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White Pine Blister Rust in the Central Rocky Mountains: Time to consider the impacts

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White pine blister rust (WPBR) has long been an important element of North American forest management. Limber and whitebark pine infestations in Wyoming continue to intensify and spread, recently moving into northern Colorado. However, little consideration has been given to its ultimate potential ecological and resource impacts in the central Rocky Mountains and Intermountain West. Addressing these issues requires close and early cooperation between research and field staffs from several disciplines.

Currently, white pine blister rust infestations surround an uninfested core area of the Central Rocky Mountains on all sides, and continue to spread and intensify. The isolated infestation in southwestern white pine in New Mexico's Sacramento Mountains has spread north to new sites, and there is little reason to think its northward movement would continue. Colorado imports of WPBR-infected pine horticultural nursery stock could create new infestation centers in mountain towns. Cases of infested pine nursery stock shipped into Colorado have been confirmed. There is concern that new WPBR genotypes may eventually spread into the area through Midwest and Great Plains urban and shelterbelt plantings of host pines.

Historically, WPBR has impacted what were once some of the most valuable timber species in North America: eastern and western white pine and sugar pine. The susceptible pines of the Central Rocky Mountains, limber and bristlecone, (and whitebark on the northern edge of the region), have little value as a timber species. However, because of other characteristics of these species, widespread mortality can be expected to have significant resource impacts. Concerns stem from these trees:

- As wildlife food sources and habitat;

- Role in high elevation watershed snow pack dynamics;

- Contribution to scenic and recreational resources in heavily visited sites;

- Potential as a genetic resources;

- Role in other ecological processes, especially in harsh sites where limber and bristlecone pine are among the few well adapted conifers.

Past and future human and non-human disturbances to these forest stands as well as to the associated resources may amplify WPBR effects on hosts trees, effected ecosystems, and impacted resources.

WPBR in the central Rockies:

A host of questions:

The introduction of WPBR into relatively unstudied habitats poses some basic questions needing answers before the magnitude of potential ecological and resource impacts can be projected.

Where are the susceptible pines? Their location outside of timber management areas, in remote areas, and as minor stand components creates a difficulty in answering this basic question.

Which of these white pine habitats will be well suited to WPBR establishment? Given the lack of establishment of WPBR in bristlecone pine elsewhere in the West, some dry sites may not experience significant WPBR establishment.

How will the distribution and types of local ribes species effect the spread of WPBR?

Central Rocky Mountains white pine ecology: The information gap.

Limber and bristlecone pines , along with whitebark pine in northwestern Wyoming, are the central Rockies pines susceptible to WPBR. These species generally exist as minor components in mixed species stands, or in harsh, dry sites ranging from grasslands to timberline. In contrast to the highly commercially-valued, once common, eastern and western white pine and sugar pine, they are relatively scarce, slow growing, and located in less accessible areas outside of timber production zones. The historic lack of a need to understand these species for timber management purposes limited their study until fairly recently. Thus, ecological information about these species and the sites they occupy is still meager. Intensive study of whitebark pine, prompted partially by the impact of WPBR-caused mortality on this important grizzly bear food source, has provided an improved basis for its restoration and management. Efforts to better understand limber pine ecology will be vital in determining the future of limber pine-WPBR interactions and the resource impacts which may result.

We have formed an informal working group of pathologists, ecologists, foresters, and others from Colorado and Wyoming to share information and coordinate studies regarding limber pine and WPBR in the region.

New and ongoing related participants' activities:

Remeasurement of WPBR permanent (PTIPS) plots in Wyoming and South Dakota.

A review of Colorado and Wyoming stand and plot data sources for limber pine.

Discussions with regulatory officials concerning options for controlling interstate importation of potentially infested nursery stock.

Continuing support and testing of a WPBR impact simulation model linked to the Forest Service's Forest Vegetation Simulator (FVS).

Limber pine physiology and ecological studies at sites in National Forests, Rocky Mountain National Park, Niwot Ridge and Shortgrass Steppe LTERs, and elsewhere.

Coordination and information sharing sessions between participating pathologists, foresters, tree physiologists, ecologists, and others.

Proposed and potential working group activities:

Joint proposals for USDA and NSF competitive grants.

Analysis for a landscape level hazard rating model.

Organization of a cross disciplinary conference.

Assessment of remote sensing options for finding and inventorying white pine populations.

Expanded cross-disciplinary coordination with peers from outside the region.

Individuals from several agencies and disciplines have cooperated to study whitebark pine and to address the impact of WPBR in northern Rocky Mountain ecosystems. Products include the online publication *Nutcracker Notes* and the proceedings of a conference being published fall 2000 as *Whitebark Pine Communities*. These efforts serve as a model for how pathologists, ecologists, and others might collaborate to better address white pine - WPBR impacts elsewhere.

Recent survey findings for limber pine from the Northern Rocky Mountains and for multiple species in the Intermountain West indicate high levels of infection may be possible through much of the currently uninfested range of white pines.

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