



**Sudden Oak Death Task Force
Strategic Action Plan
May 31, 2017**



Background Information

Who Convened this Task Force?

Co-Conveners US Senator Jeff Merkley and Oregon House of Representatives David Brock Smith convened this Task Force to develop a Strategic Action Plan to address Sudden Oak Death in Southwest Oregon.

Senator Merkley:

"Oregon has a long history of pioneering innovative ways to resolve urgent natural resource issues. I'm proud that in a time of political divisiveness, we in Oregon are coming together to tackle a pressing issue for our southern counties. Sudden Oak Death and EU1 are too great a problem for one agency or one level of government to solve. With the potential for devastating impacts on our local economy and environment, this task force will work collaboratively to look for more and better solutions to fight the pathogens."

Representative David Brock Smith:

"I am grateful to Senator Merkley for co-convening the Sudden Oak Death Task Force and am very appreciative of his deep understanding of this issue and its potential impact on our region."

Who's on the Task Force and Subcommittees?

Senator Merkley and Representative Brock Smith convened local groups, county, State and Federal governments, Tribes, Associations and Partnerships, including but not limited to:

- U.S. Bureau of Land Management
- U.S. Department of Agriculture (USDA) Natural Resource Conservation Service
- U.S. Forest Service
- USDA Animal and Plant Health Inspection Service Plant Health
- Cow Creek Band of Umpqua Indians
- Coquille Tribe
- Tolowa Dee-Ni Nation
- Confederated Tribes of the Grand Ronde
- Governor's Office
- Business Oregon
- Oregon Department of Forestry
- Oregon Department of Agriculture

- Oregon Department of Transportation
- Oregon Forest Industry Council
- Coos Forest Protective Association
- Oregon State University
- South Coast Development Council
- SW Oregon Workforce Investment Board
- Curry County
- Coos County
- Douglas County
- Josephine County
- City of Gold Beach
- City of Brookings
- City of Port Orford
- City of Gold Beach
- Oregon Association of Nurseries
- Easter Lilly Foundation
- Port of Coos Bay
- OSU Extension Service
- South Coast Lumber
- Weyerhaeuser
- Roseburg Resources
- Oregon Small Woodlands Association
- Curry Watersheds Partnership
- Wild Rivers Forest Collaborative
- Wild Rivers Coast Alliance

What is the Task Force’s Charge?

There are two charges given to the Task Force. One by the Oregon Legislative Emergency Board and one by the Task Force’s Mission Statement:

- Direction from the Oregon Legislative Emergency Board in the Fall of 2016

The Association of Oregon Counties has been asked by the Oregon Legislature to convene and facilitate a task force on Sudden Oak Death comprised of critical partners. The task force will assess the work that has been accomplished so far, the results of these efforts, and develop a strategic action plan moving forward, which will include how this plan will be funded. The task force may identify additional work tasks.

- Mission Statement approved by the Sudden Oak Death Task Force on March 3, 2017

Our mission is to develop a collaboration based action plan, including the securement of adequate resources, to contain the NA1 pathogen and eradicate the EU1 pathogen using the best available science.

The task force has agreed to develop a collaboration-based action plan to contain the Sudden Oak Death disease and eradicate the EU1 virus, using the best available science.

What and Where is the Problem?

Sudden Oak Death, caused by a non-native pathogen *Phytophthora ramorum* (*P. ramorum*), is a devastating disease that has killed hundreds of thousands of tanoak trees in Curry County. It was first detected in the county in 2001; about one-third of the county has since been affected. In Oregon, it occurs only in the forests of southwest Curry County, where a containment program is in place to slow the spread. If further measures aren't taken, it will spread north into Coos County and west into Josephine County in coming years. In California, the disease has killed millions of oaks and tanoaks in the coastal region from Monterey to Humboldt Counties.

Additionally, a European virus, EU1, that affects evergreen trees was recently detected in Oregon. The EU1 infestation in Curry County is the only one found in the United States. The potential negative economic impact is very large if we can't eradicate EU1 before it spreads.

Why the Need to Call the Task Force Now?

Sudden Oak Death (SOD) continues to slowly spread mostly to the north in Curry County. If more aggressive action is not taken now to slow and contain the disease, it will continue to expand its range and could result in further restrictions and possible quarantines that will negatively affect the natural environment of species susceptible to SOD and continue to negatively affect the economy of the South Coast.

In addition, with the recent detection of the EU1 strain of SOD, it has the potential to negatively affect conifer species if it follows a similar path to the same strain in Europe. The Task Force is clear that its goal is to eradicate the EU1 strain before it expands any further.

Action Plan

Background:

Co-conveners Merkley and Smith convened six subcommittees. The six subcommittees each met twice in April and May. The co-conveners gave them the following charge.

- **Communication & Civic Engagement Strategy Subcommittee**

You are to develop a communication & civic engagement strategy for the public, property owners and agencies interested in this subject.

- **Core Science Group**

Currently operating group. You are responsible for providing information on the latest science, research still needed and recommendations.

- **Adaptation Team within the quarantine area**

You are to develop a strategy to deal with the effects of SOD on fire danger, transportation, and public safety. How to live SOD. How to be proactive with SOD.

- **Public, Private, Civic Funding Sub-Committee**

This committee will help develop funding strategies and proposals as well as lobby for funding as identified by the other groups.

- **All lands Coordination Sub-Committee**

You are asked to engage the public, Tribal and private property owners working and coordinating together to ensure all entities who have an interest integrate their efforts in a seamless fashion.

- **Economic Impacts and Workforce Training Sub-Committee**

This committee would work with a contractor to develop an economic impact study of Sudden Oak Death now and into the future. This committee would also help develop a workforce plan to help implement recommendations from the sub-committees and the SOD Task force on workforce needs to create jobs to help treat the disease infested areas.

Recommended Action Items

Public, Private, Civic Funding Subcommittee

Form a working group, including major land owners (USFS, BLM, State) and other interest groups such as NRCS, OWEB, FERC, FSA, Oregon Nurseries Association, Oregon Forest Industry Council, Tribes, key philanthropic entities, the local forest collaborative, and others that works to:

- 1) Identify landscape scale, place-based projects that cross ownership boundaries, and
- 2) secure the appropriate resources to implement those projects.

Example to consider: Klamath model

COMMUNICATIONS AND CIVIC ENGAGEMENT SUBCOMMITTEE

After conducting an RFP process, hire a marketing/outreach firm to work with key partners to develop a clear message and a coordinated communications plan to begin implementation no later than January 2018. The message must be one that can be tailored for each target audience to answer the questions, "how does this affect me?" and "what can I do?" It should include (but is not limited to):

- Talking Points
- Website
- Earned Media Strategy
- Social Media
- Public Service Announcements
- Mail
- Speaker's Bureau
- Door-to-door outreach
- Citizen Science program

Process/Accountability: It is recommended that this subcommittee continue to meet to review the RFP, assess the applicants, and provide support as the plan is developed and executed. Lead could be the County Solutions Staff.

July 2018 Update: The RFP has been developed and is ready for distribution following the securement of funding. It is estimated the cost of the RFP is \$80,000.

CORE SCIENCE TEAM

Research requested to improve monitoring and determine pathogen host range. Priorities for funding should include:

- Integrated Pest Management
 - Sylvicultural treatments
 - Chemical treatment
 - Disease resistance – investigate the use of resistant plants to sustain ecological function
- EU1 Epidemiology
Compare EU1 and NA1 strains for virulence, pathogenicity, sporulation and epidemiology
- Evaluate and improve control efforts and early detection monitoring techniques
- Quantify the ecological and social impact of living with SOD

Assumes additional landowner participation through in-kind contributions.

ECONOMIC IMPACT AND WORKFORCE DEVELOPMENT SUBCOMMITTEE

Request the development of a RFP and hire a consultant to complete an economic impact analysis of Sudden Oak Death.

Key questions to examine to include in the RFP:

1. What is the economic impact of SOD today in the quarantine area, on state, federal, tribal and private lands?
2. What's the economic impact if we do nothing?
3. What's the impact if we do not treat NA1 and aggressively focus on EU1?

The study should also assess:

- The direct/indirect/induced impacts including:
 - Indirect economic costs of the loss of public revenue and increased cost to local government and tribes
 - Socioeconomic impacts on tribal cultural and traditional uses
 - Habitat, ecological value
 - Impact on extraction (hunting, fishing) and other recreational uses (hiking, camping, bird watching, biking)

- Is the quarantine zone affecting land/property values?
- The geography of the quarantine area – what is the economic impact of current quarantine area? What if the quarantine expands to all of Curry County? All of Curry and Coos Counties? If it reaches the Port of Coos Bay? And what if it expands everywhere where tan oak is present (Coos, Curry, Josephine, Jackson, and Douglas Counties)?
- The values of the trees for private property owners – what is the true value of the trees?
- What's the economic cost of hazard trees falling on roads, houses, etc.
- The added cost to private land owners to meet regulatory requirements to export products from Curry County?
- What is the economic impact of conifers being infected by NA1 over and over, which causes tip die back, suppresses the new growth, and reduces the size/overall health of the tree?
- What is the economic impact on the nursery industry in Oregon?

Process/Accountability: It is recommended that members of this subcommittee continue to meet to review the RFP, assess the applicants, provide support as the study is developed and review the final product before it goes to final bid.

July 2018 Update: A RFI was distributed which resulted in an RFP which was responded to by three proposers. Mason Bruce and Girard was the successful bidder. ODF is funding this effort with an acceptance bid of \$80,000

Workforce Development

- If funding is approved hire additional staffing for treatment
- Additional agency administration will be required to supervise contract crews and handle contract administration
- Contract local fire crews, agency crews, and tribal crews that are out of work at the end of the summer to keep them going during the fall and winter
- Work with the county to keep their seasonal employees employed year-round to do SOD treatments
- Coordinate with the Oregon Workforce Investment Board to examine the applicability of hiring low income tract workers in SW Oregon.
- Help streamline the process so the fire crews that are laid off after the summer can be picked up by another agency (it can be difficult to keep these crews because they are hired as "1039" temporary employees and are limited in the number of hours they can work for one agency)
- Is there an opportunity for jobs related to restoration (planting resistant and protecting water quality)?

- Explore whether there is an opportunity for a value-added forest product industry and related workforce (i.e. chipping tanoak, turning it into pallets or flooring, log debarking, cleaning, etc.).
- Are there any opportunities for people with strong technical skills to help with surveying, etc.?

Need to identify who would be the lead in implementing coordinated workforce implementation plan.

- **ALL LANDS SUBCOMMITTEE**

Recommend agencies develop policies at the programmatic level to encourage and support projects across all land ownership (i.e. The Wyden Bill, IGAs that allow for work across boundaries, Good Neighbor Authority, Tribal Forest Protection Act)

- We recommend an interagency MOU between ODF, BLM, USFS, Tribal to implement SOD related all lands projects.
 - *July 2018 Update: The MOU has been completed and except for a few signatures yet to receive has been signed.*
- We recommend funding of a SOD outreach coordinator as soon as possible.
 - *July 2018 Update: It has been recommended that ODF or OSU Extension lead this effort. Waiting to hear back from ODF and OSU. Need concurrence as to who would take this on the estimated cost.*
- Provide prior notification and opportunity for input between agencies, tribes, private landowners, and counties in, and close to, the quarantine area in establishing or expanding that area.
- We recommend the science team continues to take an all lands approach.

Need to identify a lead to insure implementation of these recommendations.

ADAPTATION SUBCOMMITTEE

Fire Risk and Prevention:

- Secure funding to remove tanoak trees once they are dead and help private land owners dispose of the trees.
- Create Fire Wise Communities to get the work done for people in the area and reduce fire risk. The first priority for now would be the Cape Ferrelo Rural Fire District.

- Explore the possibility of an incentive program for landowners to remove dead oaks and restore habitat.
- Investigate potential disposal sites inside the GIA for SOD treatment material.

Transportation/Roads/Recreation

- Pretreat tanoak with buffer strips along roads and high-use recreation areas that could potentially become a hazard.
- Prioritize Carpentersville Rd. (Old Highway 101) for clean-up and then focus on local county, national forest and BLM roads affected by tanoaks mortality.

Restoration and Conservation:

- Identify important cultural and ecological sites to preserve and protect.
 - *July 2018 Update: It is recommended that one the tribes take the lead on this effort and help provide funding for this effort.*
- Engage public and private landowners to help identify infestations.
- Incentivize citizens to help identify living tanoaks inside of the GIA for potential resistance breeding or genetic conservation.
- Expand SOD related education programming provided by OSU Extension and others.
 - *July 2018 Update: This proposal can be tied into the Outreach Coordinator efforts and funding.*

Prevention

- Provide best management practices to communities in advance of SOD infestation via education outreach.
- We encourage the creation of a citizen science program.
 - *July 2018 Update: The Wild Rivers Coast Alliance is interested in this effort as they currently fund a similar program for Gorse and might be willing to provide funding to include SOD in a Citizen Science Program.*
- Within the GIA, explore funding opportunities/options to provide phosphite kits to areas with surviving tanoaks.
 - *July 2018 Update: Need to secure costs for this effort and who would lead it.*

Seek an early win with communities living with the disease by targeting high priority areas such Cape Ferrelo for dead tree removal.

Funding Recommendations

Four Funding Alternatives were developed through interagency cooperation. (See Appendix A Funding Issue paper) Three of the alternatives identify the funding needed per year for the next five years.

Alternative 1: Transition to Living with The Disease (Funding is halted)

Under this alternative, the slow-the spread program (survey, detection, and eradication) would be halted. Federal funding for SOD would likely decrease and agencies would conduct SOD detection and monitoring surveys during their normal course of business. Through annual aerial surveys and imaging, small scale ground surveys, and possible citizen science programs, the disease spread could be monitored and provide data to researchers and graduate students. ODF could continue to provide technical assistance to landowners who want to know why their tanoaks are dying and what they can do about it, give advice on how to reduce hazards from fire and tree fall, assist in enforcing quarantine regulations, and promote best management practices for this forest health issue. In short, we would rely on educating people to mitigate the effects of the disease and prevent spread to other susceptible forests in adjacent counties. This scenario would be similar to what is happening in much of California.

Alternative 2: Continue the Current Slow-The-Spread Program (with prioritized treatment sites – essentially status quo) Cost: \$1.7 million per year

This alternative continues the current slow-the-spread program as funded today. In 2016, 65 new sites outside the GIA were confirmed; if these were treated with a 300 foot buffer the total treatment area would be 638 acres: 481 acres on privately owned land, 57 acres on BLM, and 100 acres on USFS (Figure 1). BLM is treating all infestations on their ownerships. USFS expects to treat all known sites to some extent; minimal treatment standards may need to be used based on available funds. The number of outlying sites in 2016 exceeded the program's capacity to treat all sites with 300 foot buffers. Thus, the program created treatment priority areas to identify where sites will receive 300 foot buffers, while other sites will receive treatment based on available funding. The establishment of the GIA has allowed the program to focus treatment efforts on high priority sites, however, the current budget does not allow for full treatments of all new infestations outside of the GIA. Under this scenario, disease reaches the Coos County line in 20 years. The GIA would continue to expand northward 2 mi/year (rate of recent GIA expansion), with outliers occurring no more than 12 miles north of it and assuming no human assisted spread. At current funding levels, there is a risk that the rate of spread will increase over time and that risk of human spread also increases.

Cost: \$1,725,000/year

ODF-\$225,000 for program admin/treatment on state & private

USFS-\$380,000 for program admin/treatment on USFS land

USFS-\$655,000 for support to others (ODF, OSU, BLM etc.)

USDA-APHIS-\$15,000 to OSU

BLM-\$450,000 for program admin/treatment on BLM land

Alternative 3: Continue the Current Slow-The-Spread Program, with Enhanced Funding to fully treat all sites. \$5.3 million per year

Assuming at least 638 acres requiring treatment per year on forestlands, implementing the desired treatment level (300 foot buffer) at an average \$5,000 per acre would cost \$3,190,000 per year. Expanding this number to \$3,350,000 per year provides an eradication treatment budget that hedges that some sites may be larger because they encompass groups of infected trees and/or more costly due to difficult terrain or working in and around homes, power lines and other structures.

Currently, the annual operating budget for conducting eradication treatments on new sites on non-federal lands is \$150,000 per year; \$75,000 from the USDA Forest Service Forest Health Protection Program and \$75,000 from the state general fund. The annual operating budget for conducting eradication treatments on USFS land is \$250,000 and on BLM lands is \$555,000. The current deficit for needed funds is an estimated \$2,235,000 to treat new sites detected in 2016. Therefore, current funding only provides enough to treat approximately 107 acres on federal lands and 30 acres on non-federal lands to the desired level; or less than 22 percent of the anticipated need.

Cost: \$5,320,000/year

ODF-\$225,000 for program admin/treatment on state & private

USFS-\$380,000 for program admin/treatment on USFS land

USFS-\$3,050,000 for support to others/additional treatment on USFS (ODF, OSU, BLM)

USDA-APHIS-\$15,000 to OSU

USFS \$1,200,000 for research thru Pacific Southwest Research Station

BLM-\$450,000 for program admin/treatment on BLM land

Alternative 4: Contain to Curry County for As Long as Possible

Focus on preventing sudden oak death from entering the adjacent counties, Coos, Douglas, and Josephine, for as long as possible. This alternative increases the chance to protect important tanoak ecosystems, and provide long term conservation and adaptation of tanoak genes. Alternative 4 builds on alternatives 2 and 3 because continuing to slow the spread in the southern portion of Curry County is essential for containment farther north.

There is strong interest in avoiding a county wide SOD Quarantine for Curry County as well as avoiding the spread of SOD into neighboring counties. A means of ensuring aggressive eradication of human assisted or other unanticipated infestations would be to establish an Emergency Fund held in reserve and available to rapidly respond to new infestations in an action zone

adjacent to neighboring counties (Figure 2); or for sites detected in the neighboring counties themselves.

This opportunity also requires an expansion of survey, detection and monitoring capacity due to the need to survey the action zone and the area between the action zone and quarantine area at intensities currently reserved for within the quarantine area and areas proximately surrounding its boundary. From the Emergency Board allocation in 2016, \$100,000 has been placed into an emergency treatment fund to be used on any new infestation outside of the current quarantine or a new infestation of the EU1 lineage. Given the cost of an ideal eradication treatment (600 foot radius, 26 acres), this emergency treatment money would be spent down in order to cover one infestation. An emergency eradication treatment fund totaling \$500,000 would potentially treat five new sites (or 100 acres) at the ideal treatment level; this would relieve the burden of finding continued funding on potentially an annual basis.

Alternative 4 requires increased survey effort in the 6 mile wide action zone between Curry, Coos and Douglas Counties (Figure 2). The additional survey effort would include 20-30 stream baits and two aerial surveys of 250,000 acres each near the county line. Intensive delimitation surveys are conducted whenever a new infestation is found. This alternative will likely require an increase in field staff. The cost of this increase in aerial surveys, field technician time, and lab diagnostics is estimated at \$100,000 /year.

Alternative 4 is designed primarily to ensure that SOD does not move into Coos, Douglas, or Josephine Counties, and it should succeed at doing that for at least 10 years, probably longer.

Cost: \$5,920,000/year

ODF-\$225,000 for program admin/treatment on state & private

USFS-\$380,000 for program admin/treatment on USFS land

USFS-\$3,650,000 for support to others/additional treatment on USFS (ODF, OSU, BLM)

USDA-APHIS-\$15,000 to OSU

USFS \$1,200,000 for research thru Pacific Southwest Research Station

BLM-\$450,000 for program admin/treatment on BLM land

Other Options that can be done simultaneously with alternatives.

Finding and developing disease-resistant tanoaks is a long-term proposition with an unknown probability of success. Preservation of important tanoak ecosystems (refuges) seems possible if located away from the highest disease risk areas.

- **Tanoak Refugia**: Protection of important tanoak ecosystems (refugia) is possible if located away from the current distribution of SOD as well as away from the highest disease risk areas as shown in Figure 2. Areas of tanoak with high ecological and/or cultural value would be identified. Protection would involve intensive early detection, strict limits on human access and ideally eradication within 2-3 miles of each identified refuge. These areas likely will be located on federal land and will be selected by land managers and interested parties. These areas also could be part of a larger tanoak gene conservation effort. **Cost: \$130,000/year-** \$30,000 for additional aerial and ground surveys at 3 areas (\$10,000 per area) and \$100,000 to expand scope of Emergency SOD Treatment Fund to include treatment needs around designated refuges.
- **Resistance Breeding for Tanoak**¹: Begin long-term program of locating and developing tanoaks that can grow and reproduce in the presence of *P. ramorum*. Partner with Dorena Genetic Resource Center and OSU. **Cost: \$30,000/year.**
- **Tanoak Removal in Strategic Areas**: Identify areas on the landscape that are likely pathways for aerial dispersal of *P. ramorum* into adjacent counties and remove or destroy tanoak in advance of the disease. The location of these areas will be determined by recent dispersal patterns, land forms, the amount and distribution of tanoak, and risk modeling. Private landowners will need incentives to do this. Incentive programs may be available to encourage landowners to remove tanoak and establish conifers or other non-host species. Increase market opportunities to utilize tanoak so as to cover the cost of removal within the quarantine area to encourage projects. **Cost: \$650,000/year** to treat 1,000 acres/year; 50% hack and squirt treatment at \$300/acre; 50% slash and burn treatment at \$1,000/acre. This opportunity is scalable depending on the amount of funding secured.
- **Stakeholder Cooperative**: Coordinate detection and control among all landowners in SW Oregon. If stakeholders, especially private industry,

¹ Finding and developing disease-resistant tanoaks is a long-term proposition with an unknown probability of success.

do not want SOD to enter Coos and Douglas Counties, they should begin action and investment now.

Two funding scenarios are currently in state and federal budget negotiations. A full court press is needed to ensure that these packages come out of the State and Federal budget processes with adequate funding to implement the recommendations from the subcommittees. The funding levels will determine what alternatives receive funding and in what priority order.

Scenario 1. State Funding

HB 3151 has been introduced by Co-Convener David Brock Smith with an amendment to fund the SOD Implementation at **\$1.7 million for the Biennium**. The Bill has the support of the Oregon Coastal caucus as their number one Legislative priority. Meetings and lobbying have occurred with the Senate President, the Speaker's Office, both Co-Chairs of Ways and Means and the Governor's staff. The Bill is currently sitting in the Natural Resources subcommittee of Ways and Means waiting for a Hearing.

Scenario 2. Federal Funding

Federal FY 18 Appropriations requests have been submitted to Senator Merkley on behalf of the Task Force (see Appendix B). In summary, the SOD Task Force asks for the following:

BLM: \$550,000 increase to SOD and some language to allow BLM to use misc. obligation to transfer grant funds to state or county for invasive species and research

USFS: \$380,000 increase for admin/treatment on USFS \$3,650,000 increase for support to others (ODF, OSU, BLM)

OSU Research: \$1,200,000

July 2018 Update:

2018 Funding

- 2018 Farm Bill Research Grants o ODF, OSU, OSU Extension, and USDA ARS will receive in total about \$460,000 in research grants for SOD research and outreach and education.*
- Federal funding for the SOD Program is comparable for FY17-18 to previous year. USFS S&P is providing additional funds as they become available.*

- USFS will be providing ODF an additional \$100,000 for EU1 eradication*
- USDA-APHIS is providing additional funds for eradication of the EU1 infestation- \$23,000*
- State funding for SOD will remain at current service level along with an increase of \$450,000 for eradication treatments with EU1 treatments as the priority.*
- ODF will be awarded a RAC Grant through the USFS for survey, detection, and monitoring activities on federal lands in Curry County for SOD.*
- Following the 2018 Legislative short session, a \$1 million reservation to the Emergency Fund was made to fund sudden oak death eradication work by ODF. ODF may request those funds for EU1 eradication work if all other treatment funds have been expended.*
- BLM continues to treat all sites on BLM managed lands including the Generally Infested Area and will have about \$675,000 available in FY 2018?*

Treatment funds total approx. \$2,375,000 for SOD Eradication

In summary, the SOD Task Force members wish to thank Co-Conveners Senator Jeff Merkley and Representative David Brock Smith for their leadership in the development of this Action Plan and their dedication to seeing the recommendations implemented.

Appendix A



USDA Forest Service
Oregon Department of Forestry
Sudden Oak Death Management in Oregon Forests
Issue Paper



Options for Current Management Program

21 April 2017

SUMMARY

The purpose of this document is to summarize alternatives for the sudden oak death program for all forest lands in Oregon for the next five years. The Sudden Oak Death (SOD) Technical Task Force developed initial options for the function, funding and organizational structure of the sudden oak death program. The technical specialists (pathologists) convened the meetings to engage agency leaders with program leadership and planning. State and federal management teams responsible for the SOD program reviewed these options. Key components of those strategies were discussed and are presented here as a set of alternatives. The discussions did not lead to a recommendation for a fundamental change in the current SOD program, although the discussion recognized that continuing the current program is not sustainable as currently structured and funded.

ISSUE

The current slow-the-spread program uses early detection, monitoring and eradication treatment to reduce the rate of disease spread and slow disease intensification. The SOD technical team designed the program to treat infested sites outside of the generally-infested area (GIA), where the disease is commonly found. Eradication treatment priorities are set based on multiple factors including number of infested trees, location relative to quarantine boundaries, and available funds. Eradication treatments on non-federal lands range from cutting and burning an infected tree and its nearest neighbors (1/10 acre) to cutting and burning all host plants within a 300 foot treatment buffer (up to a maximum of 600 foot buffer). Expanding the GIA alleviates the obligation of non-federal landowners to treat infested sites in recognition of the high cost of doing so and the lack of available funds to cover these costs.

At the current pattern and rate of spread, the program does not have sufficient funds to treat sites that are of high priority for disease spread as proposed in the design of the slow-the-spread program. Currently, the minimum treatment option is being implemented due to insufficient funds to support the maximum treatment option. As the disease progresses, the slow-the-spread program will become more costly. Further, the inability to apply eradication treatments to infested sites on all land ownerships will increase disease intensification and spread and ultimately require expansion of the GIA. This trend also will increase the probability of spread of SOD into surrounding counties (Coos, Douglas and Josephine).

BACKGROUND

In 2001, Oregon discovered *Phytophthora ramorum*, the invasive non-native pathogen that causes the sudden oak death (SOD) disease in tanoak. *P. ramorum* spreads mostly by air when rain splashes the spores into the wind, which carries them to another host species; most likely the upper canopy of a tanoak. However, people can also spread the disease by transporting infected plant material to uninfected areas. Besides tanoak, *P. ramorum* can infect many other species of trees and shrubs. In Oregon, the diseases on these other hosts do not lead to plant mortality.

When first discovered, the objective of Oregon's SOD program in forestland was elimination of the pathogen through eradication. Eradication treatment of an infested site consists of cutting, piling and burning all infected plant material and exposed host plant material within a specified radius (aka treatment buffer) surrounding infected plants. The species of exposed host plants that are treated varies from site to site based on infestation levels and could include Oregon myrtlewood, evergreen huckleberry,

and rhododendron. The size of the treatment buffer varies depending on the level of infestation and the availability of funds to conduct the treatment; but efforts have shown that treatment within a 300 foot buffer conducted promptly following detection can successfully eliminate the pathogen from the site and slow spread. Eradication treatment can also include the application of herbicides to prevent sprouting of tanoak from stump material. Treatment is followed by reforestation by conifer or other non-host species that reduce the risk of disease recurrence or spread. Sites are monitored for persistence or recurrence of the pathogen with follow-up treatment to destroy residual or recurring infections.

Spread of *P. ramorum* is managed through the designation of a SOD quarantine area under the authorities of the Oregon Department of Agriculture (ORS 603-052-1230) and the U.S. Department of Agriculture Animal Plant Health Inspection Service (7 CFR 301-92). The state and federal quarantines regulate the intrastate and interstate movement of host plant material outside of the quarantine area. Oregon regulations require infested sites on state and private lands to undergo eradication treatment and sets forth requirements for disease free certification when moving uninfected host material to areas outside the quarantine. While federal land management agencies (U.S. Department of Interior Bureau of Land Management (BLM) and U.S. Department of Agriculture Forest Service (USFS)) are not required by federal regulations to eradicate *P. ramorum* from infested sites, federal land managers have conducted eradication treatments on all known infested sites on federal lands up to 2016.

By 2010, the quarantine area had expanded from its original 2001 size of nine square miles to 154 square miles and Oregon's SOD program on forestland transitioned from eradication to slowing the spread of *P. ramorum*. The 2010 SOD Quarantine also designated a Generally Infested Area (GIA) within the quarantine area where eradication treatment of infested sites is no longer required. Currently, federal land managers (BLM) are still conducting eradication treatments on infested sites within the GIA. The USFS has no lands within the current GIA. In contrast, treatment of non-federal sites within the GIA has mostly abated. The quarantine area expanded to 202 square miles in 2012; to 264 miles in 2013 and to 515 square miles in 2015. If SOD expands beyond the new 2015 quarantine boundary, the next quarantine area likely will be all of Curry County. The GIA now covers 58 square miles of disease establishment and intensification within the quarantine area; approximately 10 miles north-south and six miles east-west

DISEASE SPREAD

From the original infestations of 2001, SOD has spread 18 miles to the north and 8 miles to the east (Figure 1). The farthest of the infestations have received eradication treatments consisting of cutting, piling and burning of all host material within a 300 foot treatment buffer surrounding the infected trees. Many factors can affect rate of disease spread. These include climate, forest structure, host distribution, and disease abundance. Human assisted spread by moving infected plant material can transmit the disease over long distances and is a wildcard factor in terms of predicting disease spread.

Current rates of spread are estimates made from the following:

Humboldt County, California Infestation: From 2003 to 2014 SOD had spread northward 39 miles (3.5 miles/year) from the initial infestation. There is no comprehensive control program in

Humboldt County. Further, compared to Curry County, Oregon, the Humboldt County climate is less conducive to disease spread.

Curry County: Maximum distance of natural spread (no evidence of human assistance) in any given year appears to be 3 to 4 miles. From 2001 to 2016 the disease has spread northward 18 miles (average 1.4 miles/year) from the original 2001 infestations. Over the same time period spread to the northeast up the Chetco River was 8 miles (average 0.6 miles/year) from the original infestations. Human assisted spread by moving infected plant material, usually nursery stock, can transmit the disease over long distances and is a wildcard factor in terms of predicting disease spread. An example of this in Oregon is the 2010 infestation at Cape Sebastian State Park, which probably originated from nursery plants from as far away as California. Eradication treatments under the current slow-the-spread program now focus on new infested sites located outside of the GIA. The goal is to prevent these sites from becoming new sources of inoculum (or at least diminish their power); thus slowing disease spread.

Expected Spread Scenarios

While it is difficult to forecast an expected rate of spread, the following comparisons are informative.

Spread scenario assuming little or no eradication treatment to slow spread. This scenario assumes no human assisted spread, and natural spread northward at a rate of 3.5 mi/year, from the farthest north infestation (Hunter Creek). This spread rate is based on data for Humboldt County and for recent years in Oregon. Under this scenario, SOD reaches an adjacent county (most likely Coos) in ± 12 years.

Spread scenario under the current slow-the-spread program. This scenario also assumes no human assisted spread. It assumes the GIA expands northward at a rate of 2 mi/year (the rate of recent GIA expansion), with new infestations occurring no more than 12 miles north of it. All new infestations outside the GIA get some level of eradication treatment. Because of limited funding many sites will not be treated to the desired 300 foot treatment buffer. Under this scenario, SOD reaches an adjacent county (most likely Coos) in ± 20 years.

Recent Trends in Disease Intensification and Spread (2014-2016)

Due to funding limits on the current slow-the-spread effort on non-federal lands and the establishment and expansion of the GIA (where there is no eradication effort on non-federal land), the amount of disease is increasing. This, along with favorable wet weather conditions for disease spread, has increased the number of new infestations at dispersal distances greater than 2.5 miles. It is reasonable to assume that rate of spread calculations that include the first 10 years of the eradication program will underestimate current and future spread.

In early 2015, another clonal lineage of *P. ramorum* (EU1) was detected on a single tanoak tree near the Pistol River on non-federal land. This is the first report of the European (EU1) lineage in US forests. Genetic analysis suggests a nearby private nursery (now closed) as the probable source. This finding is of particular concern because in Europe, the EU1 lineage kills or damages several conifer tree species and is considered more aggressive than the North American lineage (NA1). Furthermore, establishment of the EU1 lineage would create the potential for sexual reproduction and increased variability in the North American *P. ramorum* population. The EU1 infestation was cut and burned (13 acres) and has not been detected in

post-treatment vegetation sampling in the vicinity. In 2016, the EU1 lineage was detected for a second time, ½ mile south of the one EU1-infested tanoak found in 2015. Of the 25 positive trees identified, two grand fir seedlings and 23 tanoaks are confirmed positive for EU1. The 2016 EU1 infestation is the top treatment priority and will include a 300-600 ft. treatment buffer, resulting in a 50 acre treatment. Continued monitoring and ground surveys in the area have resulted in the detection of two additional infestations, one directly to the north of the 2016 eradication treatment and one a half mile north of the treatment. At this point, eradication of the EU1 lineage is still possible, but funding and landowner cooperation have been challenges.

CURRENT SOD SLOW-THE-SPREAD PROGRAM

The current slow-the-spread program uses early detection, monitoring and eradication treatment on sites outside the GIA to reduce the rate of disease spread and slow disease intensification. Survey, detection, and monitoring efforts compose of ground, aerial and stream bait surveys. Ground-based detection and delimitation surveys around infested sites are conducted year-round. Aerial surveys, both fixed winged and helicopter, are conducted four times per year; the main surveys occur in July and October when current-year mortality is most visible. Aerial surveys cover a cumulative area of at least 700,000 acres of forest; ground surveys cover 600 acres. The current program is incorporating the use of high resolution digital aerial imagery as a means to augment aerial surveys. High-risk streams within and outside of the SOD quarantine area are targeted for stream baiting; the practice of periodically submerging host plant materials in streams and then testing the material for the presence of *P. ramorum*. Additional streams near infested nurseries or other infested non-forest sites may also be baited. Stream baits are deployed and collected at two-week to one-month intervals for a minimum of 8-10 months, beginning in late April.

Once an infestation is detected from the survey efforts, eradication treatments are conducted on all infested sites outside the GIA to the desired 300 foot treatment buffer. Eradication treatment on non-federal land still complies with quarantine regulations for conducting treatment, but the level of treatment varies from site to site due to limitations on available funds. Federal land managers conduct eradication treatments to the desired 300 foot treatment buffer outside of the GIA, and in the case of BLM, also within the GIA.

Eradication treatments are most effective when conducted promptly and at the largest treatment buffer possible. However, if funds are not sufficient, the minimal treatment is better than no treatment but increases the likelihood of the disease showing up nearby in subsequent years.

- Minimal Treatment -- Cut and burn all host material within **20 to 50'** radius of infected tree (0.03 to 0.18 acres) and fell and lop remaining tanoak within 300' radius of the infected tree. Cost \$1,500 per site.
- Desired Treatment – Hack and squirt all tanoak, then cut and burn all tanoak within **300'** radius of infected tree (6.5 acres). Cost would be \$32,500 per site (\$5,000 per acre). Sites that have a cluster of infected trees would be disproportionately higher in cost as the 300' radius for the buffer treatment is from the farthest tree out from center.
- Ideal Treatment – Hack and squirt all tanoak, then cut and burn all tanoak within **600'** radius of infected tree (26 acres). Cost would be \$130,000 per site (\$5,000 per acre). Sites that have a cluster

of infected trees would be disproportionately higher in cost as the 600' radius for the buffer treatment is from the farthest tree out from center.

Program Structure

Essential program functions are shared among the following:

Oregon Department of Forestry (ODF) – Survey, detection and monitoring; planning and administration of eradication treatments on non-federal land; landowner education and assistance. Operations are managed by the statewide forest pathologist in Salem Private Forests Division plus two Coos Bay District SOD foresters located in Brookings.

Oregon Department of Agriculture (ODA) – Authority and administration of the SOD Quarantine. Authority and administration of the nursery SOD program. Coordinates with USDA Animal and Plant Health Inspection Service (APHIS). Operations managed out of Salem.

USDA Forest Service (USFS) – Planning and administration of eradication treatments on Rogue River-Siskiyou National Forest lands; assists ODF with aerial survey, conducts ground survey, detection and monitoring and technical assistance to federal land managers. Ground survey and treatment operations are managed by Southwest Oregon Forest Health Protection Service Center's zone forest pathologist in Central Point and SOD Forester in Gold Beach in conjunction with the Rogue River-Siskiyou National Forest. Aerial survey assistance provided by Pacific Northwest Region Forest Health Protection aerial survey program. Through grants provided to ODF & BLM and contracts with OSU the USFS provides program funding, technical support and assistance to entities engaged in SOD work.

USDI Bureau of Land Management (BLM) – Planning and administration of eradication treatments on Coos Bay District lands; conducts ground surveys and monitoring. Operations managed by BLM foresters in the Coos Bay District Office with program coordination by Oregon State Office in Portland.

Oregon State University (OSU) College of Forestry – Testing of sampled plant material for *P. ramorum* and related diagnostics. Everett Hansen Lab in Corvallis. Research into pathogenicity of NA1 and EU1 lineages of *P. ramorum*. Jared Leboldus Lab in Corvallis.

Oregon State University College of Agricultural Sciences/USDA Agricultural Research Service (ARS) Horticultural Crops Research Unit -- Genotyping of *P. ramorum* species and clonal lineages from sampled plant material. Nik Grünwald Lab in Corvallis.

Oregon State University Forestry and Natural Resource Extension Service – Outreach, education and assistance. Operations conducted by Forest Health Extension Specialist in Corvallis and the Coos and Curry Extension Forester in Myrtle Point.

Coordination of operations is conducted by the SOD Science Team: Ellen Goheen (Forest Pathologist, USDA Forest Service), Everett Hansen and Jared Leboldus (Forest Pathologists, OSU), Sarah Navarro (Forest Pathologist, ODF), and Helmuth Rogg (Plant Program Director, ODA). Communication among landowners, nurseries, other organizations, and other interested parties is conducted through monthly SOD Core Group conference calls hosted by Gary McAninch, Nursery and Christmas Tree Manager, ODA.

Current funding sources

All funding for the SOD program in forests is provided by agencies. The program also benefits from cooperation by private landowners.

USFS funds a pathologist that provides program oversight and expertise and a Gold Beach RD SOD forester positions which is focused on detection and treatment on National Forest lands. It also provides \$150,000 per year for SOD diagnostics via a cost-reimbursable agreement with the Everett Hansen laboratory at OSU. USFS eradication treatments are funded internally through USFS budget processes on an annual basis. In FY2016, \$265,000 was provided for treatments and their administration. USFS also funds grants to ODF annually which supports SOD surveys, monitoring, and eradication treatments. ODF receives \$375,000 per year from USFS for SOD (which includes \$35,000 from the forest health monitoring grant for stream baiting).

BLM funds eradication on their lands and related work through their internal budgeting process, and thru interagency grant programs which are approximately \$250,000 per year from USFS.

ODF funds the pathologist and two foresters in Brookings, plus \$75,000 per year for eradication. In 2016, in order to alleviate the eradication treatment funding shortage, ODF submitted a request to the Emergency Board for \$250,000 of General Fund to the SOD program in May of 2016. The request was granted to ODF and the money was allocated in three parts: \$100,000 to increase treatment of the leading edge of infested sites in or near the quarantine boundary; \$100,000 will be used to create an emergency treatment fund that will be held by ODF for rapid treatment of any site outside of the quarantine area or an infestation of the EU1 lineage; and \$50,000 was given as a block grant to the Association of Oregon Counties to convene and facilitate the SOD Task Force. Although the Emergency Board money helps to address the current backlog of funding, there is no guarantee the SOD slow the spread program will receive funding such as this in the future.

OSU receives funding for diagnostics and other lab support primarily from USFS, plus other agencies (\$185,000 per year). The Grunwald Lab receives \$15,000 per year from USDA APHIS for genetic lineage analysis.

Estimated Annual Program Expenditures- (funding source)

ODF-Brookings Field Office (\$100,000 US Forest Service, \$60,000 State General Fund)	\$160,000
ODF-Salem Staff (State General Fund)	\$90,000
ODF-Aerial Surveys (includes digital imaging) (US Forest Service)	\$45,000
OSU-Hansen Lab (US Forest Service)	\$185,000
OSU/USDA ARS-Grunwald lab (USDA APHIS)	\$15,000
USDA Forest Service	\$130,000
BLM-Coos Bay staff	\$145,000
Subtotal	\$770,000

*Excludes treatment costs for ODF Survey, detection, monitoring, and program administration costs are \$325,000 per year.

Estimated Annual Eradication Treatment Expenditures

ODF (\$75,000 State General Fund; \$75,000 US Forest Service)	\$150,000
USDA Forest Service	\$250,000
BLM (\$305,000 BLM and \$250,000 US Forest Service)	\$555,000
Subtotal	\$955,000
TOTAL	\$1,725,000

Cumulative Program Expenditures – 2001 through 2015

Cumulative Operating and Eradication Treatment Expenditures by Funding Source (excluding research)

USDA Forest Service	\$10,195,700 ²
BLM	\$3,901,000
ODF – State General Fund	\$3,442,000
Oregon Department of Agriculture / USDA APHIS	\$490,000
Private	\$322,000
Other State Agency (Eradication Treatments)	\$96,500
TOTAL	\$18,447,200

² In 2010, the Oregon SOD Program received \$2,692,000 from the American Recovery and Reinvestment Act through the US Forest Service.

ALTERNATIVES AND THEIR CONSEQUENCES

Alternative 1: Transition to Living with The Disease

Sudden oak death is here to stay and will be a forest health issue into the future. Under this alternative, the slow-the spread program (survey, detection, and eradication) would be halted. Federal funding for SOD would likely decrease and agencies would conduct SOD detection and monitoring surveys during their normal course of business. Through annual aerial surveys and imaging, small scale ground surveys, and possible citizen science programs, the disease spread could be monitored and provide data to researchers and graduate students. ODF could continue to provide technical assistance to landowners who want to know why their tanoaks are dying and what they can do about it, give advice on how to reduce hazards from fire and tree fall, assist in enforcing quarantine regulations, and promote best management practices for this forest health issue. In short, we would rely on educating people to mitigate the effects of the disease and prevent spread to other susceptible forests in adjacent counties. This scenario would be similar to what is happening in much of California.

Without treatment, the disease intensifies and rate of spread increases. Tanoak is rapidly being eliminated from infested areas in California and in the Oregon GIA. Oregon will lose tanoak in at least the western portion of its range. Birds, mammals, insects and fungi dependent on tanoak will migrate or die. Loss of tanoak will impact Native American culture; they have traditionally relied on tanoak acorns as a food source. Assuming no human spread, starting at the farthest north infestation (Hunter Creek), disease spreads northward 3.5 mi/yr. Disease reaches the Coos County line in 10-12 years.

The quarantine regulations would change soon to encompass all of Curry County, and eventually Coos and Douglas counties, potentially raising export and trade issues with species on the *P. ramorum* host list, including Douglas-fir, western hemlock, grand fir, and others. Forest, nursery, Christmas tree and other forest product operations that intend to ship material will need inspections and disease-free certifications, probably on a fee-for-service basis.

Alternative 2: Continue the Current Slow-The-Spread Program (with prioritized treatment sites – essentially status quo)

This alternative continues the current slow-the-spread program as funded today. In 2016, 65 new sites outside the GIA were confirmed; if these were treated with a 300 foot buffer the total treatment area would be 638 acres: 481 acres on privately owned land, 57 acres on BLM, and 100 acres on USFS (Figure 1). BLM is treating all infestations on their ownerships. USFS expects to treat all known sites to some extent; minimal treatment standards may need to be used based on available funds. The number of outlying sites in 2016 exceeded the program's capacity to treat all sites with 300 foot buffers. Thus, the

program created treatment priority areas to identify where sites will receive 300 foot buffers, while other sites will receive treatment based on available funding. The establishment of the GIA has allowed the program to focus treatment efforts on high priority sites, however, the current budget does not allow for full treatments of all new infestations outside of the GIA.

The consequences of continuing the slow-the-spread program at current funding levels are becoming clear. In areas where treatments have stopped, disease intensifies dramatically and kills most of the tanoaks in just a few years. As more inoculum is produced in the areas of uncontrolled disease, the leading edge of the main infestation expands northward and eastward, and the probability of human-assisted spread increases. Each year, outlier infestations become more numerous and occur farther from the leading edge. Funding for eradication treatments is not sufficient to treat all outliers effectively and will continue to be increasingly insufficient as the disease continues to intensify. Scaling treatment area size to importance of site allows the most important infestations to be cut and burned, which slows disease relative to no treatment.

Under this scenario, disease reaches the Coos County line in 20 years. The GIA would continue to expand northward 2 mi/year (rate of recent GIA expansion), with outliers occurring no more than 12 miles north of it and assuming no human assisted spread. At current funding levels, there is a risk that the rate of spread will increase over time and that risk of human spread also increases.

Additionally, Oregon State University would continue to conduct small scale research studies based on SOD program needs using existing funding from ODF and USFS.

Cost: \$1,725,000/year

ODF-\$225,000 for program admin/treatment on state & private

USFS-\$380,000 for program admin/treatment on USFS land

USFS-\$655,000 for support to others (ODF, OSU, BLM etc.)

USDA-APHIS-\$15,000 to OSU

BLM-\$450,000 for program admin/treatment on BLM land

Alternative 3: Continue the Current Slow-The-Spread Program, with Enhanced Funding to fully treat all sites

Assuming at least 638 acres requiring treatment per year on forestlands, implementing the desired treatment level (300 foot buffer) at an average \$5,000 per acre would cost \$3,190,000 per year. Expanding this number to \$3,350,000 per year provides an eradication treatment budget that hedges that some sites

may be larger because they encompass groups of infected trees and/or more costly due to difficult terrain or working in and around homes, power lines and other structures.

Currently, the annual operating budget for conducting eradication treatments on new sites on non-federal lands is \$150,000 per year; \$75,000 from the USDA Forest Service Forest Health Protection Program and \$75,000 from the state general fund. The annual operating budget for conducting eradication treatments on USFS land is \$250,000 and on BLM lands is \$555,000. The current deficit for needed funds is an estimated \$2,235,000 to treat new sites detected in 2016. Therefore, current funding only provides enough to treat approximately 107 acres on federal lands and 30 acres on non-federal lands to the desired level; or less than 22 percent of the anticipated need.

Under this alternative, the slow-the-spread program would need to secure increased funding for conducting eradication treatments on all lands by \$2,395,000 per year for a total treatment of \$3,350,000 per year. Unused funds should be allowed to be banked from year to year so as to take advantage of savings incurred in lower than average spread years to be available to address treatment needs in above average spread years. Mechanisms should be developed so funds can also be used on all lands should their managers face the same financial limitation currently being incurred on non-federal lands to treat sites at the desired levels.

Research is needed to improve our ability to combat sudden oak death, especially given the introduction of the EU1 lineage in Oregon's forests. A cooperative, competitive research program is proposed to improve early detection and silvicultural control methods, as well as compare aggressiveness and host range for the NA1 lineage versus EU1 lineage. Studies are also needed to describe the ecological and economic impacts of sudden oak death in Oregon. The program would be administered through the US Forest Service, Pacific Southwest Research Station, and would require an annual budget of \$1.2 million for 2018 and \$1.7 million for the following 3 years.

Cost: \$5,320,000/year

ODF-\$225,000 for program admin/treatment on state & private

USFS-\$380,000 for program admin/treatment on USFS land

USFS-\$3,050,000 for support to others/additional treatment on USFS (ODF, OSU, BLM)

USDA-APHIS-\$15,000 to OSU

USFS \$1,200,000 for research thru Pacific Southwest Research Station

BLM-\$450,000 for program admin/treatment on BLM land

Alternative 4: Contain to Curry County for As Long as Possible

Alternative 4 focuses on preventing sudden oak death from entering the adjacent counties, Coos, Douglas, and Josephine, for as long as possible. This alternative increases the chance to protect important tanoak ecosystems, and provide long term conservation and adaptation of tanoak genes. Alternative 4 builds on alternatives 2 and 3 because continuing to slow the spread in the southern portion of Curry County is essential for containment farther north.

There is strong interest in avoiding a county wide SOD Quarantine for Curry County as well as avoiding the spread of SOD into neighboring counties. A means of ensuring aggressive eradication of human assisted or other unanticipated infestations would be to establish an Emergency Fund held in reserve and available to rapidly respond to new infestations in an action zone adjacent to neighboring counties (Figure 2); or for sites detected in the neighboring counties themselves.

This opportunity also requires an expansion of survey, detection and monitoring capacity due to the need to survey the action zone and the area between the action zone and quarantine area at intensities currently reserved for within the quarantine area and areas proximately surrounding its boundary. From the Emergency Board allocation in 2016, \$100,000 has been placed into an emergency treatment fund to be used on any new infestation outside of the current quarantine or a new infestation of the EU1 lineage. Given the cost of an ideal eradication treatment (600 foot radius, 26 acres), this emergency treatment money would be spent down in order to cover one infestation. An emergency eradication treatment fund totaling \$500,000 would potentially treat five new sites (or 100 acres) at the ideal treatment level; this would relieve the burden of finding continued funding on potentially an annual basis.

Alternative 4 requires increased survey effort in the 6 mile wide action zone between Curry, Coos and Douglas Counties (Figure 2). The additional survey effort would include 20-30 stream baits and two aerial surveys of 250,000 acres each near the county line. Intensive delimitation surveys are conducted whenever a new infestation is found. This alternative will likely require an increase in field staff. The cost of this increase in aerial surveys, field technician time, and lab diagnostics is estimated at \$100,000 /year.

Additionally, the program must be able to mobilize eradication crews quickly and sometimes simultaneously within days or weeks of detection to prevent additional spread, especially in the action zone. Contractor response time has been problematic due to fire danger and contractor availability. We will need to review and secure contracts to ensure acceptable response or train a local workforce to conduct eradication work.

Alternative 4 is designed primarily to ensure that SOD does not move into Coos, Douglas, or Josephine Counties, and it should succeed at doing that for at least 10 years, probably longer. Cutting and burning isolated individual infestations can stop intensification and spread, provided delimitation and treatments are done properly. Based on current observations, it is unlikely that the disease will naturally spread across the 6 mile wide action zone without detection and an opportunity for eradication, provided continued diligence with detection surveys. Host removal in disease pathways leading to the action zone should improve the chance of containment in Curry County. The GIA likely will expand slowly, the rate of which will depend in part on our capacity to treat infestations beyond its leading edge to the north, but short of the action zone.

Cost: \$5,920,000/year

ODF-\$225,000 for program admin/treatment on state & private

USFS-\$380,000 for program admin/treatment on USFS land

USFS-\$3,650,000 for support to others/additional treatment on USFS (ODF, OSU, BLM)

USDA-APHIS-\$15,000 to OSU

USFS \$1,200,000 for research thru Pacific Southwest Research Station

BLM-\$450,000 for program admin/treatment on BLM land

Other Options that can be done simultaneously with alternatives.

Finding and developing disease-resistant tanoaks is a long-term proposition with an unknown probability of success. Preservation of important tanoak ecosystems (refuges) seems possible if located away from the highest disease risk areas.

- **Tanoak Refugia:** Protection of important tanoak ecosystems (refugia) is possible if located away from the current distribution of SOD as well as away from the highest disease risk areas as shown in Figure 2. Areas of tanoak with high ecological and/or cultural value would be identified. Protection would involve intensive early detection, strict limits on human access and ideally eradication within 2-3 miles of each identified refuge. These areas likely will be located on federal land and will be selected by land managers and interested parties. These areas also could be part of a larger tanoak gene conservation effort. **Cost: \$130,000/year-** \$30,000 for additional aerial and ground surveys at 3 areas (\$10,000 per area) and \$100,000 to expand scope of Emergency SOD Treatment Fund to include treatment needs around designated refuges.
- **Resistance Breeding for Tanoak³:** Begin long-term program of locating and developing tanoaks that can grow and reproduce in the presence of *P. ramorum*. Partner with Dorena Genetic Resource Center and OSU. **Cost: \$30,000/year.**
- **Tanoak Removal in Strategic Areas:** Identify areas on the landscape that are likely pathways for aerial dispersal of *P. ramorum* into adjacent counties and remove or destroy tanoak in advance of the disease. The location of these areas will be determined by recent dispersal patterns, land forms, the amount and distribution of tanoak, and risk modeling. Private landowners will need incentives to do this. Incentive programs may be available to encourage landowners to remove tanoak and establish conifers or other non-host species. Increase market opportunities to utilize tanoak so as to cover the cost of removal within the quarantine area to encourage projects. **Cost: \$650,000/year** to treat 1,000 acres/year; 50% hack and squirt treatment at \$300/acre; 50% slash

³ Finding and developing disease-resistant tanoaks is a long-term proposition with an unknown probability of success.

and burn treatment at \$1,000/acre. This opportunity is scalable depending on the amount of funding secured.

- **Stakeholder Cooperative:** Coordinate detection and control among all landowners in SW Oregon. If stakeholders, especially private industry, do not want SOD to enter Coos and Douglas Counties, they should begin action and investment now.

Appendix B

Federal Appropriations Requests by SOD Task Force

SOD Task Force Appropriations Requests

FY2018

Using USDA/ODF's Issue Paper Alternative 4

Alternative 4: Contain to Curry County for As Long as Possible

Alternative 4 focuses on preventing sudden oak death from entering the adjacent counties, Coos, Douglas, and Josephine, for as long as possible. This alternative increases the chance to protect important tanoak ecosystems, and provide long term conservation and adaptation of tanoak genes. Alternative 4 builds on alternatives 2 and 3 because continuing to slow the spread in the southern portion of Curry County is essential for containment farther north.

There is strong interest in avoiding a county wide SOD Quarantine for Curry County as well as avoiding the spread of SOD into neighboring counties. A means of ensuring aggressive eradication of human assisted or other unanticipated infestations would be to establish an Emergency Fund held in reserve and available to rapidly respond to new infestations in an action zone adjacent to neighboring counties; or for sites detected in the neighboring counties themselves.

This opportunity also requires an expansion of survey, detection and monitoring capacity due to the need to survey the action zone and the area between the action zone and quarantine area at intensities currently reserved for within the quarantine area and areas proximately surrounding its boundary. From the Emergency Board allocation in 2016, \$100,000 has been placed into an emergency treatment fund to be used on any new infestation outside of the current quarantine or a new infestation of the EU1 lineage. Given the cost of an ideal eradication treatment (600 foot radius, 26 acres), this emergency treatment money would be spent down in order to cover one infestation. An emergency eradication treatment fund totaling \$500,000 would potentially treat five new sites (or 100 acres) at the ideal treatment level; this would relieve the burden of finding continued funding on potentially an annual basis.

Alternative 4 requires increased survey effort in the 6 mile wide action zone between Curry, Coos and Douglas Counties. The additional survey effort would include 20-30 stream baits and two aerial surveys of 250,000 acres each near the county line. Intensive delimitation surveys are conducted whenever a new infestation is found. This alternative will likely require an increase in field staff. The cost of this increase in aerial surveys, field technician time, and lab diagnostics is estimated at \$100,000 /year.

Additionally, the program must be able to mobilize eradication crews quickly and sometimes simultaneously within days or weeks of detection to prevent additional spread, especially in the action zone. Contractor response time has been problematic due to fire danger and contractor availability. We will need to review and secure contracts to ensure acceptable response or train a local workforce to conduct eradication work.

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Cost: \$5,920,000/year

State

ODF: \$695,000 in HB 3151. Trying to amend to \$1.7 million for biennium. (David Brock Smith/Mark Labhart). Mark meets with Coastal Caucus on May 4th to discuss increasing through an amendment in Ways and Means Committee. (need minimum of **\$225,000** per year. Anything more will increase capacity and match funding from USFS).

Federal

BLM (2 requests) (George McFadden)

- Line item: California and Oregon Grant Lands/ Western Oregon Resources - Reforestation and Forest Development
- Language: *The Bureau of Land Management may use a miscellaneous obligation for the purpose of transferring grant funds to a state or county government agency for the purpose of identifying, treating and monitoring of noxious or invasive species and for the purpose of supporting cooperative research to inform the scientific management of Bureau of Land Management administrated lands.*
- Funding: **\$550,000** plus up so BLM can direct this amount to SOD and redirect same amount to other prioritized state programs.

USFS (Debbie Hollen)

- Line Item: Forest Health Management (Must be directed to the Pacific Northwest Region)
- FHM- Federal Lands (SPFH) = plus up: **\$380,000** for program admin/treatment on USFS land
- FHM – Cooperative Lands (SPCH) = plus up: **\$3,650,000** for support to others/additional treatment on USFS (ODF, OSU, BLM)

Research: USFS Southwest Research Station: (Ellen Goheen/Susan Frankel/Jared Leboldus and Gabrielle Serra@ OSU)

- Line Item: ARS Salaries and Expenses (or maybe USFS Southwest Research Station) Decision to be made in DC
- OSU request funding through ARS Horticultural Crops Research (HCRU) for **\$1,200,000**

OR

- USFS for transfer to Pacific Southwest Research Station = plus up: **\$1,200,000**

APHIS (Christopher Deegan via Chris Needham in DC) – no ask

- Funding for SOD comes out of our specialty crops line item. **\$15,000** to OSU for FY17.
- For FY16, we spent \$3.7 million Agency-wide on p. ramorum programs. We don't have final FY17 numbers because we're still waiting on the total funding levels due to the current continuing resolution. Obviously, we don't yet have final totals for what the FY18 request will be. With everything up in the air, it's hard to be more concrete about funding totals.
- APHIS funds to the line item level, which allows us to shift funding among different programs funded under that line item based upon needs and emerging priorities.

If we can ask for a bit more, additional funds could be well used for funding and developing disease-resistant tanoaks. Per USDA/ODF Issue Paper: This effort is a long-term proposition with an unknown probability of success. Preservation of important tanoak ecosystems (refuges) seems possible if located away from the highest disease risk areas.

- Tanoak Refugia: \$130,000
- Resistance Breeding for Tanoak: \$30,000 Partner with USFS and Dorena Genetic Resource Center and OSU.
- Tanoak Removal in Strategic Areas: \$650,000 Identify areas on the landscape that are likely pathways for aerial dispersal of pathogen and remove or destroy tanoak in advance of the disease. This would require stakeholder and private landowner cooperation. (This may be controversial).

U.S. Senators Ron Wyden and Jeff Merkley
Oregon Programmatic Request Form for FY 2018 Appropriations

Organization Information

- Requesting Organization: Oregon State University
- Contact's Name at Organization: Gabrielle Serra
- Contact's Email: Gabrielle.Serra@oregonstate.edu
- Contact's Phone: 541-737-6320

Program/Activity Information

- Subcommittee: Agriculture, Food and Drug Administration, Rural Development
- Department: Agriculture
- Agency: Agriculture Research Service
- Account: Salaries and Expenses
- Program/Activity: Sudden Oak Death (new)
Program Description: ARS is the principal intramural research agency at USDA responsible for conducting basic, applied, and developmental research. ARS Horticultural Crops Research Unit (HCRU), located in Corvallis Oregon, is focused on developing fundamental and applied knowledge to enhance plant health and quality, environmental stewardship and economic sustainability for the efficient production of horticultural crops. The HCRU has historically conducted federally funded research on sudden oak death in Oregon.

Funding Information Regarding Program/Activity

- What was the program funding level included in FY2017 enacted bill (if applicable)? NA
- What is the program funding level requested in the President's FY2018 budget (if applicable)? NA

Request for Program/Activity

- Program/Activity Funding Level Requested (if applicable): \$1,200,000
- Program/Activity Report language requested (if applicable): Sudden oak death.—The European strain 1 (EU1) and the North American strain 1 (NA1) of the sudden oak death pathogen are major threats to western Douglas-fir/tanoak forests, resulting in quarantine restrictions that threaten US forests and export markets for log shipments and lily bulbs. The Committee recommendation includes \$1,200,000 for research to understand what tree species are most at risk from these strains, how the pathogen spreads, and evaluation of treatment efficacy to inform control and management techniques in wildlands.
- Brief explanation of and rationale for the funding or language: Eradication of the new EU1 strain is urgently needed to protect mid-western and eastern US oak and other tree species. Eradication is only effective if action is taken at a large enough scale immediately after

detection. To destroy the threat to US forests, research is needed to understand what tree species are at risk, how the pathogen spreads, as well as to evaluate treatment efficacy to refine control and management techniques for the new EU1 strain.

A new strain of the sudden oak death pathogen (*Phytophthora ramorum*, SOD) was first detected in a Douglas-fir/tanoak forest in 2015 in Curry County, Oregon. For comparison, in Great Britain, the EU1 strain has killed millions of plantations of Japanese larch. It is more virulent than the NA1 strain that has killed millions of tanoak in Oregon and California since 2000. The EU1 strain, present only in Oregon forests, is genetically distinct and more virulent than the NA1 strain found in California. It is also of opposite sex thus potentially allowing for sexual reproduction and increased genetic diversity.

Quarantine restrictions threaten export markets for log shipments and lily bulbs from Curry County. Eradication and other treatments are needed to prevent this invasive, quarantined pathogen from spreading to other adjacent Oregon counties. This is a new and developing risk in Oregon; research is needed to develop environmentally sound strategies to protect America's forests and sustainable economic conditions for affected timber.

Research priorities include:

- Develop silvicultural, chemical, and genomics-based biotechnological control strategies
- Compare EU1 and NA1 SOD strains for virulence and epidemiology
- Quantify ecological, economic and social impacts
- Evaluate and improve NA1 strain control and early detection techniques
- Investigate the use of resistant plants to sustain ecological function

FY 2018 funding at \$1.2 million, would be the first installment of a four-year funding plan, scheduled to increase to \$1.7 million in FY 2019 for each year through FY 2021.

- Organization's plans for funding/report language: OSU participates on the Oregon Sudden Oak Death Task Force, convened to develop a science-based, collaborative action plan, to secure adequate resources, and to eradicate the EU1 strain and contain the NA1 strain in Oregon. This is a new and developing risk in Oregon, with significant implications for ecological, economic, and social impacts. Further research is needed to develop wildland treatment strategies to meet these objectives. The Task Force works collaboratively with the ODF, ODA, USDA Forest Service, ARS, APHIS, DOI BLM, and OSU. OSU provides leading expertise on forest pathology and is positioned to offer research program management. The USDA ARS Horticultural Crop Research Unit includes a research plant pathologist that has gained national recognition for his work on molecular genetics of SOD. In addition, the HCRU lab has the only containment facility in Oregon designated for SOD research. OSU would like to see this research program, with significant implications for Oregon and the nation, led by ARS HCRU with coordination from OSU and the member institutions of the Oregon Sudden Oak Death Task Force listed above.

**U.S. Senators Ron Wyden and Jeff Merkley
Oregon Programmatic Request Form for FY 2018 Appropriations**

Organization Information

- Requesting Organization: Sudden Oak Task Force
- Contact's Name at Organization: Mark Labhart
- Contact's Email: marklabhart@gmail.com
- Contact's Phone: (503) 801-1704

Program/Activity Information

- Subcommittee: Interior
- Department: Interior
- Agency: Bureau of Land Management
- Account: Oregon & California Grant Lands
- Program/Activity: Reforestation and Forest Development
- Program Description: SOD identification, monitoring, treatment
- Line Number/ (PE) Line Item/ (PE) Line Item Title (if applicable): *(Defense related request only)*

Funding Information Regarding Program/Activity

- What was the program funding level included in FY2017 enacted bill (if applicable)?
- What is the program funding level requested in the President's FY2018 budget (if applicable)? Unknown.

Request for Program/Activity

- Program/Activity Funding Level Requested (if applicable): Increase line item by \$550,000
- Program/Activity Report language requested (if applicable): N/A
- Brief explanation of and rationale for the funding or language: BLM currently uses general fund money for SOD treatment. Increasing this line item would allow them to use \$550,000 for SOD and maintain other programs without taking general fund dollars.
- Organization's plans for funding/report language: The Oregon Department of Forestry (ODF) is the agency responsible for SOD treatments on private lands. BLM will use some of these funds to treat their own land but it will mainly be transferred to ODF to treat private lands that are close to or will impact BLM lands.

**U.S. Senators Ron Wyden and Jeff Merkley
Oregon Programmatic Request Form for FY 2018 Appropriations**

Organization Information

- Requesting Organization: Sudden Oak Task Force
- Contact's Name at Organization: Mark Labhart
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Program/Activity Information

- Subcommittee: Interior
- Department: Interior
- Agency: Bureau of Land Management
- Account: Oregon & California Grant Lands
- Program/Activity: Reforestation and Forest Development
- Program Description: SOD identification, monitoring, treatment
- Line Number/ (PE) Line Item/ (PE) Line Item Title (if applicable): *(Defense related request only)*

Funding Information Regarding Program/Activity

- What was the program funding level included in FY2017 enacted bill (if applicable)?
- What is the program funding level requested in the President's FY2018 budget (if applicable)? Unknown.

Request for Program/Activity

- Program/Activity Funding Level Requested (if applicable): N/A
Program/Activity Report language requested (if applicable): \

The Bureau of Land Management may use a miscellaneous obligation for the purpose of transferring grant funds to a state or county government agency for the purpose of identifying, treating and monitoring of noxious or invasive species and for the purpose of supporting cooperative research to inform the scientific management of Bureau of Land Management administrated lands.

- Brief explanation of and rationale for the funding or language: BLM currently goes through a cumbersome contracting process to annually get money to ODF. This language would allow them to more quickly and easily transfer money to the state agency. USFS has such an easy process.
- Organization's plans for funding/report language: BLM will transfer money to ODF and maybe OSU for SOD identification, monitoring, research and treatment of the SOD pathogen in southwest Oregon.

U.S. Senators Ron Wyden and Jeff Merkley
Oregon Programmatic Request Form for FY 2018 Appropriations

Organization Information

- Requesting Organization: SOD Task Force
- Contact's Name at Organization: Mark Labhart
- Contact's Email: marklabhart@gmail.com
- Contact's Phone: 503-801-1704

Program/Activity Information

- Subcommittee: Interior, Environment and Related Agencies
- Department: Department of Agriculture
- Agency: Forest Service
- Account: Forest Health Management
- Program/Activity: Forest Health Management – Cooperative Lands - SPCH
- 1. Program Description: Forest Health Protection provides funding, technical assistance, and technology development to support invasive plant species programs of NFS, other federal agencies, state agency and weed management cooperators, Tribes, and the Pacific Trust Territories. Technical assistance includes providing entomology and pathology expertise in the implementation of biological control program efforts. Forest Health Protection also provides assistance in pesticide use, including herbicide risk assessments, which are requirements for the environmental analysis of NFS invasive plant control programs.
- Line Number/ (PE) Line Item/ (PE) Line Item Title (if applicable): *(Defense related request only)*

Funding Information Regarding Program/Activity

- What was the program funding level included in FY2017 enacted bill (if applicable)? \$64,400,000 for Forest Health Management which includes both SPFH and SPCH was FY16's number
- What is the program funding level requested in the President's FY2018 budget (if applicable)?

Request for Program/Activity

- Program/Activity Funding Level Requested (if applicable): SPFH plus \$3,650,000
- Program/Activity Report language requested (if applicable): TBD in DC
- Brief explanation of and rationale for the funding or language: USFS and ODF submitted an Issue Paper outlining 4 alternative funding options with comparative treatment efforts for each funding level. We chose Alternative 4 because it best and most aggressively addressed containment and eradication of the SOD pathogens in Curry County.
- Organization's plans for funding/report language: to contain the NA1 SOD pathogen to Curry County and eradicate the EU1 pathogen before it spreads further in Curry or into neighboring counties.

U.S. Senators Ron Wyden and Jeff Merkley
Oregon Programmatic Request Form for FY 2018 Appropriations

Organization Information

- Requesting Organization: SOD Task Force
- Contact's Name at Organization: Mark Labhart
- Contact's Email: marklabhart@gmail.com
- Contact's Phone: 503-801-1704

Program/Activity Information

- Subcommittee: Interior, Environment and Related Agencies
- Department: Department of Agriculture
- Agency: Forest Service
- Account: Forest Health Management
- Program/Activity: Federal Lands - SPFH
- **Program Description:** Forest Health Protection provides funding, technical assistance, and technology development to support invasive plant species programs of NFS, other federal agencies, state agency and weed management cooperators, Tribes, and the Pacific Trust Territories. Technical assistance includes providing entomology and pathology expertise in the implementation of biological control program efforts. Forest Health Protection also provides assistance in pesticide use, including herbicide risk assessments, which are requirements for the environmental analysis of NFS invasive plant control programs.
- Line Number/ (PE) Line Item/ (PE) Line Item Title (if applicable): *(Defense related request only)*

Funding Information Regarding Program/Activity

- What was the program funding level included in FY2017 enacted bill (if applicable)? \$64,400,000 for Forest Health Management which includes both SPFH and SPCH was FY16's number
- What is the program funding level requested in the President's FY2018 budget (if applicable)?

Request for Program/Activity

- Program/Activity Funding Level Requested (if applicable): SPFH plus up \$380,000
- Program/Activity Report language requested (if applicable): TBD in DC
- Brief explanation of and rationale for the funding or language: USFS and ODF submitted an Issue Paper outlining 4 alternative funding options with comparative treatment efforts for each funding level. We chose Alternative 4 because it best and most aggressively addressed containment and eradication of the SOD pathogens in Curry County.
- Organization's plans for funding/report language: to contain the NA1 SOD pathogen to Curry County and eradicate the EU1 pathogen before it spreads further in Curry or into neighboring counties.