ACTIVE FOREST MANAGEMENT
PROTECTING OREGON'S FORESTS FOR FUTURE GENERATIONS

Oregon Forest Resources Institute

FOREST THREATS

THOMAS MANESS Dean
of the Oregon State University
College of Forestry

COMBATING THREATS

Managing for forest health and long-term sustainability

The Pacific Northwest has a natural advantage when it comes to growing forests. Deep soil, temperate climate and an abundance of rain make this one of the best places in the world to cultivate trees, especially the sturdy evergreens we use to build our homes and office buildings.

Earth's population is projected to expand to 9 billion by 2050. Our great challenge is to build our homes and cities from natural materials that are sustainably produced with energy from the sun. The Pacific Northwest is one of the few places on Earth where this can be done with forest plantations consisting of native species. It is the job of professional foresters to ensure that we grow these trees in a responsible manner, respecting the ecological niche in which we live and the needs of society.

While timber has great value to society, our forests themselves are also valuable. It is the role of scientific forest management to ensure that natural forests, reserves and wilderness areas are functioning, resilient ecosystems that provide other benefits, including outdoor recreation and spiritual places to seek sanctuary.

Our native species grow so well here that we take them for granted. But as this report shows, our forests are vulnerable to many threats. Whether it's newer ones such as climate change and invasive species, or traditional ones such as wildfire, insects, disease, or wind and ice storms, our forests benefit from forest management to stay vibrant and healthy. Our future depends on it.

MANAGING FOR FOREST RESILIENCY

How active management fosters forest health

As the timber manager for a southern Oregon wood products company, Phil Adams' number-one priority is forest health.

"Our focus is on the trees," he says. "A healthy, growing forest is less susceptible to insects and disease." It's also less likely to be as devastated by a wildfire.

Keeping the trees healthy on Roseburg Resource Co. timberland requires active management, including commercial thinning and fuels-reduction projects, Adams says. These measures help prevent unhealthy, overcrowded stands of trees that are more prone to catastrophic wildfire.

Active management can help prevent the spread of a wildfire and aid the growth of the trees, says Nicole Strong, an Oregon State University Extension forester based in Redmond.

"You're setting up your forest to be more resilient," she says. "You want your trees, plants and animals to have everything they need to thrive."

Removing some trees reduces the competition for water, nutrients and sunlight among the surviving trees, leading to healthier stands, Strong says.

"You might end up in a situation where there is too much competition and the trees can get stressed," she says. "Stressed trees, just like you and me, are more likely to get sick."

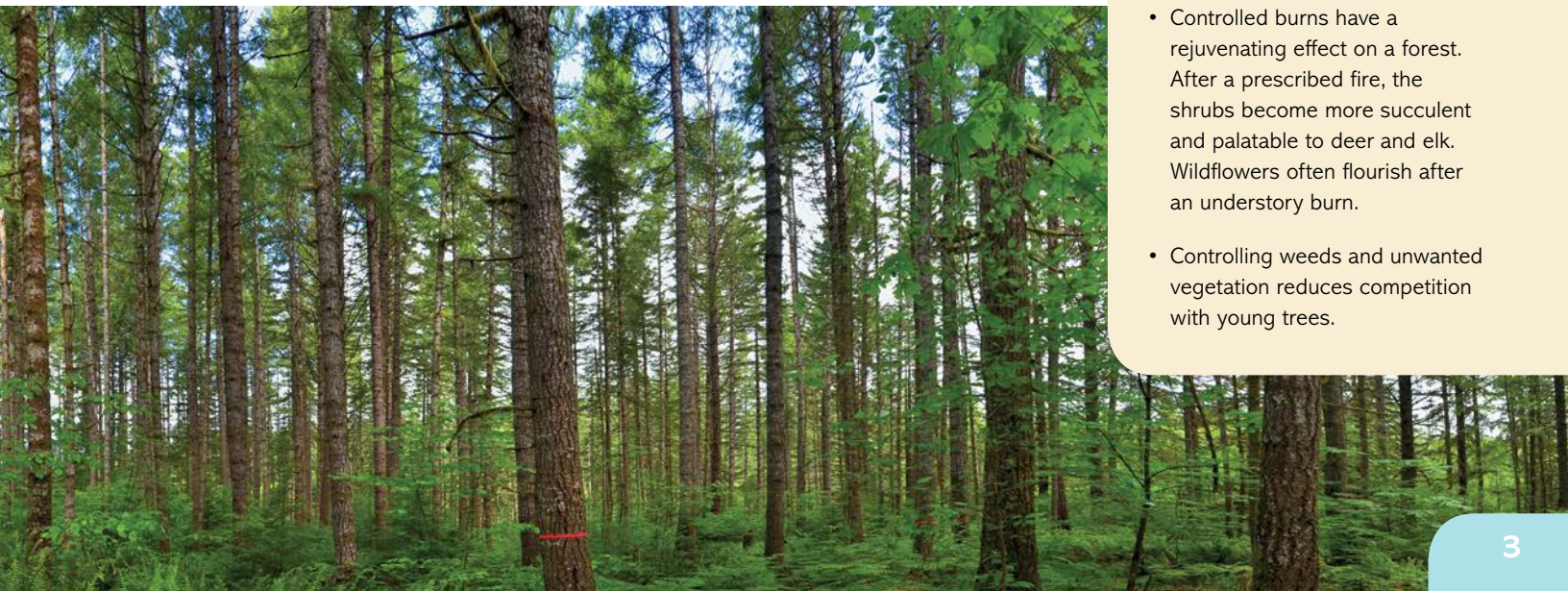
Thinning overcrowded trees and clearing out dry underbrush and other fuels through mowing and controlled burns are common active management techniques. Thinning can make a big difference in limiting the impact of a wildfire, says Lee Fledderjohann, resource manager with Collins Pine in Lakeview.

"When a fire hits a managed forest it tends to lie down," he says. "There is much less fuel for the fire to race through the stand."

BENEFITS OF FOREST MANAGEMENT

Active forest management means the growing, harvesting and planting of trees, along with other measures, to provide a wide range of values and forest products sought by Oregonians. Management keeps forests healthy and resilient in a number of ways:

- Thinning overcrowded forests results in less competition among the trees that remain after the harvest, leading to healthier stands that are less prone to insect infestations.
- Opening up stands through tree thinning eases access for firefighters when a forest is hit by a wildfire. A wildfire is also less likely to jump between tree crowns in a thinned forest.
- Reducing fuels, salvaging dead trees after a fire and creating space among trees can slow the spread of future wildfires.
- Creating clearings in dense forests opens the forest floor to sunlight, fostering the growth of young trees and shrubs eaten by wildlife.
- Controlled burns have a rejuvenating effect on a forest. After a prescribed fire, the shrubs become more succulent and palatable to deer and elk. Wildflowers often flourish after an understory burn.
- Controlling weeds and unwanted vegetation reduces competition with young trees.



FIRE

Suppression success tied to forest management

After more than 30 fire seasons, Pat Skrip still finds working as a fire behavior analyst challenging.

"Each year, I learn how little I really know," he says. "It's humbling."

Skrip works for the Douglas Forest Protective Association, which protects more than 1.6 million acres of mostly forested land in southern Oregon from wildfires. He analyzes weather patterns, terrain and fuel loads to predict how and where a wildfire will spread. Skrip then uses the fire behavior forecasts he creates through computer modeling to help firefighters plan their tactics for suppressing the fire.

> It's somewhere between a science and an art."

"I'm looking for that next big change that will affect the fire," Skrip says. "My job is to take that model and interpret how we can apply it for success. It's somewhere between a science and an art."

He's learned that successful suppression of a wildfire is often tied to how a forest has been managed. In particular, actively managed stands often have less dry fuel that can foster the spread of a wildfire.

This is because forest managers have control over the amount of fuel available for a potential fire to consume, Skrip says. Reducing hazardous woody debris often ends up aiding firefighters.

"We find we have a lot better success engaging in managed stands, and the reason is that total fuels have been minimized," he says. "That reduces the fire intensity."

PAT SKRIP Fire behavior analyst, Douglas Forest Protective Association, Roseburg

Kyle Reed, DFPA

PREVENTING HUMAN-CAUSED WILDFIRES

While there's no way to stop lightning from igniting forest fires, another major cause of wildfires is preventable.

"People are the wild card," says Kristin Babbs, president and CEO of Keep Oregon Green Association Inc. The nonprofit organization works to reduce the number of human-caused wildfires in Oregon through awareness and education.

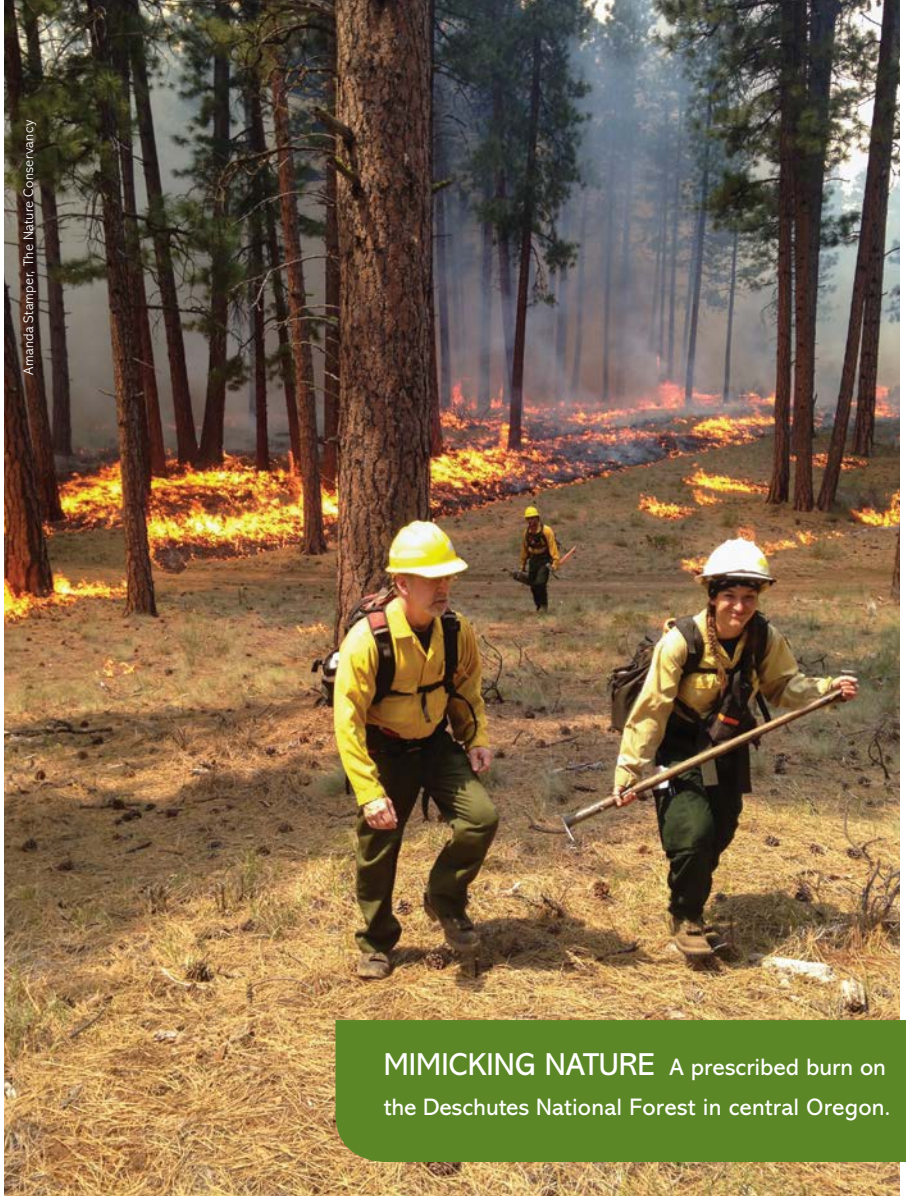
Unattended backyard burn piles, campfires, sparks from motorized equipment or vehicles, and other human activities start roughly 70 percent of the state's wildfires,

FIGHTING FIRE WITH FIRE

Amanda Stamper describes her job as putting "good fire back into our ecosystems."

As the fire management officer for the Oregon chapter of The Nature Conservancy, she's responsible for planning and coordinating controlled burns throughout the Willamette Valley, aimed at improving forest health and fire resiliency.

Stamper, who has also worked for the U.S. Forest Service and Bureau of Land Management, believes one of the best tools to fight catastrophic wildfire is by using controlled burns to mimic the natural role fire plays in the landscape. Controlled burns clear away dry brush and often have a rejuvenating effect on the plants and trees.



MIMICKING NATURE A prescribed burn on the Deschutes National Forest in central Oregon.

The wildflower blooms following a burn are spectacular and a rewarding sight, she says.

Among her proudest moments was seeing how a forest where she'd led a series of controlled burns fared when it was later hit by a wildfire.

"That was probably my number one post-burn moment," Stamper says. "The results spoke for themselves. There was no tree mortality in the stands we had burned."

according to Keep Oregon Green. These blazes can damage natural resources, fish and wildfire habitat, and homes or other structures. Wildfires are also often costly to extinguish and negatively impact air and water quality.

Here are some tips to prevent human-caused wildfires:

- Before you conduct any activity that could spark a fire, check current restrictions in the area. Even common activities like mowing grass could be restricted or prohibited during fire season.
- Tend to backyard burn piles and campfires constantly and extinguish them thoroughly before leaving the area.
- Keep firefighting tools on hand to quickly extinguish any stray embers or sparks from burn piles or campfires.

Learn more

Tips for forest landowners on reducing fire hazard – Knowyourforest.org/learning-library/reducing-fire-hazard

Preventing human-caused fires – keeporegongreen.org

Oregon Department of Forestry's Fire Protection program – oregon.gov/ODF/fire/pages/default.aspx

INSECTS

Combating tiny pests

Insects are opportunistic.

Tiny pests such as bark beetles can detect when a tree is stressed from drought, root disease, fire or storm damage. That's when they attack, burrowing through bark to lay their eggs.

The results can be devastating. Bark beetle larvae chew farther through the tree, cutting off the connective tissues that deliver water and nutrients. Other insects that can cause major damage to forests include wood-boring beetles, which typically bore directly into sapwood, and caterpillars that voraciously feed on foliage.

CHRISTINE BUHL
Forest entomologist, Oregon Department of Forestry

> "It's much more sustainable to be preventative."

Often, an insect infestation is the nail in the coffin for a tree that's already unhealthy because of root disease or another factor, says Christine Buhl, a forest entomologist for the Oregon Department of Forestry.

"Almost all these insects are not the primary agents of mortality," she says.

INSECT THREATS TO OREGON FOREST

Bark beetles (pictured at left) are rice-sized insects that as adults burrow through tree bark to form galleries where they lay eggs. After hatching, the larvae chew through the inner bark, girdling the tree by cutting off its vascular tissues.

Defoliators are moth and butterfly caterpillars or sawfly larvae that voraciously feed on conifer foliage and buds.

Wood borers are beetles that typically attack dead or dying trees, boring directly into the sapwood.

Other pests include the **balsam woolly adelgid**, an invasive species that attacks true firs. It sucks sap from the host trees while injecting toxic saliva to induce changes in the sapwood that impedes water and nutrient transport.

"There are nearly always extenuating circumstances."

This is why Buhl emphasizes active forest management to combat the threat of insects.

"If you keep your trees healthy, you'll keep the insects in check," she says.

This could include thinning to give the healthiest trees the best chance to thrive, and clearing away harvest slash that can harbor insects. Storm damage can also attract species such as Douglas-fir beetles that prefer freshly fallen trees.

Combating an insect outbreak is tricky, although in some cases biological controls have helped. Planting native trees that are adapted to the climate and soil or cultivated to be resistant to certain diseases improves a forest's chance of surviving an infestation, Buhl says.

"It's much more sustainable to be preventative," she says.

BEETLE KILL Dying trees in a stand infested by mountain pine beetle.

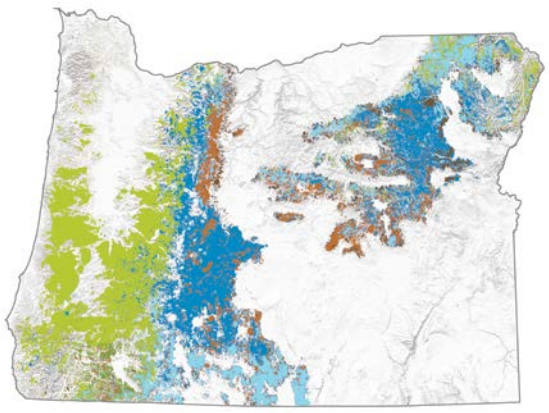
SURVEYING FOREST HEALTH

Every year, the Oregon Department of Forestry's Forest Health program teams up with the U.S. Forest Service to conduct an aerial survey of insect and disease damage across the state.

Using small, low-flying planes, representatives from both agencies survey the landscape and record the location of various insect and disease outbreaks. The data helps inform state and federal forest entomologists and pathologists, forest managers, private landowners and researchers working to improve overall forest health in Oregon.

"This is a primary tool for us in collecting information," says ODF's Christine Buhl. "It tells us what trees are being affected, how many are being affected and by what."

Insect species ranges in Oregon



Source: Oregon Department of Forestry

Learn more

Oregon Department of Forestry's Forest Health program – oregon.gov/odf/forestbenefits/pages/foresthealth.aspx

Forest Service Forest Health Protection program – fs.usda.gov/main/r6/forest-grasslandhealth

Forest Service insect and disease leaflets – fs.usda.gov/goto/fhp/fidls

INVASIVE SPECIES

Waging war on non-native invaders

Controlling the spread of invasive plants, insects and diseases that pose a threat to Oregon's forests is a constant battle.

"I can list hundreds of species, and we have dozens more that are knocking at our door," says Wyatt Williams, an invasive species specialist with the Oregon Department of Forestry.

> "I can list hundreds of species."

Invasive plants such as Scotch broom, English ivy and exotic species of blackberry and thistles outcompete native plants and saplings for sunlight, water and nutrients. These invasive plants also proliferate rapidly, and once established are tricky to control.

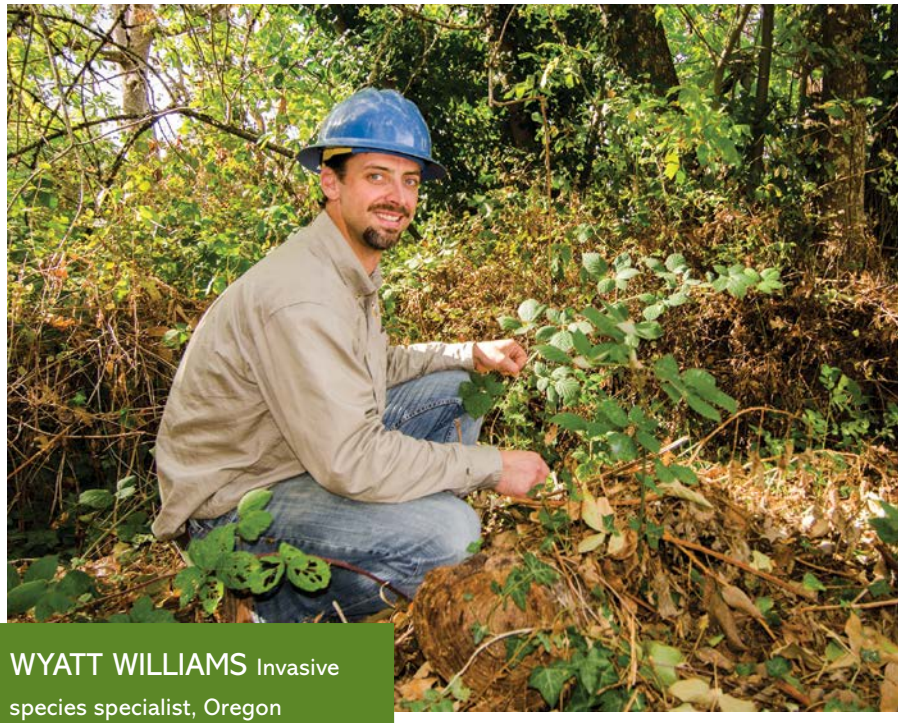
Along with invasive plants, non-native insects pose another threat. For example, the emerald ash borer and gypsy moth, which have devastated forests in other parts of the country, could do the same in Oregon if they become established.

Invasive pathogens such as white pine blister rust, Port-Orford-cedar root disease and Sudden Oak Death can cause widespread tree mortality, especially because native species haven't evolved to resist them.

Combating invasive species may seem daunting, but there is much that can be done, Williams says. Inspecting live plant imports and heat-treating shipping pallets addresses two common ways invasive insects arrive in Oregon. Forest researchers have also found that herbicides can help control invasive weeds such as Canada thistle and Scotch broom in natural areas. Selective cultivation of trees has shown promise in creating strains that are resistant to invasive diseases.

Meanwhile, public outreach is helping spread the word to recreational forest users on ways to avoid inadvertently transporting invasive species to new areas.

"Together we can protect our forests from invasive species," Williams says.



WYATT WILLIAMS Invasive species specialist, Oregon Department of Forestry

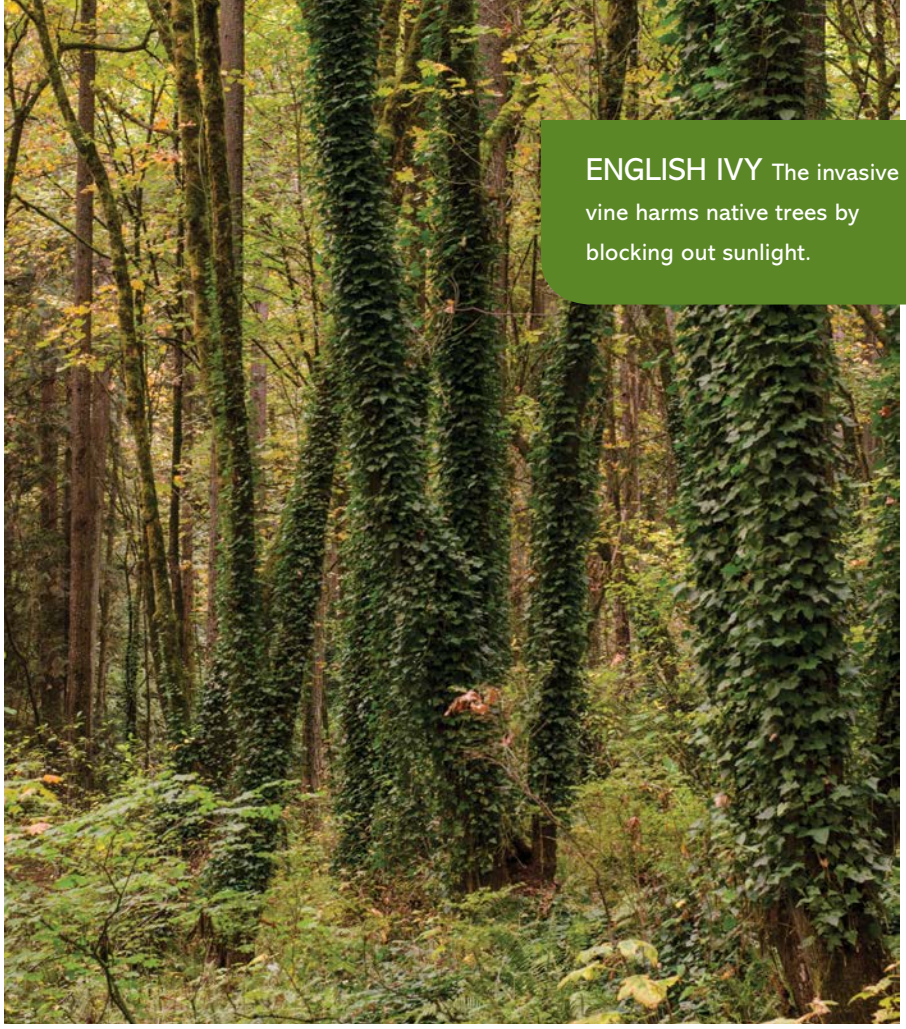
HOW TO PREVENT THE SPREAD OF INVASIVE SPECIES

- Don't move firewood. Invasive insects can hitch a ride on firewood brought to campsites. To prevent the spread of these invasive pests, buy firewood where you'll burn it. Don't transport firewood more than 50 miles and burn all the wood before leaving a campsite.
- Don't transport mud. Seeds from invasive plants can be transported in soil caked on gear, boots, bicycles, vehicles or forestry equipment. Scrape or spray off mud left on gear, shoes, vehicles or equipment before and after recreating or working in the forest.
- Report invaders. If you see a plant that looks out of place, report it by calling 1-866-INVADER or visiting the website oregoninvasiveshotline.org

Source: Oregon Invasive Species Council

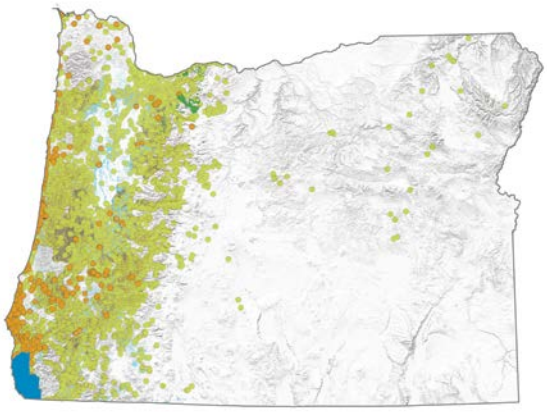
USING HERBICIDES TO CONTROL INVASIVE PLANTS

- The legal use of herbicides protects young forests and promotes healthy forest growth.
- Herbicides help control invasive species such as ivy, blackberry and Scotch broom that rob nutrients and sunlight from native trees.
- Young trees are the most vulnerable to competition from unwanted vegetation, and without herbicide use they take much longer to grow.
- Foresters use herbicides sparingly in the first few years of tree growth to give seedlings the best chance to thrive, and then not again until the next generation of forest is planted.



ENGLISH IVY The invasive vine harms native trees by blocking out sunlight.

Invasive species ranges in Oregon



SUDDEN OAK DEATH (disease)

SCOTCH BROOM (plant)

EMERALD ASH BORER RISK (insect)

GORSE (plant)

WHITE PINE BLISTER RUST (disease)

Source: Oregon Department of Forestry

Learn more

Oregon Forest Pest Detectors – pestdetector.forestry.oregonstate.edu

Oregon Invasive Species Council – oregoninvasivespeciescouncil.org

Forest Service Pacific Northwest Region web page on invasive species – fs.usda.gov/goto/r6/invasives

DISEASE
A sneaky forest threat

When John and Cathy Dummer bought nearly 40 acres of forestland in rural Washington County, they didn't know about a silent killer lurking there.

JOHN AND CATHY DUMMER Small woodland owners, North Plains

The self-described "rookie tree farmers" found the problem while doing an inventory of their property near North Plains.

"We started keeping track of the number of dead trees, and that's when realized something wasn't right," John Dummer says.

They learned that the dead and dying trees on their property were suffering from several root diseases commonly found in Oregon: black stain root disease, laminated root rot and Armillaria.

"We kind of became the poster child," Cathy Dummer says.

Root diseases are caused by fungi and pathogens that attack and kill a tree's root system. The disease then spreads through root-to-root contact, growing from an infected root or stump to the root of a healthy tree.

Armed with this information, the Dummers

FOREST DISEASE THREATS IN OREGON

Dwarf mistletoes are parasitic, flowering plants that can slow tree growth, deform crowns and branches, and eventually kill the trees in which they grow.

Foliage diseases, such as Swiss needle cast (pictured at left), are caused by fungi that infect foliage and cause it to fall prematurely from the tree. In needle blights, the dead or partially dead needles often remain attached to the twig.

Root diseases are caused by fungi and pathogens that attack and kill a tree's root system. Trees affected by root disease are more susceptible to bark beetles and wood borers, and are more likely to fall during a storm or high winds.

Rust diseases and stem cankers — localized areas of dead bark on a tree branch or trunk — are caused by fungi that destroy the inner bark and can kill branches and entire trees. White pine blister rust, a stem canker caused by a non-native rust fungus, has devastated five-needle pine trees throughout the state.

Stem decay is caused by fungi that enter trees through wounds or small branches.

Sudden Oak Death is a non-native pathogen that has killed hundreds of thousands of tanoak trees on the southern Oregon coast. It has a wide host range and, in addition to tree mortality, can cause branch dieback and leaf spots on many native plants, including Douglas-fir trees.

were heartened to learn there are ways to combat root disease.

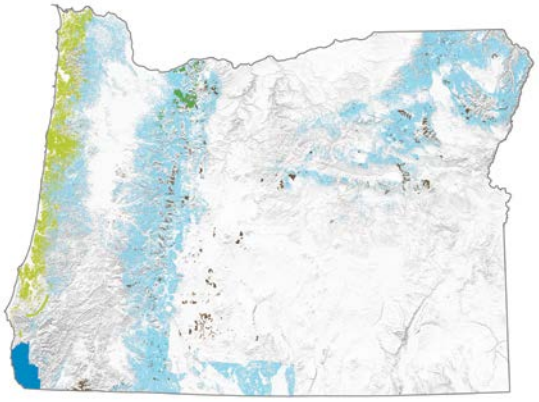
"One of our goals is having a healthy forest," John Dummer says.

Planting hardwood tree species such as alders that are not affected by root disease is one way to fight the pathogens. Other management techniques to treat root disease include harvesting a buffer around diseased trees and breaking the chain of root contact between infected and healthy trees through thinning.

The Dummers see their property as an investment, but also enjoy it as a place for recreation. As he shows off the land, John Dummer points out several large tree stumps left over from when the area was logged more than a decade ago. The stumps, he explains, hold the promise of what's to come.

"There's evidence that big trees can grow here," he says. "I call those pillars of hope."

Tree disease ranges in Oregon



Source: Oregon Department of Forestry

Learn more

Information for forest landowners on forest health – knowyourforest.org/learning-library/forest-health

Forest Service Forest Health Protection program – fs.usda.gov/main/r6/forest-grasslandhealth

Oregon Department of Forestry's Forest Health program – oregon.gov/odf/forestbenefits/pages/foresthealth.aspx

Oregon State University Swiss Needle Cast Cooperative – sncc.forestry.oregonstate.edu

photo: Alan Kanaskie, ODF

COASTAL DISEASES

Sudden Oak Death (left) has caused widespread tanoak tree mortality on the southern Oregon coast. Swiss needle cast (right) is most common on the northern coast. Infected Douglas-fir trees typically have yellowed crowns and premature needle loss.

STORMS & WEATHER

Oregon's hazard trees

TOM BERGIN
Clatsop County Sheriff

To most travelers, the towering trees along Oregon's highways are a beautiful sight. But Clatsop County Sheriff Tom Bergin sees some as a dangerous hazard.

Every winter, storms topple trees across highways, causing accidents and isolating the residents of the county's coastal communities. The Great Coastal Gale of 2007 knocked down so many trees that it took nearly a week to reopen a portion of Highway 26.

"Nobody for six days could get in and out of Clatsop County," Bergin says. And the thousands of downed trees stalled emergency responders.

After the Great Coastal Gale and subsequent storms, Bergin advocated for a state law passed in 2012 that allows Oregon Department of Transportation crews to remove trees that pose a threat to public safety in forested buffer zones along state highways.

"By clearing up the sides of our roads, we're actually helping our community," Bergin says.

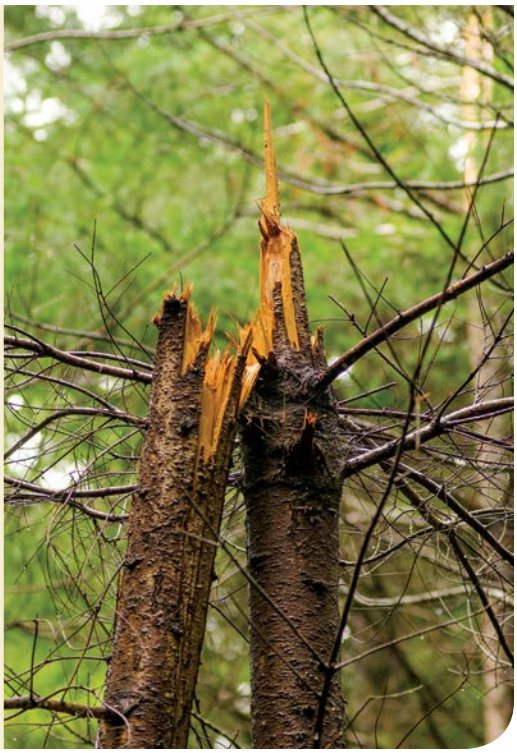
HOW EXTREME WEATHER AFFECTS FORESTS

Storms and extreme weather can have lasting impacts on forest health, but active management often minimizes the damage.

Trees with limbs and tops snapped off in storms are more prone to insect and disease outbreaks, says Stephen Fitzgerald, director of Oregon State University's College of Forestry Research Forests. Freshly downed trees and branches attract bark beetles and could fuel a wildfire. As a result, salvage work is often needed after a storm, he adds.

After the McDonald-Dunn Research Forest north of the OSU campus in Corvallis was hit by in 2014 by a wind and ice storm, Fitzgerald also noticed that areas that had been thinned a few years earlier fared better in the storm. This is because the trees in these actively managed areas had grown stronger and more wind-resistant with less competition.

"At one level, this is all natural, but depending on the condition of the forest the damage can be light or heavy," Fitzgerald says. "The thinned stands had far less damage than those that hadn't been thinned."



DRY SEASONS
The increase in intense wildfires and drought attributed to climate change is negatively impacting Oregon's forests.

CLIMATE CHANGE

A 'multiplier' for forest threats

Think about all the ways Oregon's forests are threatened – by fire, insects or disease. Now amplify the effects.

That's what the latest research on how climate change will impact forests suggests.

"It's a multiplier," says Chris Still, an associate professor in Oregon State University's College of Forestry.

Still is among other researchers investigating how rising temperatures and prolonged drought caused by climate change are affecting Oregon's forests. This includes contributing to longer, more intense fire seasons, increased insect and disease outbreaks, and diminished productivity. Climate change may also reshape the makeup of the state's forests as conifers that need more moisture have a harder time surviving.

The good news is that the impacts of climate change can be lessened with active management, especially through forest restoration and fuels reduction for wildfire resiliency, says Robert Scheller, an associate professor in Portland State University's School of the Environment.

"No doubt climate change is going to happen and it's going to trigger more wildfire and insect infestations," he says. "It's getting to the point where you really have to manage for the overall health of the forest."

Forests also serve a vital biological role in reversing the effects of climate change, because trees take in and store carbon through photosynthesis. This carbon continues to be sequestered even after a tree is harvested and manufactured into forest products. Using wood from sustainable forestry can help fight climate change, according to the United Nations' Intergovernmental Panel on Climate Change.

Learn more

National Climate Change Assessment – nca2014.globalchange.gov/report/sectors/forests

Food and Agriculture Organization of the United Nations – fao.org/forestry/climatechange/53459/en

Consortium for Research on Renewable Industrial Materials – corrim.org

Intergovernmental Panel on Climate Change – ipcc.ch/index.htm

PEOPLE

Teaching stewardship

Pulling out blackberry vines may be monotonous work, but Northwest Youth Corps crew leader Justin Senekham thinks about the big picture.

By removing the invasive plants that are choking a grove of red alder trees in the Tualatin River National Wildlife Refuge, he and a crew of young adults are helping restore the natural ecosystem. It's a big reason Senekham is proud to be part of Northwest Youth Corps, a Eugene-based nonprofit organization that provides education and job training to teens ages 16 to 19. Crews work on conservation, reforestation and recreation projects.

"With this job, you're able to explain to youth why this work is important," Senekham says. "You're being a good steward to our land."

He and other members of a Portland metro area crew say one of the most important lessons of the experience is how people influence natural environments in negative and positive ways. Along with pulling invasive weeds, NYC crews plant native species, repair and build trails, and reduce wildfire fuels in forests and other natural areas.

"It surprises me the small things that can have a big impact," says crew member Dylan Bongiovanni.

When he told a friend about doing conservation work, Bongiovanni was heartened by the response. "His reaction was to thank me. He saw the importance of coming out here to do work because it is everybody's space."

> "It surprises me the small things that can have a big impact."

NORTHWEST YOUTH CORPS crew leader Justin Senekham, left, and crew member Dylan Bongiovanni, right, clear away invasive blackberry vines in the Tualatin River National Wildlife Refuge.

CLYDE ZELLER
Tillamook District
recreation unit manager

LEAVE NO TRACE

Oregon's forests offer a breathtaking array of camping, hiking and other recreational opportunities. But if outdoor enthusiasts aren't careful, they'll harm the places they've come to enjoy.

"We have a lot of folks who do things right, but then a small percentage of the population is doing things that negatively impact the landscape," says Stephanie Beall, the recreation coordinator for the Forest Grove District of the Tillamook State Forest.

With its proximity to the Portland metro area, the Tillamook State Forest is a popular destination for outdoor recreation that's suffered from the consequences of irresponsible visitors, says Clyde Zeller, Tillamook District recreation unit manager. Common problems include littering, trampled vegetation, human waste that's not disposed of properly, and people chopping their own firewood.

In some cases the repeated damage has gotten so bad that rangers have resorted to closing campgrounds. To avoid this result, Zeller recommends, "Practice leave no trace and clean up after others. Stewardship starts with you."

Learn more

Leave No Trace Center for Outdoor Ethics – lnt.org

Tread Lightly – treadlightly.org

STEWARDSHIP ORGANIZATIONS

Along with Northwest Youth Corps, there are a variety of organizations in Oregon that promote forest stewardship and encourage public involvement. Here are a few:

- SOLVE mobilizes volunteers for cleanup and restoration projects in natural areas throughout the state. For more information, visit solveoregon.org.
- Keep Oregon Green works to reduce the number of human-caused wildfires in Oregon through public awareness and education. For more information, visit keeporegongreen.org.
- The Oregon Watershed Enhancement Board provides grants to help Oregonians take care of rivers, wetlands and natural areas. For more information, visit oregon.gov/OWEB/pages/index.aspx.
- The Oregon Invasive Species Council works to raise public awareness of invasive species issues. For more information, visit oregoninvasivespeciescouncil.org.

MANAGED LANDSCAPE
A diversity of tree ages and species contributes to overall forest health.

ACKNOWLEDGMENTS

OFRI is grateful to the people who agreed to be featured here and others who gave their time, expertise, insights and comments during development of this report: Phil Adams, Roseburg Resource Co.; Kristin Babbs, Keep Oregon Green Association Inc.; John Bailey, Oregon State University; Quintin Bauer, SOLVE; Stephanie Beall, Tillamook State Forest; Tom Bergin, Clatsop County Sheriff; Dylan Bongiovanni, Northwest Youth Corps; Christine Buhl, Oregon Department of Forestry; John and Cathy Dummer, forest landowners; Stephen Fitzgerald, OSU; Lee Fledderjohann, Collins Pine; Robbie Flowers, U.S. Forest Service; Randy Hereford, Starker Forests; Nancy Hirsch, ODF; Alan Kanaskie, ODF; Thomas Maness, OSU; Danny Norlander, ODF; Jeff Parker, Northwest Youth Corps; Robert Scheller, Portland State University; Justin Senekham, Northwest Youth Corps; Dave Shaw, OSU; Pat Skrip, Douglas Forest Protective Association; Amanda Stamper, The Nature Conservancy; Chris Still, OSU; Rex Storm, Associated Oregon Loggers Inc.; Nicole Strong, OSU; Wyatt Williams, ODF; and Clyde Zeller, Tillamook State Forest.

ABOUT OFRI

The Oregon Forest Resources Institute was created by the Oregon Legislature in 1991 to advance public understanding of forests, forest management and forest products and to encourage sound forestry through landowner education. A 13-member board of directors governs OFRI. It is funded by a dedicated forest products harvest tax.

Oregon Forest Resources Institute

Paul Barnum, Executive Director
Mike Cloughesy, Director of Forestry
Jordan Benner, Senior Public Outreach Manager
Inka Bajandas, Public Outreach Manager

317 SW Sixth Avenue, Suite 400
Portland, OR 97204-1705
971-673-2944 • OregonForests.org

Download the Oregon Forest Facts & Figures mobile app at Apple's iTunes store or Google Play

Follow OFRI on Facebook