

2025 OREGON FOREST HEALTH HIGHLIGHTS





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This report is a joint product from the Forest Health Unit of the Oregon Department of Forestry (ODF) and the U.S. Forest Service (USFS) – Forest Health Protection programs. We also rely on reports from other ODF, USFS, and Oregon State University Forestry Extension staff from across the state (pages 3 and 4) and collaborate with other natural resource agencies, universities, public and private forest landowners, and members of the public to gather information.

Each year we provide information on forest health trends and highlights, as identified by ground and aerial monitoring (Fig. 2). A large part of estimating forest health is measuring damage from agents that cause injury or mortality. These agents include pest insects, diseases, and abiotic stressors, such as drought, storms, and wildfire. Here, we review major damage-causing agents observed in the past year and provide resources for management.

We wish to acknowledge Karen Ripley and Beth Willhite, two of our colleagues who contributed greatly to our knowledge and understanding of forest health. Both will be greatly missed. wfiwc.org/memorium

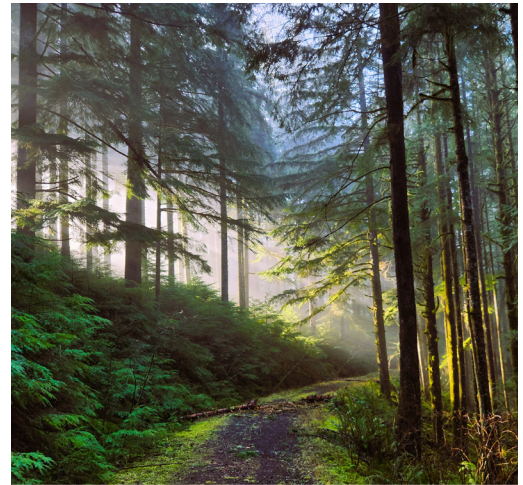
Cover, Figure 1: Oaks from the ground and aerial image (Christine Buhl, ODF). 2025 was a peak year for various foliar and twig pests of Oregon white oak, which caused damage that was visible from ground and aerial surveys.



Figure 2. Data collection via ground sampling, trapping, and aerial survey (Christine Buhl, ODF).

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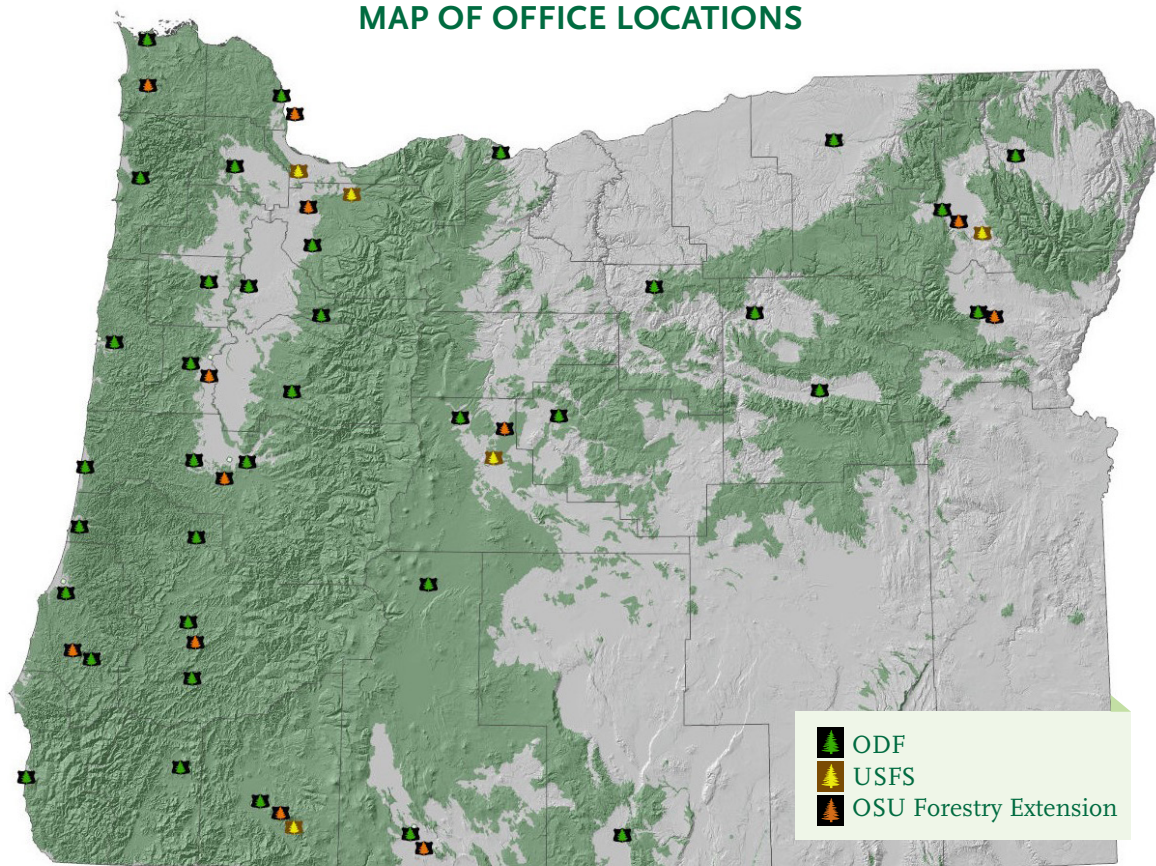
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MAP OF OFFICE LOCATIONS



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GENERAL FORESTRY TECHNICAL ASSISTANCE

knowyourforest.org/assistance-map

FORESTRY FINANCIAL ASSISTANCE

ODF Agency-Wide Landowner Assistance Programs

tinyurl.com/ODFcostshare

Your Local ODF Stewardship Forester

oregon.gov/ODF/Working/Pages/FindAForester.aspx

ODF Urban Program Funding

oregon.gov/odf/forestbenefits/pages/urbanforests.aspx

ODF Seed Orchard May Have Stocks or Recommendations

oregon.gov/odf/working/pages/seed.aspx

OSU Forestry Extension

extension.oregonstate.edu/find-us

OSWA

oswa.org/local-chapters

NRCS

nrcs.usda.gov/state-offices/oregon/whats-available-in-my-county

SWCD

geo.maps.arcgis.com/apps/instant/lookup/index.html?appid=31b2f5ae9d494ecfbf7ff2608061a63f

OWEB

oregon.gov/oweb/grants/pages/grant-programs.aspx



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IN 2025...

Oregon experienced a short, weak La Niña (cooler, wetter winters), which contributed to an increase in total precipitation for the state. However, we then entered the 4th driest spring in recorded history, stressing trees during the most important time of year for tree growth. Wildfire activity was well below the 10-year average, which was a significant drop from the historic wildfire year in 2024. Total damage from insects, disease, and abiotic issues (excluding wildfire) consisted of 181,500 affected acres, which was about 0.7% of the total area surveyed. Damage levels were similar to what we observed in 2024 and well below the 10-year average. The majority of the damage resulted from a complex of drought and opportunistic beetles targeting Douglas-fir (*Pseudotsuga menziesii*), true fir species (*Abies* spp.), and pine species (*Pinus* spp.).

In addition to the insect and disease pests that we regularly see each year, we also observed the following in 2025 (Cover, Fig. 3a-d):

- » Various insects and vertebrates attacking leaves and twigs in oak species (*Quercus* spp.) across its range
- » Sawflies (*Neodiprion* spp.) in Douglas-fir in the Willamette and Umpqua Valleys and coastal foothills
- » Spruce aphid (*Elatobium abietinum*) in Sitka spruce (*Picea sitchensis*) along the coast
- » Douglas-fir tussock moth (*Orgyia pseudotsugata*) in Douglas-fir and other conifer hosts east of Mt. Hood
- » First emerald ash borer (*Agrilus planipennis*) detection in Portland and other areas of Willamette Valley

Also in 2025, federal administrative changes significantly reduced staff and funding. The future of collaborative forest health programs, such as aerial surveys, is to be determined for 2026 and onward.



Figure 3a



Figure 3b

Figure 3a-d. Tree injury from sawflies, spruce aphid, Douglas-fir tussock moth, emerald ash borer (Christine Buhl and Wyatt Williams, ODF; Melissa Fischer, USFS; Dan Stark, OSU).



Figure 3c



Figure 3d

OREGON FORESTS

At 30 million acres, almost half of Oregon is forestland. The number of acres of forest in Oregon has remained relatively consistent since 1953. These forests include family-owned forests that are handed down across generations, large tracts of industrial timber land, and untouched wilderness. Oregon's forests consist of federal (60%), private (35%), state (3%), tribal (1%), and other public (1%) ownerships (Fig. 4).

Oregon offers a diversity of forests ranging from mossy rain-drenched coastal ecosystems dominated by Sitka spruce, Douglas-fir, red alder (*Alnus rubra*), western redcedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*) to oak-dominated savannas, to semi-arid mixed conifer forests of lodgepole pine (*Pinus contorta*), ponderosa pine (*P. ponderosa*), sugar pine (*P. lambertiana*), and incense cedar (*Calocedrus decurrens*) (Fig. 5, next page). Western Oregon is characterized by high rainfall and dense coniferous forests along the Pacific coastline, the Coast Range, and western slopes of the Cascade Range. Eastern Oregon largely consists of lower density, semi-arid forests and high-elevation sagebrush steppe. The most abundant conifers include Douglas-fir, true fir species, western redcedar, western hemlock, lodgepole pine, and ponderosa pine, and the most abundant hardwoods are bigleaf maple, red alder, Oregon white oak (*Quercus garryana*), and black cottonwood (*Populus balsamifera ssp. trichocarpa*). **Oregon Forestry Stats:** oregonforests.org/media/2351

LAND OWNERSHIP IN OREGON

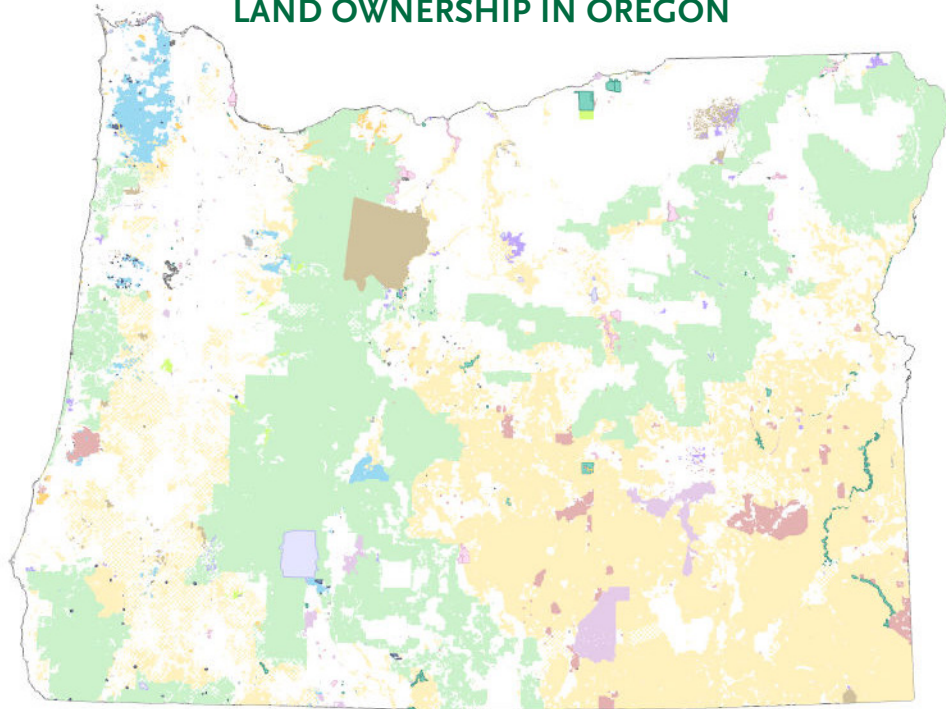


Figure 4. The majority of land ownership in Oregon is private (white) and public land managed by BLM (yellow) and USFS (green).





Figure 5. Diversity of Oregon forests (Christine Buhl, ODF).

MONITORING METHODS

TRACKING FOREST HEALTH

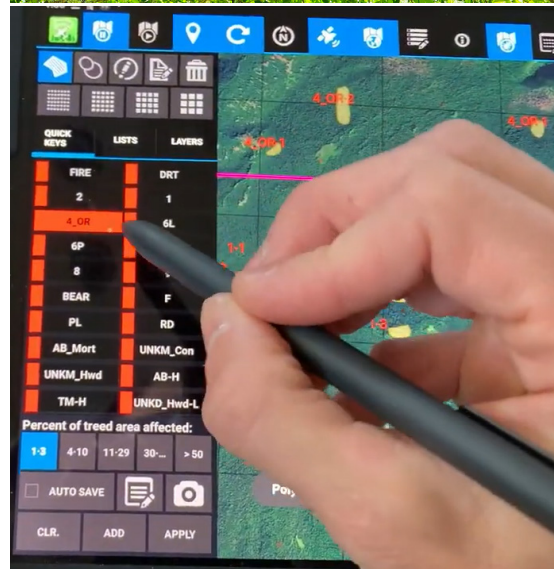
Monitoring includes ground and aerial surveys, sampling, and trapping. Observation and sampling from the ground and air play an important role in detecting novel damage causal agents and monitoring forest health conditions. We use data from these monitoring efforts to diagnose causes of tree damage and to provide technical guidance to landowners. In addition to these traditional monitoring methods, we are developing and testing new methods of forest health monitoring using remotely-sensed data from uncrewed aerial vehicles, fixed-wing aircraft, and satellites.

AERIAL DETECTION SURVEY (ADS)

The Pacific Northwest forest health Aerial Detection Survey (ADS) is a cooperative effort between the Forest Health Protection program of the USDA Forest Service (FHP), the Forest Health Unit at the Oregon Department of Forestry (ODF), and the Forest Health Unit at the Washington Department of Natural Resources (WA DNR). These surveys help ODF and its partners monitor forests for tree injury and mortality from insects, pathogens, and abiotic agents, such as drought, windthrow, and fire. ODF, FHP, and WA DNR disseminate ADS data in technical bulletins, such as this publication, professional conferences, and peer-reviewed scientific research articles to help inform forest management.

ODF and its partners conduct the general ADS to map damage from all agents annually as well as several specialized surveys for damage from agents of special interest. Specialized surveys are conducted for Sudden Oak Death three to four times per year. Specialized surveys for other agents such as oak looper and pandora moth are conducted on an as-needed basis. Historically, ODF conducted specialized surveys for Swiss needle cast biennially. However, after re-evaluating monitoring needs for this foliar pathogen, ODF will transition its Swiss needle cast monitoring program to a network of fixed-radius forest plots to provide data more directly relevant to silvicultural interventions to mitigate the effects of Swiss needle cast.

For the general survey, trained observers fly over all forested lands in the Pacific Northwest in fixed-wing aircraft and record damage to trees from both abiotic and biotic agents. Flights are staffed with one observer on each side of the aircraft. Survey flights typically maintain a flight altitude of approximately 1,500 – 2,500 feet above ground level, travel at approximately 90 to 140 miles per hour, and follow a systematic grid of transects spaced four statute miles apart. ADS staff use their knowledge of biogeography, host species, and visual cues to infer the damage causal agent.



Damage is recorded in real time using the specialized software platform Digital Mobile Sketching Mapping developed by the Forest Health Assessment and Applied Sciences Team at the USDA Forest Service. Crew members scan the forest up to two statute miles outboard from the aircraft and record all damage observed. ADS observers draw either points or polygons to record the spatial location of the damage they observe and assign the observation a host and damage causal agent combination as well as an estimate of the extent of the damage. For points, the extent of the damage is expressed as the number of trees damaged. For polygons, the extent of damage is expressed as the percent of the area within the polygon containing damaged trees. At the end of the season, the data are reviewed for topological integrity and quality control. We quantify the extent of tree damage using two values: "acres with damage" and "affected acres." "Acres with damage" represent the total area within a polygon drawn by an observer and typically contain a mosaic of damaged and undamaged trees. "Affected acres" directly estimate the spatial extent of tree injury or mortality and are the product of the acres with damage and the proportion of the polygon affected. Typically, polygon data consist of fewer affected acres than acres with damage. For point data, acres with damage and affected acres are the same. The spatial extent of each polygon is calculated to determine the acres with damage. Finally, the affected acres are calculated for both points and polygons using standardized formulas, reflecting both the acres with damage and the extent of the damage.

The Pacific Northwest ADS is the longest continuous survey of its kind in the United States, having been established in 1947 and flown every year thereafter. The only exception was in 2020 due to the COVID-19 pandemic. The ADS data provide a spatially extensive, point-in-time estimate of forest health issues on all forested lands in Oregon and Washington. However, there are important caveats to interpreting these data. Due to the nature of the survey, the ADS data are not necessarily comprehensive and spatial locations should be considered approximate. As noted above, damage causal agents are inferred from the combination of biogeography, host species, and visual cues. Some things that cause damage have similar visual signatures, overlapping biogeographies, and affect the same host species, leading to misclassified damage in the ADS dataset. Other damage-causing agents, such as many root diseases, may not create visual signatures detectable from fixed-wing aircraft. Furthermore, while observers attempt to record all damage within two miles of the aircraft, frequently observers are unable to detect and record damage when topography blocks their line-of-sight to a damaged area or if the tree damage would only be observable while they are recording another observation. Finally, tree damage is frequently the result of a complex, interacting suite of abiotic and biotic factors, including climate change, drought, soil conditions, pathogens, interspecific and intraspecific competition, and others. Therefore, the assigned agent should be considered the presumed proximate cause of tree damage rather than either the sole or even the primary cause of tree damage.

In 2025, ODF and its partners surveyed about 29.5 million acres of forest in Oregon during the general ADS. Finally, ODF and USFS jointly conducted four rotorcraft and one fixed-wing specialized survey for Sudden Oak Death in 2025.

ADS Data & Maps

oregon.gov/ODF/ForestBenefits/Pages/ForestHealth.aspx

Statewide Insect & Disease Aerial Surveys

fs.usda.gov/science-technology/data-tools-products/fhp-mapping-reporting/detection-surveys



Figure 6. Video of ADS being conducted.
youtu.be/-1wD--yKaLg?si=UFmFoKMOp7sXohxA

IMPACT ASSESSMENT

Some injury and mortality agents are underrepresented here because they were not visible during surveys or are hard to observe or verify on a large scale (e.g., root diseases).

Oregon contains 30 million acres of forestland. In 2025, approximately 340,000 acres were impacted to varying degrees by wildfire (acres represent a mosaic with burned and unburned trees). This was a significant drop from a record high in 2024.

Current-year damage from non-wildfire stressors (storms, drought, insects, diseases) recorded in 2025 totaled 181,500 affected acres, which was substantially less than the 10-year average (Fig. 7). “Affected acres” indicates actual acres of damage rather than a mosaic with and without damage. About 0.7% of the area surveyed was damaged, which was a slight decrease from the past 3 years. Of this total damage, 34,250 acres consisted of tree injury, which trees may or may not survive, and 147,250 acres of tree mortality. The majority of recorded damage (78%) was a result of a complex of drought stress and opportunistic beetle pests that target stressed trees (Fig. 8). Damage was more concentrated in our most frequently drought-stricken parts of Oregon in the southwest, east of the Cascades into Central and northeastern Oregon (Fig. 9). Elsewhere damage was more scattered. The counties with the highest levels of tree death relative to area covered during surveys were those east of the Cascades (Fig. 10), and the major damage agents were primarily opportunistic insects on drought-stressed trees (Fig. 11).

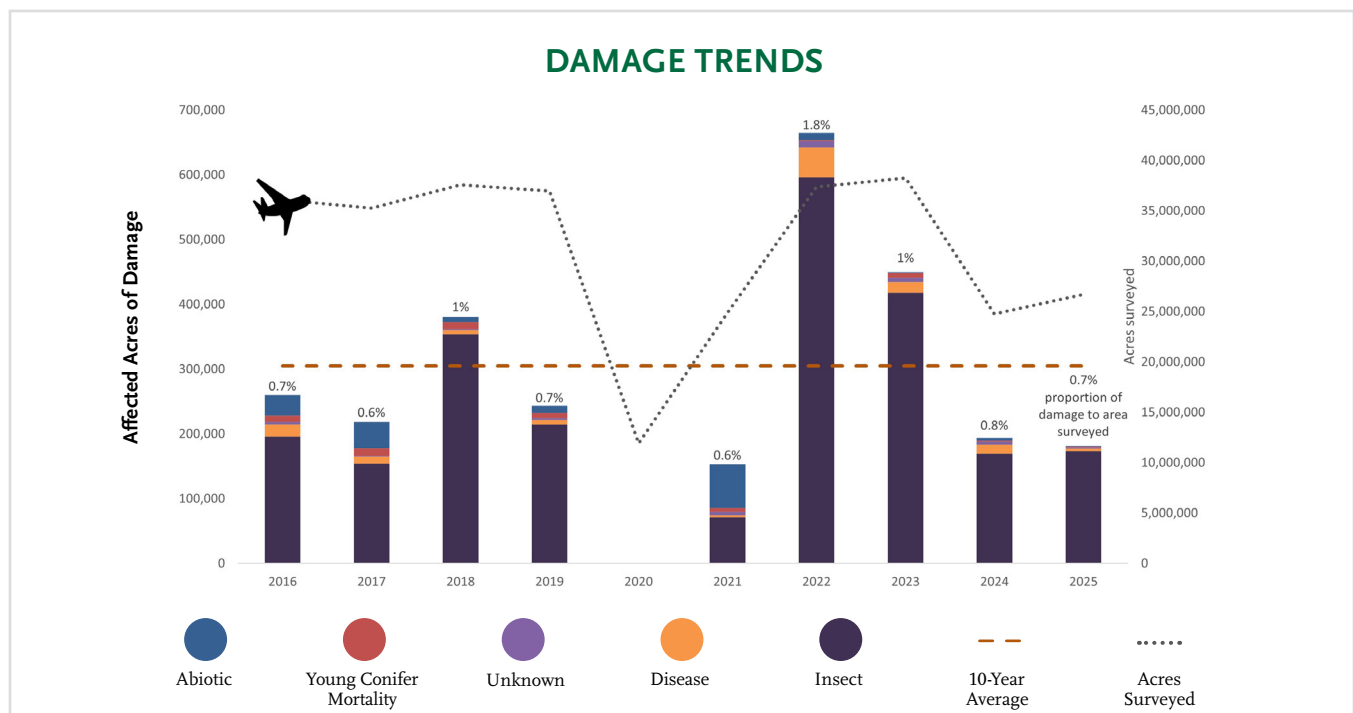


Figure 7. 10-year trend of affected acres of tree damage (injury and mortality) from insect, disease, and abiotic (wildfire excluded) damage causal agents observed during annual aerial surveys. Caveats to these data:

- 1) Insect damage often indicates underlying stress from a different primary causal agent, such as drought.
- 2) Diseases are greatly underrepresented because they are hard to capture via aerial survey. Swiss needle cast is not shown here because it is not an annual survey.
- 3) Data from 2020 are excluded because they were collected via a different method (Scan and Sketch 2020 Forest Health Highlights) that is not comparable across years.

The majority of tree deaths were observed in pine species, true fir species, and Douglas-fir (Fig. 11). The extent of tree mortality by species is strongly related to the abundance of each species. Thus, some of the results from the Aerial Detection Survey may belie more existential forest health concerns. Species such as tanoak (*Notholithocarpus densiflorus*), Oregon ash (*Fraxinus latifolia*), and whitebark pine (*Pinus albicaulis*) face serious threats of local extirpation and extinction from novel forest pests. Since 2001, tanoak in Curry County have died from sudden oak death caused by the oomycete *Phytophthora ramorum*. Oregon ash mortality will likely increase exponentially as the emerald ash borer, a Buprestid beetle, continues to spread throughout the Willamette Valley and Oregon. Whitebark pine populations have declined from white pine blister rust caused by the Basidiomycete fungus *Cronartium ribicola*.

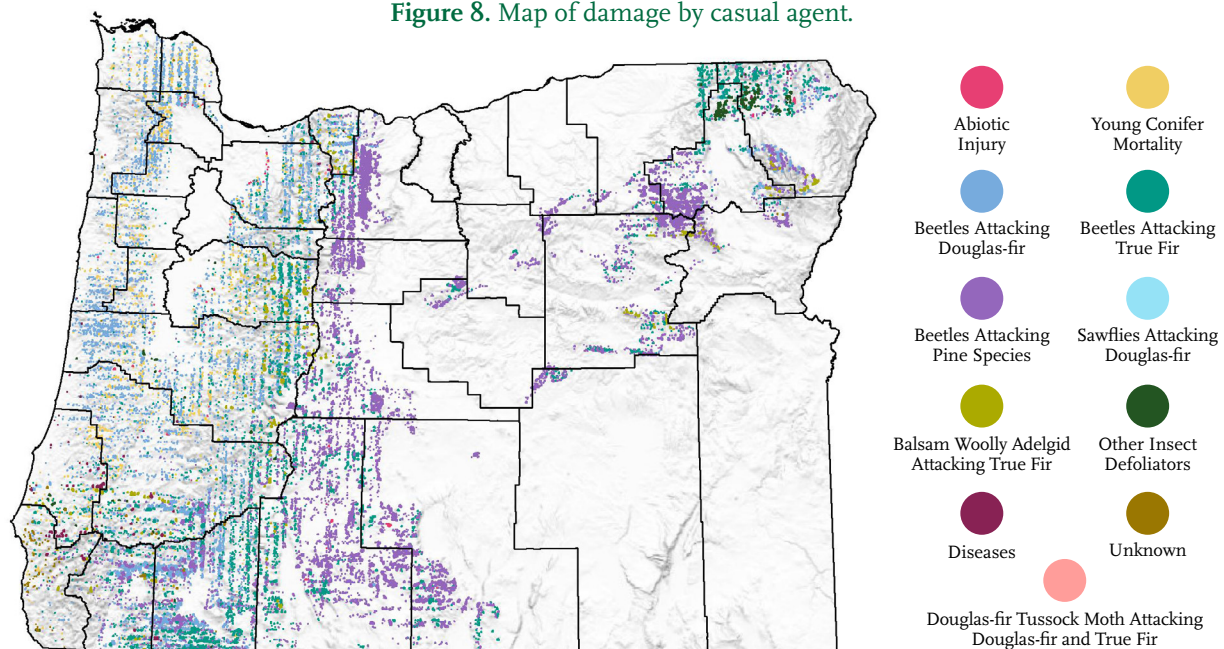
Nonetheless, the majority of tree mortality reported here is attributed to native or naturalized biotic agents. Generally, these damage causal agents are only the proximate cause of tree mortality. Typically, a complex interaction of abiotic and biotic factors ultimately causes a tree to die. In particular, climatic stressors such as heat and drought make trees more susceptible to forest insects and pathogens.

For example, true fir species are fire intolerant. They are also less drought tolerant than are many other tree species. With widespread fire exclusion over the past century, their populations have expanded in spatial extent and density where previously their populations would have been strongly regulated by fire. Climate change has increased the frequency and severity of drought and heat events, making large portions of the landscape more stressful for true fir species. As a result, we frequently observe large true fir species mortality events attributed to the Scolytine bark beetle fir engraver (*Scolytus unispinosus*) in response to prolonged hot drought events. However, even under wetter growing conditions at high elevation, true fir species are susceptible to balsam woolly adelgid, a naturalized insect introduced from Europe in the late 19th or early 20th century.

Finally, young trees may be more susceptible to some damage causal agents than mature trees would be. We observed approximately 11,200 acres of young conifer mortality as a result of root disease such as blackstain root disease (*Leptographium wagneri* oregon.gov/odf/documents/forestbenefits/blackstainrootdisease.pdf), poor establishment, drought stress, and sometimes vertebrate animals (doi.org/10.1016/j.foreco.2018.10.005).

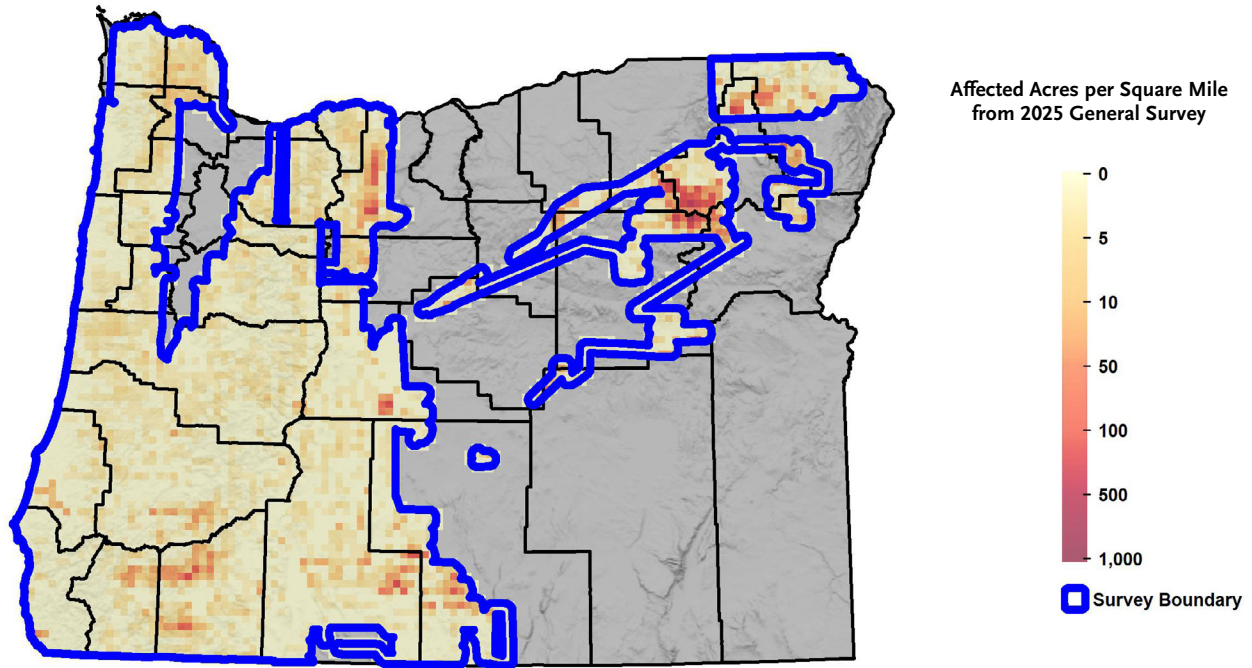
MAJOR DAMAGE CAUSAL AGENTS

Figure 8. Map of damage by casual agent.



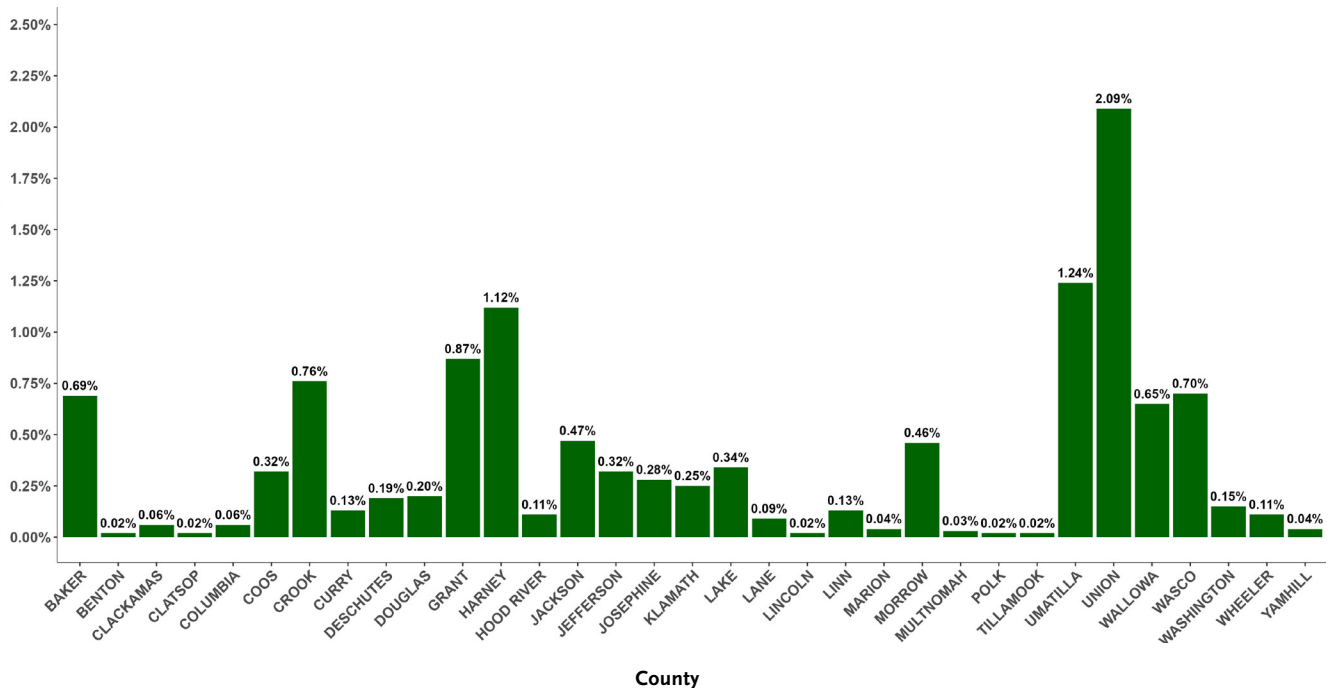
AFFECTED ACRES PER SQUARE MILE FROM 2025 GENERAL SURVEY

Figure 9. Heat map of damage from all agents (wildfire ex



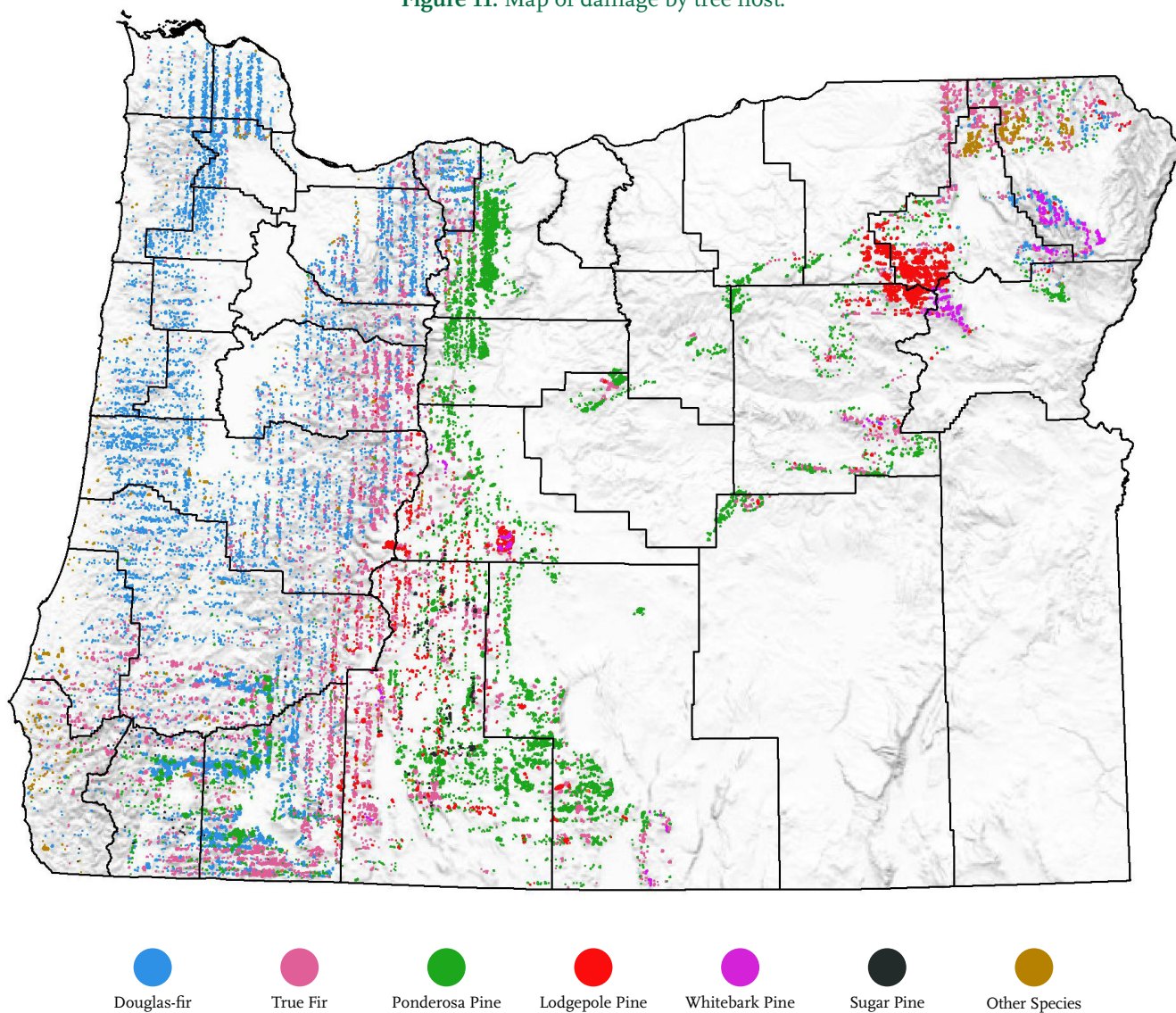
PERCENT OF SURVEYED ACRES AFFECTED IN COUNTY

Figure 10. Amount of damage relative to area surveyed for each county.



MOST AFFECTED TREE SPECIES

Figure 11. Map of damage by tree host.



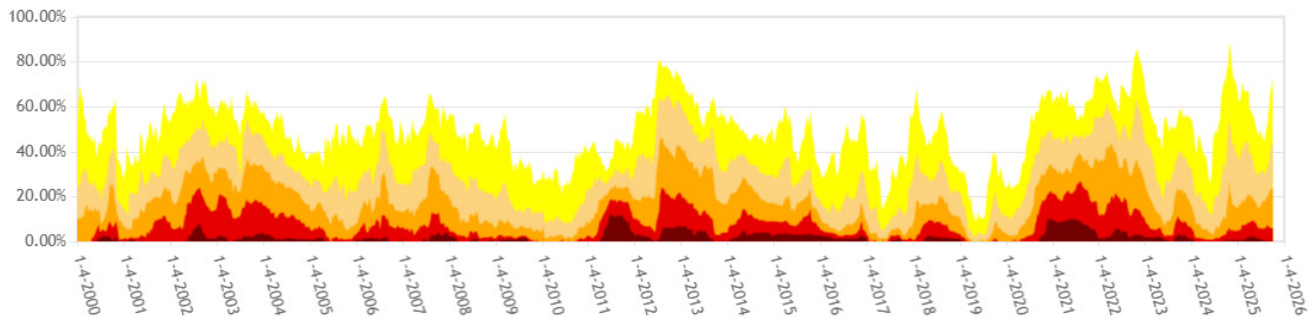
DAMAGE CAUSAL AGENT BY COUNTY

Figure 12. Affected acres from the most damaging causal agents within each county.

COUNTY	DOUGLAS-FIR BEETLE	BALSAM WOOLLY ADELGRID	FIR ENGRAVER	FLATHEADED FIR BORER	MOUNTAIN PINE BEETLE	WESTERN PINE BEETLE
Baker	75	60	26	0	1,831	185
Benton	40	0	2	0	0	0
Clackamas	217	80	77	3	1	1
Clatsop	59	0	3	0	0	0
Columbia	141	0	3	0	0	0
Coos	43	1,184	42	20	0	1
Crook	24	0	577	0	40	767
Curry	11	470	86	27	1	31
Deschutes	0	66	303	0	1,637	556
Douglas	253	2,239	611	1,588	34	259
Grant	22	433	371	0	7,105	2,043
Harney	0	0	169	0	11	795
Hood River	69	233	13	2	0	9
Jackson	68	138	794	5,678	282	1,237
Jefferson	11	228	32	0	3	679
Josephine	15	605	321	1,633	13	284
Klamath	4	187	1,484	1	715	5,437
Lake	0	0	1,319	0	160	3,840
Lane	462	750	314	17	485	4
Lincoln	55	0	2	0	0	0
Linn	106	1,006	281	3	17	0
Marion	55	10	50	0	0	0
Morrow	0	0	4	0	2	674
Multnomah	19	3	10	0	0	0
Polk	39	0	10	0	0	0
Tillamook	91	0	2	0	0	0
Umatilla	2	4	320	0	4,134	241
Union	569	182	1,570	0	13,617	87
Wallowa	501	196	1,523	0	706	61
Wasco	118	54	69	0	8	4,056
Washington	107	0	8	0	0	0
Wheeler	0	0	66	0	0	127
Yamhill	90	0	7	0	0	0

ANNUAL AVERAGE PROPORTION AREA OF DROUGHT IN OREGON

Figure 13. Drought trends from 2000–2025 showing average proportion of Oregon that experienced each level of drought each year. In recent years larger proportions of the state (peak heights) have experienced longer periods (width of peaks) of more intense (increasing red color) (U.S. Drought Monitor).



From the U.S. Drought Monitor website, droughtmonitor.unl.edu/DmData/TimeSeries.aspx, 10-14-2025



CLIMATE

DROUGHT DEEPENS

The western U.S. is experiencing the worst megadrought (period of extreme dryness that lasts for decades) on record (Fig. 13). Despite some individual years of wet conditions, since the year 2000, on average conditions have been drier than any other 25-year period in the past thousand years. Climatic stressors in the Pacific Northwest such as drought and heat events make trees less resilient to insect attacks and pathogen infection. Sometimes these climate stressors kill trees directly by interrupting a tree's ability to transport water from the soil to its leaves. In 2025, Oregon experienced a historically dry spring, receiving about half its usual precipitation between April and August. The lack of spring rain caused record low stream flows. Consequently, Governor Kotek declared drought emergencies for some counties to help address water supply issues and facilitate emergency permit processes.

Note: Temperature, rainfall, and snowfall are typically summarized over the course of a 'water year,' which is a 12-month period from October 1 to September 30. Climatic variables within a given water year are often compared to a 30-year mean. For this report, we compare climatic data to the corresponding 30-year mean values from 1991-2020. When evaluating impacts on long-lived plants such as trees, what is considered "normal" in terms of temperature and precipitation may also be compared against longer time spans, such as 100-year averages.

Over the course of the last water year (October 1, 2024, to September 30, 2025):

- » We experienced a short, weak La Niña phase of the El Niño Southern Oscillation (ENSO) cycle. ENSO cycles are interannual fluctuations in oceanic surface temperatures in the equatorial western Pacific Ocean. La Niña phases occur when oceanic surface temperature is below average and result in cooler, wetter winters in the Pacific Northwest.
- » For much of the state, the mean daily temperatures were 1-2°F warmer than the 30-year average (1991-2020). Winter months (January-March) were 0.8°F cooler than average. Despite this reprieve, spring (April-June) was 2.3°F warmer than average and summer was 2.0°F warmer than average. Water year 2024-2025 was Oregon's fifth warmest on record and contained Oregon's fourth warmest spring on record.
- » The total precipitation ranged from above the 30-year average across southern Oregon, including the Rogue Valley and adjacent regions, to much lower than average across northern Oregon, particularly along the Columbia Plateau and lower Columbia regions, with slightly below-average precipitation across parts of central Oregon. Precipitation was 110–130% of normal in southern Oregon, approximately 70% of normal

across northern Oregon, and around 90% of normal across parts of central Oregon. Trees require the most moisture during the active growing season in spring, and despite above-average precipitation during the overall water year, Oregon experienced its fourth driest spring (April–June) on record, with statewide precipitation 41% below the 30-year normal.

- » Snowpack peaked on March 25, before its typical peak in mid-April. Water year 2024-2025 had greater snowpack between November and March than did the previous water years for that same time period. Snowmelt increased exponentially in April.
- » Standardized Precipitation-Evapotranspiration Index, or SPEI, is a climate metric used in drought monitoring and incorporates both precipitation and temperature as it influences water demand or evapotranspiration. The range is from -2.5 to 2.0, negative values indicate drought and positive values indicate wetness. Across the water year, much of the state was around normal, but the Willamette Valley and northern Cascades were in the -1.5 range and the Oregon Outback ranged from 0.5–1.5 and an isolated portion of the southwest nexus of Coos, Josephine, and Douglas counties was in the 2.5 range. However, various parts of the state experienced varying levels of drought ranking depending on the month. The counties of Lincoln, Coos, Douglas, Jefferson, Wheeler, Morrow, Union, and Baker each received drought declarations at some point during the water year.

TREE DECLINES

An increasing issue in Oregon is widespread mortality events of native tree species within their range due to the climate changing too rapidly for them to adapt. Climate impacts such as high temperatures and reduced or inconsistent precipitation are further intensified at more stressful or less suitable sites. Trees are especially at risk when growing along exposed edges, steep slopes, south-facing aspects, on thin or poor soils, etc. Tree genetics, establishment, site quality, regional atmospheric climate, and within-stand microclimatic factors contribute to tree health and survival. These factors not only influence tree growth, but also susceptibility to insect and disease pests that healthy trees may otherwise resist or tolerate. Tree decline often results from a combination of multiple factors over time (Fig. 14). Best management practices for stands include maintenance of stocking levels below the carrying capacity of the site under intensifying climate change and selection of tree species or seedlots that are best suited to site conditions such as soil, topography, and climate macro and microclimate.

Climate-adapted Timber Stocking Tables

extension.oregonstate.edu/sites/extd8/files/documents/emg206.pdf

Movement of Seedlots

pmc.ncbi.nlm.nih.gov/articles/PMC4780373/#eva12293-bib-0002

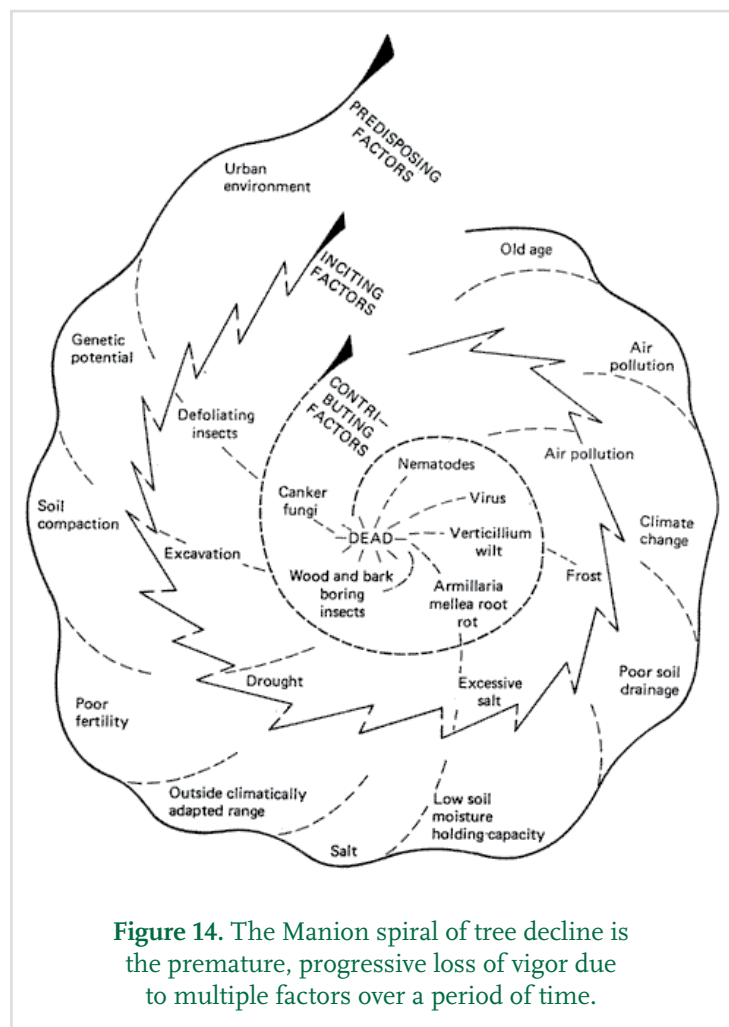


Figure 14. The Manion spiral of tree decline is the premature, progressive loss of vigor due to multiple factors over a period of time.

BIGLEAF MAPLE

Significant portions of bigleaf maple crowns with scorched or fully desiccated leaves were visible starting around mid-summer (Fig. 15). Bigleaf maple is a moderately drought-tolerant species. However, it will show signs of physiological stress when drought conditions are intense, extend for long durations, or begin abruptly after periods of cool and moist conditions. The rapid onset of warm dry conditions in the spring combined with ongoing drought over the past two decades likely contributed to the discoloration in bigleaf maple crowns we observed.

Bigleaf Maple Silvicultural Characteristics

srs.fs.usda.gov/pubs/misc/ag_654/volume_2/acer/macrophyllum.htm



Figure 15. Scorched leaves in maple are often linked to drought (Christine Buhl, ODF)

WESTERN REDCEDAR

Western redcedar (WRC) continues to show symptoms of decline in the form of thinning crowns and topkill of upper crowns (Fig. 16). Some trees continue to survive despite noticeably struggling. However, each year more WRC die throughout its biogeographic range. WRC requires shady, moist growing conditions. As climate change intensifies, WRC will continue to decline throughout the Willamette Valley as former conducive sites become too stressful for its survival. Climate projections for this species indicate potential range reduction and shift (Fig. 17 Range 1 & 2). It is advised to retain WRC at the best sites that can provide sufficient shade and moisture but consider shifting toward more drought-tolerant species at sites that are more prone to heat and drought.

WRC Silvicultural Characteristics

srs.fs.usda.gov/pubs/misc/ag_654/volume_1/thuja/plicata.htm

WRC Dieback Information: tinyurl.com/WRCStorymap



Figure 16. Thinning and/or topkill are common symptoms of declining western redcedar. Brown, sparse foliage and dead upper branches are visible indicators of stress (Christine Buhl, ODF).

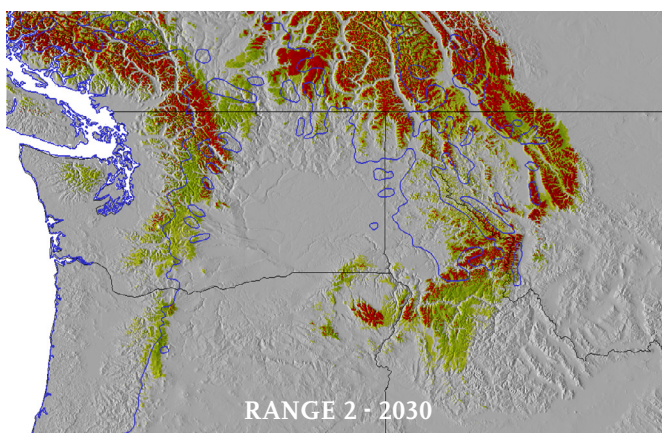
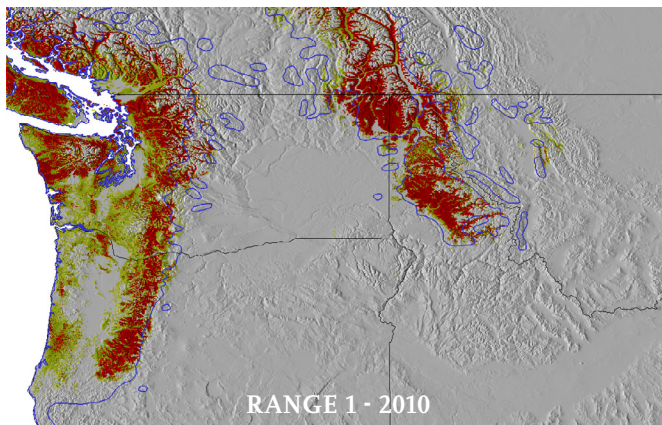


Figure 17 Range 1 & 2. Current WRC range as of 2010 and predicted range in 2030 under a mild climate change scenario. Red indicates optimal habitat and green indicates less optimal habitat for WRC. (Crookston et al. 2010 doi.org/10.1016/j.foreco.2010.07.013)

Figure 18. Missing foliage, flagging or dropped branches, topkill, and irregular crowns are often indicators of drought stress (Christine Buhl, ODF).



DOUGLAS-FIR

We observed continued Douglas-fir mortality in the Rogue, Umpqua, and southern Willamette Valleys (Fig. 18). Fire exclusion in the Rogue and Umpqua Valleys over the past century allowed Douglas-fir to expand its populations into areas where historically they would have been strongly limited by fire. As climate change intensifies, growing conditions are likely becoming increasingly stressful for Douglas-fir in these geographies. Consequently, these trees are succumbing to the opportunistic Buprestid beetle flatheaded fir borer (*Phaenops drummondi*) (see page 27), which is fatal only for the most stressed Douglas-fir trees. In other parts of the Willamette Valley, trees that were previously adapted to the site conditions are failing due to rapidly worsening conditions.

Douglas-fir Silvicultural Characteristics

srs.fs.usda.gov/pubs/misc/ag_654/volume_1/pseudotsuga/menziesii.htm

Drought stress in Conifers

oregon.gov/odf/Documents/forestbenefits/Drought.pdf

Flatheaded Fir Borer Fact Sheet

oregon.gov/odf/Documents/forestbenefits/FFB_2016.pdf



CHRISTMAS TREES

Christmas tree seedling mortality is an increasing issue for Christmas tree growers in Oregon due to rising temperatures and more frequent droughts. Seedling establishment is influenced by tree species, planting stock health, weather, soil conditions, and seedling traits such as shoot height, stem diameter, root mass, and shoot-to-root ratio. Larger stem diameter and more balanced shoot-to-root ratios can improve survival under these adverse conditions.

Within commonly planted Christmas tree species, noble fir (*Abies procera*), which is best adapted to elevations above 3,000 feet, is more susceptible to summer heat and drought than are other commonly planted Christmas tree species in the Willamette Valley such as Douglas-fir, Nordmann fir (*Abies nordmanniana*), and Turkish fir (*A. nordmanniana* ssp. *equi-trojani*). The OSU Christmas tree extension program has conducted several trials over the years to evaluate various practices to improve survival, such as utilizing foliar sprays, shade screens, root dips (polymers, bio-stimulants, mycorrhizae), and mulch. Among all these approaches, organic mulches such as wood chips improve seedling survival by significantly reducing soil temperature. Despite the potential for improved seedling survival during droughts, there are concerns with mulch, such as cost, nutrient immobilization, and introduction of diseases.

Drought stress predisposes Christmas trees to opportunistic beetles, weevils, and canker-causing fungi that can result in branch flagging or whole-tree mortality (Fig. 19). Beetle infestation can be diagnosed by evidence of bored holes and sawdust (frass), particularly near branch junctions. Cankers often cause visible sunken and discolored bark tissue. These signs and symptoms indicate that trees are stressed, and the primary culprit, which is often drought, must be addressed for a long-term solution.

OSU Christmas Tree Program

extension.oregonstate.edu/forests/christmas-trees

ODA Christmas Tree Program

oregon.gov/oda/nursery-christmas-tree/pages/default.aspx



Figure 19. Tiny round exit holes from beetles (left), sunken and discolored tissue from cankers (middle), and branch flagging and topkill (right) (Christine Buhl, ODF).

WILDFIRE

Oregon's 2025 wildfire season (Fig. 20) resulted in approximately 340,000 acres with damage from wildfire (Fig. 21), which was significantly less than in previous years (Fig. 22), particularly following the historic 2024 season where 1.9 million acres were impacted (Fig. 23, next page).

CAUSE	NUMBER	ACRES
Human-caused	1,109	120,524
Lightning-caused	1,434	149,432
Undetermined	422	68,746
Total	2,965	338,702

Figure 21. 2025 Wildfire statistics (WRCC).

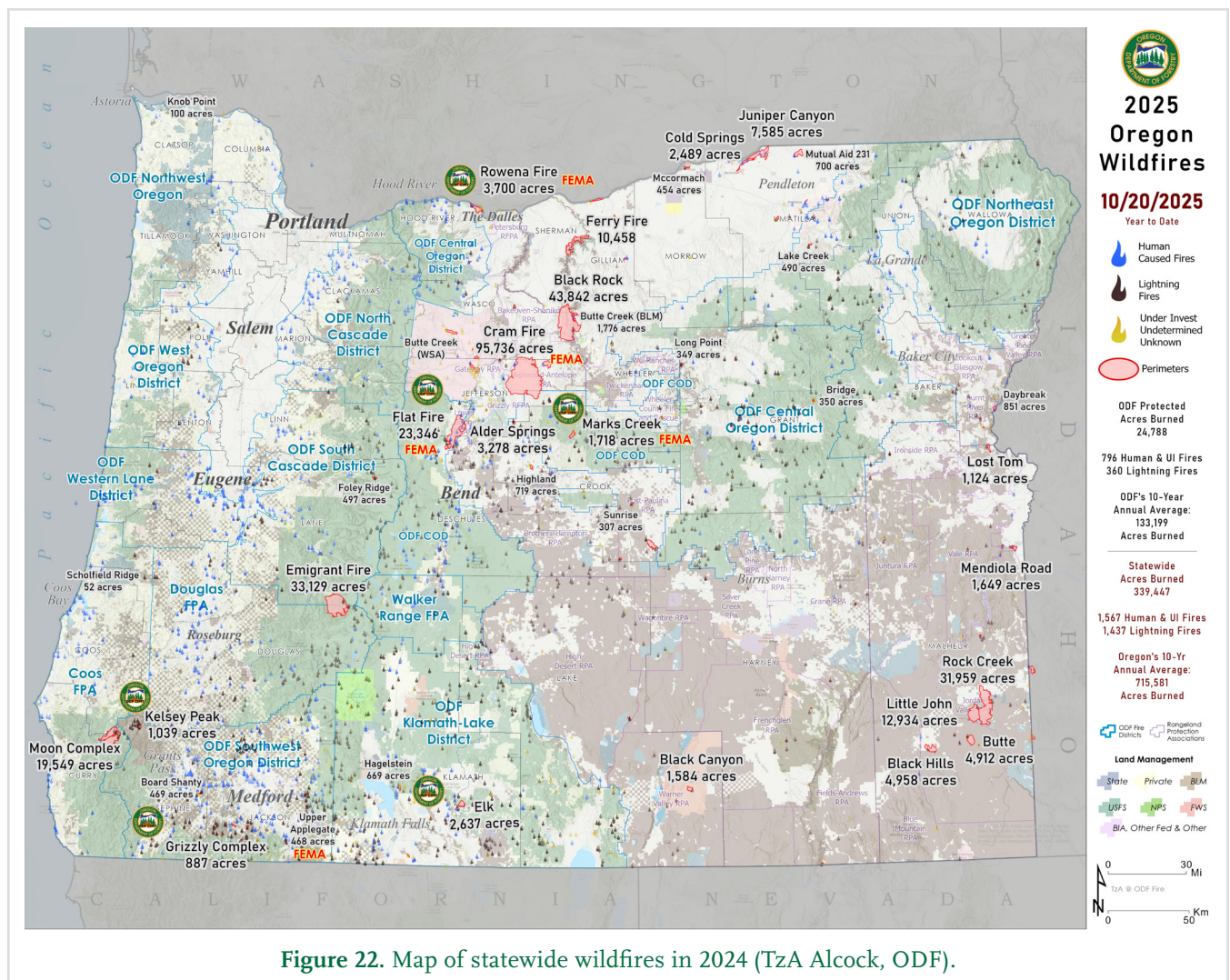
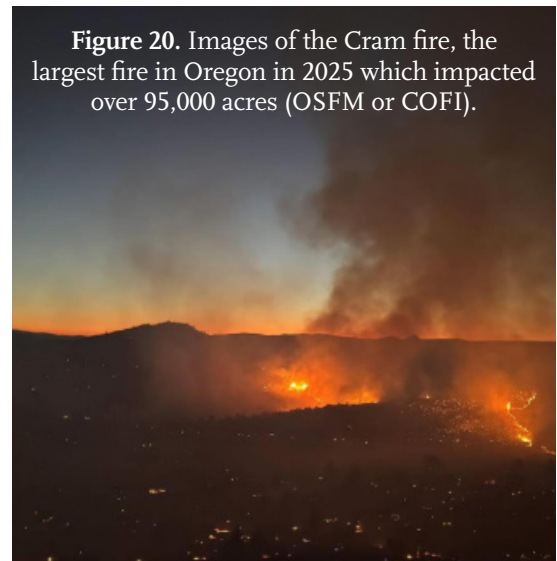


Figure 22. Map of statewide wildfires in 2024 (TZA Alcock, ODF).

The milder fire season likely resulted from thunderstorms that were often accompanied by precipitation, less frequent high wind events, and higher snowpack than in recent years. Additionally, early fire detection using Forward Looking Infrared (FLIR) devices aboard fixed-wing aircraft, smoke detection cameras, and lightning strike detection systems allowed for early suppression before fires could spread. The ODF multi-mission aircraft (MMA), which is fitted with a FLIR sensor, had a very successful season, consisting of 24 primary fire detections (previously undetected and unreported). These tools are a major contributor to the 80% reduction in acres impacted by wildfire in 2025 compared with that in 2024 despite having 900 more fire starts in 2025 than in 2024.

A significant fire event occurred in the Doerner Fir, also known as the Brummitt Fir, which is a former record-holding coastal Douglas-fir. The Doerner Fir is one of the tallest known trees in the world that is not a redwood. In 2025, the tree's trunk ignited in a lightning-caused fire. Fifty feet of its crown burned but was eventually extinguished by tall tree climbers (Fig. 24).

Real-Time Weather, Alerts, Burn Condition Updates
beforeyouburn.com

Estimating Tree Mortality Post-Fire
tinyurl.com/ODFpostfire

Post-fire Resources
extension.oregonstate.edu/fire-program/after-wildfire

Current Wildfires watchduty.org

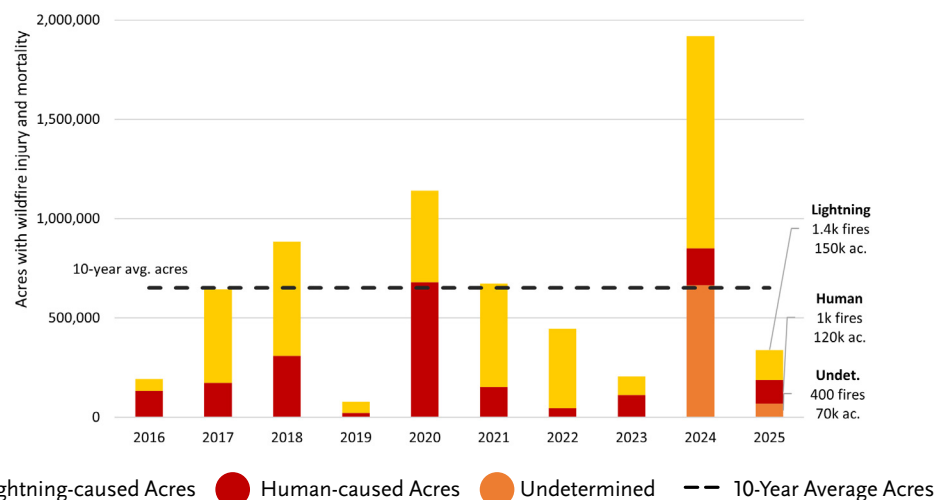
Wildfire Cameras ohaz.uoregon.edu/wildfire-cameras



Figure 24. Tree climbers Damien Carré and Logan Collier putting out a fire on the Brummitt Fir (Coos Fire Protective Association and Bureau of Land Management).

10-YEAR FIRE TRENDS

Figure 23. Oregon 10-year statewide wildfire trends across all ownerships and all protection districts (Northwest Interagency Coordination Center).



INSECT HIGHLIGHTS IN 2025

BIOTIC

Healthy trees can resist or tolerate most native (and some non-native) insects and diseases. Generally, we recommend management interventions address the underlying stressors such as drought and competition rather than focusing only on the insect or disease. However, some non-native pests such as emerald ash borer or white pine blister rust can be lethal even to healthy trees growing in optimal conditions. In those special circumstances, management may need to focus specifically on the insect or disease exclusively.

DEFOLIATING INSECTS IN WHITE OAK THROUGHOUT THEIR RANGE

In 2025, Oregon white oak experienced a substantial increase in non-lethal damage across its biogeographic distribution from a variety of insects that feed on leaves, suck juices from leaves, or lay eggs in infest leaves and twigs to create swellings called galls (Fig. 26, next page). These insects include various species of moth caterpillars, true bugs, and tiny gall-making wasps, flies, and mites. Oregon white oak hosts substantially more gall-making insects than other tree species do. Squirrels may cause additional damage by peeling back bark on twigs in search of these developing grubs (Fig. 25). Symptoms of injury from these pests include brown blotches on leaves, rolled leaves, yellow mottled leaves, or scattered clumps of dead leaves throughout the crown. In some areas, a whole-tree bronzing effect was observed starting near the end of summer. Because Oregon white oak is a deciduous species, leaf injury late in the growing season, when the trees will shed their leaves anyway, typically has a negligible effect on tree health. Moreover, the trees will grow a new set of leaves for the next growing season. However, ongoing drought may complicate tolerance to heightened pest activity this year, even in drought-tolerant species such as oak, and the health of heavily affected areas will need to be reevaluated in 2026. We were not able to reliably quantify these types of injury in oak species (*Quercus* spp.) because their signs and symptoms were not visible from the air and frequently manifested after we conducted our surveys. However, the damage was visible on the ground at the end of the growing season in the Columbia River Gorge, Willamette Valley, Umpqua Valley, and Rogue Valley.

Oak Pests

oregon.gov/odf/Documents/forestbenefits/oak-pests.pdf



Figure 25. Peeled bark from squirrels digging for larvae of gall-making insects which kills clumps of leaves in a scattered pattern across an oak crown (Christine Buhl, ODF).



Figure 26. Symptoms of injury from various insects injuring oak leaves or twigs (Christine Buhl, ODF).

MEDITERRANEAN OAK BORER

Mediterranean oak borer (MOB, *Xyleborus monographus*, Fig. 28, next page) is a non-native, invasive ambrosia beetle. Ambrosia beetles do not feed directly on wood, but rather feed on fungi that they vector and propagate within the sapwood. Some of the pathogenic fungi that ambrosia beetles vector can be particularly deleterious if the host tree has not coevolved with the fungus. MOB is native to Europe, northern Africa, and the Middle East where it infests many hardwood species. This insect has been detected in Oregon and California where it vectors fungi that cause a potentially lethal wilting disease.

In 2018, a single MOB individual was detected in a trap in Multnomah County and another beetle was found in 2021 in Marion County. Starting in 2022, we observed Oregon white oak trees killed by MOB in Clackamas and Multnomah counties. To date, this insect has been identified in either ground or trap monitoring in Multnomah, Clackamas, Washington, Marion, Polk, and Yamhill counties. The rate of trapping, in terms of proportion of infested traps and number of adults collected per trap, was relatively unchanged in 2025 compared with those in 2024 (Fig. 27). Federal funding for the trapping program ended in 2025, but we are working with collaborating agencies to continue trapping in counties where MOB has not yet been detected.

As of 2025, the majority of infested Oregon white oak have been found in heavily urbanized areas, often in trees with other signs of stress such as root disease, storm damage, or recent construction near mature trees. Many infested trees have been destroyed, and there are currently at least 30 known infested Oregon white oak trees. MOB has not been found infesting other tree species in Oregon. Oregon is working closely with California to learn more about this insect. Thus far, MOB is not considered as much of a threat as emerald ash borer. Oak savannas have been greatly diminished over time. Retaining these drought-tolerant species is more important than ever, and we encourage reporting of suspected infestations to the Oregon Invasive Species Hotline.

MOB Diagnosis Guide and Reporting

oregon.gov/odf/documents/forestbenefits/mob-and-eab-visual-diagnosis-guide.pdf

MOB Diagnosis Video

youtu.be/_IQEPLkUciM

ODF Factsheet

tinyurl.com/MOB-oregon

MOB Ground and Trap Monitoring Map

tinyurl.com/mobmonitoring



Figure 27. Funnel trap baited for Mediterranean oak borer detection (Wyatt Williams, ODF).



Figure 28. MOB infestation can be identified by dieback of a whole branch, pale boring dust (frass) in the crevices of bark often seen at the base of the trunk, and branching galleries in sapwood that are stained black by fungus, the beetle itself is quite small (Christine Buhl, ODF).

FLATHEADED FIR BORER

Flatheaded fir borer (*Phaenops drummondi*) is a type of native woodboring beetle that does not enter wood but instead feeds under the bark and girdles Douglas-fir. Woodpeckers often shave the exterior of Douglas-fir bark to pluck out flatheaded fir borer larvae (Fig. 29). This insect is native and widespread. It opportunistically attacks already stressed trees. Drought is the most common underlying precursor to flatheaded fir borer induced mortality. This insect may appear to be a growing problem across the state, but in reality it has always been an opportunistic pest of Douglas-fir. The increased mortality attributed to flatheaded fir borer is really more a reflection of worsening site conditions and increasing hot droughts as a result of climate change. In 2025, Douglas-fir mortality involving this insect was estimated at 17,600 affected acres.

Flatheaded Fir Borer

oregon.gov/odf/Documents/forestbenefits/FFB_2016.pdf



Figure 29. Shaved bark on the exterior of a Douglas-fir is a good indicator of flatheaded fir borer activity (Glenn Ahrens, OSU).

BARK BEETLES

Oregon's primary bark beetle pests are native and preferentially attack stressed or less vigorous trees. Drought is the most common underlying precursor to bark beetle outbreaks. Mountain pine beetle (*Dendroctonus ponderosae*) feeds on pine species. In 2025, growing outbreaks (Fig. 30) were observed in the Blue Mountains in Eastern Oregon and Newberry National Volcanic Monument. Scattered outbreaks of western pine beetle (*Dendroctonus brevicornis*) and fir engraver (*Scolytus ventralis*), in ponderosa pine and true fir species respectively, continue in the eastern Cascade foothills, the Blue Mountains, and the Wallowa Mountains. In 2025, mortality involving bark beetles was estimated at 124,700 affected acres (Fig. 31).

Financial assistance is available for landowners to prevent bark beetle outbreaks using strategies such as density reduction to increase moisture availability and tree resilience: tinyurl.com/ODFcostshare

MORTALITY FROM BARK BEETLES BY HOST

Figure 31. Proportion of mortality in 2025 from bark beetles (often with underlying drought stress) in the most heavily attacked tree hosts.

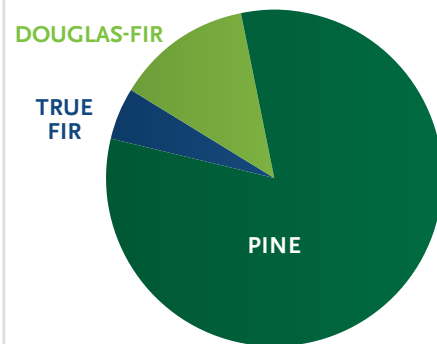


Figure 30. Mountain pine beetle outbreak observed during aerial survey in 2025 (Brent Oblinger, USFS).

DOUGLAS-FIR TUSSOCK MOTH IN DOUGLAS-FIR AND TRUE FIR

Douglas-fir tussock moth (*Orgyia pseudotsugata*, Fig. 32) is a native moth that experiences periodic outbreaks east of the Cascades. In 2025, isolated outbreaks were reported in various areas east of Mt. Hood. The caterpillars of this insect typically feed on needles of Douglas-fir and true fir species but may also sample other conifer species. These caterpillars are part of a group called tussock moths because of their distinct tufts of hair, which vary from a mixture of yellow, brown, white, and black. Caterpillars start feeding on young foliage in spring/summer, then move to older foliage. Caterpillars stop feeding and pupate in late summer and adults emerge in late summer/fall to lay eggs, which overwinter and hatch the next spring/summer. Defoliation from these insects can be severe, but outbreaks typically collapse naturally after a couple of years. Sequential, heavy defoliation events can cause growth reduction, but most trees survive defoliation events. Mortality is more likely in heavily affected trees that are less resilient such as open-grown or drought-stressed trees. Conifer injury from this insect was estimated at 220 affected acres but may be underreported due to timing of aerial survey flights and cuts to the survey program. Federal funding for the trapping program to monitor outbreaks of this pest was cut in 2025.

Douglas-fir Tussock Moth

oregon.gov/odf/documents/forestbenefits/douglas-fir-tussock-moth.pdf



Figure 32. Douglas-fir tussock moth caterpillars are visible feeding on foliage in summer, pupal cocoons are visible starting in late summer and they remain attached to foliage through winter (Melissa Fischer, USFS).

SAWFLY IN DOUGLAS-FIR IN THE VALLEY

Small pockets of defoliation in Douglas-fir from native sawflies (*Neodiprion abietus complex*, Fig. 33) were visible in various areas around the far west side of the state. These events occur periodically and do not typically persist in the same area for more than a couple of years. Outbreaks may persist for longer durations under favorable conditions such as mild winters or in high-stress settings such as plantations. Sawflies are in the same Hymenoptera order as bees, wasps, and ants. Sawfly larvae feed on previous year needles and may leave behind half-eaten needles resulting in a “singed” look. Larvae can be observed feeding together in clusters in late spring into summer. When approached, they attempt to ward off predators by moving in a synchronous movement ([youtube.com/shorts/PQ8C5gcaW9s?feature=share](https://www.youtube.com/shorts/PQ8C5gcaW9s?feature=share)). By mid-late summer feeding subsides, and larvae disappear to pupate. Sawfly larvae leave behind only evidence of partial defoliation, which is often heaviest near the base of a tree. Adults emerge in the fall and lay eggs in foliage. Eggs overwinter and hatch into larvae, and the feeding cycle begins again in late spring/summer. Douglas-fir damage from this insect was only visible from the ground in sporadic pockets, though we did map some sawfly damage, notably in western Lane County and eastern Coos County.

Sawflies

oregon.gov/odf/Documents/forestbenefits/Sawflies.pdf



Figure 33. Sawfly larvae congregate when feeding and target older needles preferentially (Brent O’Nion, ODF).

SPRUCE APHID IN SITKA SPRUCE ALONG THE MID-COAST

Spruce aphid (*Elatobium abietinum*, Fig. 34) is a long-established, non-native, invasive insect that experiences periodic outbreaks that injure Sitka spruce along the west coast. In 2025, a spruce aphid outbreak was detected around Yachats, Oregon. Spruce aphid sucks moisture and nutrients from older needles, which causes them to turn yellow, red, and then drop. Needle color change and shedding occurs in one year old needles, but not in current year needles. Injury is concentrated at the bottom of the tree but may expand throughout the crown during larger outbreaks. This insect actively feeds in February-March, but injury is often not apparent until later spring/summer when populations of this insect have already declined. Infested trees may look unsightly, but spruce aphid damage is rarely fatal for Sitka spruce trees because outbreaks are only periodic and spruce aphid does not feed on current year needles or buds. Sitka spruce is often stressed by flooding and exposure to brackish water if growing too close to the coastline, therefore, those trees might be more at risk from the additional impact of spruce aphid. We typically do not see frequent spruce aphid outbreaks. However, outbreaks may eventually become more frequent with climate change because outbreaks are linked to mild winters and a lack of late-season frost. Sitka spruce injury from this insect was estimated at 130 affected acres. Affected acres from our Aerial Detection Survey may underestimate the extent of spruce aphid damage because the peak of visibility is well before survey flights.

Spruce Aphid

oregon.gov/odf/documents/forestbenefits/Spruce_aphid_2017.pdf



Figure 34. Spruce aphids are bright green and preferentially feed on older foliage which causes discoloration then premature needle shedding (Christine Buhl, ODF).

EMERALD ASH BORER

New Detections Expand State Quarantine

In 2025, several survey and monitoring projects for emerald ash borer (EAB) (*Agrilus planipennis*) took place across the state involving numerous agencies and landowners. The project coordination occurred through the Emerald Ash Borer Task Force, led by the Oregon Department of Agriculture (ODA). Multnomah County was added to the state quarantine after an arborist reported a single infested tree in east Portland in mid-August (Fig. 35). EAB populations are expanding in Washington, Yamhill, Clackamas, and Marion counties where EAB has previously been detected. State quarantine law prohibits the movement of unprocessed ash wood and all hardwood firewood out of the five-county area (Multnomah, Washington, Yamhill, Clackamas, Marion) of the northern Willamette Valley.

Statewide EAB Trap Survey

In 2025, ODF Forest Health Unit organized a cooperative trap survey for EAB. The USDA Animal and Plant Health Inspection Service (APHIS) provided purple prism traps and plant volatile lures while ODF offered training and support to local governments and other cooperators who wished to survey for EAB in their jurisdictions. Trapping season started in May and concluded at the end of September. There were 335 traps deployed by 23 cooperating agencies, representing local, state, federal, and academic institutions. Nine traps were positive, the most positive traps in the history of trapping for EAB in Oregon. Positive traps occurred in all five infested counties, suggesting that EAB is beginning to rapidly spread across the northern Willamette Valley (Fig. 36, 37 and 38, next page).

Public Reports of EAB

In 2025, there were nearly 200 reports of suspected EAB to the state's invasive species online hotline. After review, nine reports were confirmed as EAB, the most positive hotline reports in the four years of EAB in Oregon (Fig. 39, next page). Seven positives were from the town of Forest Grove, while one was from east Portland and one from near Woodburn. Many other reports were emailed directly to agency staff.



Figure 35. In 2025, the first EAB infested tree and first positive trap were reported in Portland. Cody Holthouse answers questions about the find during a media day on September 10 at the David Douglas School District in southeast Portland, where the EAB-positive tree was located (Kat Bethea, ODF).

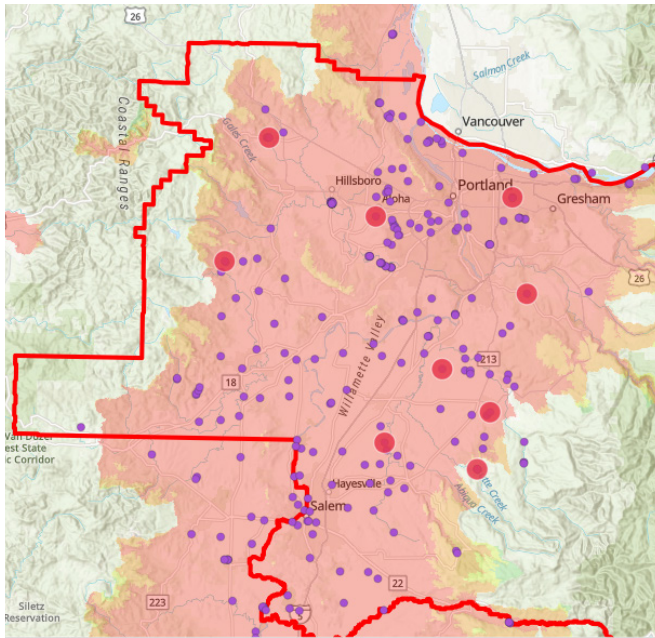


Figure 36. Twenty-three cooperating agencies placed 335 EAB traps in 2025. Nine were positive, represented by the red circles.

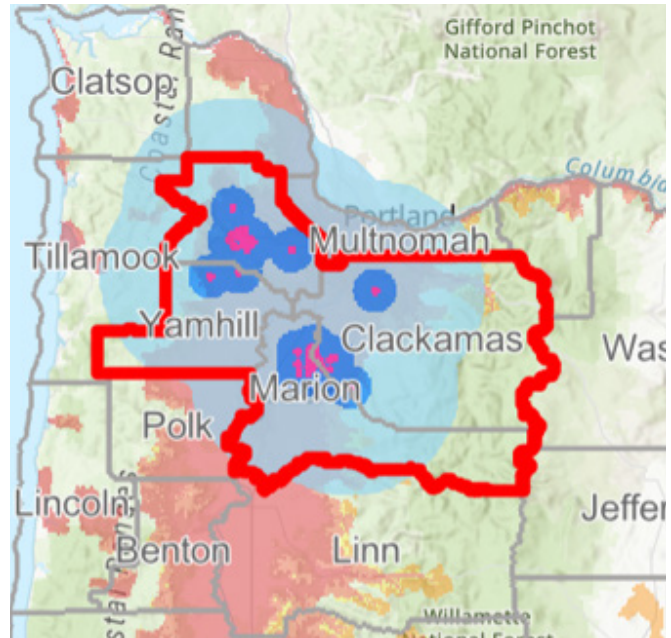
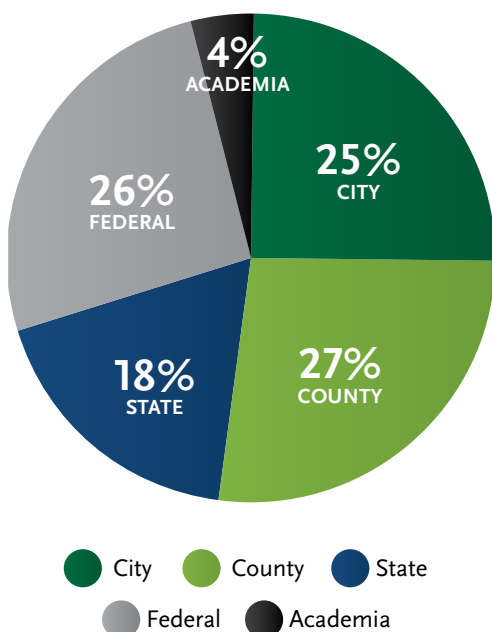


Figure 37. Five counties are now in the state quarantine for EAB. The background shows the areas at risk for future spread.

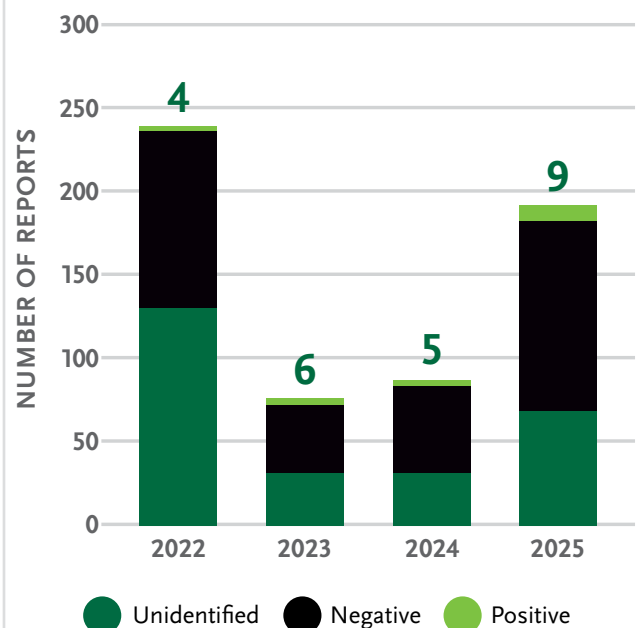
2025 EAB TRAPS BY COOPERATOR GROUP

Figure 38. Cooperators that completed EAB trapping in 2025 represented a diverse group of agencies across the state.



OREGON EAB REPORT HOTLINE CALLS BY YEAR

Figure 39. Public reports of EAB to the state's invasive species hotline since 2022. In 2025, there were 9 positive EAB reports while the remaining were negative (115) or could not be identified (69).



Management for EAB

In 2025, ODF assisted Oregon Department of Agriculture in releasing over 20,000 individuals of three species of parasitoids at eight sites in the northern Willamette Valley. The three species of parasitoids (*Oobius agrili*, *Spathius galinae*, and *Tetrastichus planipennisi*) have been approved by the USDA for biological control of emerald ash borer. If parasitoids establish self-sustaining populations in Oregon, they help slow the spread rate of EAB in the state and region.

Over 10,000 Oregon ash seedlings, sown from seeds collected between 2019-2022, will be planted at three locations in the Willamette Valley during the winter of 2025-2026. These plantations will serve as test plots for genetic screening for natural resistance to EAB. One of these plantations occurs at the ODF J.E. Schroeder Seed Orchard near St. Paul. One in one thousand ash seedlings is predicted to have genetic resistance. Finding genetic resistance will accelerate breeding programs to ensure that Oregon ash can be a viable tree in Oregon in the future.

Outreach and Education on EAB

Because EAB is expected to have a large financial impact on communities and homeowners, in the coming years, particularly in the Willamette Valley, ODF and its partners have dedicated substantial effort in conducting public outreach and education. In 2025, ODF staff handed out over 23,000 pieces of outreach material on EAB, such as pocket guides, fact sheets, stickers and brochures. ODF staff provided more than 80 trainings and conferences on EAB, reaching more than 7,000 Oregon residents, landowners and land managers. ODF maintains a website dedicated to EAB news updates and management in Oregon, OregonEAB.com. In 2025, the website had more than 17,000 views.

See OregonEAB.com for Interactive Map
Oregoninvasiveshotline.org



DISEASES IMPACTING OREGON FORESTS

SUDDEN OAK DEATH

Sudden Oak Death (SOD) is caused by the non-native pathogen *Phytophthora ramorum*. In Oregon, it readily kills tanoak (*Notholithocarpus densiflorus*) (Fig. 40), creating girdle-forming canker lesions on the main stem and threatening the species throughout its natural range. *P. ramorum* has a broad host range of over 100 plant species, including several species native to Oregon's forests. The pathogen thrives in Oregon's wet and cool coastal climate, spreading from infected plants to other trees, shrubs, and nearby vegetation during rainy and windy periods. The disease can spread up to 3-5 miles per year through windborne spore distribution. Humans also contribute to disease spread by moving infected material, whole plants, plant parts, or infested soil.

In 2025, 54 new *P. ramorum* infestations were detected outside of the 2015 SOD Quarantine area. These new detections triggered an immediate expansion of the SOD Emergency Quarantine boundary, now approximately 289 square miles (Fig. 42, next page). Using a 300-600 feet treatment buffer, 2025 proposed eradication treatment areas totaled 526 acres (Fig. 41).

To monitor the spread of sudden oak death disease and detect new infestations, the Oregon SOD program uses various survey methods conducted throughout the year. These methods include aerial detection surveys using both broad-scale surveys in fixed-wing aircraft and targeted surveys in helicopters (686,455 acres), landscape analysis using high-resolution four-band aerial imagery (~653,000 acres), followed by ground verification, as well as ground-based transects (820 acres) and stream monitoring of 56 drainages.

Progress for Oregon's Slow-the-Spread Program in managing sudden oak death is updated monthly on the Oregon SOD Program Dashboard. Since the inception of the sudden oak death program, the Oregon Department of Agriculture (ODA) has monitored the expansion of the quarantine boundary to address the spread of *P. ramorum* across the landscape. Although multiple new infestations have occurred outside the current official quarantine area, these regions are still covered under the existing ODA SOD regulations, which enforce quarantine in any area statewide where a SOD infestation is identified (OAR 603-052-1230(2)(d)). In 2026, the Oregon SOD Program will be proposing changes to the current disease management protocols, given the spread of the pathogen across the landscape and the funding available for aggressive treatments.

SOD December 2025 Update: oregon.gov/odf/documents/forestbenefits/sod-update.pdf

SOD Resources: oregon.gov/ODF/Documents/ForestBenefits/SOD.pdf

SOD ODA Program: oregon.gov/oda/plant-health/pages/sudden-oak-death-program.aspx



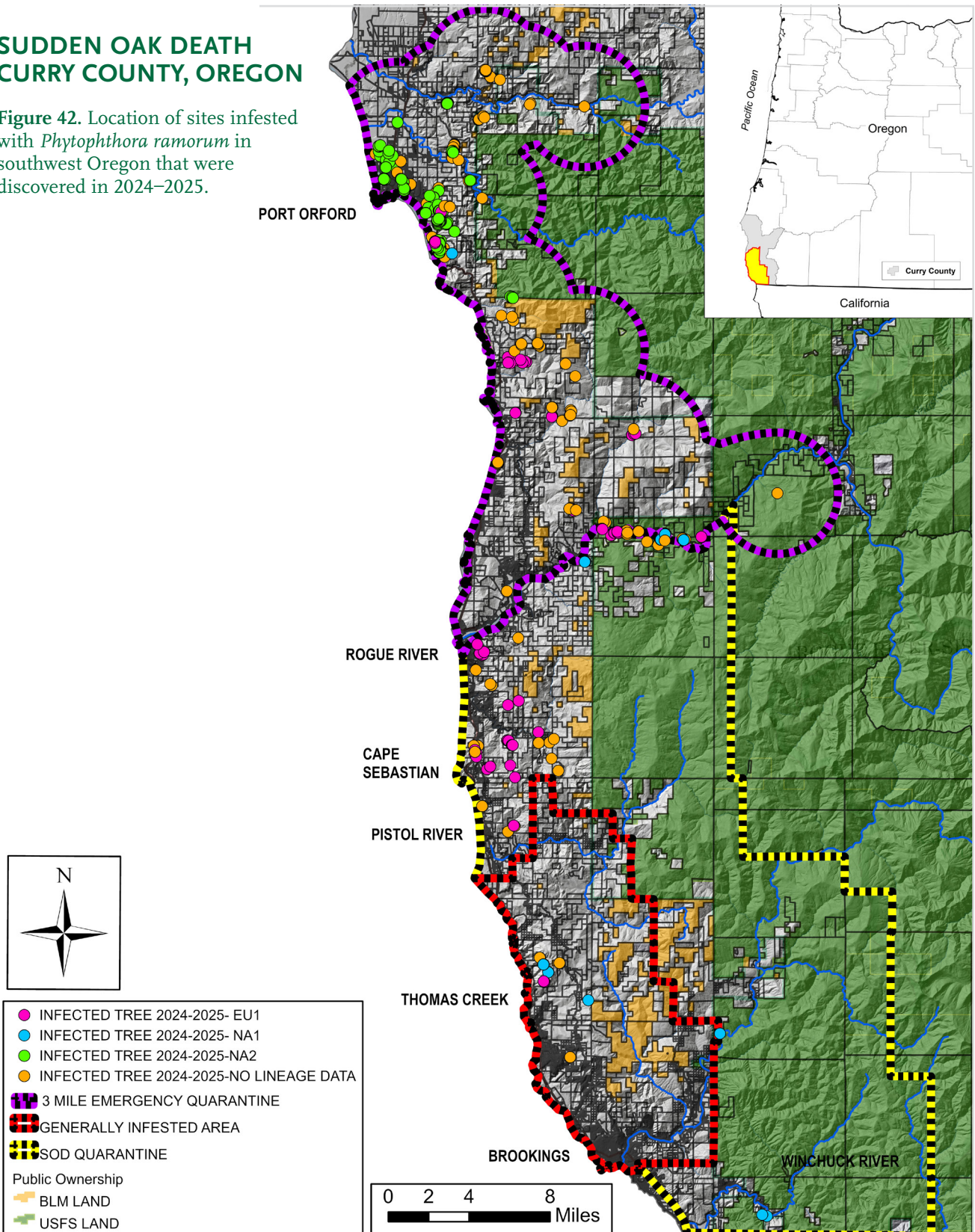
Figure 40. 2025 Tanoak mortality caused by *Phytophthora ramorum* in Gold Beach, Oregon (Gabi Ritokova, ODF).



Figure 41. Local eradication treatment of an infected area. Treatment includes cutting, lopping, piling and subsequently burning the material (Gabi Ritokova, ODF).

SUDDEN OAK DEATH CURRY COUNTY, OREGON

Figure 42. Location of sites infested with *Phytophthora ramorum* in southwest Oregon that were discovered in 2024–2025.



SWISS NEEDLE CAST

Swiss needle cast (SNC), a native foliar disease of Douglas-fir (Fig. 43), is caused by the fungus *Nothophaeocryptopus gaeumannii*. This disease has been prominent in Douglas-fir forests in the Coast Range since the 1990s.

Because the physical inhibition of gas exchange by fungal fruiting bodies results in premature needle loss, the number of years of retained foliage is a primary symptom of infection, and the quantifiable index most closely associated with Douglas-fir volume growth losses. Accordingly, regular monitoring of foliage retention on repeatedly measured trees provides the best means of assessing the general trend in disease conditions.

Results from assessments in 35 Coast Range plantations (aged 20-40) in spring 2025 indicate that compared to 5 years prior, foliage retention decreased in uninfected plantations (initial FR ≥ 3.0 years) by an average of 0.46 years, and in moderately infected plantations ($2.0 \text{ years} \leq \text{initial FR} \leq 3.0$ years) by an average of 0.32 years. In contrast, foliage retention increased slightly in the most infected plantations (initial FR < 2.0 years). Across 34 plots in the Cascades foothills, where SNC is less of a concern, the average foliage retention increased by 0.04 years from the previous year. The Cascades plots did not include any sites with an initial foliage retention below 2.2 years.

Plantations nearest the coast have exhibited low foliage retention for years and have demonstrated no signs of improvement or recovery since the onset of the disease epidemic in the 1990s. The lack of change in foliage retention for the most diseased plantations likely reflects the relatively narrow range in potential retention. However, in moderately infected areas, there has been more observed annual variation in climate conditions associated with successful infection and fungal development, resulting in larger year-to-year changes in retention, particularly in older age classes of needles. Although the Coast Range results cited above are based on a five-year period of assessment, were the annual inter-period foliage retentions available, they would have almost certainly demonstrated a noisy display rather than a consistent trend.

Collaborative research conducted over the last 25 years has explored numerous silvicultural means of counteracting the volume losses due to SNC, including thinning, multiple types of fertilization and select genetics, but none of these tools has been found to provide a fix.

SNC Silvicultural Guide

extension.oregonstate.edu/catalog/em-9352-silvicultural-decision-guide-swiss-needle-cast-coastal-oregon-washington

SNC Resources

oregon.gov/odf/documents/forestbenefits/swissneedlecast.pdf

SNC Co-Op

sncc.forestry.oregonstate.edu



Figure 43. Swiss needle cast causes yellow foliage which is visible here in Douglas-fir growing among bright green alder and darker green conifers that are either uninfested Douglas-fir or other species not infected by SNC (Christine Buhl, ODF).

WHITE PINE BLISTER RUST

White pine blister rust is caused by the non-native fungal pathogen *Cronartium ribicola*, which has been present in the Oregon Cascades since the 1920s. Damage due to blister rust continues to occur throughout the state on five-needle pines (*Pinus subgenus strobus*) including sugar pine (*Pinus lambertiana*), western white pine (*P. monticola*), and whitebark pine (*P. albicaulis*). Management of this disease is ongoing, and genetic control is a common strategy to reduce losses via rust-resistance screening conducted at the USDA Forest Service's Dorena Genetic Resource Center. Outplanting of rust-resistant five-needle pine stock has occurred in recent years in the Cascades. Another management strategy to reduce adverse impacts of blister rust is pruning the lower crown of western white pine and sugar pine in parts of the state (Fig. 44, before and after). Pruning lower branches prevents new infections and prevents some existing infections from reaching the bole and becoming lethal in young western white pine (Fig. 45). A recent survey in 12 stands (Fig. 46, next page) was completed to help inform blister rust pruning guidelines in the Oregon East Cascades. Results indicate that nearly all infections occur in the lower half of young white pine crowns, and of the 1,306 cankers examined, 90% were found within the first third of total tree height (Oblinger and Stauder 2023, [DOI:10.1111/efp.12832](https://doi.org/10.1111/efp.12832)). Given that the vast majority of cankers were prunable and occurred in the lower crown of young western white pine below 8 ft, pruning lower branches to increase white pine survival is a management option in the Oregon East Cascades, and prioritization of stands for treatment is recommended. Therefore, we recommend prioritizing western white pine stands for treatment. Long-term monitoring plots to evaluate the effectiveness of pruning treatments have also been established in central, southwestern, and western Oregon on federal and state lands to help inform management decisions.



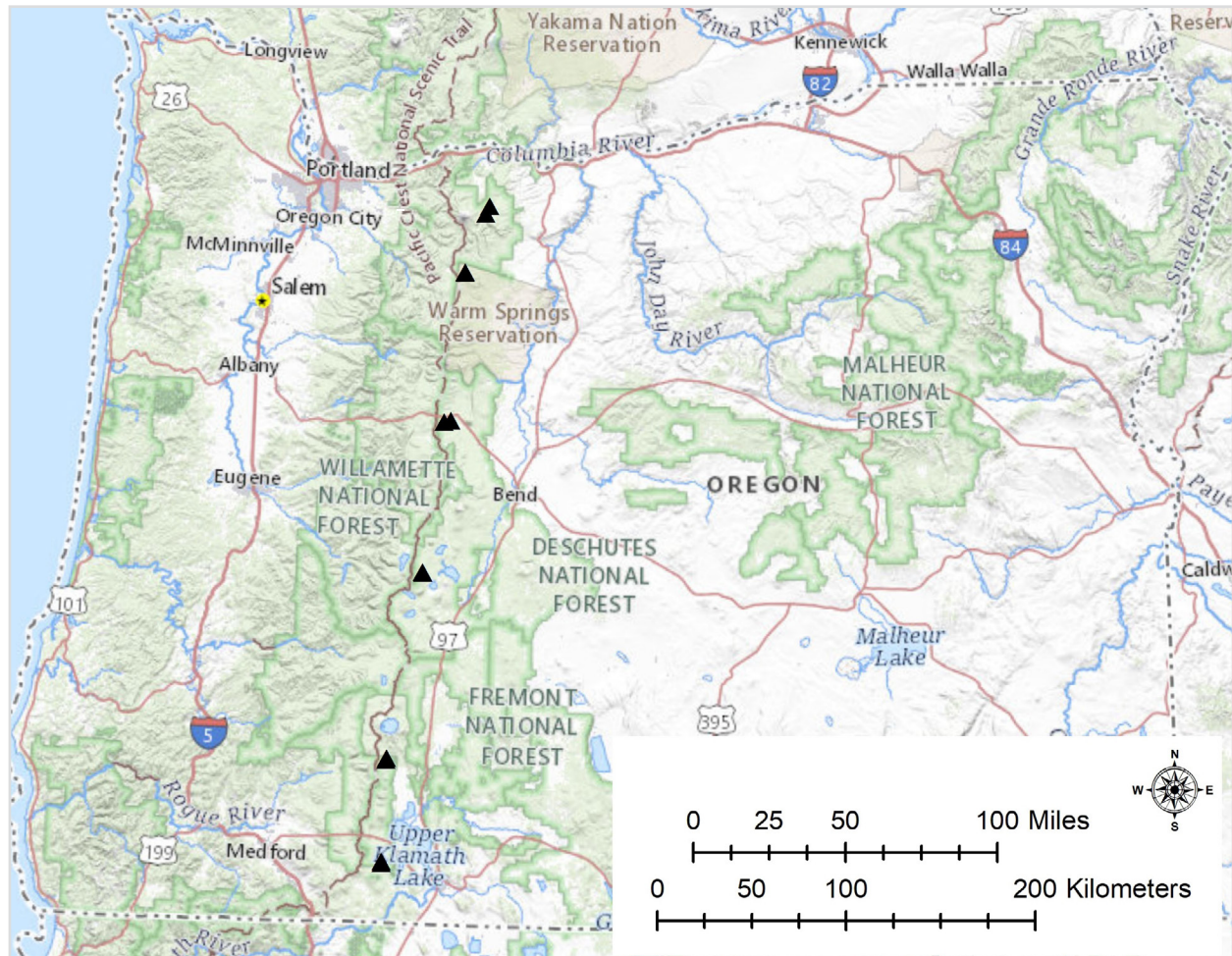
Figure 45. Lethal bole canker caused by *Cronartium ribicola* on a young western white pine that originated from a branch canker below 8 ft aboveground in the lower half of the tree's crown (Brent Oblinger, USFS).



Figure 44. Pine stands after pruning for management of white pine blister rust. Western pines on Warm Springs Reservation immediately after pruning (left) and sugar pines on the Deschutes National Forest six years after pruning (right) (Brent Oblinger, USFS).

WHITE PINE BLISTER RUST RECENT SURVEY LOCATIONS

Figure 46. Locations of stands recently surveyed in the Oregon East Cascades to evaluate heights to white pine blister rust cankers on young western white pine to inform pruning guidelines.



▲ Survey Locations

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