

# Swiss Needle Cast Aerial Survey, 2011

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## Abstract

Aerial surveys to detect and map the distribution of SNC damage have been flown annually since 1996. Although the disease occurs throughout the range of Douglas-fir, damage is most severe in the forests on the west slopes of the Coast range. The 2011 survey mapped 444,228 acres of Douglas-fir forest with obvious symptoms of Swiss needle cast; this was the largest area with damage since the survey began. Most damage occurred within 18 miles of the coast, but it extended up to 28 miles inland in some areas.

## Introduction

Swiss needle cast (SNC) is a native disease of Douglas-fir that has intensified dramatically in coastal western Oregon since 1990. The main effect of SNC on forests is reduction of tree growth and vitality. In addition to growth impacts, SNC alters wood properties and affects stand structure and development. This complicates stand management decisions, especially in pure Douglas-fir stands.

Aerial surveys to detect and map the distribution of SNC damage have been flown annually since 1996. Although the disease occurs throughout the range of Douglas-fir, it is most severe in the forests on the west slopes of the Coast range, and in this area it presents a unique aerial survey signature that is highly visible for approximately 6 to 8 weeks prior to bud break and shoot elongation, usually late April to early June.

## Methods

The 2011 Oregon Coast Range survey was flown on May 18 & 24 and June 8, 9, & 17, and covered approximately 2.9 million acres of forest. The observation plane flew at 1,500 to 2,000 feet above the terrain, following north-south lines separated by 2 miles. Observers looked for areas of Douglas-fir forest with obvious yellow to yellow-brown foliage, a symptom of Swiss needle cast. Patches of forest with these symptoms (patches are referred to as polygons) were sketched onto computer touch screens displaying topographic maps or ortho-photos and the position of the aircraft. Each polygon was classified for degree of discoloration as either “S” (severe) or “M” (moderate). Polygons classified as “S” had very sparse crowns and brownish foliage, while those classified as “M” were predominantly yellow to yellow-brown foliage with slightly denser crowns than those classified as “S”. The survey area extended from the Columbia River south to Brookings, and from the coastline eastward until obvious symptoms were no longer visible. We did not survey the Cascade Range in 2011, but Swiss needle cast does occur at damaging levels in some areas.

## Results and Discussion

The 2011 survey results show an increase in the area of forest with symptoms of Swiss needle cast compared to the previous 3 years and reached an all-time high for the second year in a row. We mapped 444,228 acres of Douglas-fir forest with obvious symptoms of Swiss needle cast (Figure 1). As has been the case for the past several years, the easternmost area with obvious SNC symptoms was approximately 28 miles inland from the coast in the Highway 20 corridor, but most of the area with symptoms occurred within 18 miles of the coast. Figure 2 shows the

overall trend in damage from 1996 through 2011. Figure 3 shows damage trends in the north and south half of the Coast range. SNC Damage continues at very high levels despite a shift by many landowners to forest management practices aimed at reducing damage from SNC.

Caution is advised when interpreting aerial survey data. The SNC aerial survey should be considered a conservative estimate of damage because observers can map only those areas where disease symptoms have developed enough to be visible from the air. Permanent plot data and ground checks show that Swiss needle cast occurs throughout the survey area, but that discoloration often is not severe enough to enable aerial detection. Considerable variation from year to year can result from weather patterns which affect both symptom development and timing of the survey. Undoubtedly, the total area of forest affected by Swiss needle cast is far greater than indicated by the aerial survey. Despite these shortcomings the aerial survey provides a reasonable depiction of the extent of moderate and severe damage, and coarsely documents trends in damage over time.

### **Additional Notes**

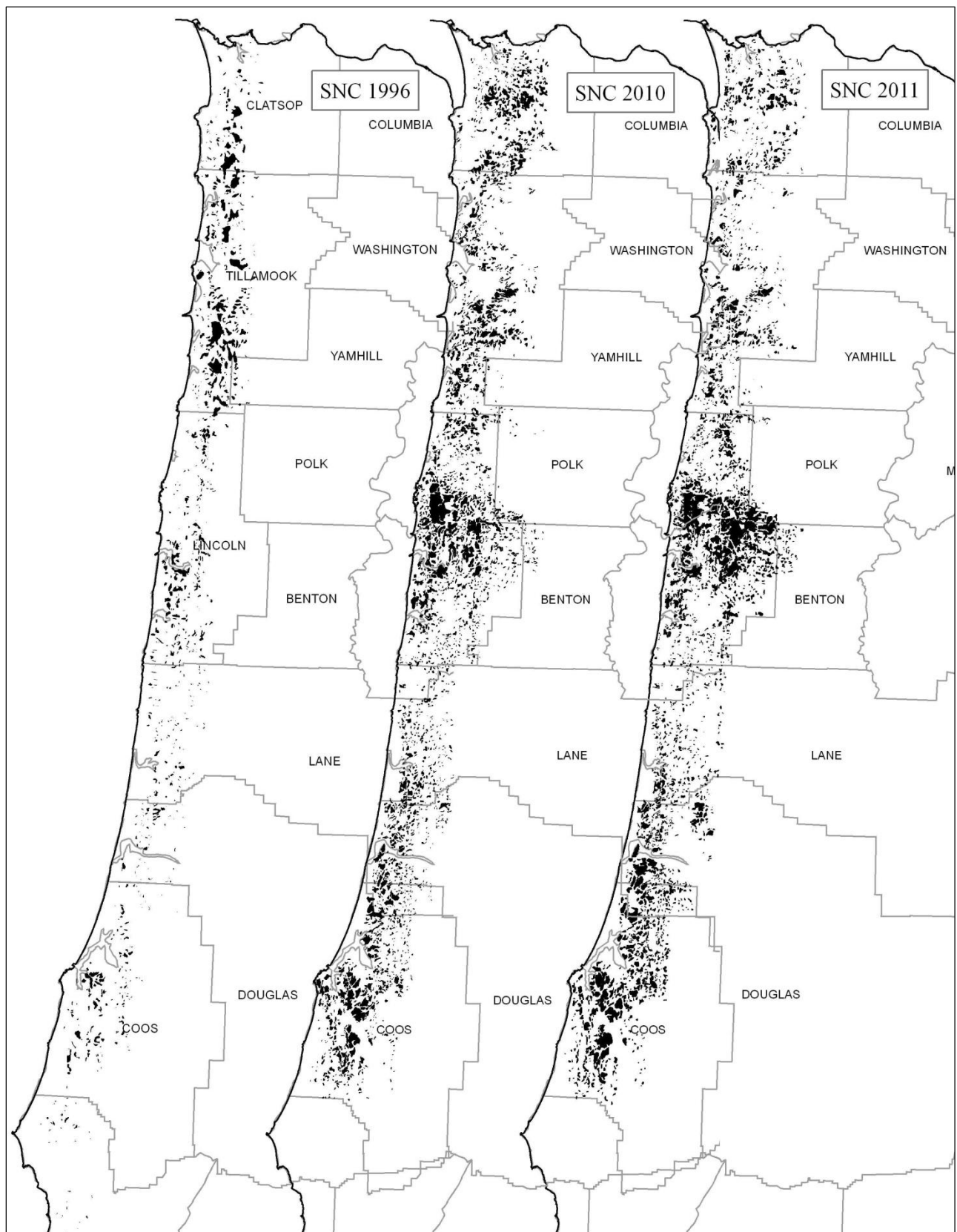
We appreciate any information regarding the accuracy or usefulness of the maps. If you have a chance to look at some of the mapped areas on the ground, please let us know what you observe. Please call Alan Kanaskie (503-945-7397) or Mike McWilliams (503-945-7395) if you have questions, suggestions or comments.

The GIS data and a .pdf file can be accessed via the ODF web page at:

<http://www.oregon.gov/ODF/privateforests/fhMaps.shtml>

### **Acknowledgements**

The 2011 survey was conducted by the Oregon Department of Forestry Insect & Disease and Air Operations sections, and was funded by the Oregon State University Swiss Needle Cast Cooperative, the USDA Forest Service Forest Health Monitoring Program, and the Oregon Department of Forestry. Trevor Courtney (ODF) piloted the plane. Mike McWilliams (ODF) is the survey coordinator and primary aerial observer; Ben Smith (USFS) and Rob Flowers (ODF) were the other aerial observers.



*Figure 1. Swiss Needle Cast (SNC) aerial survey: areas of Douglas-fir forest with symptoms of Swiss Needle Cast detected in the 1996, 2010 and 2011 surveys. Solid black polygons (blotches) depict areas with severe or moderate damage from SNC.*

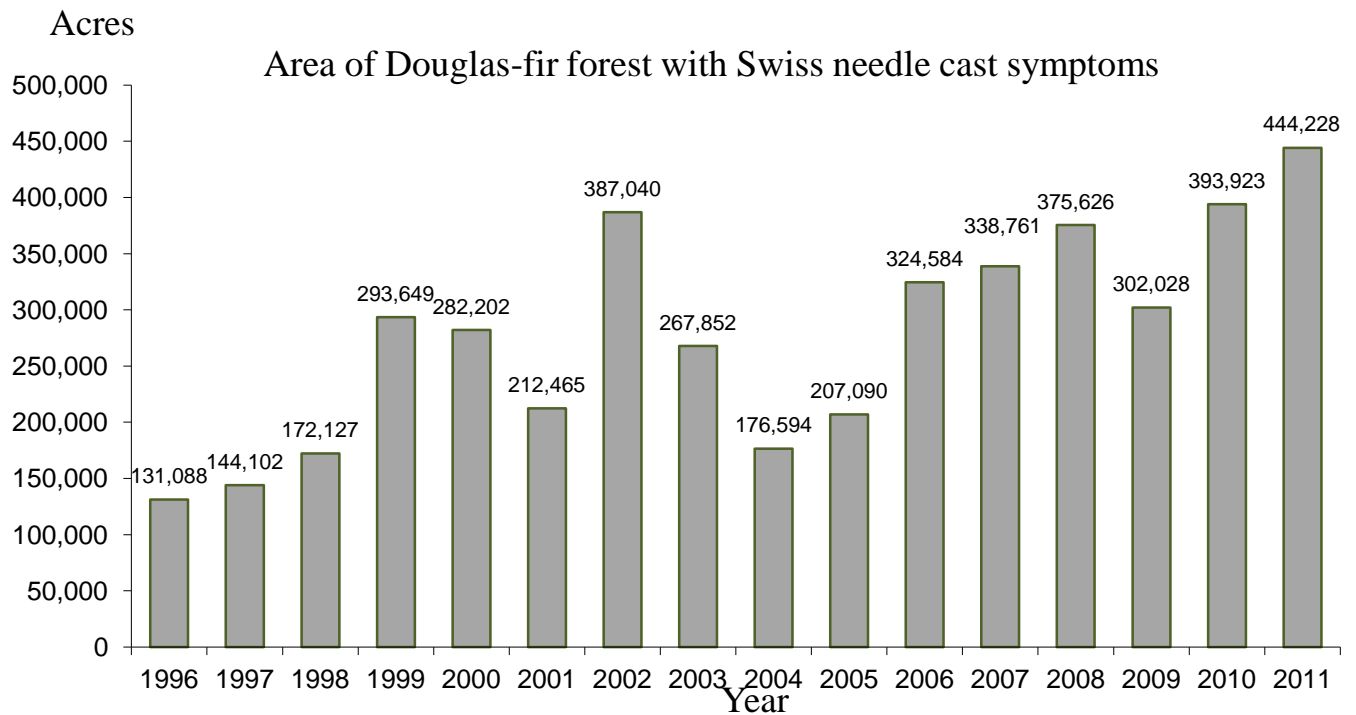


Figure 2. Trend in area of Douglas-fir forest in western Oregon with symptoms of Swiss needle cast detected during aerial surveys in April and May, 1996-2011. Results for 2008 were estimated by extrapolating from 3 sample survey blocks.

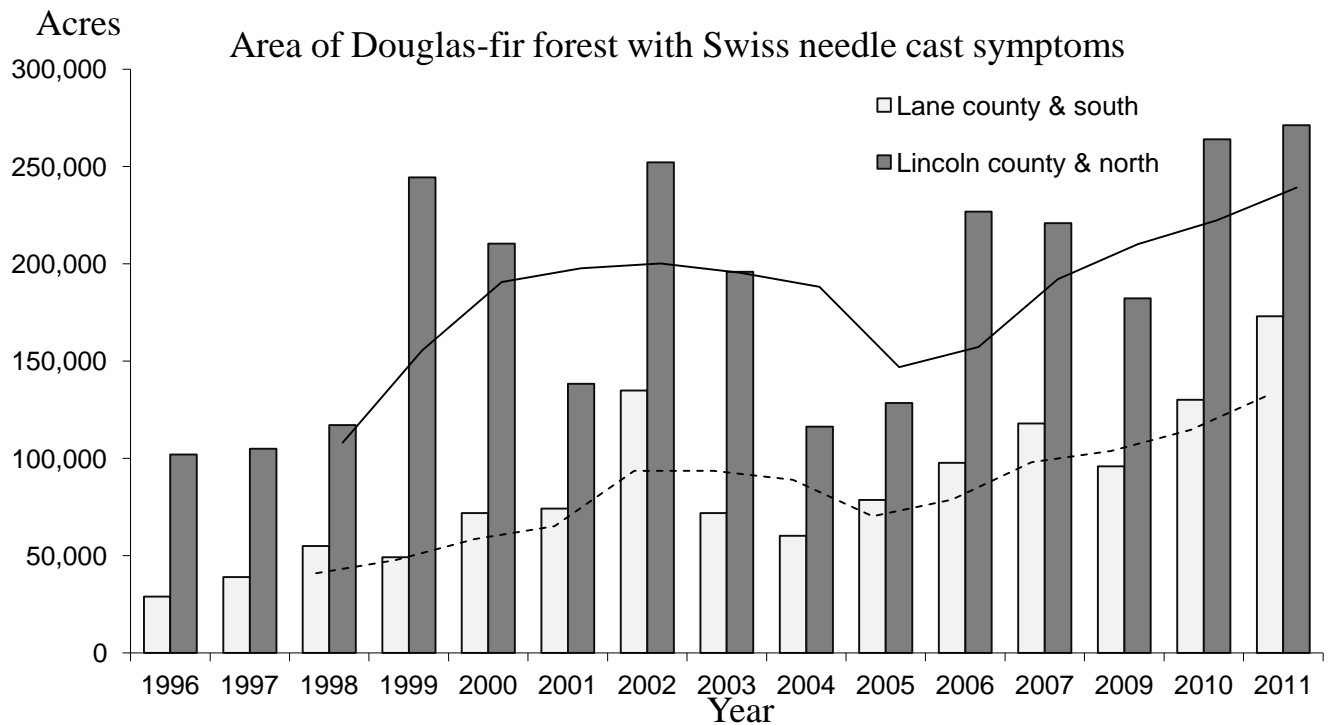


Figure 3. Trend in area of Douglas-fir forest in western Oregon with symptoms of Swiss needle cast detected during aerial surveys in April and May, 1996-2011. North region = Lincoln county & north; South region = Lane county & south. Trend lines are 3-year rolling averages.