



CALIFORNIA OAK MORTALITY TASK FORCE REPORT OCTOBER 2014

MONITORING

2014 SOD Blitz Results – This year 500 citizen scientists participated in surveying more than 10,000 trees and collecting more than 2,000 samples from San Luis Obispo to Mendocino Counties. Unexpectedly high levels of *Phytophthora ramorum* were found in north Berkeley and Tilden Regional Park (Alameda County), with the pathogen not only found on California bay laurel, but also on oaks. Similar findings were also made in the region between Novato (Marin County), Petaluma, and Sonoma (Sonoma County). In eastern Santa Cruz County, a canyon on the San Benito County border was found positive. While this is one of the easternmost reports of SOD in California, it is in a cooler area that is conducive to the pathogen, with redwood and tanoak. Among findings in San Francisco County was a *P. ramorum*-positive redwood in The Presidio (National Park Service). While redwood isn't harmed if infected, its needles support pathogen sporulation and spread. SOD has only been found once before in the park in 2011 on an oak. Mitigation activities there are underway. Additionally, the main Golden Gate Park nursery continues to be infested; officials there are working to address the issue.

The drought has led to a reduction in the number of infected trees in many warmer areas with oak woodlands as well as in areas where SOD has recently become established, including southern Mendocino County, northern Sonoma County, and a portion of Alameda County as well as the eastern S.F. Peninsula and Carmel Valley Village (Monterey County). For more information on the 2014 Blitz results, go to http://nature.berkeley.edu/garbelottowp/?page_id=1458.

Oregon Forests Sudden Oak Death Update - Five of the 45 streams baited in 2014 for *P. ramorum* have tested positive (figure 1). All confirmations have been inside the quarantine area. The inoculum source is still undetermined for two of the positive drainages. Aerial surveys this year detected 182 suspect trees from the California border north to Humbug Mountain and inland up to 12 mi from the coast (figure 2). Follow-up ground surveys confirmed 34 newly infected trees (See figure 3 for all 2014 *P. ramorum*-positive trees, including those identified earlier in the year.), some of which are within 1 mile of the quarantine boundary, and one of which is 0.3 mi (east) outside of it (pending confirmation of positive PCR results). Delimitation surveys for all sites will be completed in the next several weeks. Of the 84 tanoaks identified as symptomatic north of the Rogue River, all were negative for the pathogen; most died from *Phytophthora* spp. canker (not *P. ramorum*), Armillaria root disease, beetles, or a combination thereof.

Sudden oak death remains primarily within the quarantine area; however, as the pathogen has spread closer to the perimeter of the northern edge of the generally infested area (GIA) and treatment funds are limited, the quarantine area will be expanded. Disease continues to intensify within the 56 mi² GIA, especially near the coast (figure 4). Inside the GIA eradication treatments are no longer required on private land, but the USDI Bureau of Land Management continues to treat all infestations on their ownership. Infestations outside of the GIA will be cut and burned to slow disease spread, but



treatment size and intensity will be scaled back considerably due to limited funding. Treatments on private land will begin after delimitation surveys are completed and risk of wildfire diminishes.

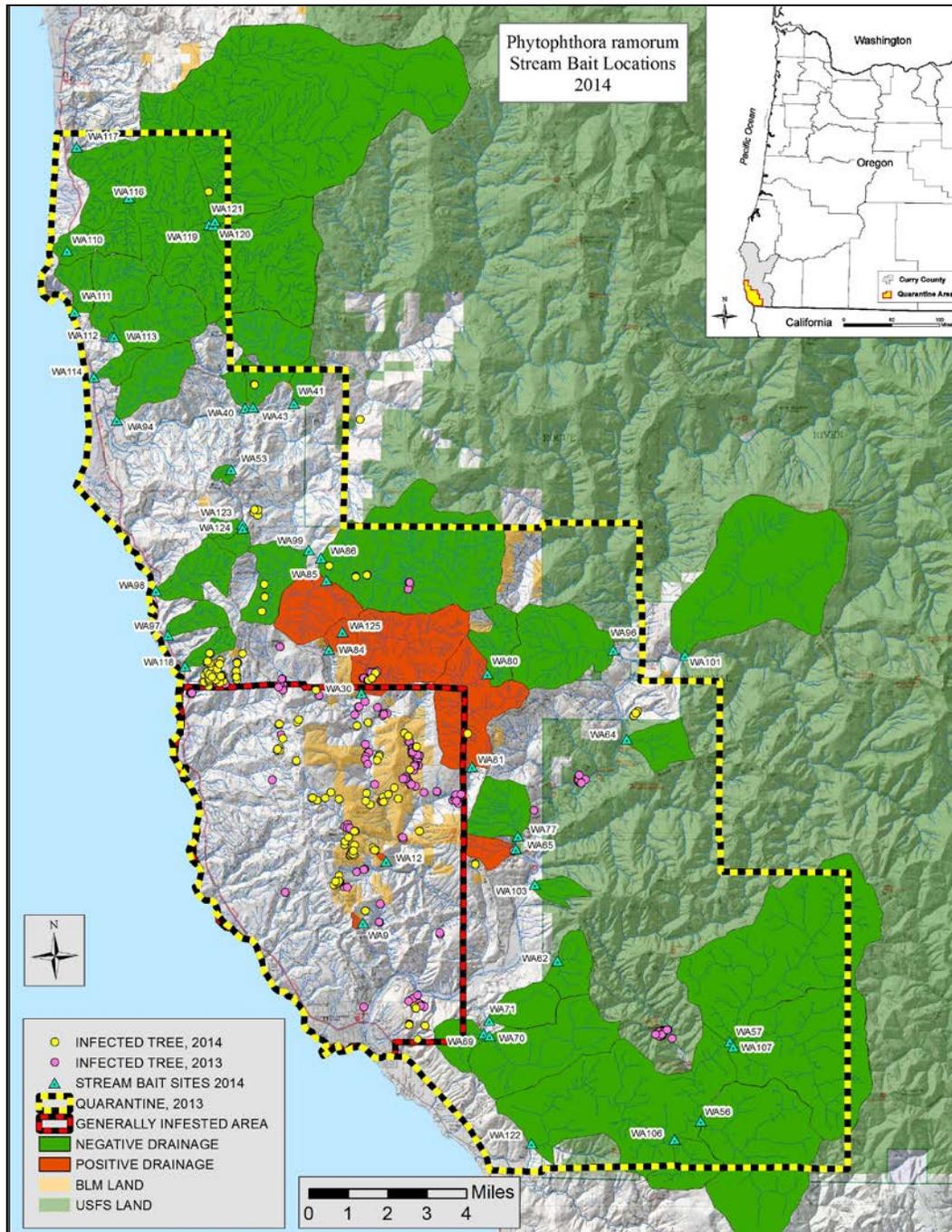


Figure 1. Stream baiting results for *P. ramorum* in Curry County at 2-week intervals, from April through August, 2014. Red drainages tested *P. ramorum* positive at least once; green tested negative.

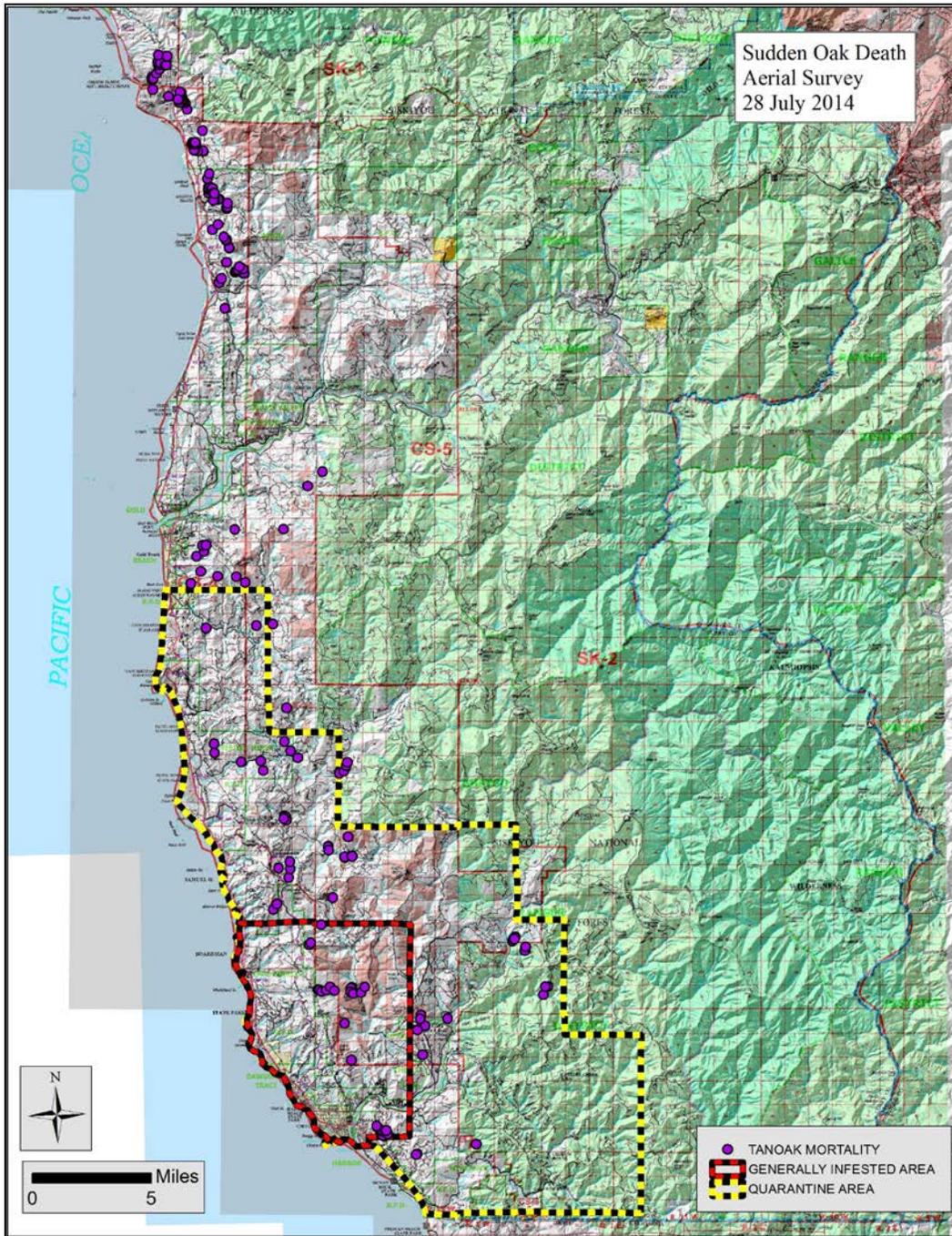


Figure 2. Dead tanoaks mapped during an aerial survey conducted July 16 and 28, 2014. All trees were examined by field crews. Samples were collected and assayed for *P. ramorum* at Oregon State University.

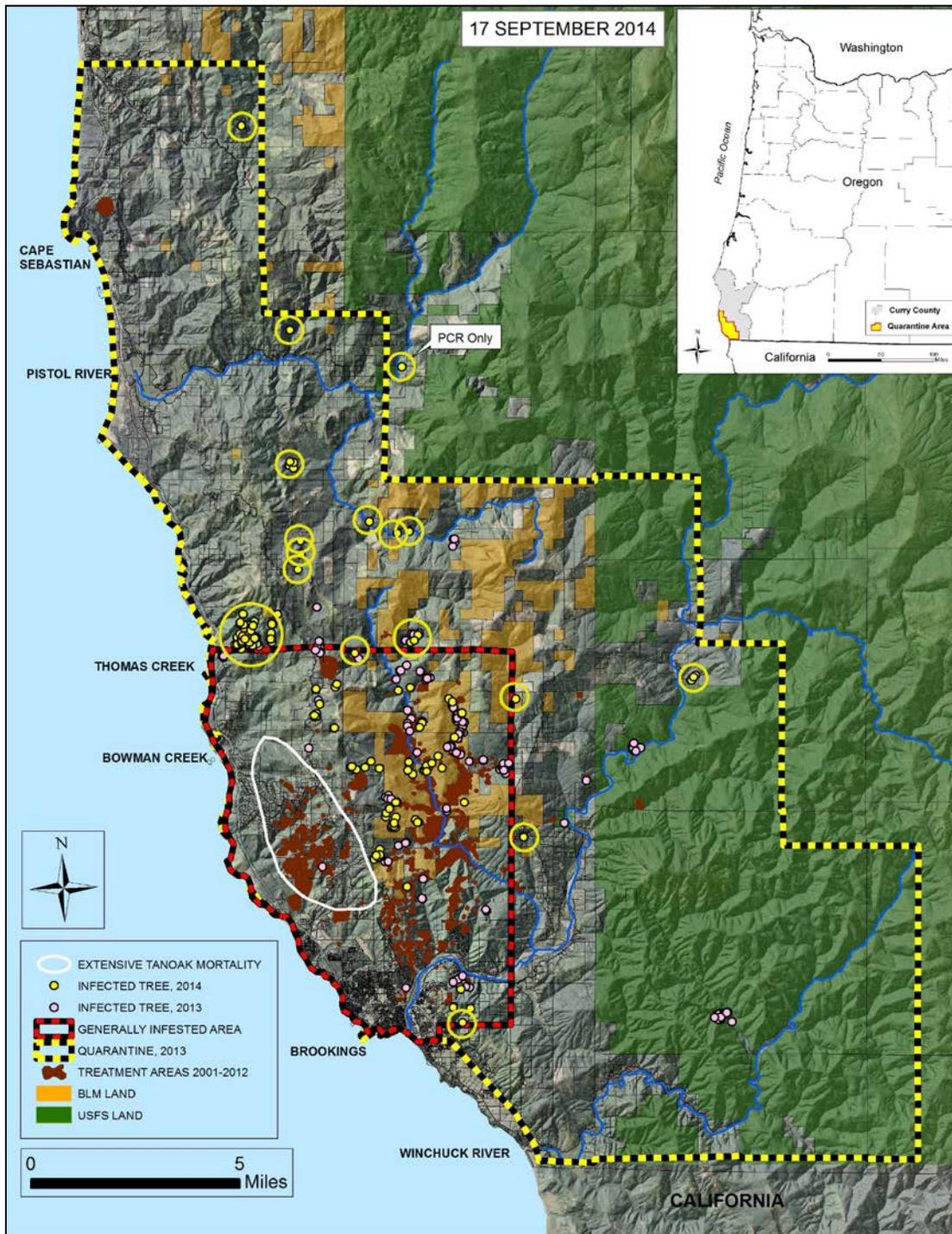


Figure 3. Location of sites infested with *Phytophthora ramorum* in southwest Oregon that were discovered in 2013 and 2014, as of September 17, 2014. Yellow circles indicate high-priority for 2014 slow-the-spread treatments.



Figure 4. Intensification of tanoak mortality in the GIA western region near Lone Ranch Creek. The image on left was taken 2012, the right in 2014. Pale green trees are living tanoak, darker green are red alder (*Alnus rubra*). Red or grey trees are tanoaks killed by *P. ramorum*.

NURSERIES

In 2014, 13 Oregon nurseries (one with two locations) opted into the Federal *P. ramorum* Certification Program, while three nurseries opted out. However, all 17 nursery locations were surveyed for *P. ramorum* this spring, with initial inspections completed by June 3rd. Of the nurseries surveyed, *P. ramorum* was detected in five opt-in nurseries. Positive detections were made on *Gaultheria shallon*, *Rhododendron*, and *Rhododendron* 'Hahn's Red' in the first nursery; *Rhododendron* spp. and used media in the second nursery; *Pieris taiwanensis*, *Pieris* 'Valley Valentine' and 'Valley Rose,' and a retention pond in the third nursery; *Rhododendron* and used media in the fourth nursery; and potting media in the fifth nursery. The positive nurseries were located in Washington (2), Clackamas (2), and Lane Counties. The USDA Confirmed Nursery Protocol (CNP) was enacted at all five nurseries. During delimitation surveys, additional positives were found in the second nursery on *Rhododendron* spp. and the third nursery in soil substrate beneath positive plants. After the 2014 spring sampling period, two of the positive nurseries decided to opt out of the federal program.

In addition to the opt-in nurseries, *P. ramorum* was detected in an opt-out nursery on *Pieris* sp.; *Pieris* 'Little Heath,' 'Forest Flame,' and 'Flaming Silver;' *Rhododendron*



'Holden;' and twice in the soil substrate beneath positive plants. The USDA CNP was enacted and the delimitation survey identified additional positive plants, including *Viburnum* sp., *Leucothoe axillaris* 'Rainbow,' and *Rhododendron* 'Baden Baden.' After treatment, a positive *Rhododendron* sp. was identified at the nursery during the 90-day quarantine hold period, requiring the CNP to be completed a second time.

Two *P. ramorum*-positive rhododendron plants (*Rhododendron* 'Roseum Elegans' and 'Roseum 2') were also identified at a non-regulated Columbia County nursery during an annual inspection. The CNP was implemented at the site. This nursery ships interstate and will be considered an opt-in nursery for future regulatory activities. No additional positives were found at the nursery during delimitation surveys. *Phytophthora ramorum* was also detected in a Coos County residential landscape infecting a *Camellia sinensis* 'Sochi.' The plant had been purchased and imported from a positive Washington nursery. The USDA Confirmed Residential Protocol has been implemented.

In addition to survey and certification activities, the Oregon Department of Agriculture updated Oregon's *P. ramorum* quarantine, including harmonizing state and federal regulations and adding specific nursery requirements to the quarantine language, which enabled the repeal of Oregon's statewide *P. ramorum* control area for nursery stock.

REGULATIONS

The USDA Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine met with California, Oregon, and Washington regulatory agencies September 9-10, to discuss the implementation of the January 2014 Federal Order in regulated nurseries. Program managers, nursery inspectors, and diagnosticians from APHIS and the state regulatory agencies reviewed the implementation of the survey, sampling, critical control point assessment, and mitigation protocols and discussed needed changes. The outcome of the meeting will be shared with National Plant Board (NPB) leadership during the upcoming APHIS NPB Safeguarding meeting in Sacramento, California, October 15-16, 2014.

RESEARCH

Parke, J.L.; Knaus, B.J.; Fieland, V.J.; Lewis, C.; and Grünwald; N.J. 2014. *Phytophthora* Community Structure Analyses in Oregon Nurseries Inform Systems Approaches to Disease Management. *Phytopathology*. 104(10): 1052-1062.

Abstract: Nursery plants are important vectors for plant pathogens. Understanding what pathogens occur in nurseries in different production stages can be useful to the development of integrated systems approaches. Four horticultural nurseries in Oregon were sampled every 2 months for 4 years to determine the identity and community structure of *Phytophthora* spp. associated with different sources and stages in the nursery production cycle. Plants, potting media, used containers, water, greenhouse soil, and container yard substrates were systematically sampled from propagation to the field. From 674 *Phytophthora* isolates recovered, 28 different species or taxa were identified. The most commonly isolated species from plants were *Phytophthora plurivora* (33%), *P.*



cinnamomi (26%), *P. syringae* (19%), and *P. citrophthora* (11%). From soil and gravel substrates, *P. plurivora* accounted for 25% of the isolates, with *P. taxon Pgchlamydo*, *P. cryptogea*, and *P. cinnamomi* accounting for 18, 17, and 15%, respectively. Five species (*P. plurivora*, *P. syringae*, *P. taxon Pgchlamydo*, *P. gonapodyides*, and *P. cryptogea*) were found in all nurseries. The greatest diversity of taxa occurred in irrigation water reservoirs (20 taxa), with the majority of isolates belonging to internal transcribed spacer clade 6, typically including aquatic opportunists. Nurseries differed in composition of *Phytophthora* communities across years, seasons, and source within the nursery. These findings suggest likely contamination hazards and target critical control points for management of *Phytophthora* disease using a systems approach.

Schlenzig, A.; Campbell, R.; and Chard, J. 2014. *Phytophthora* Species Infecting Hardy Ornamentals in Nurseries and the Managed Environment in Scotland. Journal of Phytopathology. DOI: 10.1111/jph.12308. (Early view.)

Abstract: Between 2002 and the end of 2009, more than 4000 samples from hardy ornamental plants, collected in surveys for *Phytophthora ramorum*, were examined to establish the occurrence and diversity of *Phytophthora* species in Scotland. The samples were gathered from more than 77 plant genera in nurseries, gardens and amenity landscapes. Fifteen different *Phytophthora* spp. were isolated and identified either by polymerase chain reaction (PCR) or by sequencing of the ITS1, 5.8S subunit and ITS2 region of the ribosomal RNA gene. The most widespread *Phytophthora* spp. were *P. ramorum* and *P. syringae*, followed by *P. cactorum*, *P. kernoviae*, *P. plurivora*, *P. cambivora*, *P. citrophthora*, *P. taxon 'Pgchlamydo,' P. pseudosyringae*, and some single isolates of *P. cinnamomi*, *P. cryptogea*, *P. gonapodyides*, *P. nicotianae*, and *P. hibernalis*. One isolate did not match any known species. In relation to the number of samples, *Phytophthora* was found more frequently in trade premises than in gardens or amenity landscapes and the species diversity was higher, highlighting the risks involved in plant trade.

RELATED ISSUES

***Phytophthora tentaculata* (first reported in the 2014 COMTF August Newsletter)** was found in spring, 2014, on a *Diplacus* (= *Mimulus*) plant that was outplanted at restoration site in Monterey County. Consequently, all sticky monkey flowers at the site were removed and properly disposed of at a landfill. Modifications have been made to prevent runoff at the site, helping to prevent spread, and employees have implemented best management practices. All remaining plants at the site will be closely monitored to help assure all stock is healthy.

RESOURCES

[**A Sudden Oak Death Firefighting Briefing Paper**](#) is now available for firefighters working in SOD-affected areas. The document is being distributed to CAL Fire Safety Officers and local firefighting agencies throughout the state with the intention of raising awareness about *P. ramorum*, including how it spreads, its impacts to California's forest health, and risks of firefighting in affected areas.

**CALENDAR OF EVENTS**

- 10/4 - East Bay, Garber Park Oak Health 101 Workshop – How to Manage Oaks** with SOD, Drought, and More; [144 Evergreen Ln., Berkeley](#); [Garber Park Stewards](#); 10:00 a.m.; For more information, contact Shelagh Brodersen at garberparkstewards@gmail.com.
- 10/5 – 10/10 – IUFRO 2014 World Congress “Sustaining Forests, Sustaining People, The Role of Research;”** Salt Lake City, Utah; For more information or to register, go to <http://iufro2014.com/scientific-program/overview/>.
- 10/18 - Carmel Valley SOD Blitz Results, Management Guidelines, and Q & A Meeting and Oak Health 101 Workshop – How to Manage Oaks with SOD, Drought, and More;** Natural History Museum, [Garland Ranch Regional Park](#) Meeting Room; [Map](#); 10:00 a.m.; For more information, contact Kerri Frangioso at kfrangioso@ucdavis.edu.
- 10/19 - Los Altos Hills Oak Health 101 Workshop – How to Manage Oaks with SOD, Drought, and More;** [Oak Grove Picnic Area, Foothills Park, 3300 Page Mill Rd, Los Altos](#); [Map](#); 10:00 a.m.; For more information, contact Sue Welch at sodblitz09@earthlink.net.
- 10/22 – SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC Berkeley Campus;** 1:00 – 3:00 p.m.; Pre-registration is required. This class is free and will be held rain or shine. To register, or for questions, email kpalmieri@berkeley.edu, and provide your name, phone number, affiliation and license number (if applicable), and the date for which you are registering. For more information, go to <http://nature.berkeley.edu/garbelotto/english/sodtreatmenttraining.php>.
- 10/23 - Sonoma Oak Health 101 Workshop – How to Manage Oaks with SOD, Drought, and More;** [Luther Burbank Art and Garden Center](#), 2050 Yulupa Ave, Santa Rosa; 7:00 p.m.; For more information, contact Lisa Bell at lkbell@ucanr.edu.
- 11/3 – 11/6 - 7th California Oak Symposium: Managing Oak Woodlands in a Dynamic World;** Visalia Convention Center, Visalia; For more information, or to register, go to <http://ucanr.edu/sites/oaksymposium/>.
- 11/10 – 11/14 - Seventh meeting of the IUFRO Working Party 7.02.09 “Phytophthora in Forests and Natural Ecosystems;”** Esquel, Argentina. For more information, registration, or abstract submission details, go to <http://www.iufrophytophthora2012.org/>.
- 11/12 – 11/13 - 2014 Annual Meeting of the California Forest Pest Council (CFPC);** USDA Forest Service, Wildland Fire Training & Conference Center; 3237 Peacekeeper Way; McClellan; More information will be posted to the CFPC website soon at <http://caforestpestcouncil.org/>. For more information, contact Katie Palmieri at kpalmieri@berkeley.edu.
- 1/13/15-1/17/15 – California Native Plant Society Conservation Conference;** “Celebrating 50 Years of Progress and Promise;” Hilton DoubleTree; San Jose; Registration is now open. For more information, go to <http://www.cnps.org/cnps/conservation/conference/2015>.