

2024 Swiss Needle Cast Aerial Survey

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Aerial Detection Surveys (ADS) to detect and map the distribution of Swiss Needle Cast (SNC) damage have been flown annually from 1996 until 2016, after which the Swiss Needle Cast Cooperative (SNCC) members decided to conduct the survey every other year.

Survey Methods

Three fixed-wing aircraft were used for the 2024 survey: a Cessna Skylane 182 and Cessna StationAir 206 operated by Butler Aviation of Walla Walla, WA, and a Kodiak K-100 operated by the USDA Forest Service Region 6 Aviation Program. The observation plane flew at 1,500 to 2,000 feet above ground level, travelling at approximately 80 – 120 knots along north-south transect lines separated by 2 miles. Our survey grid covered Oregon's Coast Range from the coast to approximately 25 statute miles inland and from the Columbia River to as far south as Bandon (figure 1). Additional acreage was surveyed in Clatsop County to ensure full coverage of the main block of the Clatsop State Forest. Observers looked for areas of Douglas-fir forest with obvious yellow to yellow-brown foliage, a symptom of Swiss needle cast (SNC). Patches of forests with these symptoms (patches are referred to as polygons) were sketched onto computer touchscreens displaying topographic maps or orthophotos and the position of the aircraft. Each polygon was classified as either "S" (severe) or "M" (moderate) based on the degree of discoloration. 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". In 2024, the survey did not include any of the Cascade Range or the southwestern part of the State (south of Port Orford) despite SNC occurring at damaging levels in some of these areas.

Historically, the software used to map SNC damage only allowed aircrew staff to draw polygons where they observed damage without assigning additional attribute data. The acres with SNC damage were reported as the sum of the spatial extent of all polygons drawn. This assumes that the polygons drawn consist entirely of SNC affected Douglas-fir. In reality, this assumption is rarely valid. In 2018, aircrew staff adopted Digital Mobile Sketch Mapping (DMSM), specialized software developed by the Forest Health Assessment and Applied Science Team (FHAAS) at the USDA Forest Service, to record data for the SNC aerial survey. DMSM's interface allows aircrew staff to assign a 'percentage of area affected' category, consisting of a range of values for each polygon. We now report two related, but distinct values: "acres with damage" is the sum of the spatial extent of all polygons drawn, while "affected acres" are the acres with damage weighted by the median values of the percent affected categories for each polygon. For example, if an observer drew a 1,000 acre polygon and assigned it the 50 – 75% affected category, then that polygon would have 1,000 acres with damage and 625 affected acres. For the purposes of this report, we will emphasize the more accurate "affected acres" for the 2024 data. However, for consistency with our legacy data, we will report the "acres with damage" to allow for temporal comparisons.

Results and Discussion

The survey was flown between May 8, 2024 and June 6, 2024, covering approximate 3.25

million acres in the Oregon Coast Range (figure 1). In 2024, bud break was on time, but the survey was delayed until later than planned because of a staffing shortage, technical and administrative difficulties related to the aircraft, and contract delays. Despite this, symptoms remained visible to observers well after bud-break and into June.

The survey showed an increase in the area of forest with symptoms of SNC compared to the previous 5 years, reaching an all-time high with aerial observers mapping a mosaic of 948,656 acres with damage containing 441,573 affected acres of Douglas-fir forests with obvious symptoms of Swiss needle cast (figure 2). As has been the case for the past several years, the easternmost area with obvious SNC symptoms was approximately 25 miles inland from the coast in the Highway 20 corridor, but most of the area with symptoms occurred within 18 miles of the coast. Figures 3 and 4 show the trend in damage from 1996 through 2024. This year's increase in SNC is probably due in part to prolonged wet spring of 2023, which was very conducive to infection.

The Swiss needle cast aerial survey provides a conservative estimate of damage because observers can map only those areas where disease symptoms have developed enough to be visible from the air. We know SNC occurs throughout the survey area, but discoloration often is not severe enough to enable aerial detection. The total area of forest affected by Swiss needle cast is far greater than indicated by the aerial survey. The aerial survey does, however, provide a reasonable depiction of the extent of moderate and severe damage and coarsely documents trends in damage over time.

Acknowledgements

The 2024 survey was conducted by the Oregon Department of Forestry Forest Health and Air Operations sections and the USDA Forest Service and was funded by the Oregon State University Swiss Needle Cast Cooperative. Sean McKenzie (ODF) was the survey coordinator and an aerial observer. Gabriela Ritokova and Christine Buhl (ODF), Sarah Navarro, Tim Bryant, Danny Depinte and Justin Hof (USFS) were the other aerial observers.

Additional Notes

We appreciate any information regarding the 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 contact Gabi Ritokova (gabriela.ritokova@odf.oregon.gov; 503-978-2404) or Sean McKenzie (sean.c.mckenzie@odf.oregon.gov; 971-453-2692) if you have questions, suggestions, or comments.

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

<http://tinyurl.com/ODF-ForestHealth>

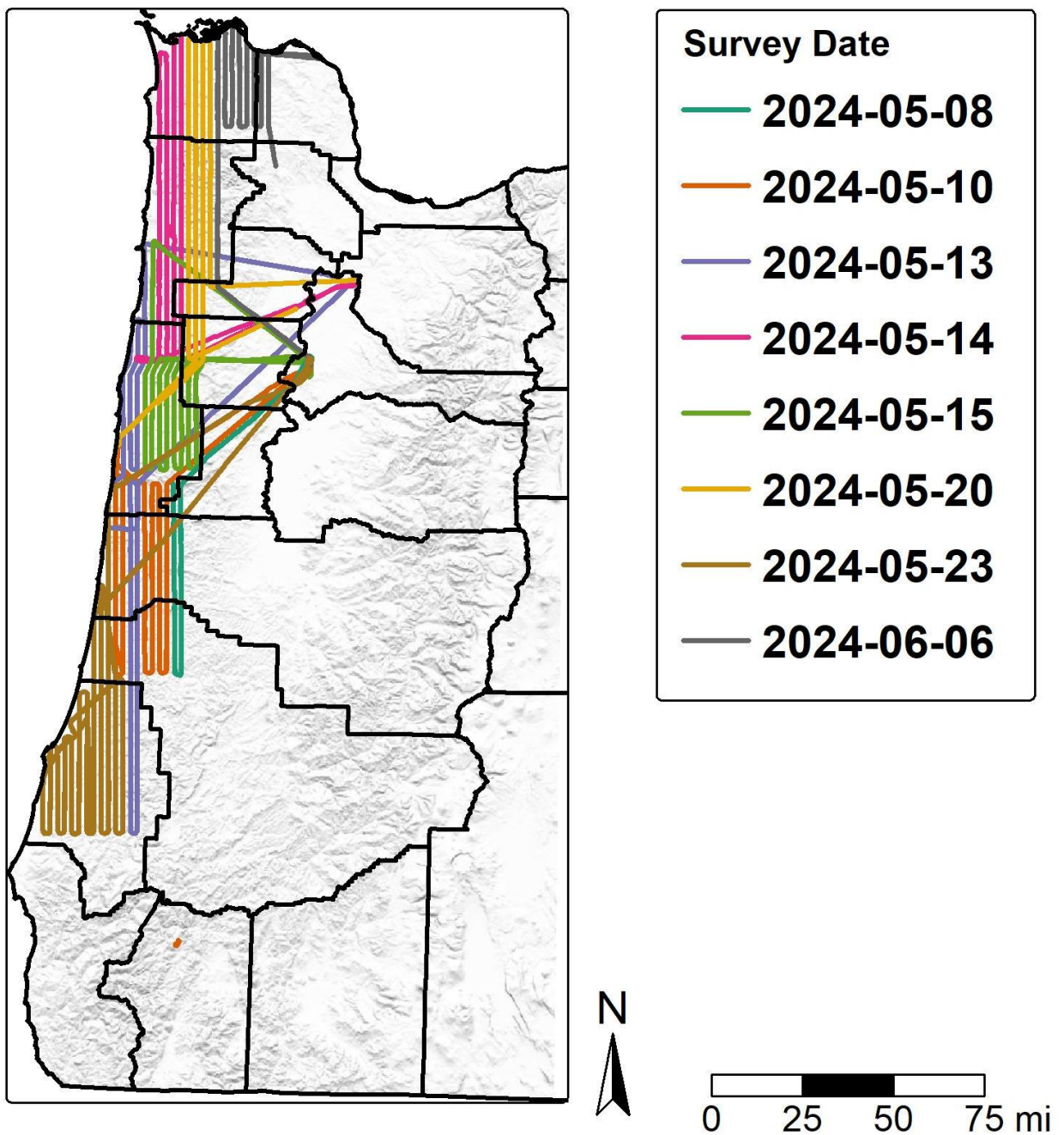


Figure 1. Area surveyed for Swiss needle cast symptoms, 2024. Flight lines are two miles apart.

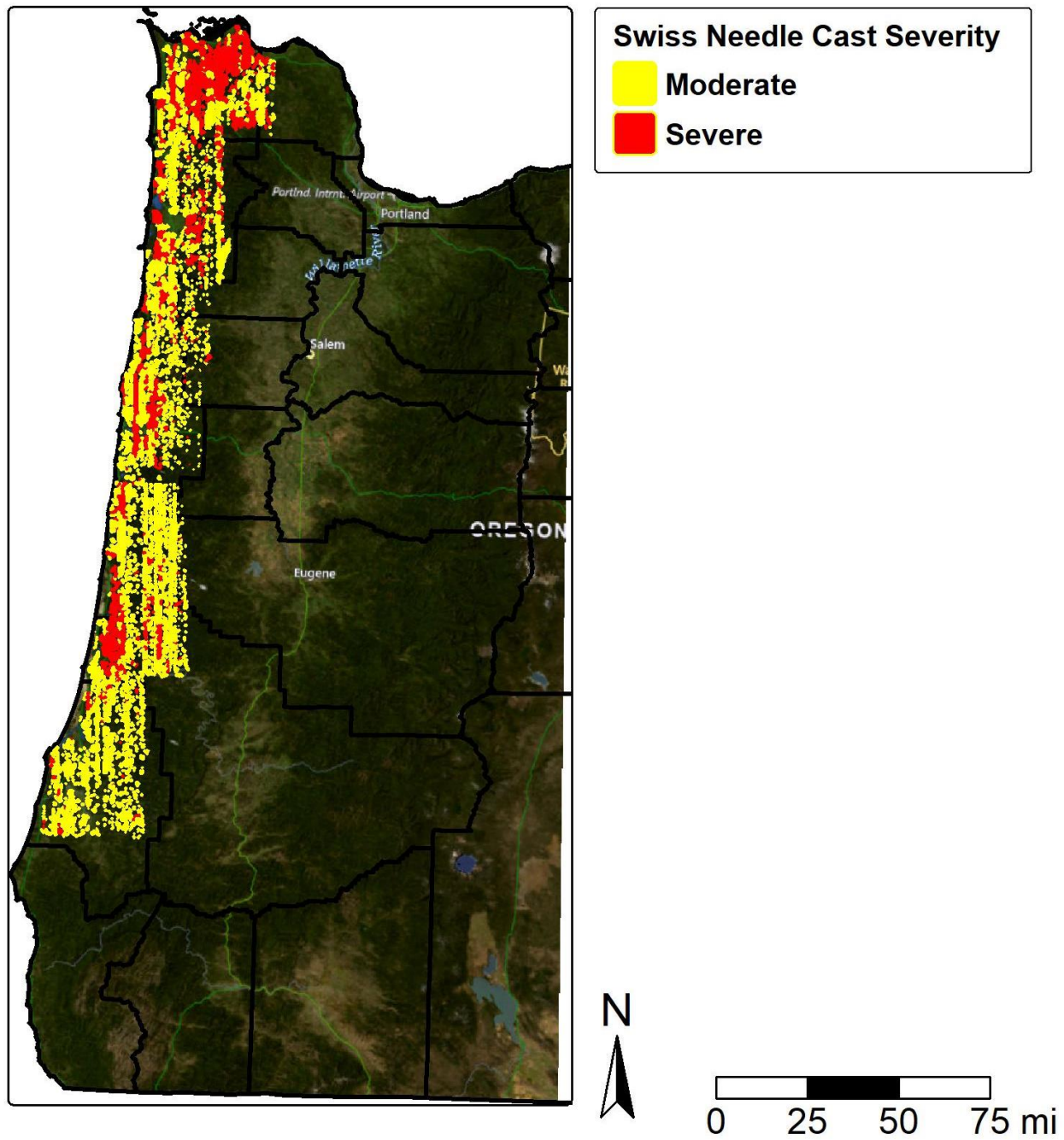


Figure 2. Areas of Douglas-fir forest with symptoms of Swiss Needle Cast detected in the 2024 aerial survey, Coast Range, Oregon.

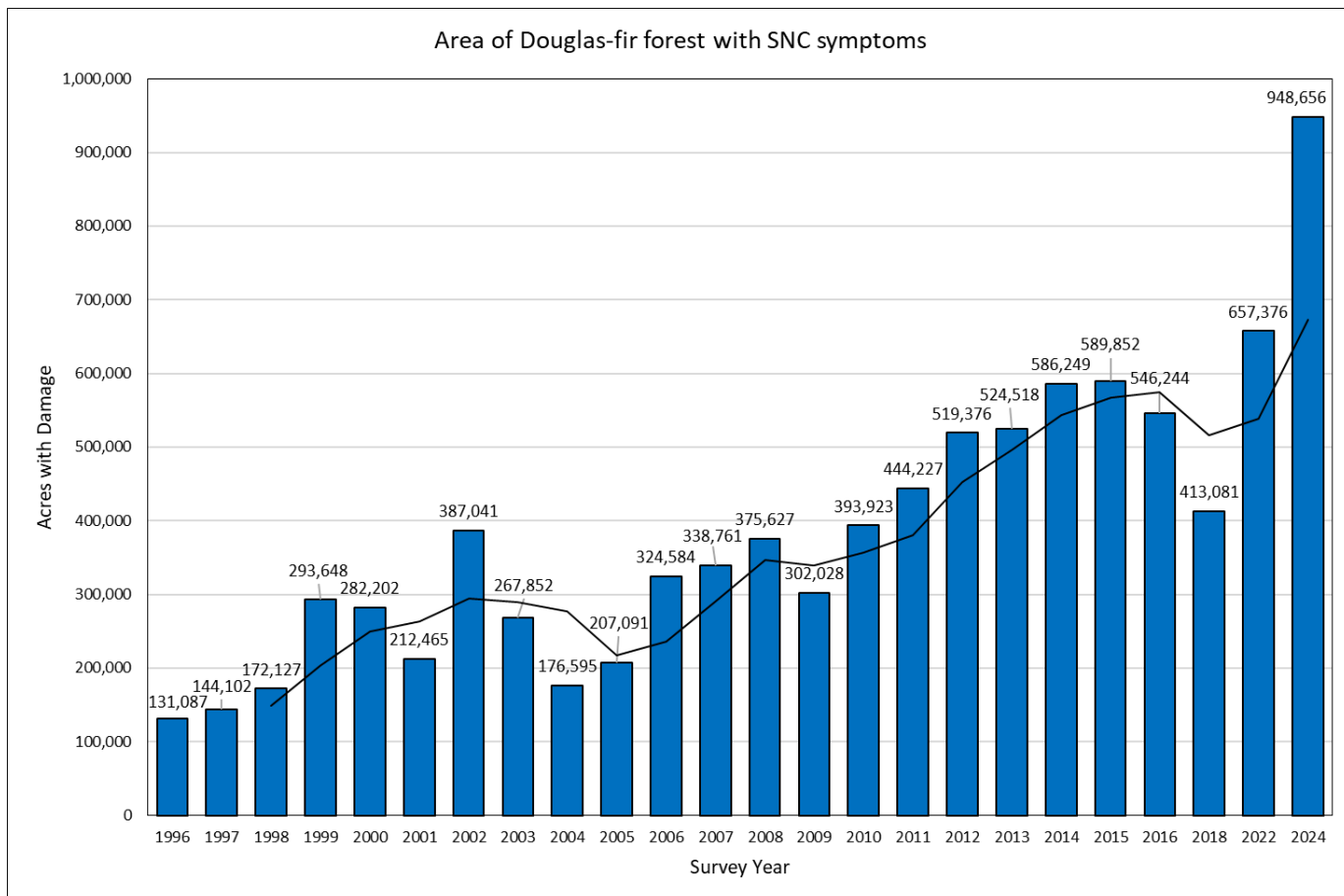


Figure 3. Area of Douglas-fir forest in western Oregon with symptoms of Swiss needle cast detected during aerial surveys conducted between April and June, 1996-2024. Results from 2008 were estimated by extrapolating from three survey blocks. Trend line is 3-year rolling average.

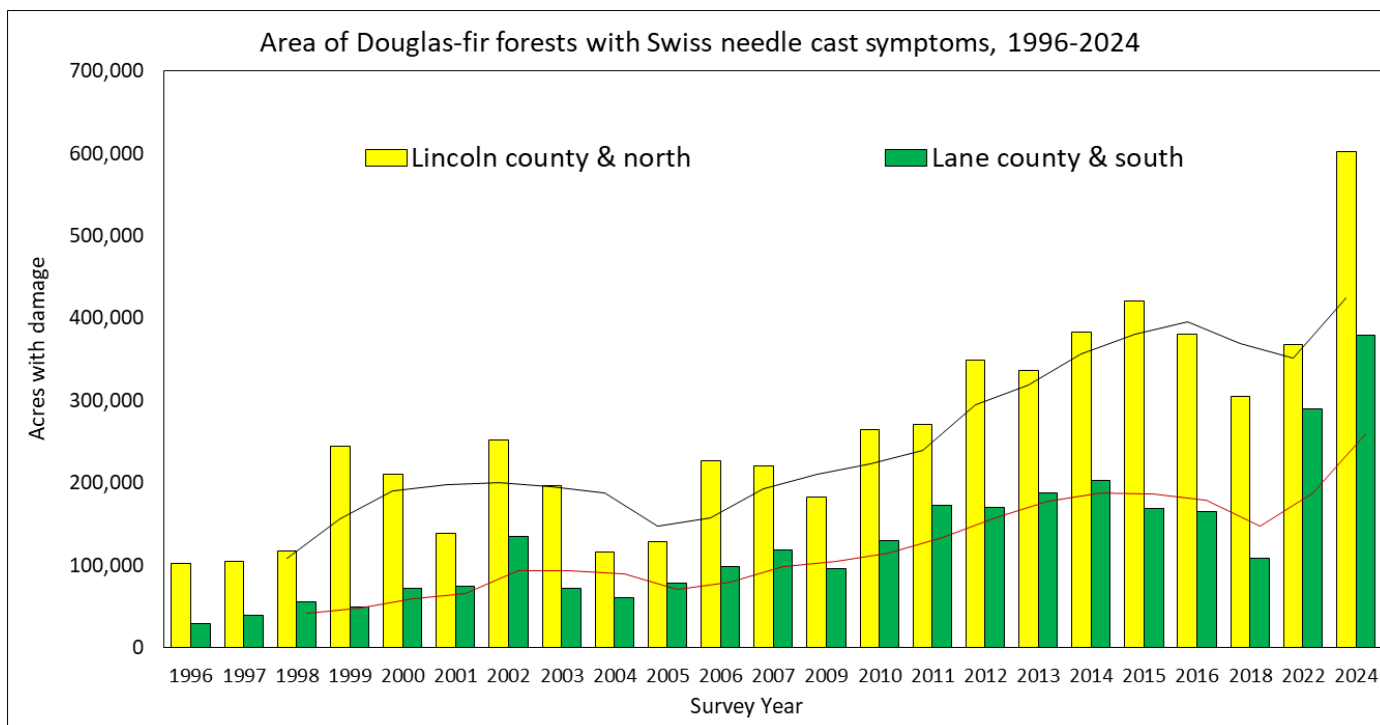


Figure 4. Area of Douglas-fir forest in western Oregon with symptoms of Swiss needle cast detected during aerial surveys conducted in April-June, 1996-2024; north and south halves of survey area. Trend line is 3-year rolling average. Coast Range, Oregon.