

2018 Forest Health Unit Update

This report summarizes work completed by Oregon Department of Forestry (ODF) Private Forests Forest Health Unit personnel since the last Board of Forestry (Board) update in September 2018 (for the 2017 Forest Health Report).

Forest Health staff provide specialized expertise in forest entomology, pathology, invasive species and other forest health issues to ODF District Offices, all three ODF Divisions, ODF leadership, and other state, local, and federal agencies and Tribes by surveying, detecting and responding to forest health issues on all non-federal forestlands in Oregon. Beyond survey and detection, employees in the ODF Forest Health Unit plan, develop and execute education and outreach training events in conjunction with ODF Public Affairs and OSU Extension Forestry to provide news releases, information and technical assistance to private and local forest landowners and forest managers. Forest Health Unit staff also work toward the advancement of forest health related science by cooperating and developing forest health research projects with international and national scientists.

By combining the Unit's capabilities in the areas of forest health surveys, trainings, and collaborative research, the **ODF Forest Health staff aim to ensure healthy forests for decades to come** by assisting private forest landowners and others in the management goal of productive and sustainable forestry in the Pacific Northwest.

Below are project highlights for the Board to review. We welcome questions and requests for more information on these and other forest health issues.

Aerial Survey Detection (ADS)

The annual cooperative statewide aerial survey of Oregon forestlands for insect and disease damage began in 1947. A Cooperative Agreement signed in 1965 between the State Forester, the Board of Forestry, and the USDA Forest Service formalized the collaborative relationship by instructing personnel to carry out systematic surveillance and reporting of insect and disease conditions on forestlands. Oregon's survey covers over 35 million acres across all ownership categories, and is one of the best long-term data sets on forest health conditions across the globe. ODF is also recognized nationally for developing and testing digital sketch mapping and aircraft technologies that improve information delivery and the safety of aviation personnel. Annual aerial surveys are accomplished through collaboration with the U.S. Department of Agriculture (USDA) Forest Service Pacific Northwest Region, with additional funding and support provided by the U.S. Department of the Interior (USDI) Bureau of Land Management (BLM), private industrial forest landowners, and cooperatives such as the Oregon State University (OSU) Swiss Needle Cast Cooperative.

In 2018, the ODF Forest Health Unit detected over 675,000 acres with tree mortality and other damage during the statewide aerial survey, which is below the 10-year average of approximately 750,000 acres. The majority of tree mortality detected during aerial surveys over

the last decade has been due to insect outbreaks, namely bark beetles. In 2018, over 640,000 acres with tree damage and mortality was attributed to insect damage although predisposing stressors such as drought were common (see 5c attachment 3).

2018 insect damage totals (approximate acres):

Bark beetles: 469,000

Defoliators: 184,600

Many forest insects are secondary pests, attracted to already stressed trees, which are in turn less resilient to withstand attack. In recent years, drought has been the primary contributor to tree stress, leading to subsequent insect attack and tree mortality. Other primary stressors include various foliar, stem and root diseases and abiotic factors. For a summary, see the *Forest Health Highlights in Oregon –2018* (see 5c attachment 3).

While aerial surveys anchor Oregon Department of Forestry efforts to collect information on forest health conditions in Oregon's forests, they are not able to detect the occurrence of many damaging agents. Oregon's Forest Integrated Pest Management Laws (ORS 527.310 to 527.370) requires that the State Forester conduct surveys to determine the presence, extent, trend, and impact of native and invasive pests, as well as overall forest health. Agents that can significantly affect forest health, such as root diseases and dwarf mistletoes, are assessed by ground surveys completed annually in priority areas or as part of special ground survey projects.

Sudden Oak Death

Sudden oak death (*Phytophthora ramorum* or SOD) continued to intensify and spread in Curry County. In 2018, 48 new infestations were detected at or beyond the GIA (generally infested area). The GIA is an area within the sudden oak death quarantine where eradication treatments of infested sites are no longer required under Oregon Department of Agriculture (ODA) rules. The GIA now covers 89 square miles of disease establishment and intensification within the quarantine area; approximately 14 miles north-south and nine miles east-west. The current quarantine area for *P. ramorum* has reached 515 square miles in Curry County or 31% of the county. Using a 300 ft treatment buffer, the 2018 NA1 lineage (North American 1) infestations totaled approximately 393 acres, with 335 acres private and 58 acres federal lands. Again with a 300 foot buffer, approximately 598 acres of non-federal lands were infested with the more aggressive EU1 lineage (European 1) of *P. ramorum*.

Eradication treatments for EU1 infestations totaled 270 acres in 2017 and 203 acres for 2018. Treatments are underway or planned on the remaining 455 acres of EU1 infestations detected in 2018. New laboratory results from OSU have detected an additional 85 acres of SOD infestations in the surrounding areas, which are most likely the EU1 lineage.

The economic benefits of slowing the spread of SOD, in contrast to eliminating it, were recently analyzed for the Oregon Department of Forestry. The report concluded that over the next 20 years, the potential benefits of slowing the spread outweighed the costs of control operations at a ratio of 19:1. Measured benefits were primarily derived from reduced risk of international sanctions that would severely disrupt timber exports from the major deep-sea port at Coos Bay, Oregon, north of the current range of sudden oak death. Importantly, the ecological and sociological costs and benefits of controlling the disease were discussed including cultural impacts to tribes, adverse impacts on aesthetics and related private property values, increased public safety risk and increased wildfire risk.

Most funding for the SOD slow the spread program continues to be provided by the USDA Forest Service's Forest Health Protection program, BLM, and State of Oregon. In the 2019 Legislative Session, \$1.7 million was allocated to the Department for the purpose of eradication efforts of *Phytophthora ramorum*. ODF has recently started working with the National Resources Conservation Service (NRCS) on an Environmental Quality Incentives Program (EQIP) Project to treat EU1 sites and high priority NA1 sites.

The department continues to collaborate with and support the SOD Task Force convened by State Representative Caddy McKeown and State Representative David Brock Smith.

In addition to the slowing the spread activities in Curry County, the Department is collaborating with OSU on multiple new research projects related to SOD in Oregon. First, ODF received 2018 USDA Farm Bill funding to develop a coordinated outreach effort with the OSU Extension Service to train citizen scientists about the importance of early detection in order to slow the spread of the disease of infected host plants. By focusing on communities along the leading edge of the disease, workshops were held to teach local residents about disease recognition, early detection methods, and effective treatment options. Second, a multi-year project started in 2016 to investigate genetic resistance and develop a population of tanoak trees to be used for restoration and reforestation. Acorns were collected by ODF in 2016, 2017, 2018, grown at the USFS Dorena Genetic Resource Center, and tested for possible resistance at OSU. Lastly, ODF is collaborating with North Carolina State University with the development of an updated disease spread model for SOD in Oregon. The last model was developed in 2010 and the new model will incorporate refined host and climate data as well as the yearly treatments the SOD Program has conducted since 2001. ODF will be hosting a participatory modeling workshop in September 2019.

Bark beetle mitigation

ODF allocates money from USFS as part of 50/50 cost-share incentive for landowners to prevent or mitigate bark beetle outbreaks primarily with preventative thinning and pine slash disposal. ODF received \$70,000 from the USFS in 2018. ODF Forest Health staff work with Stewardship Foresters in southern and eastern Oregon to identify the best targets for these limited funds. There is a waiting list for bark beetle mitigation requests. In 2018 we paid out \$56,217 to treat 212 acres across 15 separate ownerships in the Southern and Eastern Oregon

Areas. ODF Forest Health staff assisted in organizing and leading a field tour of bark beetle mitigation projects for USFS leadership.

Gypsy moth

Since the 1970s, through a cooperative agreement between the USDA and the Oregon Department of Agriculture (ODA), ODA has conducted annual statewide surveys for the exotic forest pest, gypsy moth (*Lymantria dispar dispar*). Also since the 1970s, ODF Forest Health staff have routinely assisted ODA pest management staff in statewide surveys and response to incipient gypsy moth populations in Oregon's forests. Gypsy moth is an exotic defoliating forest pest that was introduced in Massachusetts in the 1800s. It is commonly transported via cargo to western states and is known to feed on over 300 species of trees and shrubs, including conifers. Notable gypsy moth events occurred in 1985-1986, when over a quarter-million acres of forests in Lane County were treated, and 2016, when 9,000 acres were treated in Forest Park and Portland's urban forests. In both cases, ODF worked to ensure successful missions. In all, there have been over 20 instances of gypsy moth detection, rapid response and successful eradication of this damaging pest. ODF Forest Health staff worked with ODA and USDA to represent and protect resources of private and local forest owners.

In 2018, ODA staff detected 27 gypsy moths in and around two apartment complexes in Benton County/Corvallis. These detections resulted in an ODA-led gypsy moth eradication that occurred in May, 2019. ODF played a role as ground crew, available for questions from residents and overseeing application by the contractor. ODF also led the interagency effort to develop a project communication plan for the press and local citizens. ODA is conducting follow-up trapping in 2019 to determine if the treatment was successful.

New exotic species detections

Invasive species cost the U.S. economy over \$120 billion dollars per year and are the second leading cause of species extinctions worldwide. Beyond sudden oak death and gypsy moth, Oregon's tree species have been heavily impacted by several exotic, invasive agents such as white pine blister rust, Port-Orford-cedar root disease, and balsam woolly adelgid. Many others, such as emerald ash borer, are expected to arrive to Oregon in the years to come. Early detection of damaging exotic species, akin to initial attack in wildfire, is absolutely critical if we are to stop new invasive species from becoming established and subsequently destroying or degrading forest resources of the Pacific Northwest. By utilizing ODF resources in Information Technology and GIS, as well as technological collaborations with outside partners, ODF forest health staff are developing novel ground-based and crowd-sourced detection tools that contribute to this goal.

For instance, during 2016-2018, ODF Forest Health managed and collected data for a ground survey project entitled, "Improving Early Detection of Exotic Invasive Wood Boring Insects at High Risk Areas in Oregon." The U.S. Forest Service provided the funding for the survey through the Forest Health Monitoring-Special Technology Development Program. During the ground survey, new trapping technology in insect pheromone trapping was tested at 12 sites along a

165-mile segment of the Columbia River corridor from Astoria to The Dalles, Oregon. Four exotic species, previously unknown to occur in Oregon or the Pacific Northwest, have been detected in the samples. For one of these insects, the Asian ambrosia beetle, *Xyleborus monographus*, a species previously unknown in North America and known to cause damage to oaks in Europe, a 2019 delimitation survey is underway, funded by the USDA in partnership with ODA. ODF Forest Health staff have been assisting ODA and the USFS in developing the current sampling protocol in the area.

In conjunction with OSU Forestry Extension and USDA Forest Service program, entitled *Oregon Forest Pest Detectors*, ODF Forest Health staff aim to draw upon Oregon's "army of natural resource professionals" to detect newly-arriving exotic forest pests. The Oregon Forest Pest Detector (OFPD) program was initiated in 2015 with the goal of training professionals who work around trees (arborists, foresters, park workers) how to recognize characteristics of emerald ash borer (EAB) and Asian longhorn beetle (ALB) damage. The Pacific Northwest does not have any known populations of these insects but has several susceptible endemic host species. Since 2015 and continuing through 2019 when the grant program ends, staff from ODF and other agencies have provided training to over 500 natural resource professionals at more than 30 workshops across the state.

The Oregon Invasives Online Hotline, is a method of reporting any taxa of invasive species to Oregon's natural resource agencies via the Oregon Invasive Species Council (OISC), of which ODF, ODA and other agencies belong. A graduate of the Pest Detector Program made an observation and reported an exotic stem-borer, *Agrilus cyanescens*, in native twinberry (honeysuckle). This was the first known occurrence of this exotic pest in Oregon and proof of concept that the education and reporting system is working. ODA is completing a risk analysis on the new insect.

The OISC continues to be the vehicle by which efforts to detect, eradicate and suppress invasive species that span jurisdictions and interests of multiple agency and stakeholder groups is coordinated. ODF Forest Health serves as the agency's representative on this important interagency committee.

Invasive weeds

Invasive forest plants, such as Scotch broom and Himalayan blackberry, are major reforestation pests in Oregon. An economic assessment published by ODA indicated these two plants alone cost nearly \$80 million annually in control measures and lost revenue, the equivalent of 1,700 jobs. Nearly half of the plants on the state's regulated noxious weed list occur on forestlands. Some of these regulated weeds (e.g., "Class A") are deemed a public menace and are mandated to be controlled or eradicated (ORS 569; OAR 603-052-1200). ODF Forest Health staff provide resources to landowners and cooperators for detection, training and education pertaining to invasive plant identification and management.

ODF Forest Health surveyed nearly 400,000 acres in Curry County for the presence of the forest

weed, gorse. Gorse (*Ulex europaeus*) is an invasive shrub native to Europe that was intentionally introduced to Bandon in the 1870s. Seeds of gorse survive decades in the soil and are easily transported via heavy equipment. Gorse has thick, sharp spines and is very prone to fire due to high natural oil content. Gorse was responsible for burning nearly the entire town of Bandon in 1936. Because it is a prolific seed producer, once this plant establishes a new population, it is extremely hard to eradicate.

Although the epicenter of gorse in Oregon is along the south coast between Bandon and Port Orford, populations have turned up as far north as the Columbia River and high into both the Coast and Cascade ranges. Curry County obtained external funding to detect new populations of gorse and reached out to ODF Forest Health for assistance. ODF staff conducted a special aerial survey mission in March. Very few populations of gorse were detected and this information was provided to the county. The county's aim is to concentrate education, outreach and control of this damaging invasive plant.

Orange hawkweed (*Hieracium aurantiacum*) was initially detected in Clatsop State Forest in August 2017. Orange hawkweed invades open meadows, forest openings, and roadsides. Because of its status as a Class A noxious weed, ODF State Forests were required to report and manage for this pest plant. ODF staff conducted a ground survey in Clatsop State Forest in 2018. The noxious weed was found in two small populations at a single site on a radio tower spur road. ODF treated the site in June 2018 and conducted follow-up surveys in the summer of 2019.

Additional collaborations

Swiss Needle Cast Aerial Survey

The swiss needle cast (SNC) survey, a native foliage disease, is now flown biannually. These survey results are additive to those of the statewide aerial survey. The last survey in 2018 (supported by the OSU Swiss Needle Cast Cooperative) covered 3.8 million acres and detected approximately 420,300 acres impacted by Swiss needle cast, a slight decrease from the previous two years. Growth loss due to SNC in Oregon is estimated at more than 190 million board feet per year. In addition to growth impacts, SNC alters wood properties and affects stand development.

Oregon Bee Project

In 2017 the Oregon Department of Forestry joined the Oregon Department of Agriculture and OSU as a steering committee member of the Oregon Bee Project (OBP). This program began following a 2015 federal initiative for states to conserve and enhance pollinator health and habitat. Since its inception, this program has:

- Compiled a stakeholder group of over 25 agencies, businesses and special-interest groups
- Developed a statewide strategic plan for pollinator health

- Created a website, blog, podcast and countless publications to educate general and technical audiences
- Trained over 3,000 pesticide applicators on pesticide safety for pollinators
- Trained 150 citizen scientists to collect baseline pollinator data for the Oregon Bee Atlas
- Inducted six farms into OBP Flagship programs and worked with specialty crop farmers to develop pollinator best management practices and serve as leaders for other growers

With the help of OSU researchers, the Oregon Department of Forestry has additionally begun to develop science-based, pollinator-friendly management guidance for forestland owners while still meeting their timber production objectives. Little is known about native pollinators on forestlands but recent research by OSU has shown increases in pollinator population and diversity in actively managed forests. The Oregon Department of Forestry is working on publishing this information in reference literature and wildlife guidance documents to reach both general and technical audiences.

Emerald Ash Borer: Statewide response plan and Oregon ash seed collection

Emerald ash borer (EAB) is the most destructive forest pest to ever invade the U.S., causing the death of over 100 million ash trees at a cost of more than \$2 billion since 2001. Its current distribution includes more than 30 states in the eastern U.S. and is expected to rapidly spread in the years to come. Oregon ash (*Fraxinus latifolia*) is a susceptible host tree that occurs in riparian systems in western and southern Oregon. In 2018, ODF alongside ODA, USDA and OSU and local governments finalized a statewide response plan for emerald ash borer. The plan is all-encompassing, covering topics such as risk analysis and maps, detection, management, response and public relations surrounding this damaging pest. The audience for the 80-page plan include Oregon's state and local agencies. The state is much better prepared for this pest after the development of the plan, which you can find at www.OregonEAB.info. In 2018, ODF applied for and secured federal funding to collect ash seeds throughout its range in Oregon in anticipation of the arrival of EAB. Seeds will be collected and stored as a precaution to ensure the continuation of Oregon ash as a species and to form a basis for possible resistance research.