United States Department of Agriculture

Forest Service

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File Code: 3420 **Date:** July 21, 2004
Route To:

Subject: Evaluation of Lakehead Community Wildfire Protection Plan (FHP Rept. No. N04-06)

To: District Ranger, Shasta Lake NRA

Fuels Officer Teresa Neikirk asked for some input to the Lakehead Community Wildfire Protection Plan. She had noticed recent pine mortality and was concerned it might be spreading in the project area. We examined parts of the project area on June 28, 2004.

Ponderosa pine has been dying in Lakehead for the past several years. The mortality has built in place and isn't spreading. It is a response to dense stocking of trees during periods of lower than normal precipitation. The dying trees contain two native bark beetles, western pine beetle and red turpentine beetle. The mortality will decrease as precipitation returns to normal. Because stocking levels tend to increase over time as trees grow, additional mortality should be expected in the future if the stands aren't thinned periodically.

An area of particular concern was a knobcone pine stand north of Lakehead. One of the access roads to Sugarloaf Lookout runs through the stand. The stand has experienced groups of knobcone pine mortality over the past couple of years. Increment cores indicated the stand was approximately 45 years old. Knobcone pine is generally a short lived species, with most stands lasting only 60 to 80 years. The red turpentine beetle and *Ips mexicanus* are usually involved in knobcone pine mortality.

Knobcone pine is well adapted to regenerate after fire. The cones hang on the trees for decades and open only when heated. We used an increment borer to check the bark thickness near the ground line on some of the largest knobcone pines we could find in the area. The bark was only about an inch thick, and these trees would probably be killed by many ground fires. It might be possible to improve their chance of surviving a fire if the duff and other fuel were raked away from the base of the trees in advance. In addition, the lower branches of many large trees hung down near the ground. It would be very difficult to burn under these trees without carrying fire up into the crowns unless the lower limbs were pruned.

The spacing of the largest knobcone pines in the area was about 40 to 50 feet. This seems to be a reasonable spacing if the purpose is to extend the life of these trees. By investing a fairly large amount of hand labor, it should be possible to maintain the knobcone pine for another 15 to 35 years. There are some ponderosa pine, Douglas-fir, incense-cedar, oaks and large shrubs such as redbud on the site. Because these other species tend to be longer-lived than knobcone

pine on this site, there would be an advantage to leaving one of these if it is well-formed and spaced appropriately.

If any fresh, green pine slash is left on the site, it may become breeding material for several different species of *Ips* beetles. If a large number of *Ips* beetles build up in slash, they may cause significant local mortality when they emerge. Depending on exactly which species of *Ips* are involved, they may be capable of killing knobcone pine, ponderosa pine and sugar pine in the area. At the elevations of the project, it may take as long as 10 weeks for a generation to be produced during December, January and February, or as little as 7 weeks during the warmer parts of the year. Methods that have been successfully used to treat pine slash to prevent further pine mortality include: removal of the slash from the site, chipping the slash before any beetles emerge, and burning the slash before the beetles emerge. Because there is a large accumulation of slash on the site, it may require a lot of time and effort to burn the slash without killing many of the leave trees.

It will be challenging to maintain a low fuel load in a knobcone pine stand in an area where the Visual Quality Objective is important. Because knobcone pine bears cones early and the seed remains viable in the cones for decades, any area that is cleared and/or burned is likely to regenerate to knobcone pine. In addition, many of the hardwoods on the site will sprout if cut or burned. One of the few methods that will satisfy most of the constraints is hand cutting. Slash disposal is likely to be a problem. If slash is piled and it sits in place very long, it is likely to cause more mortality. If any of the slash burns in a hot fire, that is also likely to be counter-productive.

Dave Schultz
Entomologist
cc: Teresa Neikirk
Carl Skinner