United States Department of Agriculture

Forest Service

Northern California Shared Service Area

3644 Avtech Parkway
Redding, CA 96002
530-226-2436

File Code: 3420 **Date:** November 21, 2003
Route To:
Subject: Evaluation of black stain root disease at Ti-Bone Units 14 and 16 (FHP Report No. N04-01)
To: Bill Heitler, District Ranger, Orleans Ranger District

On October 28, 2003, Pete Angwin (Plant Pathologist) and Dave Schultz (Entomologist) met with Gend Graber and Kirk Terrill to examine insect and disease conditions at the proposed Ti-Bone thinning area in the Ten Bear LSR. Thinning is needed in this area in order to reduce tree stress and susceptibility to bark beetles, and to speed the development of late seral stand characteristics that will benefit the northern spotted owl and other late seral dependent wildlife species.

Thinning Units 14 and 16 were visited. Both units contained mostly 35-40-year-old Douglas-fir, with smaller numbers of ponderosa pine. Small groups of dead and dying Douglas-fir were scattered in the units, and were particularly noticeable where old skid trails were present from previous stand entries. Pitch was often found on the boles of the dying Douglas-fir. Cutting into the wood of the bole and roots of these trees revealed the dark black streaks that are characteristic of black stain root disease. Black stain root disease is caused by the fungus, *Leptographium wageneri*, which colonizes the water-conducting tissues of the roots, root collar and lower stem of its host, causing it to wilt and die. The disease is transmitted from infected to uninfected trees via roots that are in contact or are in very close proximity, or by root-feeding bark beetles and weevils that carry the spores of *L. wageneri*. High stocking levels of Douglas-fir, together with three consecutive dry winters from 2000 through 2002, have created ideal conditions for the spread and intensification of black stain root disease by stressing the trees and increasing insect vector abundance and activity. These conditions can also lead to other insect and disease problems, some of which were already evident in the units. While examining the dead and dying Douglas-fir for black stain root disease, some were found that did not have the black streaking characteristic of black stain root disease. Almost all of these were adjacent to large decaying Douglas-fir stumps with fire scars and extensive cubical brown rot, indicating the presence of schweinitzii butt rot, caused by the fungus *Phaeolus schweinitzii*. Although *P. schweinitzii* is not normally regarded as a particularly aggressive decay fungus, it can move from infected stumps and colonize and kill Douglas-fir that is under stress.

While it is not possible to completely eliminate the disease and insect problems in the units, several measures may be taken to minimize future impacts:

1. Thin the units. In general, thinning stands when they are growing well increases their growth rate and vigor, making them more resistant to attack by bark beetles, black stain root disease, schweinitzii butt rot and other insect and diseases. Within the black stain centers, thinning can reduce the rate of spread of *L. wageneri* by reducing number of root contacts through which it can spread. However, thinning in areas with black stain root disease can attract disease vectors and exacerbate the black stain root disease situation, because odors from freshly cut stump surfaces can attract insect vectors. This can be reduced by scheduling

thinning to take place when the insect vectors are least active. Vectors of black stain root disease of Douglas-fir usually emerge in the spring or early summer. In order to ensure that operations do not coincide with beetle flight and allow enough time for the slash to dry out, thinning should be scheduled to take place between the end of June and the beginning of September. Chances of adding to soil compaction and tree injury are also reduced during these months.

2. Minimize site disturbance. Harvest systems that that cause the least amount of site disturbance should be used. Strong evidence exists linking an increase in black stain root disease of Douglas-fir with increased site disturbance. Avoiding soil compaction and soil profile disruption are particularly important. The area covered by skid trails should be minimized and yarding should be restricted to the driest season when the risk of soil compaction is reduced. Old skid trails should be utilized whenever possible.

3. Minimize the number of future stand entries. In order to reduce disturbance events in the future, thinning during the next entry should be intensive enough to reduce or eliminate the need for additional unit entries. Because the units are being managed for wildlife considerations and not for fiber production, thinning to no less than a 40-foot spacing (approximately 30 trees per acre) is recommended. While this density would be considered low if the units were being managed for fiber production, it's high enough to satisfy late seral requirements for wildlife objectives, while still retaining a reserve for some future mortality. When thinning the units, only the "best of the best" trees should be retained. These include large trees with rapidly growing tops, high growht increment, no sign of root disease and little or no defect. Because ponderosa pine not affected by the variety of *V. wageneri* that causes disease in Douglas-fir, pines should be retained whenever possible.

4. Minimize tree injury. Damaged trees are often weakened and have been shown to be attractive to insect vectors of black stain. To reduce the spread of black stain root disease, measures should be taken to avoid the wounding of retained trees.

5. Borax all conifer stumps. Because annosus root disease is a management concern, all conifer stumps greater than 14-16 inches in diameter should be boraxed to prevent the establishment of *Heterobasidion annosum*. Currently, the only registered borate compound to prevent infection of stumps by *H. annosum* is Sporax, which is available from the Wilbur Ellis Company. Costs vary by location, and whether the material is applied by contractor, or force account. A rough estimate for planning purposes is about $1 per stump when included as a requirement in a timber sale contract. Background information on Sporax can be obtained from: http://www.fs.fed.us/foresthealth/pesticide/data/Sporax_msds.pdf, and also from: http://infoventures.com/e-hlth/pestcide/borax.html

While these recommendations are specific to the units that we visited on October 28 (Units 14 and 16), similar measures may be considered to reduce potential insect and disease spread in other units of the Ti-Bone thinning project area.

As always, Dave Schultz and I are available for any assistance that you may need. If you have any questions or comments regarding the recommendations in this report, feel free to call me at (530) 226-2436, or Dave Schultz at (530) 226-2437.

/s/ Peter A. Angwin
Plant Pathologist
N. California Shared Service Area

cc: Gene Graber
Kirk Terrill
Dave Schultz
John Kliejunas