Whitebark Pine Workshop

Science, Management, and Community

Workshop Summary 2 | May 2015

Whitebark pine is a culturally and ecologically important species to the peoples of the Confederated Salish and Kootenai Tribes (CSKT), located on Montana's Flathead Indian Reservation. Past management practices, pathogen and insect infestations, and climate change have all contributed to a dramatic decline in the abundance of this important species throughout its range. Understanding the threats and how best to manage this vulnerable yet highly valuable species was the impetus for a workshop developed and hosted by the Salish Kootenai College's Department of Forestry and the Confederated Salish and Kootenai Tribe's Climate Change Oversight Committee.

The workshop included presentations and discussions about the current status of whitebark pine (*Pinus albicaulis*) on the Flathead Indian Reservation and neighboring lands. Future management options were also discussed. Workshop presenters included tribal members, tribal elders, tribal resource managers, university researchers, and government scientists -

- James Durglo, CSKT Forestry
- Mike Durglo Sr., CSKT Tribal Preservation
- Mike Durglo Jr., CSKT Climate Change Planning
- Tony Harwood, CSKT Fire Planner
- Dennis Lichtenberg, CSKT Natural Resources
- Kari Eneas, CSKT Wildlife Biologist
- Dave McWethy, Assistant Research Professor, Montana State University (MSU)
- Cathy Whitlock, Earth Sciences Professor, MSU
- Greg Pederson, Research Scientist, US Geological Survey
- Valerie Walker, Genetics Resources Forester, Lolo National Forest

Whitebark Pine Importance

Whitebark pine (WBP) is a keystone species that is critical to the structure, function, and ecological processes of the high-elevation forests in which it occurs. Whitebark pine is an initial post-disturbance colonizer of harsh high-elevation sites in western North America where soils are poor and growing seasons are short. Following whitebark pine's establishment on recently disturbed sites, soil development improves, other tree species become established, and snow packs are retained longer. This process eventually increases the duration of runoff to lower elevation streams and vegetation.

Once mature, whitebark pine trees produce large, protein-rich seeds, which are a critical food source for over 120 animal species. These seeds are also an important cultural food for the Salish and Kootenai tribes, who during seasonal travels through whitebark pine stands or by trade with other tribes, sought these high fat, protein-rich seeds to enrich their diets.

Whitebark Pine Decline

Whitebark pine is experiencing an alarming decline throughout its range due to the combined effects of white pine blister rust (*Cronartium ribicola*), mountain pine beetle (*Dendroctonus ponderosae*), climate change, and the effects of altered fire regimes from decades of fire suppression. Whitebark pine is highly vulnerable to infection from white pine blister rust (WPBR) and highly susceptible to subsequent mountain pine beetle attacks (MPB). Damages from MPB and WPBR have been exacerbated by climate change. For example, the historic range of MPB has expanded as temperature and precipitation patterns have changed with a warming climate. In western Montana, winter and spring warming and a loss of extremely cold days have coincided with the extension of the MPB range to higher elevations. These climatic changes may also increase the level of competition whitebark pine faces, by allowing more and/or new tree species to colonize whitebark pine habitats that were once inhospitable because of extremely cold temperatures.

Reduced fire frequency in timberline forests has also contributed to the decline of whitebark pine. Historically whitebark pine habitats in the Northern Rockies burned in either low-intensity surface fires, mixed-severity fires, or in infrequent stand-replacing fires. The stand-replacing fires created forest openings favorable to whitebark pine seedling establishment, and the surface fires thinned competition from other more shade-tolerant trees. The historic fire-return interval for this mixed fire regime ranges from 30 to 500 years.

Whitebark Pine Management

Management of whitebark pine given its many interacting threats is challenging. However, scientists and managers believe restoration at a landscape scale is necessary to protect whitebark pine and its important ecological functions.

Management for restoration would include treatments to -

- promote regeneration
- improve growth rates
- decrease mortality
- encourage resiliency, especially in high-elevation stands

Considerable effort and investments have been made in whitebark pine restoration. This involves identifying cone-bearing trees exhibiting resistance to blister rust (plus trees), harvesting seed from these rust-resistant individuals, growing these trees for out-planting and future seed collection, and targeting increases in rust-resistant tree populations.

Plus whitebark pine trees exhibit resistance to white pine blister rust in the field with few to no blister rust cankers. These trees are candidates for further genetics screenings.

Elite whitebark pine trees are verified as superior through appropriate genetics testing. Plus and elite trees are selected for targeted seed collection for later use in restoration.

Because fire exclusion has influenced the decline of whitebark pine, reintroduction of fire at historic fire frequencies will likely to play a role in restoration of the species. However, fire as a restoration treatment requires careful planning and thought given that whitebark pine seed production is extremely low in some stands and fire damage could encourage MPB activity.

Management & Community

Management and restoration of whitebark pine is necessarily complex and will require informed planning, long-term monitoring, and periodic adjustments. The complexity of management suggests that cooperation and shared learning should improve restoration success.

In the CSKT's Climate Change Strategic Plan, development and implementation of a whitebark pine habitat management plan involves -

- Coordination and collaboration among local neighboring land management agencies, academic and research institutions, and regional coordination groups to develop and/or modify whitebark pine restoration strategies
- Identification, mapping, and protection of rust-resistant whitebark pine trees and suitable forest habitats
- Exploring and employing projects such as prescribed fire, wildland fire use plans, and well-engineered tree harvests to maintain early- mid-, and late-seral habitats
- Inclusion of tribal members and cultural committees in both ongoing and future planning for forest health
- Development of a high-elevation, citizen-scientist monitoring scheme

Additional Reading & Information

Confederated Salish and Kootenai Tribes. 2000. Flathead Indian Reservation Forest Management Plan: an ecosystem approach to Tribal forest management. 308 p.

Pederson, G.T.; Graumlich, L.J.; Fagre, Daniel B.; Kipfer, T.; Muhlfeld, C.C. 2010. A century of climate and ecosystem change in Western Montana: what do temperature trends portend? Climate Change. 98: 133-154 p.

Workshop cadre – James Durglo, Forestry Department Head, Mike Durglo Sr., Tribal Preservation, Mike Durglo Jr., Climate Change Planning Coordinator, Dennis Lichtenberg, Natural Resources Department, Tony Harwood, Fire Planner, Kari Smith, Wildlife Management Program, Confederated Salish and Kootenai Tribes; Rick Everett, Professor, Salish Kootenai College; Dave McWethy, Assistant Research Professor, Cathy Whitlock, Professor of Earth Sciences, Montana State University; Cara Nelson, Associate Professor of Restoration Ecology, University of Montana; Gregory T. Pederson, Research Scientist, US Geological Survey, Valerie Walker, Genetics Resources Forester, Lolo National Forest.

Summary author - Corey L. Gucker, Northern Rockies Fire Science Network Coordinator, NRFireScience.org

The Northern Rockies Fire Science Network (NRFSN) serves as a go-to resource for managers and scientists involved in fire and fuels management in the Northern Rockies. The NRFSN facilitates knowledge exchange by bringing people together to strengthen collaborations, synthesize science, and enhance science application around critical management issues.

Bringing people together, sharing knowledge
NRFireScience.org