

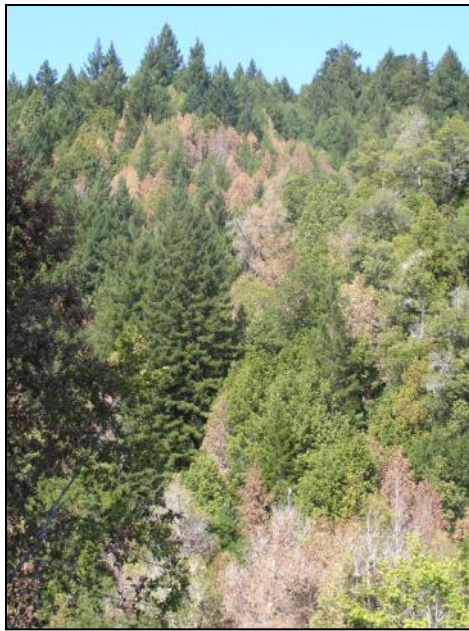
# Sudden Oak Death and *Phytophthora ramorum*



Marin County, CA  
June 2000





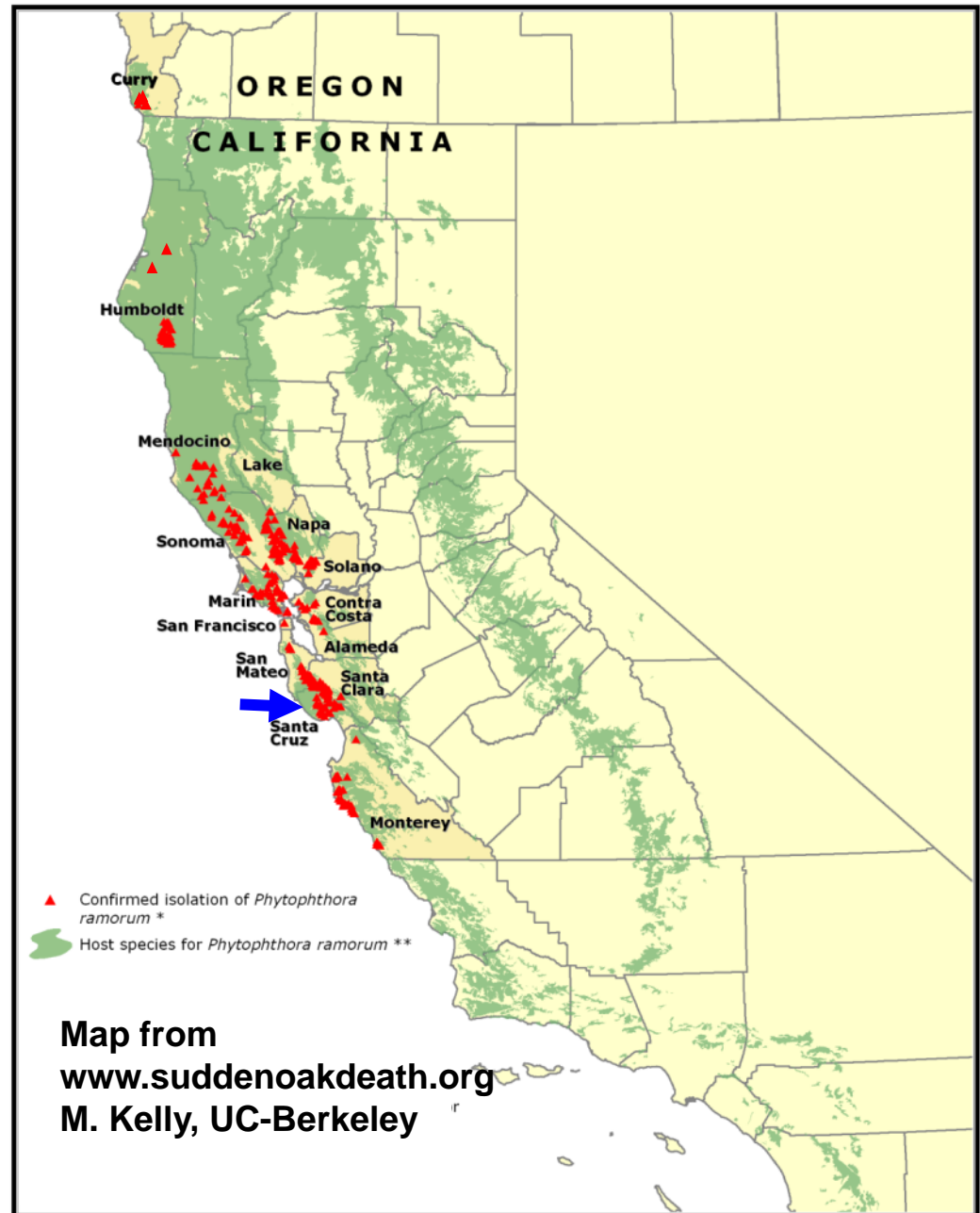


**Humboldt**



**Big Sur**

## Distribution of *Phytophthora ramorum*





## Oaks

*Quercus agrifolia*

*Q. kelloggii*

*Q. parvula* var. *shrevei*

*Q. chrysolepis*



## Tanoak

*Notholithocarpus densiflorus*

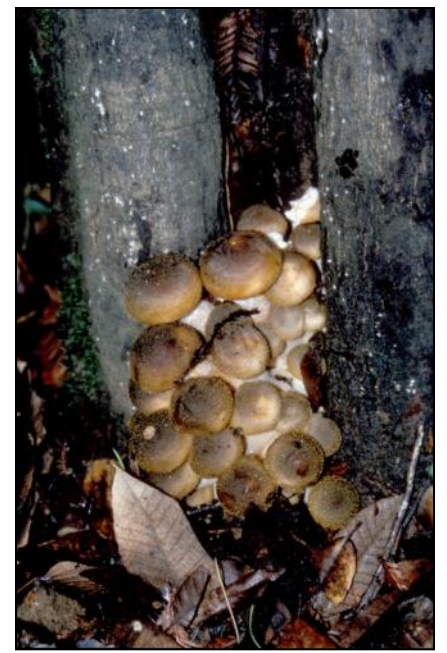
















**Big Sur**  
S. Frankel



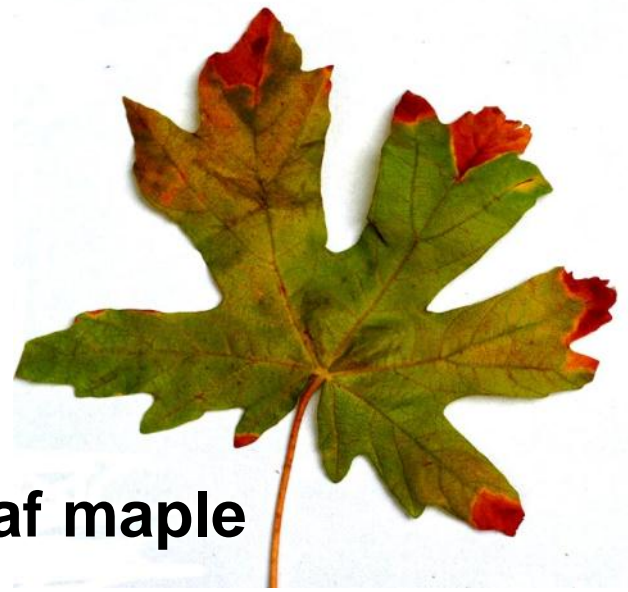
# Rhododendron







**Rhododendron**



**Bigleaf maple**



**Redwood**



**Maidenhair  
fern**



**Bay laurel**



# Known Host Range of *Phytophthora ramorum*

Andrew's clintonia bead lily

Ardisia

Bigleaf maple

Blueblossom

California bay laurel

California black oak

California buckeye

California coffeeberry

California hazelnut

California honeysuckle

California maidenhair fern

California nutmeg

California wood fern

Camellia species

Camphor tree

Canyon live oak

Cascara

Chinese witchhazel

Coast live oak

Coast redwood

Douglas fir

Drooping leucothoe

European ash

European beech

European turkey oak

European yew

Evergreen huckleberry

Evergreen maple

False Solomon's seal

Formosa firethorn

Fetterbush

Goat willow

Grand fir

Griselinia

Holly olive

Holm oak

Horse chestnut

Hybrid witchhazel

Japanese evergreen oak

Japanese larch

Laurustinus

Lilac

Madrone

Magnolia varieties

Manzanita

Michelia

Mountain laurel

Northern red oak

Oleander

Oregon ash

Osmanthus

Pacific yew

Persian ironwood

Pieris varieties

Planetree maple

Poison oak

Port-Orford cedar

Portuguese laurel  
cherry

Red fir

Red tip photinia

Redwood ivy

Rhododendron  
species

Roble beech

Rugosa rose

Salal

Salmonberry

Scotch heather

Sessile oak

Sheep laurel

Shreve oak

Southern red oak

Spicebush

Spreading euonymus

Star magnolia

Strawberry tree

Striped bark maple

Sweet bay laurel

Sweet chestnut

Sweet Cicely

Sweet olive

Tanoak

Toyon

Viburnum varieties

Victorian box

Vine maple

Western hemlock

Western maidenhair  
fern

Western starflower

White fir

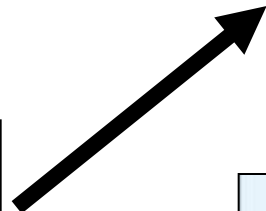
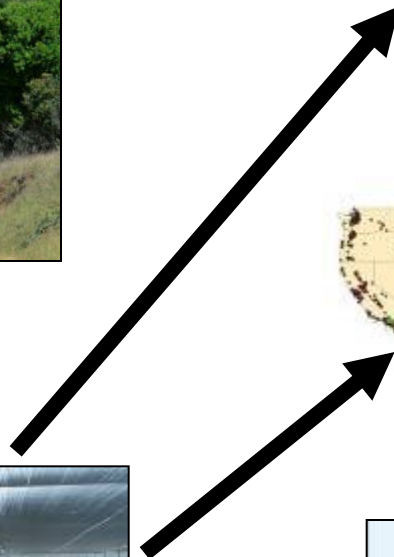
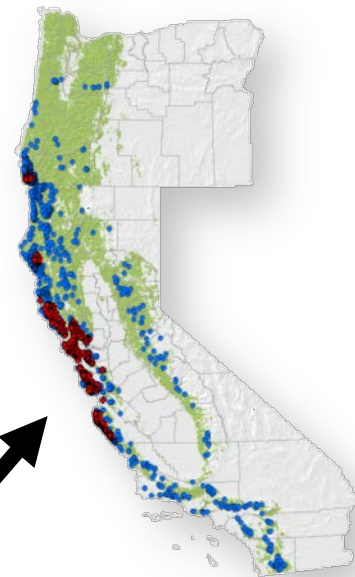
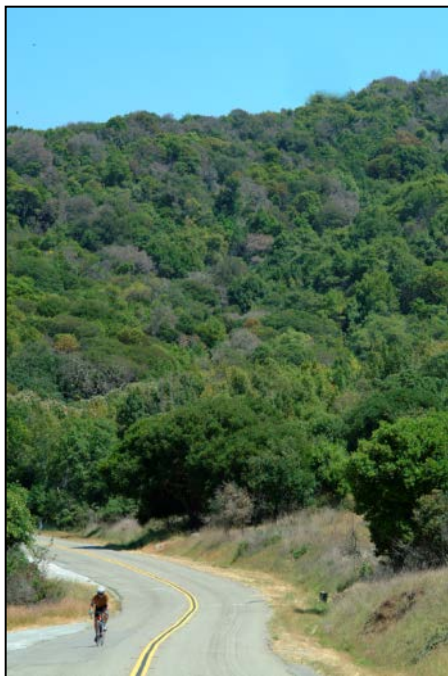
Winter's bark

Witch hazel

Wood rose

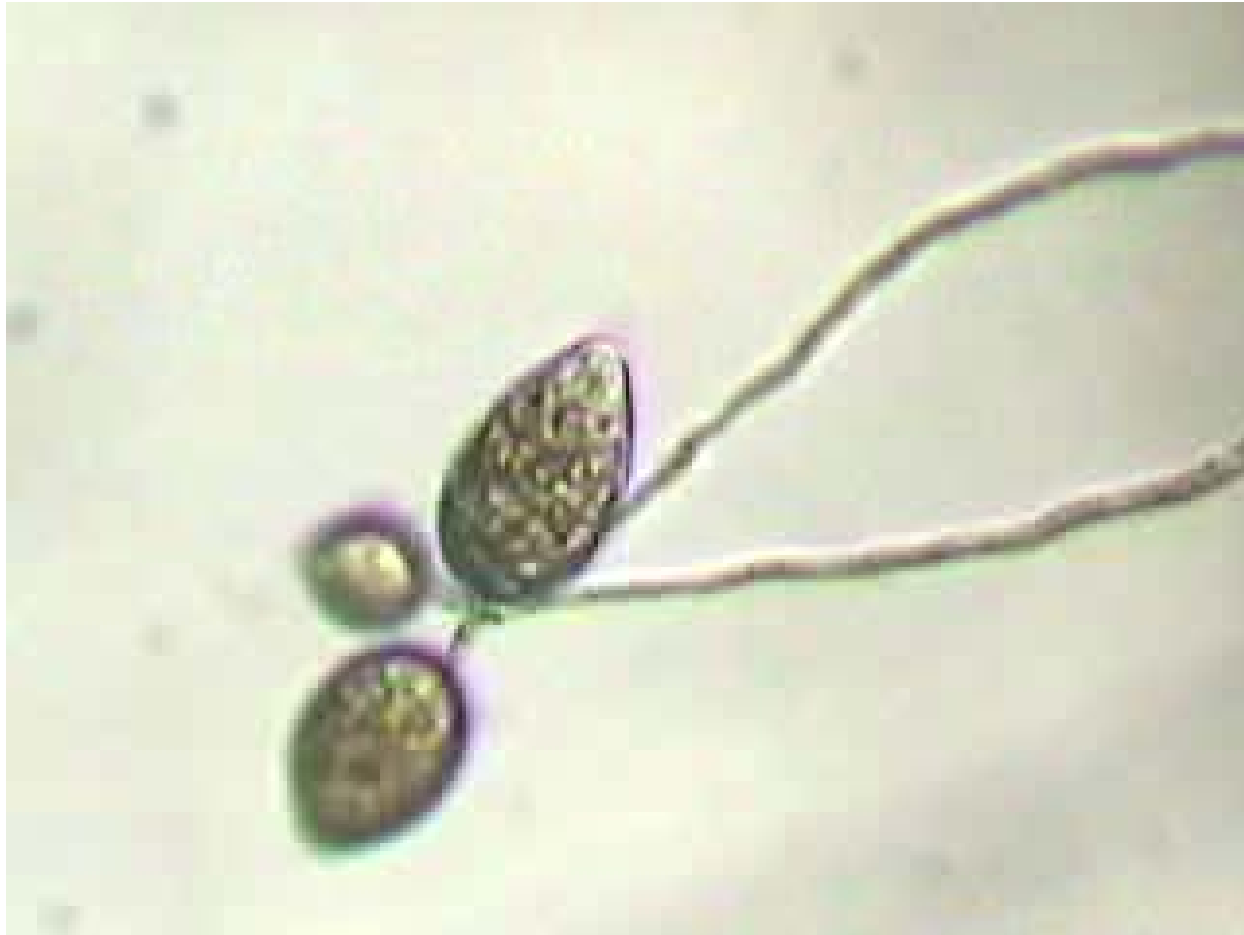
Yew







# ***Phytophthora ramorum***

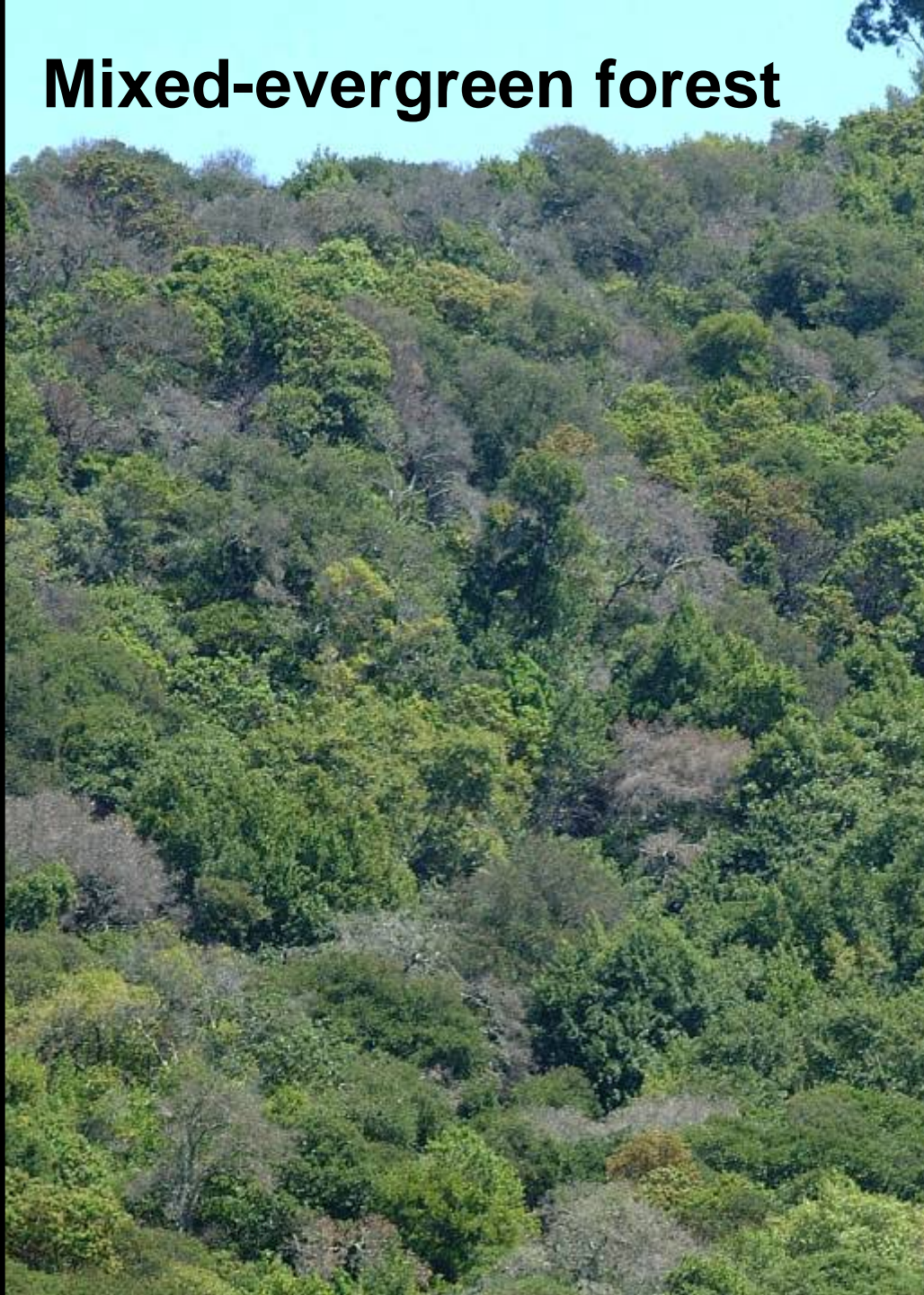




**Redwood forest**



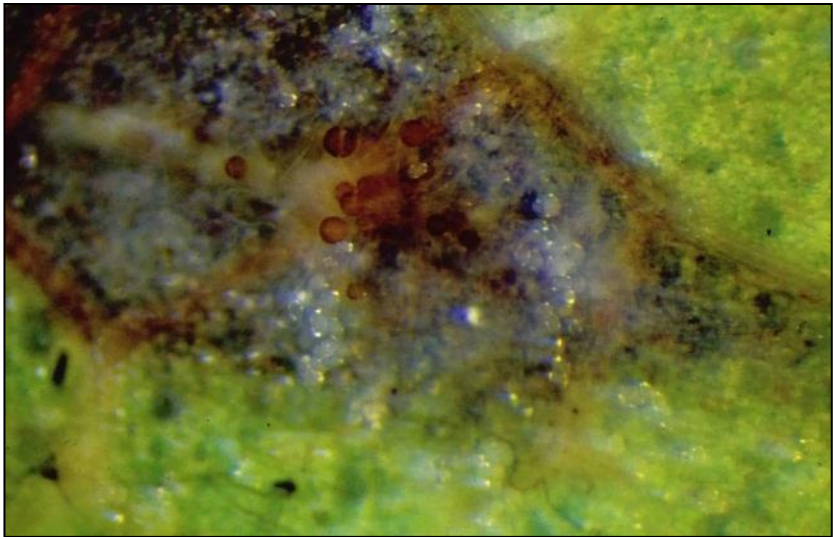
**Mixed-evergreen forest**



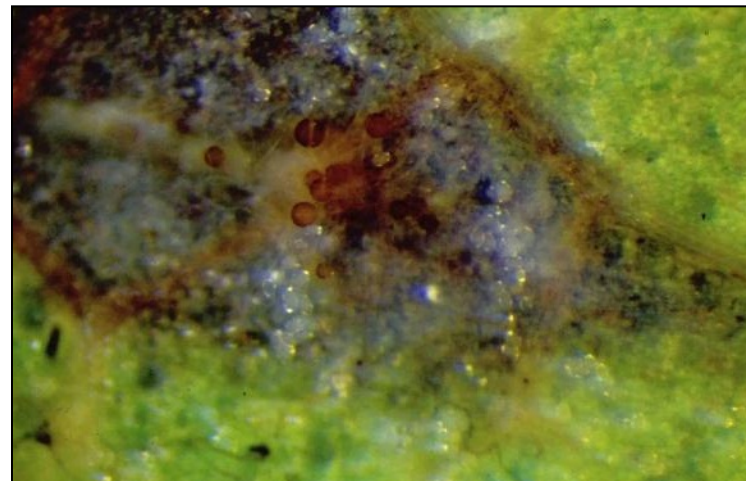










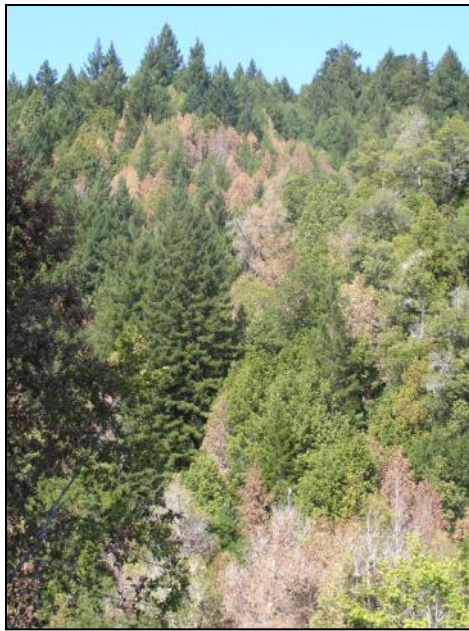




# Tanoak





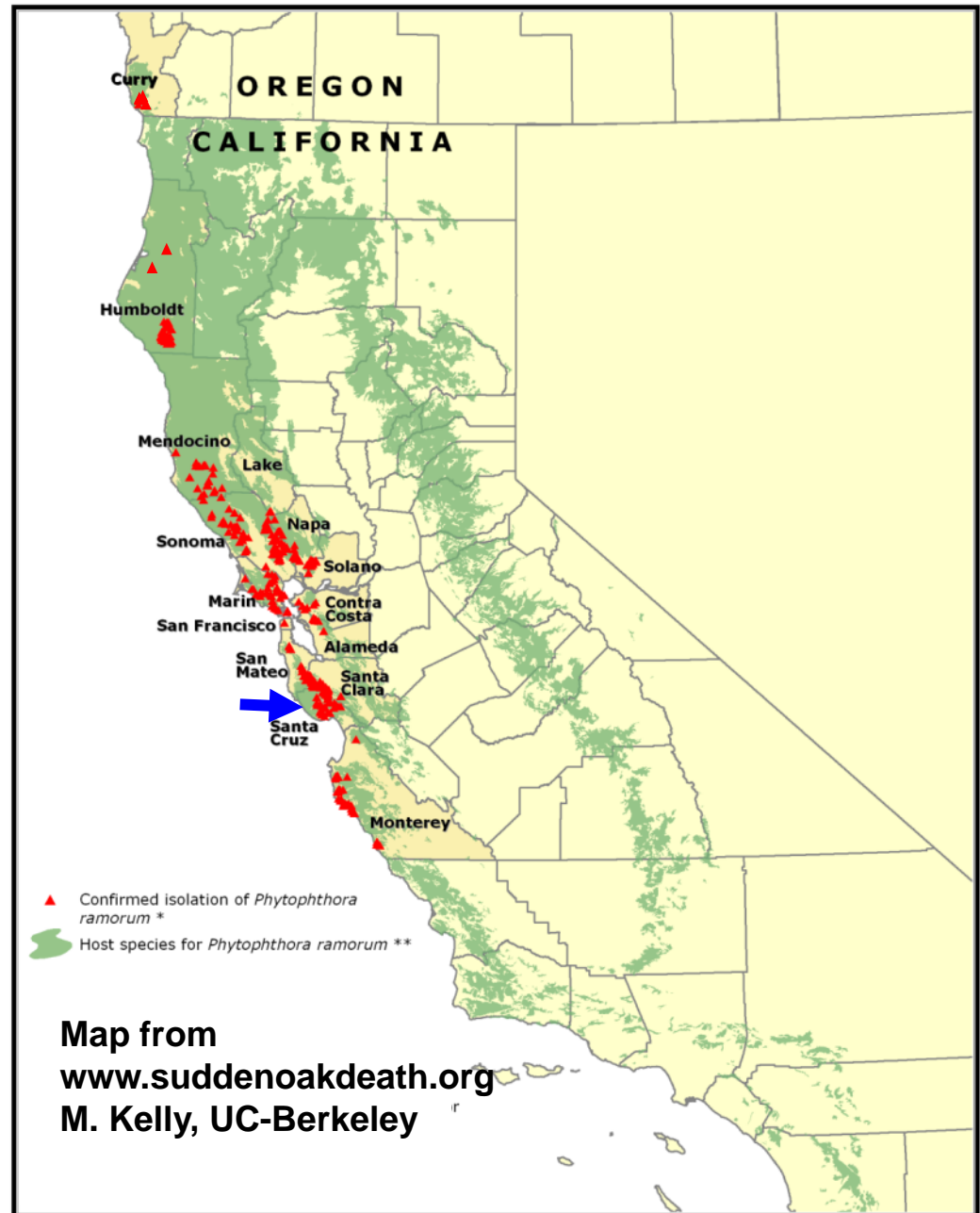


**Humboldt**



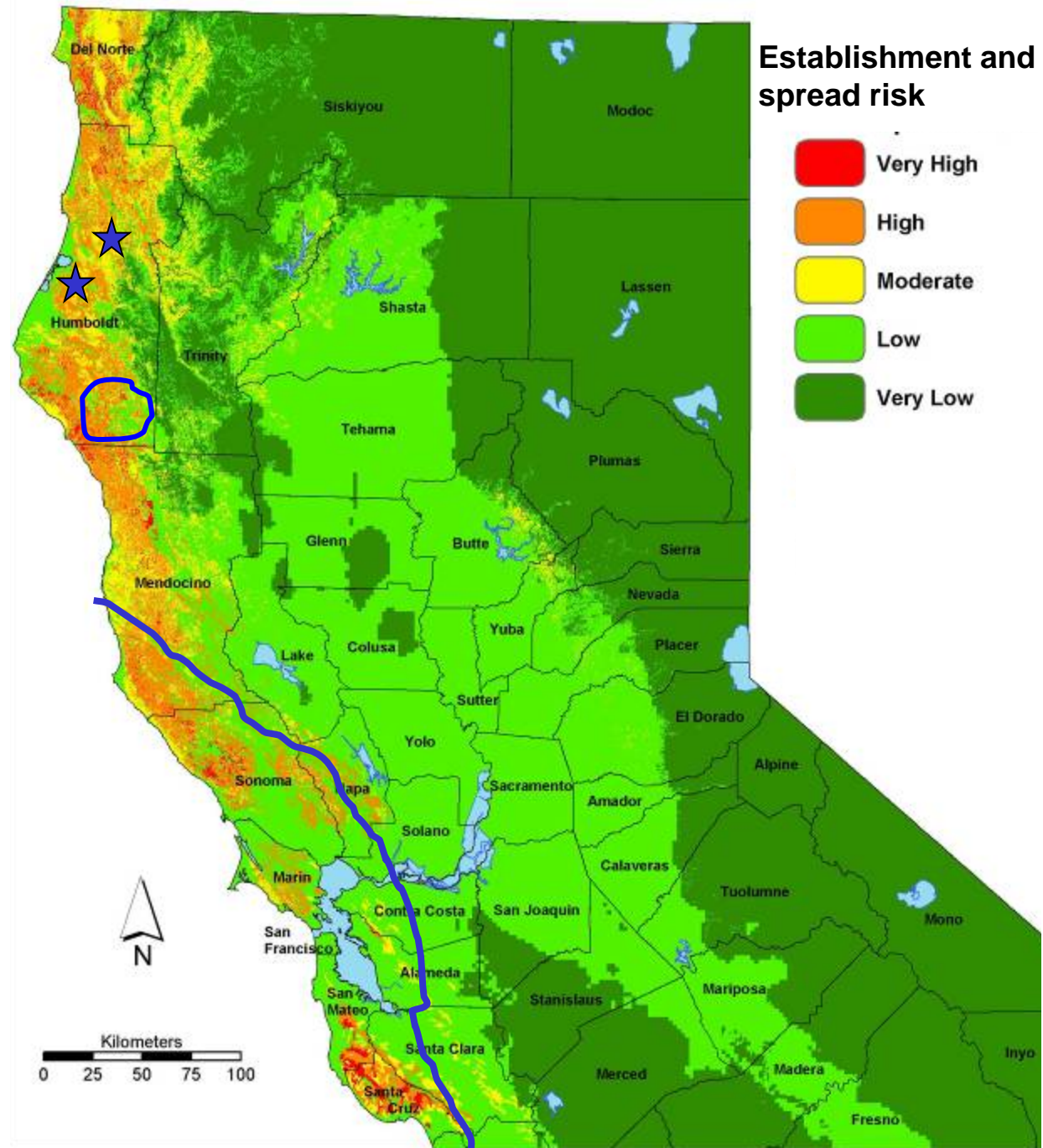
**Big Sur**

## Distribution of *Phytophthora ramorum*



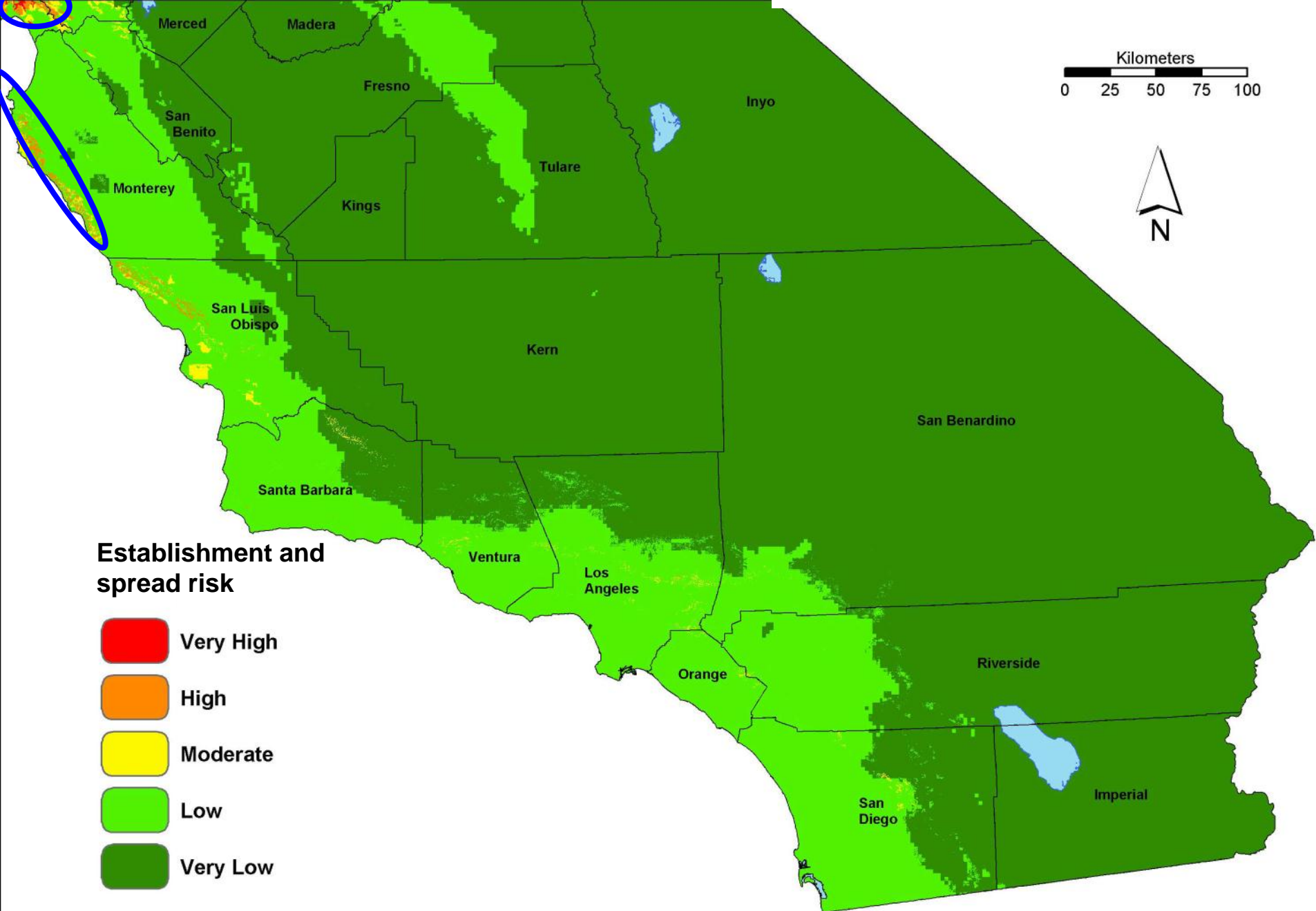


# Risk Models



Meentemeyer et al., 2004







# **Stake Holders**

- **Homeowners/Landowners**
- **Arborists**
- **Nursery industry**
- **Green waste industry**
- **Timber industry**
- **Specialty industries (bay leaves, burls)**
- **Native American Tribes**
- **Land Trusts, Preserves**
- **Public land managers (Local, State, National)**



**Marin County**





# Fungicides

## Spray Treatment

**PENTRA-BARK**  
BARK PENETRATING SURFACTANT



**AGRI-FOS**

SYSTEMIC FUNGICIDE



## Injection Treatments







An aerial photograph of a forest. The forest is composed of many trees, some of which are green and others are brown, suggesting a mix of species or a seasonal change. The trees are densely packed, and the overall color palette is dominated by shades of green and brown.

**Marin County**

Janet Klein, MMWD

08/09/2006



**Big Sur**



**Sonoma County**







**Forest structure**



**Wildlife**



**Fire**









**Before**



**After**





# Large Management Efforts

*Redwood Valley (UCCE, UC Davis, USDA FS, BLM, Yurok, Hoopa, Private landowners):*

- Slow the spread
- Impact management

*S. Humboldt, Mendocino, and N. Sonoma (UCCE, CAL Fire, Phytosphere, Fire Safe Sonoma):*

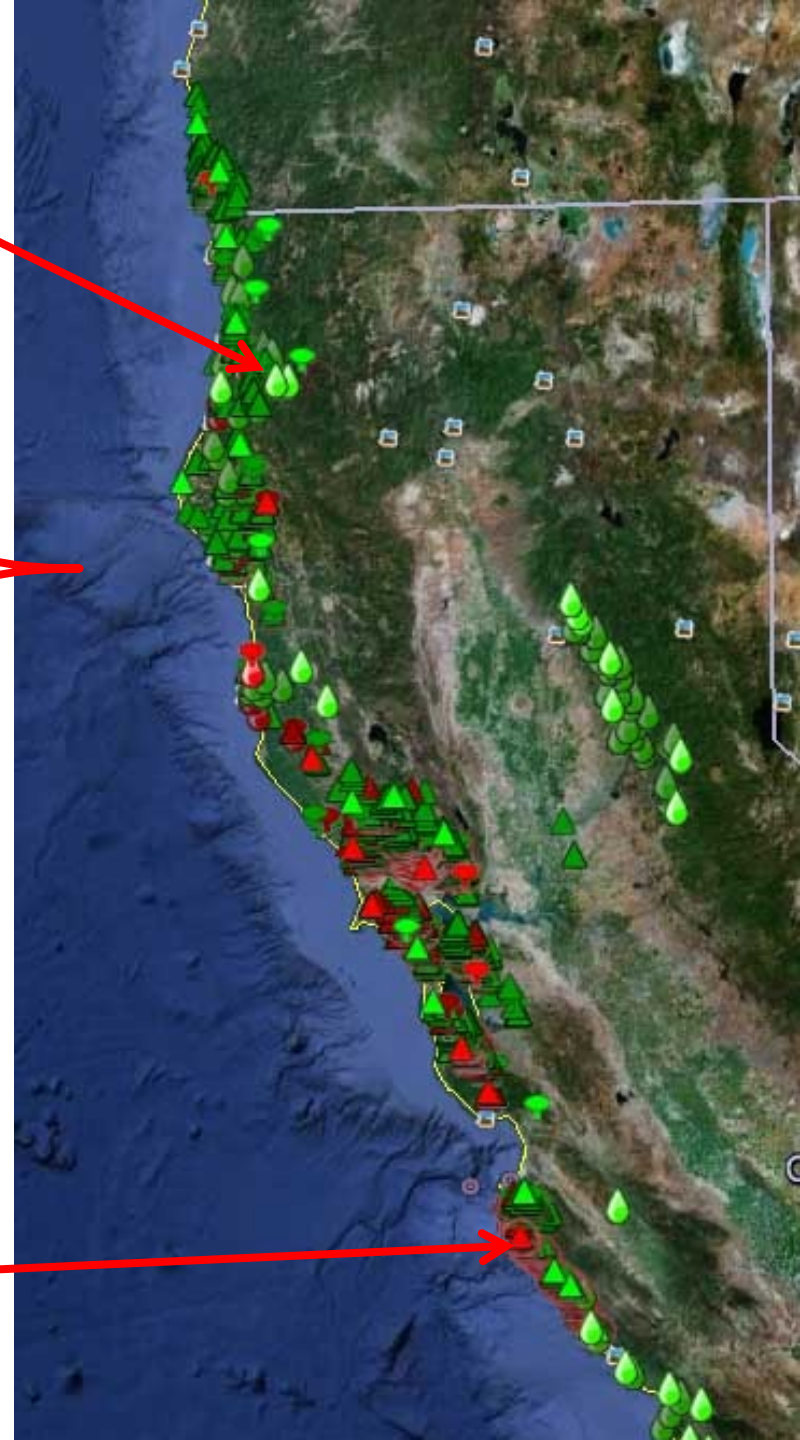
- Hot spot approach/Slow the spread
- Tanoak survival
- Fuel/impact management

*Greater Bay Area (UC Berkeley, Phytosphere):*

- Impact management
- Slow the spread
- Agri-fos trials
- Tanoak/oak survival

*Big Sur (USDA FS, UC Davis, UC Berkeley):*

- Fire planning
- Agri-fos trials
- Tanoak survival





# APHIS website:

[www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/pram/index.shtml](http://www.aphis.usda.gov/plant_health/plant_pest_info/pram/index.shtml)



United States Department of Agriculture  
Animal and Plant Health Inspection Service



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- ▶ [Wildlife Damage Management](#)

You are here: [Home](#) > [Plant Health](#) > [Pest Information](#) > [Phytophthora ramorum](#)

## Plant Health

### *Phytophthora ramorum*/Sudden Oak Death

#### Background

Since the early 1990s, oaks and tanoaks have been dying in the coastal counties of California. Since then, other types of plants have been found to be infected or associated with this disease, referred to as Sudden Oak Death (SOD), ramorum leaf blight or ramorum dieback. *Phytophthora ramorum* is the pathogen that causes these diseases. Sudden Oak Death was first reported in 1995 in Mill Valley (Marin County) on tanoak. Since that time, the pathogen has been confirmed on various native hosts in fourteen coastal California counties (Marin, Santa Cruz, Sonoma, Napa, San Mateo, Monterey, Santa Clara, Mendocino, Solano, Alameda, Contra Costa, Humboldt, Lake, and San Francisco), and in Curry County, Oregon. Through ongoing surveys, APHIS-PPQ continues to define the extent of the pathogen's distribution in the US and limit its artificial spread beyond infected areas through quarantine and a public education program.

[More](#) ▶

#### News and Information

- [Phytophthora ramorum: Stopping the Spread](#) (brochure)
- [National Pest Alert](#) (PDF; 254 Kb)
- [Frequently Asked Questions](#)
- [On-Line Resources](#)

#### Related Topics

- [Overview](#)
- [Plant Pest Program Information](#)
- [Pest Detection](#)
- [Pest Identification](#)
- [Plant Import and Export](#)
- [Permits](#)
- [Crop Biosecurity and Emergency Response](#)
- [Spotlights for PPQ](#)

#### I Want To...

- [Learn About and Access the FAVIR Database](#)
- [Learn About the Special Needs Request Rule](#)
- [View PPQ electronic manuals](#)
- [Import a plant, plant product, or soil into the U.S. \(PERMIT\)](#)



Send us your feedback!

## NPDN Web Ring

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Training &  
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[Meeting  
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[National Repository-  
Purdue University](#)

[Newsletter](#)

## Login Panel

[< PDIS Login](#)

## 2nd National Meeting of the NPDN

**Save the Date!**

**December 6-10, 2009 Miami, Florida**

Mark your calendar for the second national meeting of the National Plant Diagnostic Network. Interact with your colleagues from other states, regions, disciplines, or agencies. [Click here for more information.](#)

## First Detector Training

### Training



First Detector Training promotes awareness and early detection of exotic pests in the field. NPDN recently released a free online professional development program that teaches how to monitor and respond to high-risk insects, weeds, and plant pathogens in crops including food, horticultural, and ornamental growing systems. [Go to](#)

[First Detector Training](#) for more information.

## NPDN

This webpage was created to inform the general public of the existence of the National Plant Diagnostic Network (NPDN) and to facilitate NPDN committee function, activities, and organization.

## Upcoming Events

## NPDN Five Year Review Documentation

### Title

[Executive Summary Report \( pdf, 47 KB\)](#)

[Table of Contents for Five Year Review Document \( pdf, 46 KB\)](#)

[CSREES NPDN Five Year Review \( pdf, 9 MB\)](#)

[Summary of Recommendations From Review Team \( pdf, 71 KB\)](#)

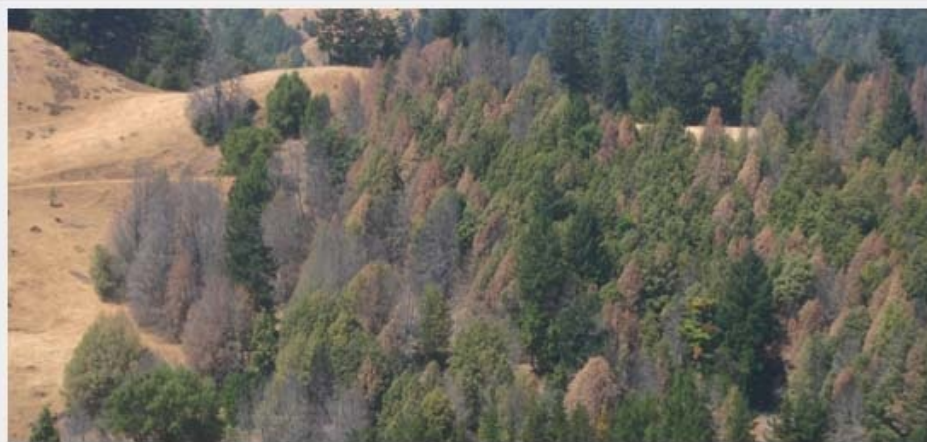
## Collaborators

[Homeland Security](#)  
[USDA-ARS Cereal Disease Laboratory](#)  
[National Plant Board](#)





# CALIFORNIA OAK MORTALITY TASK FORCE

[Home](#)[About Sudden Oak Death](#)[Diagnosis and Management](#)[News and Events](#)[Library](#)[Research](#)[Contacts](#)

## What is Sudden Oak Death?

Sudden Oak Death is a tree disease caused by the plant pathogen *Phytophthora ramorum*. The disease kills some oak species and has had devastating effects on forests in California and Oregon.

[Read more about Sudden Oak Death.](#)

  
**Search**

### Quick Links

[Current newsletter](#)[SODMAP](#)[Best Management Practices](#)[Regulations](#)[Research](#)[Join the mailing list](#)[Media inquiries](#)[Symptom Gallery](#)



# SOD-Blitz

- Education on biology and epidemiology
- Create a community-based active disease management approach
- Training sessions to allow homeowners to implement active disease management
- Provide disease distribution information for decision-making and research



<http://nature.berkeley.edu/garbelotto>



# education

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## **SOD BLITZES** **Communities Coming Together in the Fight Against** **Sudden Oak Death**

Starting in 2013, the [California Native Plant Society \(CNPS\)](#) joins UC Berkeley in co-hosting [SOD Blitzes](#). Many CNPS chapters will participate in the 2013 SOD Blitzes. Find your CNPS organizer in the contact list below.

This activity possible thanks to funding from:  
[USDA Forest Service, State and Private Forestry](#)  
[The Gordon and Betty Moore Foundation](#)

### **Spring 2013 SOD Blitz Meetings**

**Santa Cruz** - Friday, April 12, 7:00pm,  
UCSC Arboretum, Santa Cruz, CA [Map Link](#)  
Contact: [Nadia Hamey](#) - [nadah@big-creek.com](mailto:nadah@big-creek.com)  
CNPS Contact: [Brett Hall](#) - [brett@ucsc.edu](mailto:brett@ucsc.edu)

**Marin County** - Saturday April 20, 10:00am,  
Dominican University, 155 Palm Ave.,  
Joseph R. Fink Science Center, Rm 102,  
San Rafael, CA [Map Link](#)  
Contact: [Karen Suslow](#) - [karen.suslow@dominican.edu](mailto:karen.suslow@dominican.edu)  
CNPS Contact: [Kristin Jakob](#) - [kristinjakob@att.net](mailto:kristinjakob@att.net)

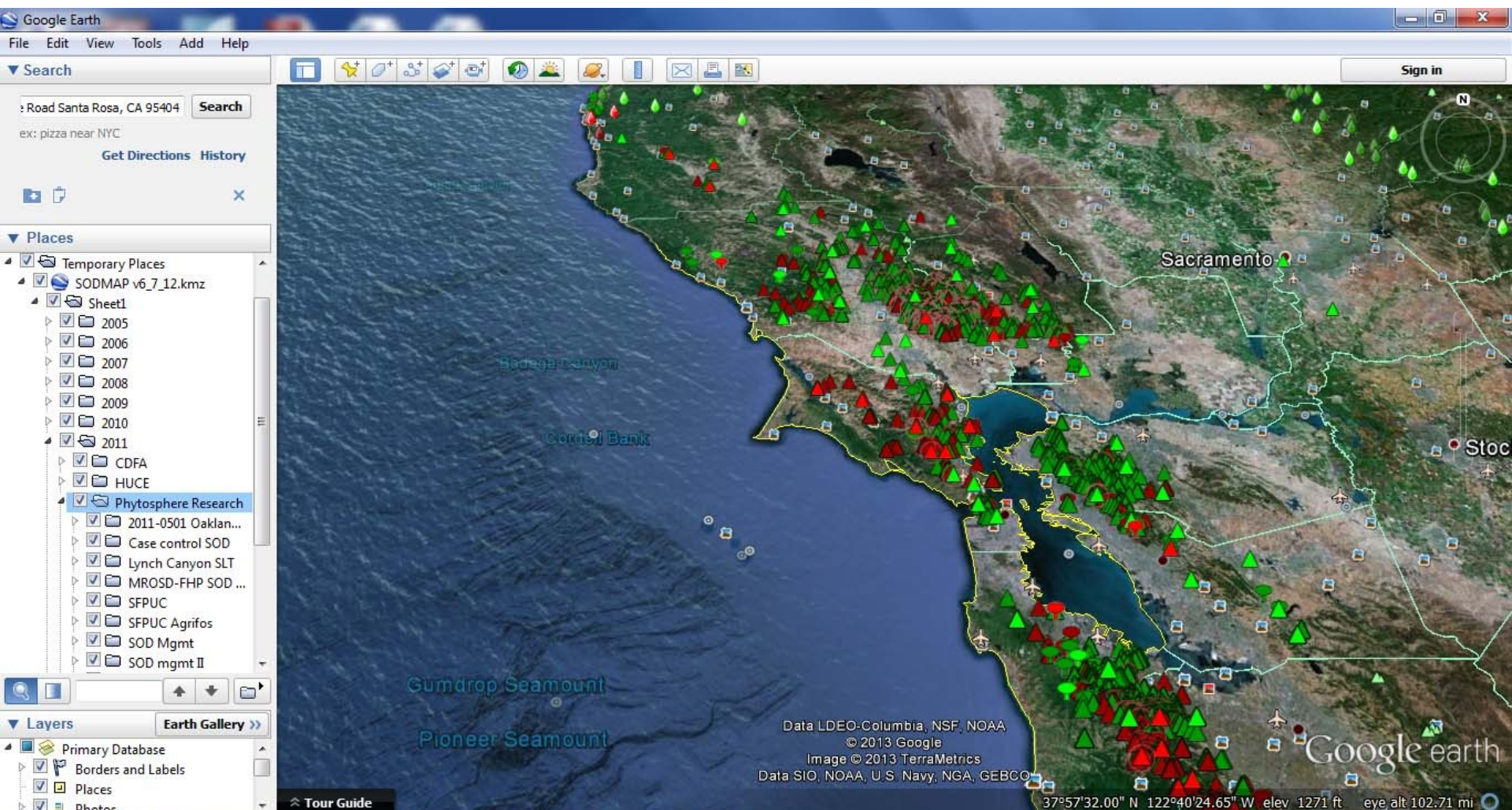
**East Bay** - Two meetings to choose from: April 27,  
10:00am, Orinda, Garden Room, Orinda Public Library, 26 Orinda Way,  
Orinda, CA  
Contact: [Bill Hudson](#) - [willhh@ymail.com](mailto:willhh@ymail.com)

1:00pm, Berkeley, 159 Mulford Hall, UC Berkeley, [Map Link](#)  
[Sign Up at Eventzilla](#)

**San Luis Obispo** - Friday, May 3, 6:30pm,



# SOD Map







**Big Sur**  
K. Frangioso