

Whitebark Pine (*Pinus albicaulis*) Growth Release Potential Following Overstory Disturbance

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Much of the information available on successional modeling for whitebark pine (*Pinus albicaulis*) communities is based on research conducted in an ecosystem influenced by maritime conditions (Pacific Northwest). The Greater Yellowstone ecosystem (GYE; Wyoming, Montana, and Idaho, USA) is subjected to more continental climatic conditions and as a result, the dynamics of whitebark pine populations in the GYE may in fact be very different from those of maritime populations. Recent survey work in the GYE shows establishment is common with variable recruitment of young trees in the understory of mature forests. Density and age distribution of these individuals vary greatly among stands across the ecosystem. By determining historical seedling and sapling growth rates and their relation to successional disturbances such as fire, bark beetles (*Dendroctonus* spp.), and disease, we will be better equipped to guide restoration efforts throughout the GYE and to ensure that management decisions are based on scientific information collected from the ecosystem in which restoration efforts are actually occurring.

Evidence for the occurrence of a growth release phenomenon in trees has been documented for several shade-tolerant and partially intolerant species following the creation of gaps in the forest canopy due to a variety of ecological impacts. By using ring width patterns taken from whitebark pine individuals, this project examines evidence for growth suppression and a hypothetical growth release event in whitebark pine understory individuals located in stands where canopy composition changed due to the mountain pine beetle (*D. ponderosae*) outbreak of the late 1970s to early 1980s in the Gallatin Range of the Gallatin National Forest (Montana). In some areas, natural regeneration of whitebark pine is clearly the optimal form of whitebark pine restoration following widespread mortality. To fully evaluate a stand for mechanical restoration, it will be important to gain an understanding of historical patterns in growth following major canopy disturbance as well as the current demographic structure of understory populations and the relationship between seedling/sapling age and recruitment potential into the canopy.

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