebark pine. ■

## Whitebark Pine Single-Species Mapping on the Flathead National Forest

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**Steve Brown, Region 1 Forest Service Remote Sensing Coordinator**

Adapted from: Housman, I.; Brown, S.; Hamilton, R.; Fisk, H. 2014. Whitebark pine single-species mapping. RSAC-10034-RPT1. Salt Lake City, UT: U.S. Department of Agriculture, Forest Service, Remote Sensing Applications Center. 14 p.

### Introduction

Currently, Whitebark pine (*Pinus albicaulis*) (WBP) is a relatively rare, but ecologically important species on the Flathead National Forest. As a result, WBP is largely absent from current mid-level vegetation maps, making consistent Forest-wide WBP management difficult. This study was initiated by Steve Brown, and funded as a 2013 USFS Remote Sensing Steering Committee (RSSC) project. It was completed in cooperation between Forest Service Region 1, the Flathead National Forest (FNF), and the Forest Service Remote Sensing Applications Center (RSAC). The goal of this study was to develop a consistent methodology for the mapping of current potential range, restoration suitability, and occurrence of WBP in areas where WBP abundance is too low for it to be a dominant species within the stand. These methods would then be applied to the rest of Region 1 in an attempt to help quantify the current extent of WBP within the Region.

### METHODS

#### Current Potential Range

The goal of the current potential range map is to provide land managers with an idea of where WBP could potentially grow given the current climate. Currently, WBP is absent from most of its range in the FNF, largely due to vegetation succession from fire suppression, mortality from white pine blister rust (*Cronartium ribicola*), and mountain pine beetle (*Dendroctonus ponderosae*) infestation (Keane and Arno 1993). To gain a better sense of where WBP could potentially be found, numerous meetings were held with various WBP experts, resulting in a more detailed understanding of attributes impacting where WBP can grow. To address the need for calibration data for the current potential range model, field collected data from 2012 was combined with expert image-interpretation-based locations. Independent predictor variables utilized by the model included the mean April 1, May 1, and June 1 snow depth, median minimum and maximum temperature, median precipitation, and various terrain metrics such as elevation, slope, and aspect. These calibration data were combined with independent predictor data in a Random Forests statistical model (Brieman 2001) to predict the potential range of WBP on the Flathead.