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Department of Agriculture

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**Route To:**

**Subject:** Evaluation of Pest Conditions in Eel River LSR, LSR 307  
(FHP Rept. No. N05-11)

**To:** Forest Supervisor, Six Rivers NF

On September 8, 2005 Dave Schultz and Pete Angwin from Forest Health Protection met with Ruben Escatell and Chuck Hetrick from the Mad River RD to examine pest conditions in the Eel River LSR. We had previously visited the LSR on August 8, 2000, so this gave us a chance to compare conditions over time.

The LSR occupies approximately 1,500 acres on northerly facing slopes along the Van Duzen River. The overstory is predominantly Douglas-fir of several age or size classes. There are scattered large trees that appear to be approximately 300-500 years old. These trees generally have infections of red-brown butt rot, *Phaeolus schweinitzii*. Repeated ground fires created basal wounds that allow spores to infect the trees. The District has a photo of part of the hillside taken in 1944 that shows most of the stand occupied by hardwoods and some scattered large conifers.

The current stand has fairly complete crown closure of Douglas-fir. In addition to dominant and co-dominant trees, intermediate and suppressed Douglas-fir are common. An understory of hardwoods, shrubs and herbaceous plants were generally present in the areas examined.

Douglas-fir mortality caused by black stain root disease has been occurring in the area for years. Although this disease is commonly associated with plantations, we found black stain root disease in Douglas-fir trees of all sizes. Because there are multiple, overlapping layers of Douglas-fir, even the old-growth trees are vulnerable to this pathogen.

A combination of heavy stocking, red-brown butt rot, black stain root disease and periodic droughty weather have caused pockets of heavy losses of Douglas-fir in the LSR. An aerial survey for conifer mortality has been done on the Six Rivers NF since 1994. Background mortality on the Forest is 0.5% of the standing volume per acre per year. Four of the 11 years for which surveys were done show notable pockets of mortality in the LSR area. The aerial survey tends to give an underestimate of total mortality because only the overstory is fully visible. The scale at which mortality is recorded makes it difficult to match spots with any accuracy, but the losses for some pockets could be as high as 43.5% for the 11-year period. Mortality during 2005 appears to be low due to very favorable winter precipitation.

The presence of numerous root disease pockets provides refugia for bark beetles in the area during periods of good precipitation. Every time that dry conditions return, the beetles are able to spread out and take advantage of trees stressed by drought and overstocking. Given the



advanced age of the overstory trees, the most reasonable scenario would be for an accelerated rate of loss in the future.

<b>YEAR</b>	<b>% MORTALITY FROM AERIAL SURVEY</b>
1994	0.5
1995	0.5
1996	6 - 10 in pockets
1997	6 - 10 in pockets
1998	0.5
1999	0.5
2000	0.5
2001	0.5
2002	0.5
2003	Over 10 in pockets
2004	Over 10 in pockets

#### Alternatives available to deal with mortality in LSR

1. Do nothing. Mortality of Douglas-fir will continue to occur in pulses during dry years. Because the LSR is near the southern range of Douglas-fir and the overstory is already of advanced age, a rapid decline in the overstory should be expected. Some of the Douglas-fir plantations infected with black stain root disease may retain enough stocking to eventually provide a replacement overstory. With recreational use of the river at the bottom of the stand and a road on the upper end of the stand, the probability of an human-caused fire is reasonably high.

2. Use prescribed fire to reduce stocking. There is at least a 60-year accumulation of excess stocking and fuel in the stand. Although fire is a historic thinning agent in this stand, current conditions are not at historic levels. The use of fire without any pre-treatment could lead to the loss of some of the larger trees. The use of fire without any pre-treatment in the Douglas-fir plantations infected with black stain root disease could lead to some large gaps in the stocking.

3. Do some mechanical pre-treatment prior to using prescribed fire. It may be possible to remove some excess stocking prior to using prescribed fire to reduce fuel and maintain stocking at levels that can be supported on this site. This would basically be a thinning from below and some sanitation around root disease pockets. To the extent that treatments are designed to reduce the impact of the insects and diseases present on the site, Forest Health Protection Prevention and Suppression funds could be used to design and implement the treatments. Prescribed fire could be used to maintain lower stocking and lower fuel loading. Much of the understory vegetation consists of sprouting species. If 10-15% of the total area was burned annually, a large percentage of the landscape would have sprouts and seedlings of various ages. This would provide horizontal diversity at levels sustainable on this site.

4. Consider replacing some plantations heavily infected with black stain root disease. Some of the plantations visited seem to have a high percentage of dead, dying and sick looking Douglas-fir. Without a more extensive survey, it is difficult to say whether there is adequate stocking to

grow to a closed-canopy stand of old trees. There are only 13 trees per acre at least 30 inches in diameter in the old-growth Douglas- fir/tanoak type according to the publication: Beardsley, Debby; Warbington, Ralph. 1996. Old growth in northwestern California National Forests. Res. Pap. PNW-RP-491. Portland, OR: USDA, FS, PNW Res. Sta. 47 p. One artifact that contributes to a distorted picture of plantation stocking is that black stain root disease in Douglas-fir is common in areas of soil compaction. Because we tend to walk along roads and previous harvest units during casual surveys, we tend to see a lot of black stain root disease. Forest Health Protection funds could be used to conduct pre-suppression surveys in plantations, as well as paying for actual treatments such as cutting infected plantations, slash disposal and ripping compacted soil. We are prohibited from paying for planting trees at this time. The use of heavy equipment for harvesting or slash treatment should be avoided or restricted to existing roads or skid trails to prevent contributing to the establishment of new black stain root disease spots.

Call Dave Schultz at (530) 226-2437 or Pete Angwin at 226-2436 if you need more information or need to discuss the alternatives.

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Dave Schultz  
Entomologist