

**California 2004 National *Phytophthora ramorum* Wildland Survey**  
**California Department of Forestry and Fire Protection**

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## Summary

As part of the 2004 National *Phytophthora ramorum* wildland survey, transects were checked for symptoms of *Phytophthora ramorum* in wildland areas near to CA nurseries that tested positive for *Phytophthora ramorum*. A new infestation was found in Golden Gate Park, San Francisco, making San Francisco County the 14<sup>th</sup> county confirmed positive in California. Forty-seven locations in 15 counties were surveyed; all but the Golden Gate Park site were negative.

## SUDDEN OAK DEATH SURVEY

In June and July 2004, CDF conducted wildland surveys as a complement to the 2004 National *P. ramorum* nursery surveys being conducted by the California Department of Food and Agriculture to detect *P. ramorum* within and around the perimeter of California nurseries. CDF's wildland surveys were conducted in areas adjacent to nurseries, but not overlapping areas surveyed by the Department of Food and Agriculture. The survey was planned and coordinated by CDF Entomologist Don Owen. Retired CDF Pathologist David Adams was hired as the project's surveyor.

### *Procedures*

A list of nurseries with stock that had been confirmed positive for *P. ramorum* was obtained from CDFA. Of these nurseries, those which met the following criteria were chosen for survey:

- A. Susceptible, natural vegetation exists within 3 kilometers of the nursery. This was determined by
  - a. Conversations with County Agricultural Commissioners' staff.
  - b. Review of USGS topographic maps and aerial photos
- B. The nursery is outside the 13 county regulated area **or** if it is in the regulated area, then no known infestations of *P. ramorum* exist within a 25 mile radius

For each nursery, a topographic map was prepared showing the location of the nursery and a circle delineating the area within a 3-kilometer radius. The surveyor used the map and a 1:12,000 scale aerial photo to further delineate areas of natural vegetation within the 3-kilometer radius. Surveys were conducted within these areas of natural vegetation. Most nurseries were located in urban or other developed areas with limited natural vegetation. In many situations, natural areas were small enough that it was possible to do a complete walk-through of the area(s). When larger natural areas were encountered, a drive-through or walk-through of the area was done to identify

locations suitable for closer inspection. For each contiguous natural area, up to 5 such locations were identified. These locations were inspected by one of two means:

1. Walking a 100m transect through the site.
2. Establishing a plot. Plots were used when a well-defined group of host plants were present and all could be inspected as a unit. Plots had no fixed size.

In addition to the surveys around nurseries, wildland surveys were conducted in the foothills of eastern Butte and Tehama Counties. For the Butte County portion, the Plumas National Forest Botanist suggested areas with populations of California Bay Laurel. Areas along the La Porte, Forbestown, Lumpkin, and Hurleton Roads and State Highway 70 were surveyed. For the Tehama County portion, the length of Ponderosa Way between State Highways 36 and 32 was surveyed. Stops were made at various locations along these routes to conduct roadside, 100m transect surveys.

The location of each plot, transect, or a general walk-through was recorded by GPS in UTM NAD 83 Coordinates, along with a written description. The presence/absence of host species/genera were recorded and host species were examined for symptoms associated with *P. ramorum* infection. Whenever symptoms were encountered, samples were collected for lab diagnosis. Samples were bagged and the bags labeled with host species, location, waypoint number or UTM coordinates, and collection date. *P. ramorum* diagnostics were conducted by the the University of California (Rizzo and Garbelotto labs).

Results were reported every 2 weeks to USDA Forest Service, Forest Health Monitoring, WO.

***Results and Discussion***

Wildland surveys were made in areas adjacent to 24 nurseries in 14 counties – San Diego, Los Angeles, Orange, Santa Barbara, San Luis Obispo, Santa Clara, San Francisco, Alameda, Yolo, Sacramento, Placer, Nevada, Butte, and Humboldt. A total of 9 diagnostic samples from 4 localities were collected and submitted. None of these samples tested positive for *P. ramorum*. However, symptoms were so compelling at one of the collection sites, Golden Gate Park in San Francisco, that CDFA made a second collection. These samples were cultured at the CDFA lab and 2 samples from coast live oak proved positive. Bay laurel foliage at the site also exhibited symptoms. This became the first confirmation of Sudden Oak Death in San Francisco, bringing the total number of infested counties in California to 14.

Final results as reported to APHIS

<b>Type of Site Surveyed</b>	<b>Number of Sites Surveyed</b>	<b>Number of Samples Collected</b>	<b>Number of Samples PCR positive for <i>Pr</i></b>
Near <i>Pr</i> + Nursery	24	9	2*
General Forest	23	0	0
<b>Total</b>	<b>47</b>	<b>9</b>	<b>2*</b>

\* CDFA follow-up survey results. ONLY 2 positive samples to date: 2 Coast Live Oaks in Golden Gate Park, San Francisco, CA

Although the survey detected an infestation of SOD within 3 kilometers of a *P. ramorum*-positive retail nursery, there was no evidence that the nursery was the source of the infestation. The nursery is approximately 1.25 miles from the infestation. While the nursery was confirmed positive in 2004, the Golden Gate Park infestation appears to have been initiated earlier. All counties bordering San Francisco are infested with SOD and San Francisco was thus at high risk for the disease.

For surveys conducted in the foothills of eastern Butte and Tehama Counties, a total of 23 100-m roadside transects were walked. *P. ramorum* hosts were found on all transects, but no disease symptoms were observed. Bay laurel, a key indicator of site suitability for SOD, was found at a number of locations below 3000 ft. elevation. In hot, dry interior areas such as these, microhabitats are likely to be important to disease establishment and persistence.

At the end of his 2 months of survey work, David Adams recorded the following general observations and assessment. He divides his assessment into 6 geographical regions. (Note: at the time this was written, the San Francisco infestation had not yet been confirmed).

1. South Coastal Locality (Los Angeles, Orange and San Diego Counties).

Certain locations in the lower foothills abound in coast live oaks and/or interior live oak—I cannot tell them apart without seeing acorns. Some oak locations are associated with stream riparian areas and others are scattered on high, dry soils. Many of these trees are quite large. Since SOD has not been found in their vicinity it is not possible judge their relative susceptibility to the disease. Nor, for the same reason, can we judge the potential of cohort vegetation to propagate the pathogen onto these red oaks. The general summer climate surrounding the oaks here is hot and dry thereby possibly precluding the pathogen from becoming established and perpetuating itself on incidental hosts.

2. Sacramento Locality (Sacramento County area including western Placer and eastern Yolo Counties).

This is generally a summer-dry, hot locality. Interior live oak is the only member of the red oaks. Common associated SOD-hosts are poison oak and toyon.

3. South Central Coastal Locality (Santa Barbara and San Luis Obispo Counties)

I did not find coast live oak and bay laurel associations in my survey locations. However, these associations probably do occur. I recommend developing monitoring sites within these counties.

4. Bay Area Climate Locality (includes all counties now known to be SOD-infested and San Francisco County).

Golden Gate Park, specifically the Aids Memorial site, should be given high priority for SOD survey. The two trees I found are both dying and have SOD-like cankers. These infections do not appear to be recent, but rather several to many years old. I've given Thomas Pestalka (CDF&A, San Francisco) their location at his request.

Tilden Park similarly has good potential for SOD incidence as bay laurels and coast live oak are in close association in numerous locations there. I did note two coast live oaks here that appear to have SOD infection(s). The Berkeley hills just below Tilden Park have some very large and old coast live oaks. A commercial gardener I spoke with said there are bay laurels in the area, although I did not personally see them. I did find one old tree on Contra Costa Avenue with a possible canker beginning in it.

#### 5. Coastal Humboldt County around Humboldt Bay area.

No red oak members occur in the Humboldt Bay region including McKinleyville. Bay laurel and tanbark oak do occur in the area, but I did not find that association in my geographically-limited survey. I did find bay laurel near McKinleyville. It could be important to watch the tanbark-bay laurel association in these presently uninfested favorable climate situations.

#### 6. Interior Northern California (Plumas, Butte and Tehama Counties)

This might be an interesting area to keep an eye on. There are tanoak, interior live oak and bay laurel and numerous other incidental recognized and potential hosts here. Warm, wet springs could offer opportunity for infection of native trees from infected nursery plants bought in from elsewhere. Microclimates in favorable locations could enhance the pathogen's ability to survive here.

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END OF REPORT