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USDA-Forest Service/California Department of Forestry and Fire Protection

2001-2002

Survey and Monitoring Program for Sudden Oak Death and *Phytophthora ramorum*

This document outlines a proposed monitoring program being considered for funding by the USDA-Forest Service, State and Private Forestry (USFS) and California Department of Forestry and Fire Protection (CDF). These agencies are working through the California Oak Mortality Task Force (COMTF) to develop a coordinated plan to determine the distribution and impacts of Sudden Oak Death and the pathogen *Phytophthora ramorum* on all its hosts. We have taken input from the Monitoring Committee of the COMTF and others to assemble a survey and monitoring program to provide pathogen locations and impact information needed by regulators, land managers, scientists, legislators and governments to address many aspects of Sudden Oak Death.

**This is being distributed to you for comment.** If the following projects are done with a reasonable level of accuracy – will there still be unmet information gaps? How can those gaps be filled? Do you have any other concerns or suggestions for the program or projects as planned? By putting this out for review – we are hoping to get feedback to improve the program. Please reply by December 10 to Susan Frankel ([sfrankel@fs.fed.us](mailto:sfrankel@fs.fed.us)) with cc to Maggi Kelly [mkelly@nature.berkeley.edu](mailto:mkelly@nature.berkeley.edu) and Wally Mark [wmark@calpoly.edu](mailto:wmark@calpoly.edu) (COMTF monitoring committee co-chairs).

#### Delimitation Survey

**Aerial survey for delimitation.** Enforcement of California's regulation for Oak Mortality requires maps of where *Phytophthora ramorum* is to within ¼ mile. Given the large area impacted (currently 10 counties) the primary survey to delimit where the disease is will be done aerially. Oregon's detection of the Brookings infestation via aerial survey indicates that aerial survey with complete ground checking (including lab confirmation) can provide the basis for a map of where trees are being killed by *P. ramorum*. Mortality due to other causes will also be documented. This survey will not detect leaf spots and twig dieback or infection in shrub species. Project lead: USFS-Pacific Southwest Region. Cooperators: California Department of Forestry and Fire Protection, Oregon Department of Forestry, USFS-Pacific Northwest Region, California Department of Food and Agriculture and University of California, Davis and Berkeley, Cal-Poly San Luis Obispo. Cost estimate: \$100,000 for fixed-wing and helicopter flights and ground checking.

**Systematic ground-based surveys for distribution of *P. ramorum* on leaf spot or twig dieback hosts.** Samples will be taken throughout the State to determine the distribution and extent of *P. ramorum* on hosts where the symptoms are leaf spots or twig dieback (symptoms of the disease that can't be detected from the air). A statistical sampling scheme will be developed so results can be used to generate estimates of where the pathogen is and extent of infestation. Some location and inventory information will be taken so the survey could be repeated several years from now to understand changes in pathogen incidence over time. Cooperators include USFS-Pacific Southwest

Research Station, USFS-Pacific Southwest Region, Cal Poly-San Luis Obispo, Sonoma State Univ., Univ. of California.

### **Delimitation survey – input from County biologists and other Sudden Oak Death specialists**

CDF and the USFS will provide several hundred thousand dollars to counties for regulatory survey needs. Surveys will be done to determine property is “free from” *Phytophthora ramorum*. Funding levels are aiming to hire full-time biologists for most of the known infested counties. These biologists and other Sudden Oak Death specialists such as UC Cooperative Extension Sudden Oak Death project leaders will be asked to provide input of confirmed SOD sites to the statewide GIS database maintained by Maggi Kelly at UC-Berkeley. An agreed to protocol will be used so data is standardized and reliable.

### Surveys of areas not known to be infested, early detection

Wally Mark, Cal Poly-San Luis Obispo (SLO) received funds in 2000-2001 to **survey counties adjacent to known infested counties** to detect Sudden Oak Death and *Phytophthora ramorum*. Aerial survey with ground checking and some ground surveys will be completed this Spring/Summer for all adjacent counties.

**Early Detection in the Sierra Nevada.** A survey to detect *P. ramorum* as a leaf spot will be done in the central valley and Sierra Nevada. Leaves will be collected throughout areas not known to be infested and lab tested for infection by *P. ramorum*. This project will be a cooperative effort of Univ. of California, California Department of Food and Agriculture, CDF, USFS, UC-Cooperative Extension, and the County Agricultural Commissioners.

### Risk Rating/Prediction

**Host maps** will be developed for the entire state by compiling the best available vegetation data for hardwood and shrub species. These maps will be used to target areas for aerial and ground checking in areas not known to be infested. They will also aid in economic analysis and prediction of the potential impact of Sudden Oak Death. This work will be done at Sonoma State University (Meentemeyer) and Cal Poly-SLO.

Two remote sensing projects will be supported to continue evaluation of spatial distribution and risk rating. Meentemeyer (Sonoma State Univ.) and Kelly (UC-B) will be provided funds to determine if remote sensing techniques can be used to develop a signature for early detection and if analysis of current distribution can be used to predict future impacts.

### Diagnostic, GIS database and map support

The USFS will provide support to UC-Davis (Rizzo) and UC-Berkeley (Garbelotto) for **field and laboratory diagnostic support**. The position at UC-Davis will assist with training all survey crews, field sampling of significant new areas or hosts and technical advice for development of education

materials. The funds for UC-Berkeley will be used for molecular diagnostic technique quality control and development. The state is also providing funds to operate a Sudden Oak Death diagnostic laboratory in Sacramento. The lab will be run by California Department of Food and Agriculture and will provide confirmations for many of these projects as well as other diagnostic services.

**GIS database and map support.** State funds will be provided to maintain the statewide GIS database and provide web and hardcopy maps to all that need them (Maggi Kelly, UCB).

Coordination with other on-going monitoring projects

There are many other survey and monitoring activities on-going throughout the State, in Oregon and initial plans for a national survey. Information from research plots, ground surveys done by land owners, and other survey programs will be added to the COMTF website and tracked through the Monitoring Committee of the COMTF.