



CALIFORNIA OAK MORTALITY TASK FORCE REPORT APRIL 2013

MONITORING

***Phytophthora ramorum* nears the border of the Six Rivers National Forest - The UC Davis Rizzo Lab and UC Cooperative Extension (UCCE), Humboldt began monitoring North Dobbyn Creek in February 2013. This was prompted by the identification of significant patches of tanoak mortality consistent with SOD along a tributary of N. Dobbyn Creek (called Hoover Creek) in the US Forest Service 2012 aerial surveys. The February and March 2013 deployments of stream baits in N. Dobbyn tested positive for *P. ramorum*. The baiting location is near the mouth of N. Dobbyn Creek, approximately 4.7 km west from the Six Rivers National Forest (SRNF); the upper N. Dobbyn Creek watershed includes a 5 by 5-km area within the boundary of SRNF that has a substantial amount of tanoak-bay vegetation.**

Only three very small patches of tanoak mortality from the 2012 aerial surveys fell within SRNF, and these were in the N. Dobbyn Creek watershed. In September 2012, SRNF and UCCE employees ground checked these patches and determined they were not due to SOD; no infected vegetation was found in the area. Thus, it seems more likely that the larger patches of mortality (four patches of 10-20 dead trees each) along Hoover Creek (around 2 km west from the SRNF boundary) are the source of inoculum for the positive stream baits in lower N. Dobbyn Creek. The Hoover Creek area mortality patches have not been ground surveyed and are on private land, but the SOD spread risk map of Meentemeyer *et al.* (2004) categorizes these locations as high risk (due to vegetation and climate). There is an additional patch of 41 dead tanoaks (aerially-identified) roughly 2 km west from the mortality patches on Hoover Creek, also on private land. The nearest lab-confirmed instances of infected vegetation are approximately 13 km to the north, near Larabee Creek, and approximately 14 km to the west, near Eel Rock. However, the 2012 aerial surveys also identified over 600 new acres of tanoak mortality widely distributed east of the Eel River. These mortality patches are clustered 6-12 km from the SRNF boundary (and are also awaiting ground confirmations).

The majority of the nearby portions of SRNF are identified as low-risk by [Meentemeyer *et al.* \(2004\)](#) spread risk map, but USFS botanists note significant areas (several hundred acres each) of tanoak-bay vegetation in the upper Conley Creek and Little Van Duzen River watersheds, both which drain the western portion of SRNF. These two watersheds are being monitored this year and have thus far not yielded *P. ramorum* in stream baits from their lower reaches.

Meentemeyer, R.; Rizzo, D.; Mark, W.; Lotz, E. 2004. Mapping the Risk of Establishment and Spread of Sudden Oak Death in California. *Forest Ecology and Management*. 200:195-214.



FUNDING

Farm Bill Section 10201 funding for fiscal year 2013 provided over \$1.6 million for *Phytophthora ramorum* work. Sixteen states (DE, FL, GA, IN, KY, MA, MI, NV, NY, OH, PA, RI, TN, TX, VA, WV) collectively received \$370,287 to participate in the *P. ramorum* National Survey. Additionally, the National Ornamentals Research Site at Dominican University of California (NORS-DUC) received funding. For a complete list of funded projects, go to http://www.aphis.usda.gov/plant_health/plant_pest_info/pest_detection/downloads/farmbill/FY13-SpendingPlan.pdf.

The 2013-14 Requests for Proposals (RFP) for NORS-DUC is now available. Approximately \$200,000 is available to fund projects ranging from \$15,000 to \$50,000. Proposals for short-term applied research are requested that address research priorities, including, but not limited to: methods development to inhibit *P. ramorum* establishment and spread, mitigations to manage *P. ramorum*, epidemiological studies on inoculum sources, pathways, soil sampling focal points, and disease distribution in nurseries. In addition to accepting proposals for nursery research on *P. ramorum*, proposals relating to other soil-borne pathogens known to occur in California that are of economic importance to the national nursery industry will also be considered.

The RFP deadline is Friday, April 26, 2013. For more information, go to <http://www.dominican.edu/academics/hns/sciencemath/community-partnerships-and-initiatives/norsduc/proposals>. For questions, contact Karen Suslow at karen.suslow@dominican.edu. Research funds are administered by the USDA Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Center for Plant Health Science and Technology (USDA/APHIS/PPQ/CPHST).

NURSERIES

Oregon Federal *P. ramorum* Certification Program surveying is underway for 2013. This year, the Oregon Department of Agriculture plans to survey blueberry fields for the pathogen. Although *P. ramorum* has never been reported infecting blueberries, there is still concern internationally that blueberry plants could become infected.

On March 25, *P. ramorum*-positive *Rhododendron* 'Unique' plants were detected within a Washington County nursery that had previously tested positive in 2010 and 2011. During delimitation, an additional positive plant was discovered in a block of *Rhododendron* 'Lee's Dark Purple'. Testing on soil samples is still in process. This is the first detection of *P. ramorum* in an Oregon nursery this year.

A Kitsap County, WA retail garden center was found to have two confirmed positive finds of *P. ramorum* in February. Due to slow sales, the nursery had the rhododendron and kalmia plants for about a year. The site was also found positive in 2004 as part of the original nationwide *P. ramorum* survey of trace forwards from a large nursery in California.



The National Plant Board (NPB) is developing national standards for a voluntary systems approach to nursery certification (SANC) as a means to enhance existing nursery certification programs. While the NPB believes current state nursery certification and quarantine programs are sound, NPB members recognize the opportunity to reduce pest risk and improve assurances by building on and improving existing programs through the incorporation of a systems approach. This effort is moving forward with industry, extension, and federal partner collaboration, and will be accomplished by:

- Promoting a harmonized risk-based systems approach to enhance nursery certification processes while recognizing varying states' authorities and industry needs;
- Developing education and outreach materials for both regulatory agencies and industry that describe the components and benefits of a risk-based systems approach;
- Providing uniform training materials and inspection templates to help state inspectors and growers identify critical control points in nursery production operations, and best management practices (BMPs) to address them;
- Developing examples of compliance agreements and other system approach components; and
- Transitioning to a voluntary risk-based approach that allows for participating nurseries to ship interstate without onerous load-by-load shipping point inspections, but still meet specific quarantine requirements.

Since 2011, the SANC coordinating team has been working with NPB members, industry, educators and federal partners to develop training materials and opportunities for inspection staffs, provide audit training, build compliance agreement templates and provide model legislation to facilitate implementation. For more information about SANC, as well as training materials for industry and regulatory agencies, go to www.sanc.nationalplantboard.org.

FEATURED REPORT

A Review of Threats to Eastern Oaks, By Chris Lee and Steve Oak - The invasion of *P. ramorum* into California and Oregon has not only threatened tanoaks, coast live oaks, California black oaks, Shreve oaks, and canyon live oaks throughout the region, but it has also brought to light the political and practical difficulties involved in trying to limit the spread of a pathogen that can travel hundreds of miles on commonly traded ornamental plants. The discovery of the pathogen on plants distributed by a large wholesale producer of ornamentals in California in 2004 sparked energetic debate and momentary distrust between state governments in the western and eastern US. In the eastern part of the country, many oak species are potentially vulnerable to *P. ramorum*-caused mortality if the pathogen were to become established in forests there. Even without the threat of Sudden Oak Death, there are other threats to *Quercus* (oak) species in the eastern US that keep anxiety levels high. A survey of many of those threats can help to remind us why continued vigilance and strong trade regulation between the states is still necessary.



The most widespread and damaging threat to oaks in eastern forests is oak decline. Large-scale decline and mortality have been described since the early 1900s in many states in the Eastern Broadleaf Forest Province, Appalachian Mountains, and Ozark Mountains. Red oak species such as scarlet oak (*Quercus coccinea*), black oak (*Quercus velutina*), and northern red oak (*Quercus rubra*) suffer the greatest impact. After predisposition by advanced physiologic age, decline events are incited by stress from combinations of prolonged drought, spring frost, and spring insect defoliation. This triggers attacks by opportunistic pests and pathogens like *Armillaria* root disease, red oak borer, Hypoxylon canker, and two-lined chestnut borer. Slow, progressive dieback of the crown ends in the death of susceptible trees. Defoliation by gypsy moth can be a particularly effective inciting factor since duration, severity, and periodicity of outbreaks of this non-native insect differ from native defoliators. While oak decline incidence does not correlate well with pollutant deposition at large regional scales, it has been linked in some areas of West Virginia and Pennsylvania along with soil nutrient status and aluminum toxicity.

Similarly, several states, such as Kentucky, Ohio, Missouri, and West Virginia, have recently seen dramatic increases in white oak (*Quercus alba*) mortality. In some places, this increase in mortality paradoxically occurs on sites with high moisture availability and deep, fertile soils. At a subset of these sites this mortality has been associated with populations of pathogenic *Phytophthora* species in the soil, especially *P. cinnamomi* and *P. cambivora*. In others, it is speculated that oak wilt (caused by *Ceratocystis fagacearum*) may be the primary cause, although white oaks are usually more resistant than red oaks to oak wilt mortality.

There are a number of other pests and pathogens causing problems with oaks (such as bur oak blight, jumping oak gall, and variable oakleaf caterpillar), but in many places the greatest threat to oak conservation is a failure to manage the oak resource appropriately. Oaks grow slowly during early establishment and are relatively shade intolerant. Historic disturbance patterns (harvesting, light-intensity fire, woods grazing by livestock) provided conditions that gave a competitive advantage for oak establishment and early growth, particularly after the elimination of American chestnut as a canopy species from eastern hardwood forests by chestnut blight (caused by the non-native pathogen *Cryphonectria parasitica*). These patterns no longer prevail, leaving oaks at a competitive disadvantage. For example, throughout the central hardwood region, oak trees making up open woodlands are well-adapted to periodic, light-intensity fires. These fires historically maintained open forest structure for shade-intolerant, fire-resistant oaks. Currently, an ongoing lack of such periodic fires in many areas is encouraging invasion by dense stands of shade-tolerant tree species such as sugar maple (*Acer saccharum*). The lack of fire has many reasons, among them narrow seasonal burning windows and a misunderstanding of the potentially beneficial role that prescribed burning can play in maintaining forest health in these areas. Fortunately, regional prescribed burning councils and newly formed fire-science consortia are increasingly stepping in to educate land managers and residents about the issue and provide needed support.



This brief listing of threats to oak health in the eastern US serves as a quick reminder of why all the economic sacrifice and strenuous control efforts for *P. ramorum* and other forest pests in the West are so greatly appreciated by those in the other half of the country. With oaks throughout the country imperiled by changing management, species composition, and climate, it's imperative to try to restrict the movement of *P. ramorum* and other damaging pathogens and pests as much as possible.

For more information:

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- Balci, Y.; Long, R.P.; Mansfield, M.; Balsler, D.; MacDonald, W.L. 2009. Involvement of *Phytophthora* Species in White Oak (*Quercus alba*) Decline in Southern Ohio. *Forest Pathology*, 40:430-442.
- Bruhn, J.N.; Wetteroff, J.J. Jr.; Mihail, J.D.; Kabrick, J.M.; Pickens, J.B. 2000. Distribution of *Armillaria* Species in Upland Ozark Mountain Forests With Respect to Site, Overstory Species Composition and Oak Decline. *European Journal of Forest Pathology*. 30:43-60.
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- Hutchinson, T.F.; Long, R.P.; Ford, R.D. 2008. Fire History and the Establishment of Oaks and Maples in Second-Growth Forests. *Canadian Journal of Forest Research*. 38:1184-1198.
- Kabrick, J.M.; Dey, D.C.; Jensen, R.G.; Wallendorf, M. 2008. The Role of Environmental Factors in Oak Decline and Mortality in the Ozark Highlands. *Forest Ecology and Management*. 255:1409-1417.
- Loftis, D.L. 1990. A Shelterwood Method for Regenerating Red Oak in the Southern Appalachians. *Forest Science*. 36(4):917-929.
- Oak, S.; Tainter, F.; Williams, J.; Starkey, D. 1996. Oak Decline Risk Rating for the Southeastern United States. *Annals of Forest Science*. 53:721-730.
- Starkey, D.A.; Oak, S.W.; Ryan, G.W.; Tainter, F.H.; Redmond, C.; Brown, H.D. 1989. Evaluation of Oak Decline Areas in the South. US Department of Agriculture Forest Service Southern Region, Protection Report R8 PR 17. Atlanta, GA, USA, 36 p.

RESEARCH

Resources remain the primary limiting factor in the effectiveness of biosecurity measures, according to one of the key points from the e-conference "Pathways Into Policy: International knowledge exchange on biosecurity governance and implications for tree pest introductions and spread," held February 20th to March 13th. The conference brought together over 120 people from 19 countries and focused on three themes, comparing biosecurity interventions implemented in different countries to regulate tree pests.



Theme 1. “Defining Key Pathways and Assessing Their Significance” – Findings: There is a growing acceptance and understanding of the ‘pathways’ approach. Various types of pathways exist, along with various ways to engage with and analyze them. Adopting a pathway approach can bring significant advantages, including the capacity to address multiple and unknown pests, cost efficiencies, and shifting some of the biosecurity cost burden. The pathways approach is not a ‘silver bullet’ solution; resources remain the main limit on effectiveness. The pathways approach should be seen as an additional element of biosecurity regulation and management, strengthening existing practices.

Theme 2. “Comparing Approaches to Pathway Management and Pest Prevention” – Findings: The pathway approach to biosecurity is clearly well developed in some countries. One significant obstacle to the development of the pathways approach is the need to overlay, adapt, and fit with pre-existing regulatory and management structures. There will always be layers of competing local priorities and limits on resources available to implement biosecurity measures. Biosecurity processes should be evidence-based, transparent, and participatory.

Theme 3. “Underlying Justifications for Pathway Management and Pest Prevention” – Findings: There is a need for more pre-emptive and deliberative stakeholder engagement to set the framework and priorities for biosecurity measures and pest management responses. Each jurisdiction faces unique issues in regard to the rights and responsibilities involved in managing pathways and outbreaks, and the vulnerabilities of different forests found there. More research is required to better comprehend the sociocultural impacts of biosecurity management on a variety of stakeholders, which are currently not well understood.

The e-conference was funded by the Living with Environmental Change Tree Health and Plant Biosecurity initiative and the UK Department for Environment, Food, and Rural Affairs, and was organized by Imperial College London, Forest Research UK, the Food and Environment Research Agency, and others.

EDUCATION AND OUTREACH

Eighteen SOD Blitzes are being offered this year throughout communities impacted by *P. ramorum*. Community members living near areas known to be impacted by SOD are encouraged to attend a Blitz and learn how to look for the disease so that they can monitor for it in their community, facilitating early detection of new outbreaks. As symptomatic California bay laurel leaves generally precede oak and tanoak infections, and are often the first sign that *P. ramorum* is in a location, participants will be trained to identify and collect symptomatic bay leaves and record sample locations. Samples will be taken to the Garbelotto lab at UC Berkeley to determine the presence or absence of the pathogen. Follow-up local sessions in the fall will present the mapped outcomes of the blitzes. Attendees will learn how to correctly use the distribution maps, determine risk of infection for their oaks and tanoaks, and learn science-based recommendations to help prevent and manage SOD. Some management options are available (sanitation, chemical preventative treatments, and selective bay removal); however, they are most effective



when implemented before oaks and tanoaks are infected. Therefore, timely detection of the disease on bay laurel leaves is crucial. For details on Blitz locations and information, see the “Calendar of Events” below.

“Best Management Practices Programs for CA Nurseries: Review and Outlook”

training sessions are being held in California this year. Hosted collaboratively by the UC Nursery and Floriculture Alliance, California Department of Food and Agriculture, USDA Animal and Plant Health Inspection Service, and National Plant Board, these trainings will cover: BMP benefits to the nursery industry; cover BMP components; discuss projects at NORS-DUC that validate and develop BMPs; review current status of the California Association of Nurseries and Garden Centers’ BMP grant for multiple plant pests in CA; and provide an update on the National Plant Board’s Systems Approach for Nursery Certification program. To find out more about upcoming trainings, go to http://ucanr.edu/sites/UCNFA/2013_Educational_Programs/.

RESOURCES

Landis, T.D. 2013. *Phytophthora ramorum*: Impacts on Forest, Conservation, and Native Plant Nurseries. USDA Forest Service Forest Nursery Notes, 33(1): 15-24. The article is available online at <http://www.rngr.net/publications/fnn/2013-winter/2013-winter-forest-nursery-notes-publication-by-article>.

“Protecting Australia from Sudden Oak Death” a 34-second outreach video on Kylie Ireland’s PhD project at Murdoch University, Perth has been posted online at <http://www.youtube.com/watch?v=HgsKC3XAgO4&sns=fb> . Kylie worked primarily on the susceptibility of Australian plants to *P. ramorum*.

PERSONNEL (2/13)

Karen Suslow is now the principal investigator for the National Ornamentals Research Site at Dominican University of California (NORS-DUC). She can be reached at karen.suslow@dominican.edu or (530) 681-5538.

CALENDAR OF EVENTS

- 4/10 - 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>.
- 4/12 - Santa Cruz SOD Blitz; UCSC Arboretum, Santa Cruz;** <http://arboretum.ucsc.edu/visit/directions/>; 7:00 – 9:00 p.m.; For more information, contact: Annie Murphy at PLN400@co.santa-cruz.ca.us or Brett Hall at brett@ucsc.edu.
- 4/20 - Marin County SOD Blitz; Dominican University; 155 Palm Ave.; Joseph R. Fink Science Center, Room 102; San Rafael; 10:00 a.m. to noon;** For more



- information, contact Karen Suslow at karen.suslow@dominican.edu or Kristin Jakob at kristinjakob@att.net.
- 4/27 – Marin ReLeaf Work Day; 10:00 a.m. - noon; China Camp State Park; Work** will include removing wire cages from oak saplings in study, moving number tags to branches, and recording GPS locations for each tree. For questions or more information on the work day, contact Sandra Sellinger at sandra@marinreleaf.org.
- 4/27 - East Bay SOD Blitz, Option 1; Orinda, Garden Room, Orinda Public Library, 26 Orinda Way, Orinda; 10:00 a.m. – noon;** For more information, contact Bill Hudson at wlhh@ymail.com.
- 4/27 – East Bay SOD Blitz, Option 2; UC Berkeley; 159 Mulford Hall, Berkeley;** 1:00 – 3:00 p.m.; [Sign Up at Eventzilla](#); For more information, contact Doug Schmidt at dschmidt@berkeley.edu.
- 5/1 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC Berkeley Campus; 1:00 – 3:00 p.m.;** Pre-registration is required. For more information, see the 4/10 listing above.
- 5/3 - San Luis Obispo SOD Blitz; San Luis Obispo County Department of Agriculture, 2156 Sierra Way, San Luis Obispo; 6:30 – 8:30 p.m.;** For more information, contact Kim Camilli at Kim.Camilli@fire.ca.gov or Lauren Brown at lbrown805@charter.net.
- 5/4 - Carmel Valley and Monterey SOD Blitz; Garland Ranch Regional Park Museum meeting room at the ranger station, Carmel Valley; [Map Link](#); 1:00 – 3:00 p.m.;** For more information, contact Kerri Frangioso at kfrangioso@ucdavis.edu or Brian Leneve at bjleneve@att.net.
- 5/7 - San Francisco SOD Blitz; Golden Gate Park Presidio and Golden Gate Park Rec. Room; San Francisco County Fair Building; Golden Gate Park near 9th Ave. & Lincoln Way, San Francisco; 9:00 – 11:00 a.m.;** For more information, contact Eric Anderson at eric.anderson@sfgov.org.
- 5/11 - Mendocino SOD Blitz; College of the Redwoods; 1211 Del Mar Drive; Fort Bragg; 10:00 a.m. – noon;** For more information, contact Lori Hubbard at lorih@mcn.org.
- 5/13 – 17 - 7th Western Hazard Tree Workshop; Relics Restaurant and Conference Center; 3235 Arizona 89A, Sedona, Arizona.** For the agenda and lodging information, or to register, go to <http://www.fs.fed.us/foresthealth/technology/htwc/index.htm>. For more information, contact Pete Angwin at (530) 226-2436 or pangwin@fs.fed.us.
- 5/14 - Best Management Practices Programs for CA Nurseries: Review and Outlook Training Session; UC Cooperative Extension Monterey County; 1432 Abbott Street; Salinas, CA 93901;** For more information, go to http://ucanr.edu/sites/UCNFA/2013_Educational_Programs/BMPs_Workshop_Salinas/.
- 5/18 - South Bay SOD Blitz, Option 1; Montalvo, Location to be determined;** 10:00 a.m. to noon; For more information, contact Kelly Sicat at KSicat@montalvoarts.org or Arvind Kumar at arvind.kumar@cnps.org.
- 5/18 - South Bay SOD Blitz, Option 2; South Skyline, Location to be determined;**



- 1:00 – 3:00 p.m.; For more information, contact Jane Manning at skyline_sod@yahoo.com.
- 5/25 - Peninsula SOD Blitz, Option 1; Burlingame Hills; 120 Tiptoe Lane (off Canyon Rd.); Burlingame; 10:00 a.m. – noon; For more information, contact Steve Epstein at steve@burlingamehills.org.**
- 5/25 - Peninsula SOD Blitz, Option 2; Woodside/Portola Valley/Emerald Hills; Woodside Town Hall; 2955 Woodside Road; Woodside; 1:00 – 3:00 p.m.; For more information, contact Debbie Mendelson at sodblitz@gmail.com.**
- 6/1 - Atherton SOD Blitz; Carriage House; Holbrook Palmer Park; 150 Watkins Ave.; Atherton; 10:00 a.m. – noon; For more information, contact Susan Finocchio at susanfin@earthlink.net.**
- 6/8 - Los Altos Hills SOD Blitz; Los Altos Hills Town Hall; 26379 Fremont Rd.; Los Altos Hills; 10:00 a.m. to noon; For more information, contact Sue Welch at sodblitz09@earthlink.net.**
- 6/15 – Sonoma SOD Blitz, Option 1 - Santa Rosa; Location to be determined; 10:00 a.m. – noon; For more information, contact Phyllis Turrill at rainbow3@comcast.net.**
- 6/15 - Sonoma SOD Blitz, Option 2; Sonoma Community Center; 276 East Napa Street; Sonoma; 10:00 a.m. – noon; For more information, contact Phyllis Turrill at rainbow3@comcast.net.**
- 6/15 - Sonoma SOD Blitz, Option 3; Sebastopol; Location to be determined; 10:00 a.m. – noon; For more information, contact Phyllis Turrill at rainbow3@comcast.net.**
- 6/15 - Napa SOD Blitz; UC Cooperative Extension Office, 1710 Soscol Avenue, Napa; Time to be determined; For more information, contact Bill Pramuk at info@billpramuk.com or Henni and Gerrald Cohen at hennic1044@gmail.com.**
- 8/24 – 25 - Fifth *Phytophthora*, *Pythium*, and Related Genera Workshop; Beijing, China; The first day focuses on the methodology for studying Oomycetes (particularly *Phytophthora* and *Pythium* species), while the second day will cover contemporary research topics. The meeting is being held in conjunction with the 10th International Congress of Plant Pathology. For abstract submission, registration, and workshop information, go to <http://www.icppbj2013.org/file/workshop/5thInternationalWorkshop.asp>.**
- 9/4 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC Berkeley Campus; 1:00 – 3:00 p.m.; Pre-registration is required. For more information, see the 4/10 listing above.**
- 10/2 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC Berkeley Campus; 1:00 – 3:00 p.m.; Pre-registration is required. For more information, see the 4/10 listing above.**
- 10/23 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC Berkeley Campus; 1:00 – 3:00 p.m.; Pre-registration is required. For more information, see the 4/10 listing above.**
- 11/13 - SOD Treatment Workshop; meet at oak outside of Tolman Hall, UC Berkeley Campus; 1:00 – 3:00 p.m.; Pre-registration is required. For more information, see the 4/10 listing above.**