

Citation: Schoettle, A.W., Burns, K. S., Costello, S., Witcosky, J., Howell, B., Connor, J. 2008. A race against beetles: Conservation of limber pine. Nutcracker Notes 14:11-12.

A Race Against Beetles: Conservation of Limber Pine

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The Rocky Mountain Research Station, Forest Health Management, Rocky Mountain National Park, Arapaho-Roosevelt National Forest, and the Medicine Bow NF are coordinating efforts to conserve limber pine along the Front Range of the southern Rockies. Mountain pine beetle (MPB) populations are increasing dramatically in the area and killing limber pines in their path. Last year alone, aerial survey recorded 38,000 acres of limber pine mortality in northern Colorado and southern Wyoming, a large increase over the 9,000 acres recorded in 2006. It is estimated that MPBs will infest nearly all the limber pine stands in this area within the next few years.

White pine blister rust (WPBR) also continues to spread and intensify in this area; incidence in some stands is as high as 100 % while other stands have yet to be invaded (Kearns and Jacobi 2007). An on-going rust resistance screening study suggests that both rust-invaded and pristine stands in this area contain limber pines with resistance (Schoettle, Sniezko and Burns et al., in progress). Other non-tested trees within the populations may also have resistance and/or serve as pollen receptors for those trees with resistance. Our goal is to protect numerous trees in each population from MPB as they are needed for research and restoration aimed at mitigating impacts from WPBR into the future (Burns et al 2008; Schoettle and Sniezko 2007).

In a race against the beetles, efforts are currently underway to (1) protect mature limber pine trees in a range of geographic locations for *in situ* conservation of seed sources to support future natural regeneration and restoration projects and (2) collect seed for *ex situ* conservation of the genetic diversity of populations for future use. Two treatment options for controlling MPB are being used: insecticide application and synthetically produced verbenone pouches. Ground application of the insecticide carbaryl prior to beetle flight (before July 1) will be used wherever possible. In areas where spraying is not feasible or advisable, verbenone, the known anti-aggregation pheromone of MPB, will be used to protect limber pines. Access prior to beetle flight is difficult due to late lying snow for some sites; in such cases the trees will be treated with verbenone and later sprayed with insecticide when access becomes available.

The limber pine in Colorado and southern Wyoming are encompassed in one seed zone, though maximum elevation transfer of seed within the zone is recommended to be +/- 700 ft (~200m) (Mahalovich 2006). Cones will be collected from individual trees and in bulk population collections from each site treated for MPB control. Additional sites will be sampled where necessary to ensure acquisition of genotypes from the diversity of habitats and elevations occupied by limber pine.

The first test of the efficacy of verbenone to control MPB on limber pine under epidemic beetle populations will also begin this summer in northern Colorado. Verbenone has been used to protect whitebark pines from MPB attacks with moderate success in the USFS Northern Region (Kegley and Gibson 2004) but has not previously been tested on limber pine. The test with limber pine will be conducted in an area with high beetle pressure where non-treated and verbenone-treated trees will be monitored for beetle attack. Although it is not expected to be as reliable and effective as insecticides, verbenone may provide protection for limber pine in circumstances where the use of insecticides is not an option.

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Depending on budgets, the trees will be treated yearly until the threat of MPB impacts decreases, or at least until adequate seed has been collected for *ex situ* conservation. All of the partners are contributing resources toward this effort in addition to some funding provided by the new USFS Forest Health Protection *Genetic Conservation of US Forest Trees Threatened by Invasive Insects and Pathogens* effort.

References

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