



# Oregon

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## MEMORANDUM

SUBJECT: 2011 Statewide Aerial Survey Summary – Northwest Oregon Area

TO: Survey Cooperators and Interested Parties

FROM: Rob Flowers, Alan Kanaskie, and Mike McWilliams

DATE: February 22, 2012



"STEWARDSHIP IN  
FORESTRY"

The following information provides the approximate location and size of areas with tree damage and mortality detected in the 2011 statewide aerial survey. Also included are descriptions of the major damage agents and comparisons to recent trends. Regional aerial survey maps and geospatial data are also available at:

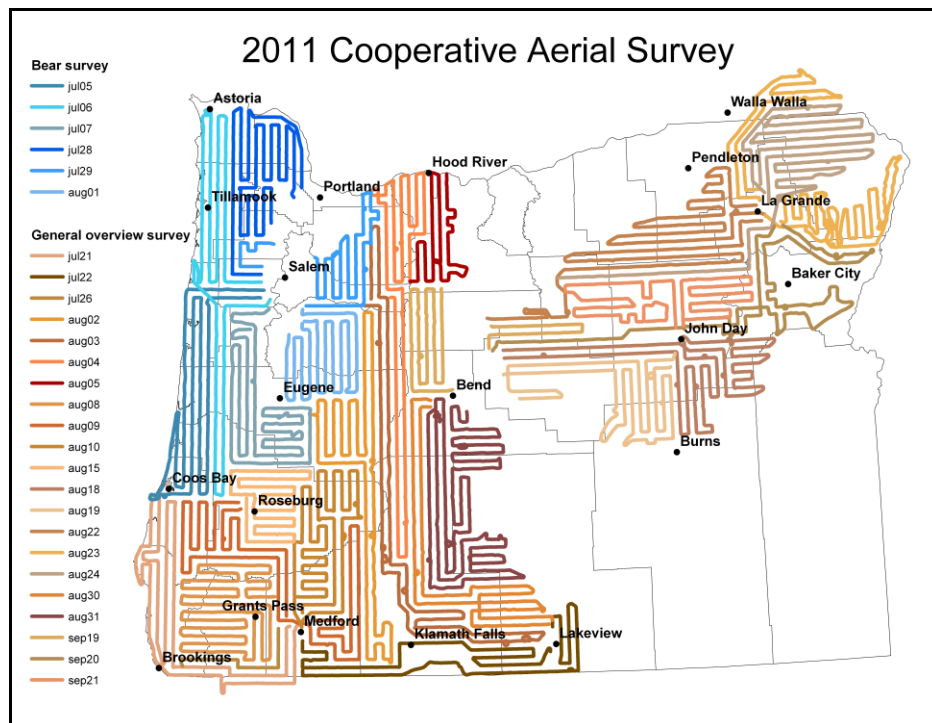
Statewide Aerial Detection Survey Quad Maps: [www.fs.usda.gov/goto/r6/fhp/ads/maps](http://www.fs.usda.gov/goto/r6/fhp/ads/maps)

Statewide Aerial Detection Survey Data: [www.fs.usda.gov/goto/r6/fhp/ads/data](http://www.fs.usda.gov/goto/r6/fhp/ads/data)

### Survey Description and Objectives:

The statewide aerial survey covers more than 28 million acres and is flown each summer and fall, as this is the optimal time to detect the tree signatures (changes in foliage color) associated with damage that occurred the previous year (Figure 1).

*Figure 1: Coverage area and flight lines for the 2011 statewide aerial survey of forest lands.*



The survey aircraft flies a grid pattern at an altitude of 1,000-1,500 ft above the ground, with flight lines 4 miles apart. A digital sketch-mapping system is used, consisting of a touch-screen computer linked to a GPS receiver, which allows observers to locate and record affected areas in the form of polygon figures.

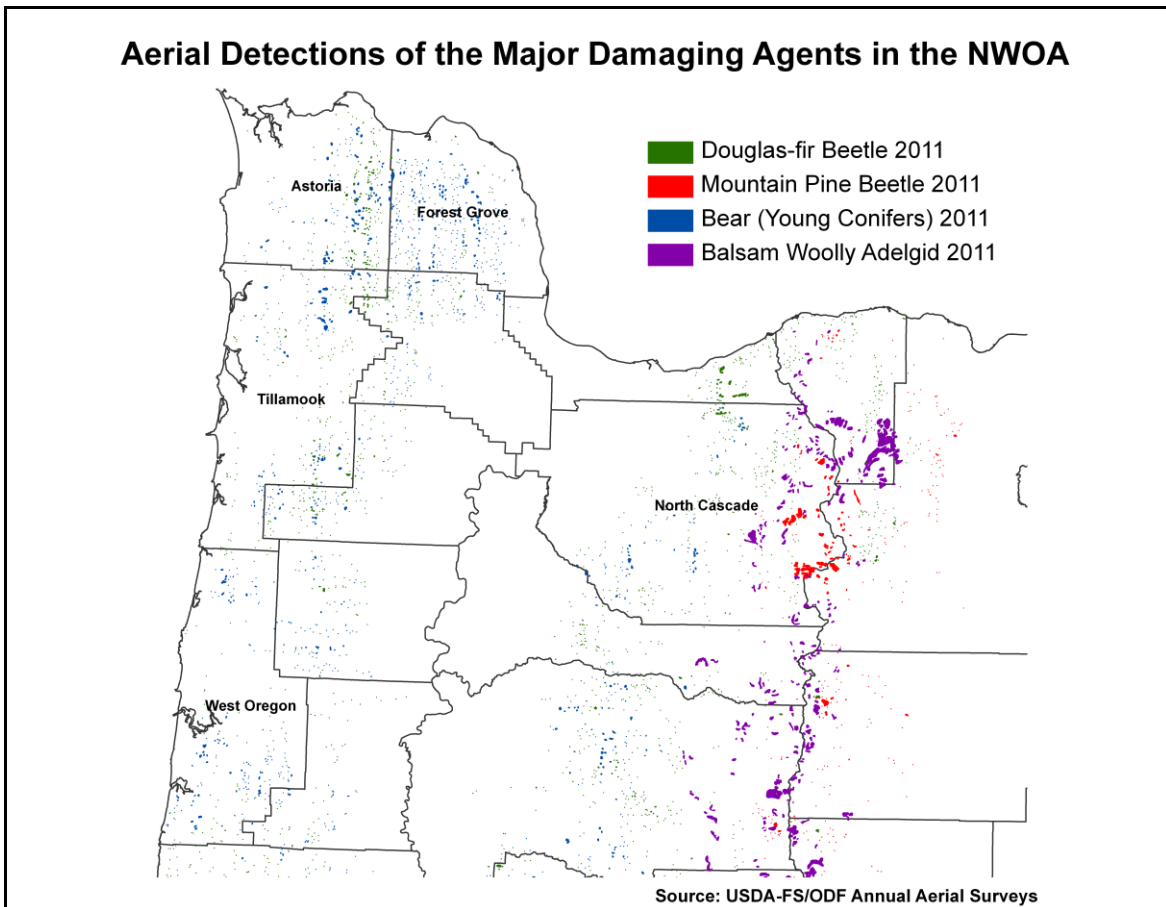
The areas mapped designate approximate damage boundaries and are coded with the suspected agent and an estimate of the number of trees affected. In areas where damage is severe, the number of affected trees per acre is estimated (1A=1 tree per acre). A key is located on each map to describe the damage agent and primary host(s) for each of the codes.

For the summary information provided here, each category or agent is described by the total number of acres over which tree mortality or other damage is occurring. Current year results are provided as part of the 25-year trend. Aerial surveys are designed to provide estimates only and cannot precisely quantify damage or confirm that specific agents are present; this can only be done by ground surveys.

### Survey Results for the Northwest Oregon Area (NWOA):

In 2011, more than 51,000 acres in the NWOA was observed to contain tree mortality or other damage at levels sufficient to be detected by aerial surveys (Figure 2).

Figure 2: The major damaging agents in the 2011 aerial detection survey of the NWOA.



The area over which tree mortality or other damage was observed during aerial surveys is summarized here by ownership (Figure 3) and forest protection district (Figure 4). The majority of the affected area this year appeared to occur on USFS ownerships, and was observed within the North Cascade district. While this represented an increase relative to the previous year, detection levels remained below the 25-year average.

Figure 3: Tree mortality and damage in the NWOA detected during aerial surveys, 1987-2011.

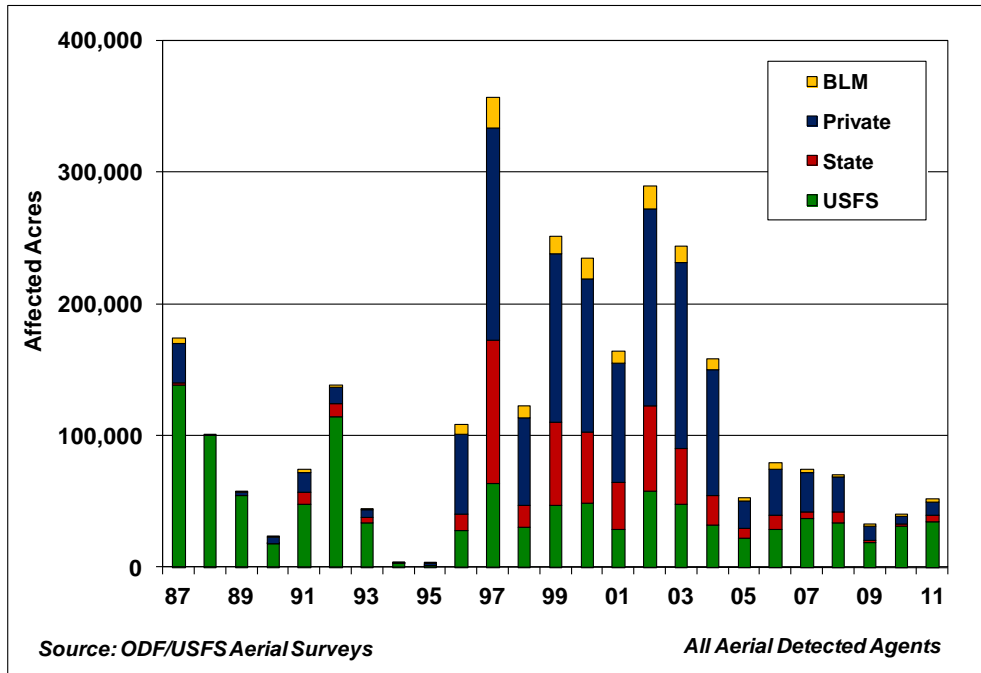
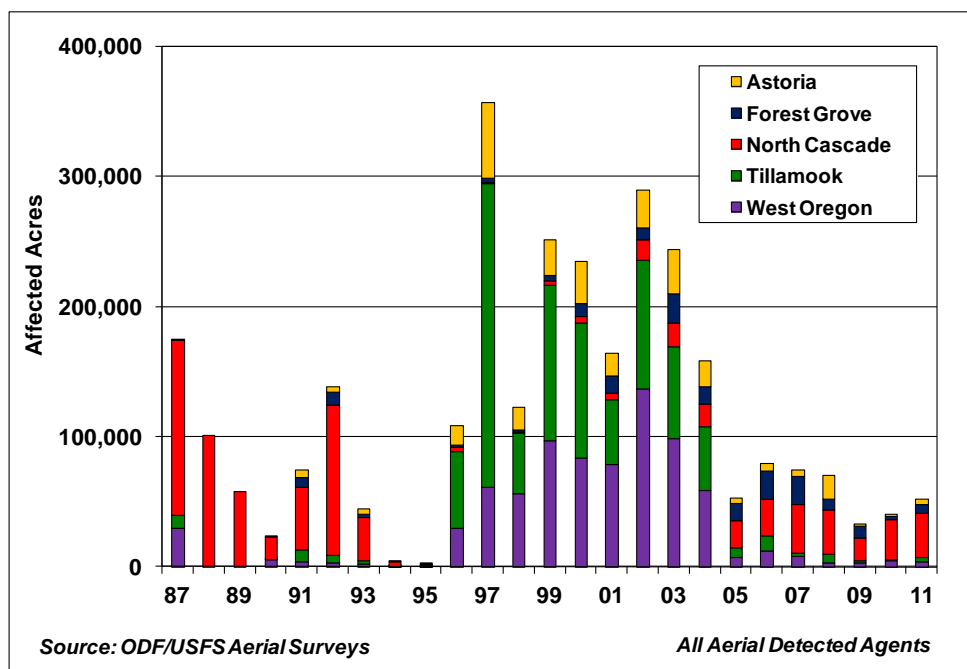
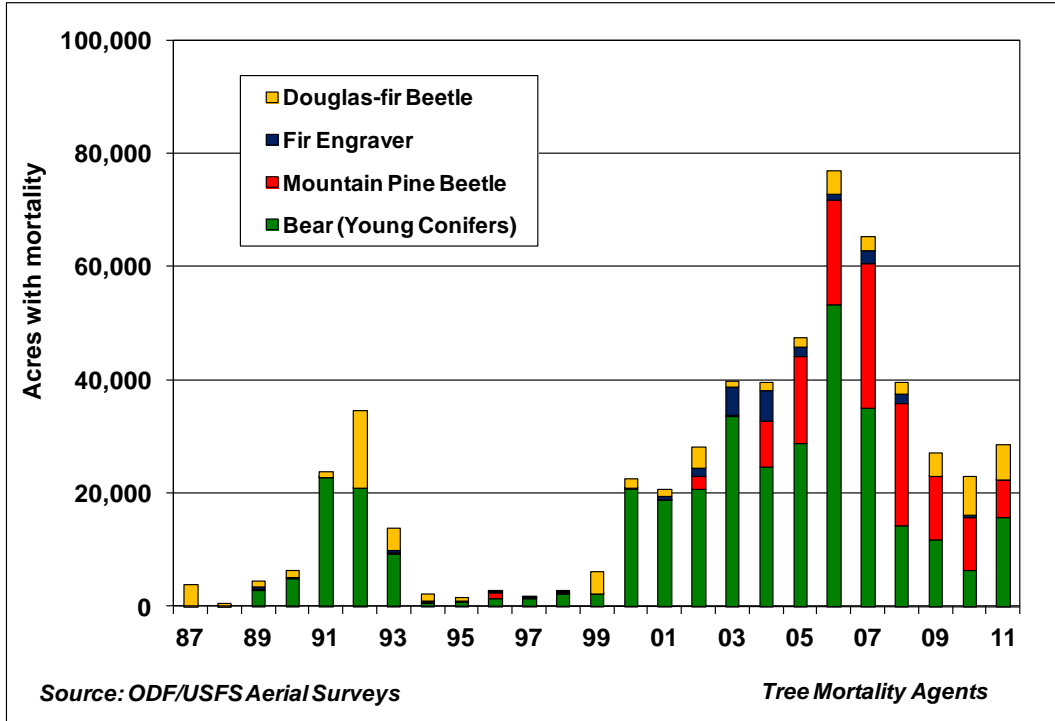


Figure 4: Tree mortality and damage in the NWOA detected during aerial surveys, 1987-2011.



Over the last 25 years of the statewide aerial survey, the majority of the tree mortality observed in the NWOA has been attributed to bark beetles and bear, although other agents, such as root diseases, are often present (Figure 5).

Figure 5: Bark beetle and bear damage detected by aerial surveys in the NWOA, 1987-2011.



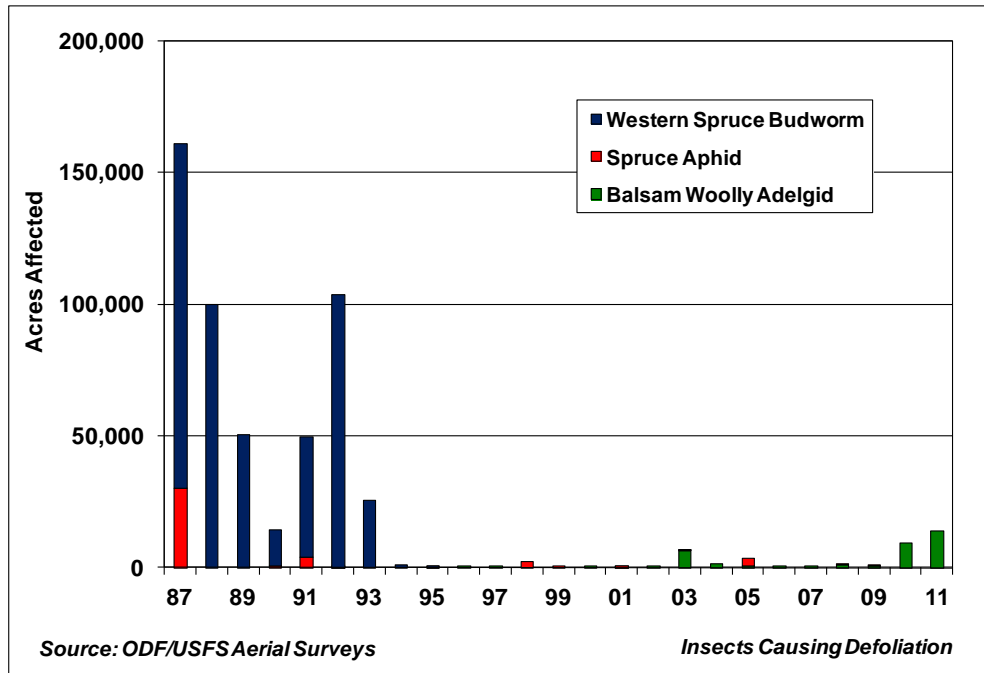
The most significant bark beetles in the NWOA historically have been the Douglas-fir beetle (DFB) and fir engraver, and as you move east into drier, pine-dominated areas, it is the mountain pine beetle (MPB). In 2010 and 2011 the area affected by DFB was significantly higher than the 25-year average. Outbreaks of DFB often follow blow-down events, as populations can build-up in larger downed materials to levels sufficient to kill standing trees. Outbreaks in the NWOA are often localized, with small patch-kill common, and they usually subside in 2-3 years. While areas of MPB damage is still being detected along the crest of the Cascades and in remaining, susceptible areas to the east, overall damage appears to be on the decline due to cumulative losses of mature lodgepole pine stands, which are needed to sustain large outbreaks.

Given the large holdings of private forest lands in the NWOA, a substantial portion of the survey in this area occurs over younger conifer regeneration. Previous ground surveys indicate that tree mortality at these sites is most frequently due to bark-peeling by bears, drought stress, and root diseases. For ease of display and description, the code “BEAR” is used to designate damage in young conifers in these aerial survey data and maps. Tree mortality at these sites increased in 2011 relative to 2010 and exceeded the 25-year average.

The primary insect defoliators in the NWOA historically include both needle-chewing and sap-feeding insects. Sap-feeding by some insects on branches and buds can cause localized tissue death and result in significant needle loss in much the same way as

needle-chewing insects. Outbreak occurrence with many of these agents is highly variable and can occur at widely-spaced, irregular intervals that may be decades apart. The most significant defoliator damage in recent history resulted from a large outbreak of the Western spruce budworm (WSB) in the late 1980s to early 1990s (Figure 6).

Figure 6: Insect defoliator damage detected by aerial surveys in the NWOA, 1987-2011.



While budworm damage is often restricted to central and Northeast Oregon, areas up to eight miles west of the Cascade crest with preferred hosts (Douglas-fir, true firs, and Engelmann spruce) were also affected. In addition, the spruce aphid and balsam woolly adelgid (BWA), two long-established, non-native sap-feeding insects have also caused widespread damage historically. Spruce aphid primarily affects Sitka spruce along the coast, and has been relatively minor of late, while BWA continues to spread through the Cascades and to the east. The most significant impacts currently are in high-elevation Pacific silver and subalpine firs. This insect virtually eliminated grand fir in some areas of Western Oregon in the 1950s and 1960s, following its initial introduction.

One of the major damaging agents of late in Western Oregon, Swiss needle cast (SNC), is not detailed here, as it is the subject of separate annual surveys and assessments. Aerial surveys to detect and map the distribution of SNC damage have been flown annually since 1996, and those areas are also displayed on the enclosed maps. Although the disease occurs throughout the range of Douglas-fir, damage is most severe on the west slopes of the Coast range. The 2011 survey mapped more than 444,000 acres of Douglas-fir with obvious symptoms of SNC, the largest area detected since the survey began. Most damage occurs within 18 miles of the coast, but it may extend up to 28 miles inland in some areas. Damage continues to occur at very high levels despite a shift by many landowners to forest management aimed at reducing damage from SNC.

SNC Cooperative Annual Report: <http://sncc.forestry.oregonstate.edu/annual-reports>  
 SNC Aerial Survey Data: [www.oregon.gov/odf/privateforests/fhMaps.shtml](http://www.oregon.gov/odf/privateforests/fhMaps.shtml)

## Survey Discussion

The summary provided here is general and we realize it may not represent trends at a more localized level due to the limitations of the survey methods, and because only damage that is readily visible at the time of the survey is recorded. Attempts are made to coordinate flights with peak visibility of the major agents, but this is often confounded by weather, fires, or other factors.

It is difficult to decipher the underlying causes of very recent trends. However, spring weather conditions in 2011 were much colder and wetter than normal and anecdotal observations suggest that the onset of damage symptoms (foliage color changes) may have occurred later in some areas than normal, and possibly resulted in less detections.

As we are only able to conduct limited ground surveys each year, we would appreciate any feedback in regard to the information provided here. Please contact us with any questions regarding this summary, the enclosed maps, or additional products.

## Acknowledgements

Cooperative aerial surveys are conducted by ODF Forest Health and Air Operations in cooperation with USDA-FS Forest Health Protection. We thank pilots Trevor Courtney and Wayne Cartwright, as well as federal cooperators Robert Schroeter, Keith Sprengel, Ben Smith, Julie Johnson, and Sundi Sigrist.

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ODF Forest Health Website: <http://www.oregon.gov/odf/privateforests/fh.shtml>