

Natural and anthropogenic threats to white pines from lower montane forests to subalpine woodlands of the Lake Tahoe Basin: An ecological and genetic assessment for conservation, monitoring, and management

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Annual Accomplishments Update (October 1, 2008-September 30, 2009)[†]:

We have established 84 long-term ecological monitoring plots for sugar pine, western white pine, and whitebark pine across the three elevation zones in the Lake Tahoe Basin Management Unit (LTBMU). In cooperation with the regional ecologist, Hugh Safford, we will incorporate the plot network into the LTBMU forest monitoring studies, with future monitoring being funded by the United States Department of Agriculture (USDA), Forest Service (FS) National Forest System. Cone collections of white pine species in the LTBMU will be complete by October 15th when we uncage and collect the cones from whitebark pine. All seed are stored at the USDA FS Placerville Nursery and most will be in the regional seed-bank. We collected cones/seed from 155 sugar pines, 195 western white pines, and 121 whitebark pines, for a total of 471 white pine collections. The first 61 LTBMU whitebark families collected in 2006 and sown in 2007 have been inoculated with the causal agent of white pine blister rust, *Cronartium ribicola*, at the Institute of Forest Genetics. These inoculations started on September 28th and the first resistance evaluations of whitebark pine will occur in November 2009 and continue into 2010. The remaining 60 whitebark families, that will be collected this month, will be sown this spring. Approximately 80% of the sugar and western white pine families are growing at the Placerville Nursery and all the sugar pine growing have been inoculated. Screening for MGR (major gene for resistance to white pine blister rust) will occur this winter, 2010. The western white pines will grow for one more year and inoculated in Fall 2010. In addition to all the ecological data we have collected for these 3 tree species, we also have revisited all sugar and western white pine plots to conduct cone counts, so that fecundity rates can be estimated and incorporated into demographic models.

We have been funded for research on adaptive genetic variation for western white pine and sugar pine (agreement still pending), which entails advanced genomic technologies with SNP genotyping and common greenhouse studies evaluating other adaptive traits (e.g., phenology, water-use efficiency, growth, etc.).

[†] This document is an intermediate progress report, not a final report; consequently, any results should be considered preliminary and should not be cited. Please contact the principal investigators or the Tahoe SNPLMA Science Program Coordinator if you have questions.