



Sudden Oak Death In Oregon

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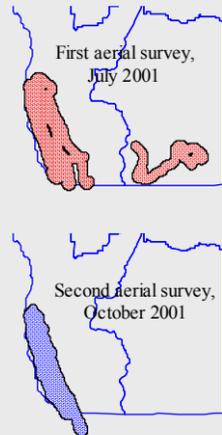
Introduction

Since 1995 large numbers of tanoaks (*Lithocarpus densiflorus*), coast live oak (*Quercus agrifolia*), and black oak (*Quercus kelloggii*) have been dying in California coastal counties near San Francisco. In 2000 a new pathogen, later named *Phytophthora ramorum*, was identified as the cause of this mortality. In 2001 the Oregon Department of Forestry, Oregon Department of Agriculture, and the U.S. Forest Service, conducted aerial and ground surveys to detect the presence of the pathogen and associated mortality in Oregon.

Oregon Surveys



Three surveys were conducted in Oregon in 2001. Two aerial surveys were conducted by the Oregon Department of Forestry and U.S. Forest Service, noting dead or dying tanoak or madrone, with subsequent ground verification. A ground survey conducted by the Oregon Department of Agriculture involved noting symptoms and mortality in known hosts near gypsy moth trap locations and along roads, with subsequent field verification. All surveys concentrated on extreme southwest Oregon, an area with extensive host types and proximity to California.



Verification Techniques

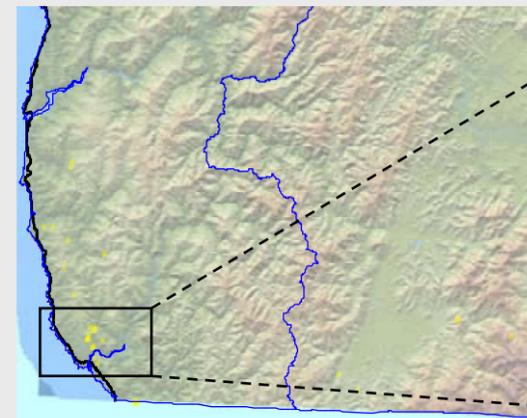
- Aerial survey used digital aerial sketchmapping system
- Latitude and longitude of polygon was derived from GIS data
- Ground location were determined with portable GPS unit
- Field sampling included direct isolation from cankers and collection of plant material for DNA tests for pathogen



Field isolation from tanoak canker *P. ramorum* in culture DNA gel showing confirmation of *P. ramorum*

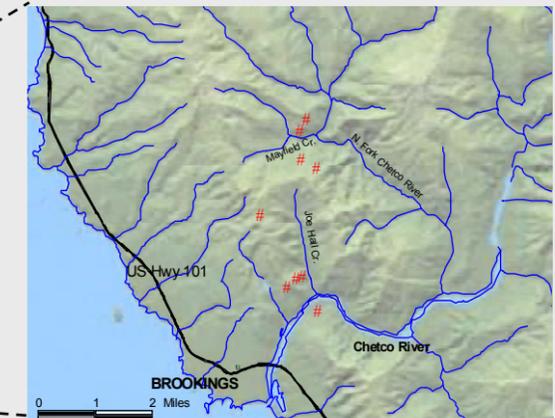
Aerial Survey Results

- Sites with dead tanoak or madrone



Ground Verification Results

- Sites positive for *P. ramorum*



- 33 sites with dead tanoak or madrone were detected with aerial survey
- 8 additional sites were found during field checking
- Because symptoms are not unique to SOD, all sites were located and confirmed on the ground

- Nine sites were positive for *P. ramorum*
- Positive sites were in two drainages near Brookings
- Dead tanoak was present at all sites
- Occasional symptoms were found on Rhododendron and evergreen huckleberry
- Pathogen identification confirmed with DNA testing
- Other agents associated with tanoak mortality included Armillaria sp., another Phytophthora species, and herbicide/mechanical damage

Symptoms of Sudden Oak Death in Oregon



Appearance of dead tanoak from the air.



Bleeding canker on tanoak

Tanoak inner bark with black canker margin

Extensive tanoak canker



Leaf spot and tip dieback on Rhododendron

Symptoms of infection by *P. ramorum* on various hosts.



Evergreen huckleberry with branch canker

Actions Resulting from Detection

- State quarantine for affected area; Canadian quarantine of entire state
- State/Federal/landowner eradication effort (cutting and burning infested stands)
- Repeat of aerial survey and ground verification in 2002
- Continued research and monitoring on
 - Effectiveness of eradication
 - Biology and epidemiology of pathogen
 - Distribution of pathogen



Eradication effort at largest infested site