



Oregon

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MEMORANDUM

SUBJECT: 2007 Statewide Aerial Survey Summary

TO: Survey Cooperators & Interested Parties

FROM: Rob Flowers & Mike McWilliams

DATE: January 15, 2008



"STEWARDSHIP IN
FORESTRY"

Maps are generated each year to show the approximate location, size and intensity of areas with tree damage and mortality detected during the 2007 statewide aerial survey. The following summary describes the major damage agents and provides comparison to 2006 results. Maps are available in printed format on request or online.

2007 Aerial Survey Maps @ <http://www.fs.fed.us/r6/nr/fid/as/quad07/index.shtml>

Survey Description & Objectives

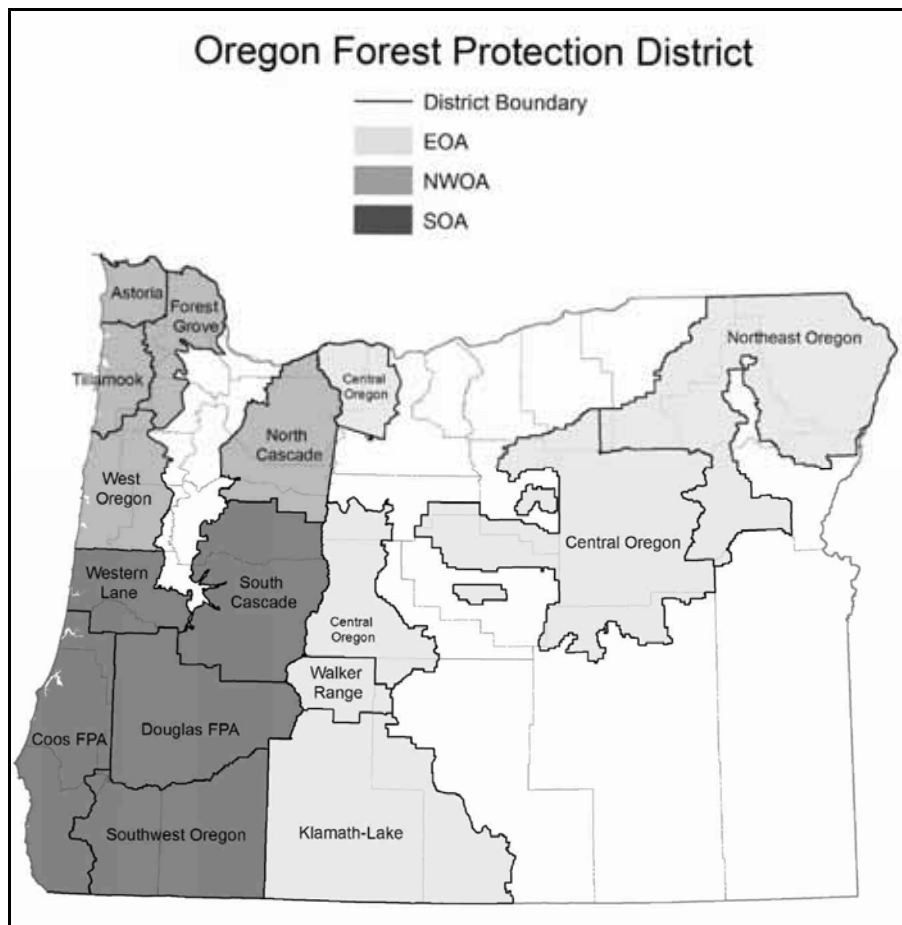
The statewide aerial survey, covering over 28 million acres, is flown during summer and fall of each year, which is the optimum time to detect changes in foliage or other characteristics associated with tree mortality and damaging agents (Figure 1). Ownership over the survey area is approximately 60% federal and 40% state & private.

The survey aircraft flies a grid pattern at an altitude of 1,000-1,500 ft above the ground, with flight lines located 4 miles apart. Each of two aerial observers maps a 2 mile area on one side of the aircraft using a digital sketch-mapping system, consisting of a touch-screen computer linked to a GPS receiver. The system displays topographic maps, satellite imagery and aircraft position, allowing observers to quickly locate and delineate affected areas in the form of polygon figures.

Polygon boundaries indicate the approximate extent of an area with damage, and a code is given to describe the likely agent(s), along with either the number of trees affected (counts) or an intensity measure (L=light, M=moderate, H=heavy), in the case of defoliators. In areas where damaged trees are too numerous to count, the number of affected trees per acre is estimated (1A=1 tree per acre). The key located on each map describes the agent and primary host(s) for each code.

The short-term objective of the survey is to provide the locations and amount of *current year* tree damage and mortality. The long-term objective is to document *trends* over time, and provide this information to assist with forest management activities. The aerial survey is designed to provide estimates only and is *not* able to precisely quantify damage from specific agents; this can only be accomplished by follow-up ground surveys of mapped areas.

Figure 1: The annual statewide aerial survey covers all forest lands (>28 million acres). Damage estimates are summarized by ODF area and protection districts.

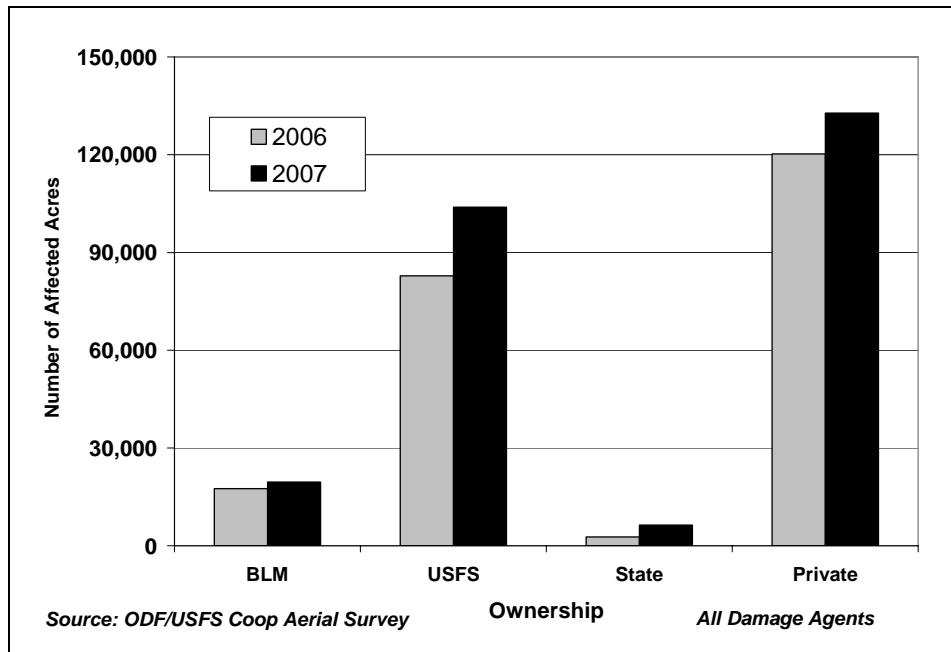


Survey Results: Southern Oregon Area

The following survey data are summarized by ownership, protection district and agent category. Agents are grouped by needle casts, bark beetles, those damaging young conifers, and those causing area-specific damage. Estimates are described by *either the total number of affected acres or the number of dying/damaged trees in those areas*. In uneven-aged stands, the affected acreage provides a better damage estimate, while in young stands the number of trees killed may provide a better indication of damage. Volume of affected timber and other measures are also available and can be provided on request.

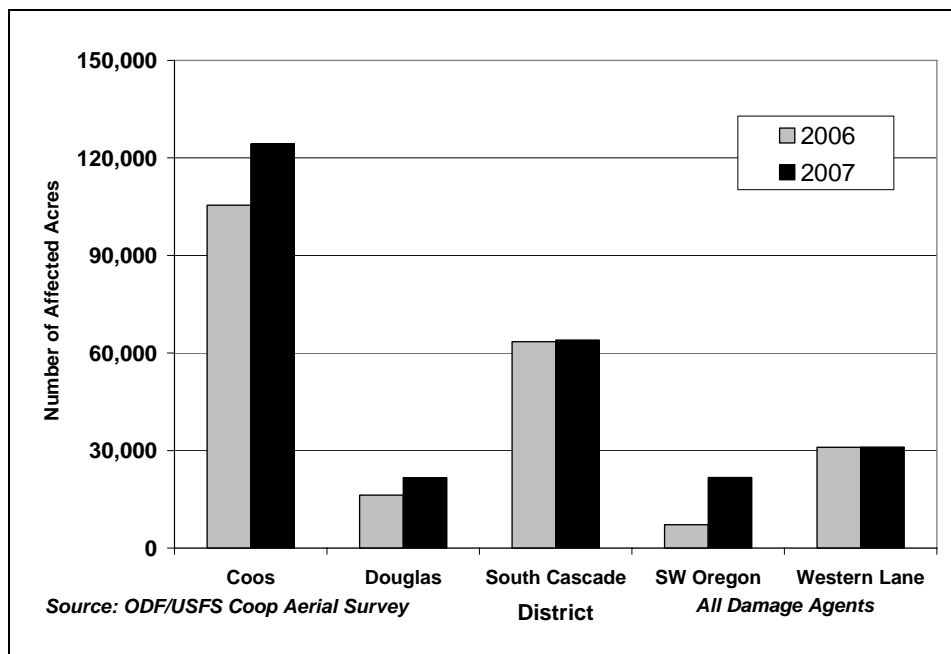
In 2007, detected damage to forest lands in Southern Oregon increased by 15% overall. Increased damage in comparison to the previous year occurred on all ownerships (Figure 2). This was greatest for U.S. Forest Service (USFS) and Private lands, followed by State of Oregon and Bureau of Land Management (BLM) ownerships.

Figure 2: Area (acres) affected by damaging agents in Southern Oregon in 2006 & 2007.



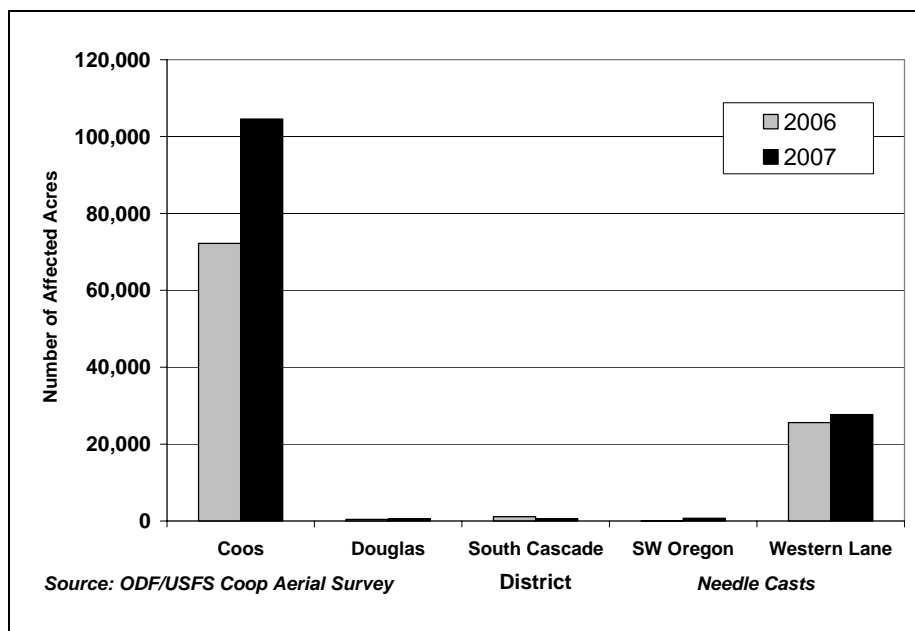
Damage trends by protection districts were somewhat variable (Figure 3). In 2007, the greatest increases were observed in the Southwest Oregon district and Coos FPA followed by the Douglas FPA. Damage in the South Cascade and Western Lane districts appeared similar between years. In coastal areas, Swiss needle cast was the major damaging agent, while bark beetles and damage to young conifers (due to bear & other agents) were more important in areas further inland.

Figure 3: Area (acres) affected by damaging agents by protection district in 2006 & 2007.



In recent years, needle cast has been the greatest damaging agent along coastal areas in Northwest Oregon. Virtually all of the damage is due to Swiss needle cast of Douglas-fir, caused by a native pathogen (*Phaeocryptopus gaeumannii*). Small pockets of Ponderosa pine needle cast (*Lophodermella* spp.) and larch needle cast (*Meria laricis*) were also observed further inland. Infection by Swiss needle cast remains widespread over the area of susceptible host, and detection was an average of 25% higher across the Southern Oregon area in 2007, with the greatest increase in the Coos FPA (Figure 4). Infection severity is often localized as it is driven by moisture levels in spring, warm winter temperatures, and other factors. This, along with difficulty in obtaining proper survey timing due to weather conditions, generates a moderate degree of variability in detection year to year.

Figure 4: Area (acres) affected by needle casts in Southern Oregon in 2006 & 2007. Swiss needle cast accounted for >98% of all detections.

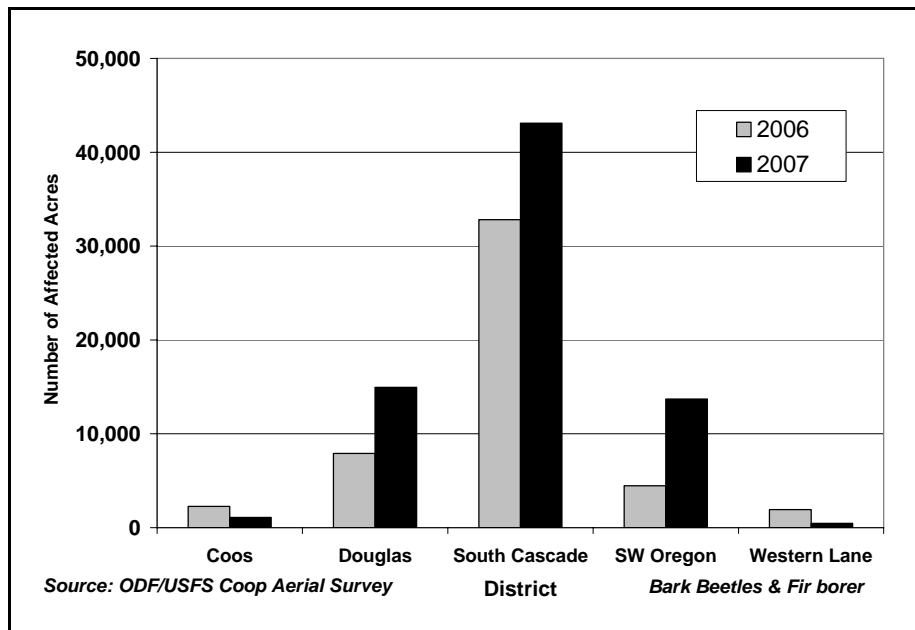


Bark beetles have the ability to rapidly increase their populations when favorable stand or weather conditions exist, and therefore tend to show high variability. Damage from bark beetles in Southern Oregon was relatively high from 2003-2005, but has been reduced in recent years due to the return of normal moisture levels. The major beetles affecting Western Oregon are Douglas-fir beetle (*Dendroctonus pseudotsugae*) and fir engraver (*Scolytus ventralis*), while areas east of the Cascade crest are being heavily impacted by an outbreak of mountain pine beetle (*D. ponderosae*). In 2007, increased levels of beetle damage occurred on the Douglas FPA, South Cascade and Southwest Oregon districts, while less damage was observed in the Coos FPA and Western Lane district (Figure 5). Mature Douglas-fir on drier sites in Southern Oregon are also affected by another beetle, the flatheaded fir borer (*Melanophila drummondii*), which consistently causes scattered mortality in the area.

High levels of mortality from Douglas fir beetle often appear 1-2 years following storm events in which there is significant blowdown of large trees. Given increased damage from winter storms over the last two years, populations are expected to rise in coming

years, although their impact tends to be quite variable across the landscape. Fir engraver, which caused high levels of tree mortality from 2003-2004, caused mostly scattered damage in 2007. However, this beetle, along with flatheaded fir borer did appear to cause increased damage in Southwest Oregon this year. The mountain pine beetle outbreak that began in 2001 is continuing to expand in lodgepole stands along east slopes of the Cascades, including areas of the Douglas FPA and South Cascade district. The outbreak is projected to continue for up to a decade or more, and is increasingly impacting Ponderosa, sugar, and whitebark pines in these areas.

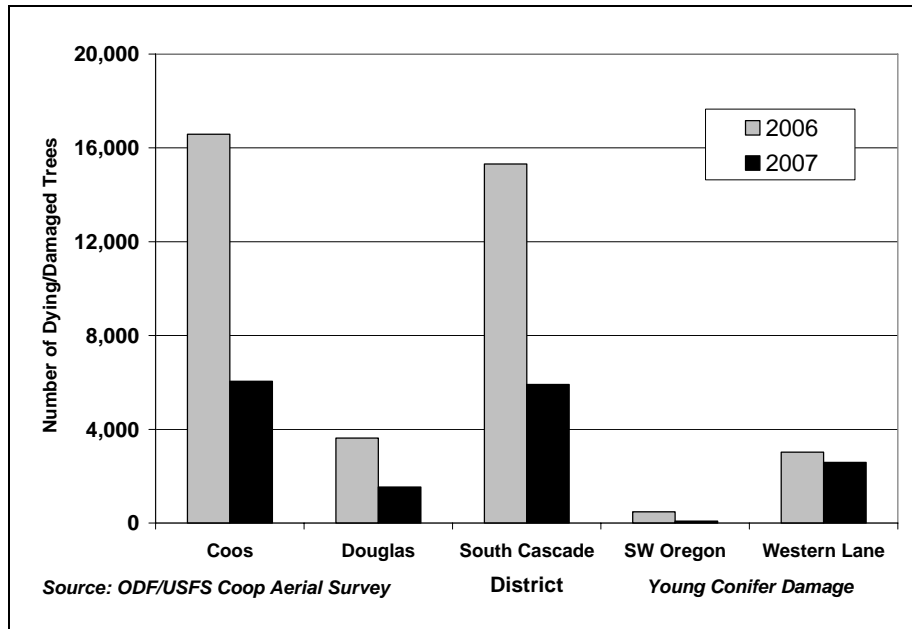
Figure 5: Area (acres) affected by bark beetles in Southern Oregon in 2006 & 2007. Mountain pine beetle accounted for >65% of all detections.



Each year, young conifers in western Oregon are damaged by a combination of agents including animals, insects and diseases. Approximately 70% of the damage usually occurs on state and private lands where the most active management is taking place. While aerial surveys attribute the majority of damage in these areas to black bear, ODF ground surveys completed in 2001 estimated that bear damage occurred in only 42% of the polygons mapped and coded as bear. Root disease and drought are the other major damaging agents, and are often underestimated due to survey limitations.

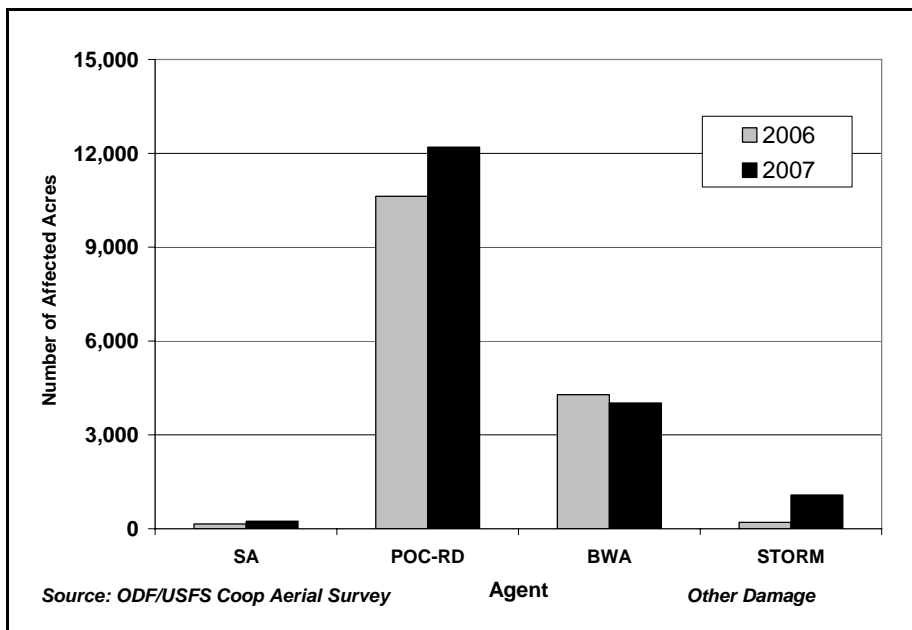
In Southern Oregon, overall damage to young conifers decreased by an average of 140% in 2007. Declines were most dramatic in the Coos and Douglas FPA along with the South Cascade district (Figure 6). Although the number of trees per acre suffering bear damage annually over the survey area is relatively low, significant damage may still result in some areas given its clumped distribution and tendency to occur in consecutive years. The 2007 results are similar to average damage levels observed in these areas over the last decade. The very high level of damage detected in 2006 is not consistent with long-term trends, and could be due to any number of factors. We can only speculate as to the relative contributions of the different agents or environmental conditions that have led to large fluctuations during recent years, as ground surveys of most areas are not done annually.

Figure 6: Approximate number of dying/damaged young conifers in Southern Oregon in 2006 & 2007. Bear, root disease & drought appear to be the primary agents.



A number of other non-native insect and disease agents, often specific to certain areas, also caused moderate levels of damage in 2007. These included the sucking insect pests, spruce aphid (SA) and balsam woolly adelgid (BWA), along with Port Orford cedar root disease (POC-RD). Damage from winter storms (STORM) also increased significantly this year. As the statewide survey was completed in fall, estimates do not include damage from storms that occurred in December 2007.

Figure 7: Area (acres) affected by other agents in Southern Oregon in 2006 & 2007.



Defoliation of Sitka spruce, due to feeding by spruce aphid, has been significantly reduced in recent years. Insect populations appear to have declined as the result of below-average winter temperatures in many areas. Port Orford cedar root disease continues to slowly expand from previously infected sites, and is causing high levels of mortality in some areas. In the Cascades, balsam woolly adelgid continues to cause decline and mortality in a number of true fir species. Annual gypsy moth surveys showed consecutive trap catches near Shady Cove in 2006-2007, and an eradication program is planned for spring 2008. Among native insect pests, small areas of Pacific silver fir in the Cascades were killed by silver fir beetle, while widespread but scattered damage to incense cedar appeared to be the result of a combination of agents including drought, branch cankers and foliar diseases.

Survey Discussion

It is important to consider that the comparisons presented here cover only a one-year interval and may not reflect long-term trends. In addition, the survey can only detect mortality or damage that is visible at the time the area is flown. Attempts are made to coordinate flights with the peak visibility of mortality and damaging agents, but this may be confounded by environmental conditions. Still, aerial surveys represent the best method available for obtaining reasonable depictions of the extent of forest lands affected by damaging agents, and serve to continually update managers as to changing conditions in these areas.

Acknowledgments

The statewide aerial survey was conducted by the Oregon Department of Forestry, Forest Health and Air Operations units in cooperation with the USDA Forest Service. We thank our pilot Jim Baranek, as well as our federal cooperators: Bob Schroeter, Ben Smith, Keith Sprengel, Julie Johnson and Sundi Sigrist.

Additional Notes

We greatly appreciate feedback in regard to the location, agent or damage intensity of mapped areas. As we are only able to conduct limited ground surveys each year, information from affected areas can be very valuable in improving mapping accuracy.

For additional information, please contact:

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