



Forest Health Protection

Pacific Southwest Region



Date: April 26, 2009

File Code: 3420

To: Forest Supervisor, Angeles National Forest
Subject: Forest Health Conditions for 2008 (FHP Report # SC-09-01)

Aerial surveys were conducted on the Angeles National Forest (ANF) during the week of July 21st, 2008. Two days were devoted to surveying insect and disease mortality across the three districts. Forest Health Protection (FHP) assisted Forest Health Monitoring (FHM) with aerial detection and mapping (Appendix 1; higher resolution Google Earth aerial data at <http://www.fs.fed.us/r5/spf/fhp/fhm/aerial/draft/index.shtml>). Ground surveys were conducted throughout the year to verify mortality mapped and to scout additional problems not detected during flights. The following report represents significant insect and disease problems surveyed in 2008. Relevant forest health issues that are occurring elsewhere in southern California also are included.

Native pine and fir bark beetles

Western pine beetle, *Dendroctonus brevicomis*, activity at the Crystal Lake Campground is the most significant bark beetle activity occurring on the ANF (Fig. 1). Western pine beetle recently killed 15 trees across 51 acres of the campground. Bark beetle populations continue to threaten high-value trees in the campground. Western dwarf mistletoe, *Arceuthobium campylopodum*, is infecting several ponderosa pines in the campground, further reducing tree health. In 2004, ponderosa pines within the campground were preventatively sprayed to protect from bark beetle injury. The spray was effective, but treatment efficacy has ended and populations are building in trees with poor health. Western pine beetle activity is expected to continue in 2009 within the Crystal Lake Campground and immediate action is required to limit further tree mortality. *The San Gabriel RD, with assistance from FHP funding, is planning to preventively spray ponderosa pines in the campground.* Posting of signs is being coordinated between FHP and the San Gabriel RD to educate the public about forest health efforts occurring in the campground. Additional information about this infestation can be found in the FHP evaluation from June 2008.



Figure 1. Mortality at Crystal Lake Campground caused by western bark beetle.

Jeffrey pine beetle, *D. jeffreyi*, caused tree mortality west of Wrightwood on the Santa Clara Mojave RD in areas that had mortality in 2007. Jeffrey pine beetle killed 28 Jeffrey pines across 35 acres. Additional mortality from this bark beetle was scattered across 220 acres in the vicinity of Three Points Trailhead. Small pockets of Jeffrey pine mortality from Jeffrey pine beetle were also scattered along the Angeles Crest Highway, but are not currently threatening

any high-use areas. *Charlton Chilao and Barley Flats prevention thinning projects funded by FHP will reduce Jeffrey pine beetle-caused mortality in these areas.*

Pinyon Ips, *Ips confusus*, killed single-leaf pinyon pine, *P. monophylla*, north of Wrightwood along Highway 2 (Fig. 2). Mortality has occurred over the past several years, killing 25 trees across an estimated 10 acres. Such beetle populations commonly subside after a few years and cause limited mortality. However, drought conditions and high stem densities likely explain the continuing low-level mortality.



Figure 2. Singleleaf pinyon pine killed by pinyon Ips along Highway 2 north of Wrightwood.

Mortality from fir engraver, *Scolytus ventralis*, was not commonly observed on the ANF even though precipitation levels were below the yearly average. Limited white fir mortality was observed within the Crystal Lake Campground in trees infected with true mistletoe, *Phoradendron pauciflorum*. These trees eventually succumbed to fir engraver attacks, likely brought on by water stress from the mistletoe.

Oak diseases and insects

Damage from a combination of golden oak scale insects, *Asterolecanium puteanum*, and unidentified canker pathogens was observed on several species of oaks (California black oak, *Quercus kelloggii*; canyon live oak, *Q. chrysolepis*; and “scrub oak”, commonly *Q. dumosa*) at several sites on the ANF, including the Charlton Flat Campground and oaks along Road 7N23 along the north slope of Liebre Mountain. The golden oak scale is an insect that causes local necrosis and a recessed pit in the bark of its host. The association of canker fungi with pit scale damage led to mortality of small trees. In larger trees, death of small to major branches caused very noticeable crown thinning. Ongoing drought was likely a factor in this damage. As previous studies have suggested, canker damage and mortality attributable to pit scale insects increases during drought.



Figure 3. Heavy mistletoe infections killing oaks in the Sawmill Campground.

Infestations of oak mistletoe, *Phoradendron villosum*, caused decline and mortality in California black oaks at the Sawmill campground on the ANF (Fig. 3). Affected trees had very heavy mistletoe, while trees with less mistletoe had relatively few symptoms of stress. Such heavy infestations cause significant water loss to the host trees. Loss of such highly prized trees would have a substantial impact on site quality and recreational enjoyment by decreasing the shade and aesthetics of the area.

Potential and emerging insect and disease problems

Goldspotted Oak Borer found on the Cleveland NF will be surveyed on the ANF

The goldspotted oak borer (GSOB), *Agrilus coxalis*, is a new non-native pest to oaks in southern California. GSOB has been killing oaks on the Cleveland NF and surrounding lands since 2002. Aerial surveys have estimated >17,000 oaks have died in the past six years from this beetle. Surveys will begin on the Angeles NF in 2009 as part of a larger study to determine the beetle's range in southern California.

Redhaired pine bark beetle detected

The redhaired pine bark beetle, *Hylurgops ligniperda*, is exotic to the U.S., but native to southern and central Europe. The redhaired pine bark beetle was first detected in the Los Angeles Basin in 2003. The bark beetle was collected on the ANF in 2003, and several times in successive years, including during the summer of 2008 in pine plantations along Highway 2 and Highway 39. This exotic species has not been associated with pine mortality on the ANF. Redhaired pine bark beetle is a forest health concern because it may be a vector for black stain root disease. Surveys will continue in 2009 to determine the extent of this beetle throughout the Angeles, San Bernardino, and Cleveland NFs.

New alder canker disease in LA basin may be present on the Angeles NF.

In 2008, a new disease of alders was found in the Los Angeles basin by UC Riverside Extension pathologist Deb Mathews in diseased Italian alders at a number of landscape plantings. The pathogen, *Phytophthora siskiyouensis*, causes bleeding trunk cankers on the alder host and had only been identified once before in California, in Foster City, on alders originating from a nursery. To determine if this pathogen might occur on wild alders, FHP and Extension pathologists started an investigation of alder stands on the ANF where mortality has been occurring over the past several years (Fig. 4). Presence of bleeding cankers and one isolation suggest that a *Phytophthora* pathogen is involved in mortality at one site in Elizabeth Lake Canyon; roles of this and additional pathogens and insects in the mortality are also being examined. DNA methods will be used to further identify pathogens. FHP would welcome information to locate additional sites on the ANF where alders are declining or dying to identify the distribution of pathogens and pests causing this mortality.



Figure 4. Young canker of new alder disease found on the ANF.

Conclusions

The western pine beetle infestation on Crystal Lake Campground is the most relevant bark beetle problem occurring on the ANF. Prevention spraying funded by FHP in 2009 should protect remaining high-value trees in the campground for two years. These trees will be monitored by FHP to evaluate the efficacy of the spray treatment and bark beetle populations. The remaining bark beetle activity throughout the ANF is not currently threatening recreational areas and may subside in the following year with average precipitation levels. If average rainfall is not received this winter, these mortality pockets could increase where tree density is high. Prevention thinning co-funded by FHP in 2009 in the areas of Charlton Chilao and Barley Flats will reduce susceptibility to insect caused mortality.

If there are additional areas of mortality that require monitoring or assessment, please contact Forest Health Protection personnel.

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Appendix 1. Tree mortality that was aerially mapped on the Angeles National Forest in 2008.

