

TITLE: Monitoring Sudden Oak Death in Oregon (ground survey, aerial survey, and aerial photography)

**FY2004 WEST COAST REGION
FHM FIRE Evaluation Monitoring Proposal (Continuing Project)**

LOCATION: Southwest Oregon

DURATION: Year 3 of a 3-year project (January 2001 – December 2004)

FUNDING SOURCE: Fire

PROJECT LEADER: Alan Kanaskie, Forest pathologist, Oregon Department of Forestry, 503-945-7397, akanaskie@odf.state.or.us

FHP SPONSOR: Iral Ragenovich, USFS Forest Insects and Diseases, R-6, Portland, OR. 503-808-2915. iragenovich@fs.fed.us

COOPERATORS:

Alan Kanaskie, Oregon Department of Forestry, 2600 State Street, Salem, Or 97310. 503-945-7397. akanaskie@odf.state.or.us. Alan will hire and train survey crew, oversee Oregon ground and aerial surveys, provide OR data and maps, and cooperate in preparation of final report(s). 6 weeks.

Mike McWilliams, Oregon Department of Forestry, 2600 State Street, Salem, Or 97310. 503-945-7397. mmcwilliams@odf.state.or.us. Mike will fly the aerial survey and coordinate ground verification, and produce maps. 5 weeks.

Everett Hansen, Oregon State University, Corvallis, OR 97331. 541-737-5243. hansene@bcc.orst.edu. Everett will determine appropriate assay techniques, process soil and plant samples, and identify isolates from infected samples. 2 weeks.

Nancy Osterbauer, Oregon Department of Agriculture, Salem, Or 97310. 503-986-4666. nosterba@oda.state.or.us. Coordinator of field surveys for ODA, 2 weeks.

Ellen Goheen, Don Goheen, Katy Marshall, US Forest Service, Medford, OR. 541-858-6126. egoheen@fs.fed.us. Coordinator of field surveys for USFS, provide technical assistance and advice for the Oregon survey. 2 weeks.

PROJECT OBJECTIVES:

1. To describe the distribution and rate of spread of *P. ramorum* in Oregon.
2. To estimate current and potential fuel loading resulting from SOD in Oregon by monitoring the occurrence of trees with symptoms of SOD.
3. To identify causal agents associated with symptoms similar to SOD in Oregon hardwood tree species.
4. To continue refining survey procedures and laboratory techniques for detecting SOD and similar disorders.

JUSTIFICATION:

a. Linkage.

This project is off-plot monitoring for oak and tanoak mortality. Elevated oak mortality has not been detected on Forest Health Monitoring plots in Oregon, and the FHM plot network cannot provide the information needed to accurately assess geographic distribution and impact of this disease. In Oregon, the disease occurs in forested areas with vast expanses of susceptible hosts. If a disease outbreak materializes, the large number of dead trees will greatly increase the potential for catastrophic wildfire.

b. Significance.

Presently the disease is confined to a relatively small area (9 sq. mi.) in extreme Southwest Oregon near the town of Brookings. Within this area, approximately 50 acres have been infested with the pathogen (eradication effort is underway). However, susceptible host plants occur continuously from Oregon to southern British Columbia. Contiguous forests of tanoak and madrone occur in SW Oregon, and extensive mortality in these areas would greatly increase the risk of fire. Large-scale mortality of selected plant species would have additional unknown effects on these ecosystems.

c. Feasibility.

Previous projects successfully detected Sudden Oak death in Oregon, and developed techniques for additional evaluation monitoring. The combined expertise of the Oregon Department of Forestry, Oregon State University, US Forest Service, and the Oregon Department of Agriculture ensures a thorough and timely project, as demonstrated by the previous projects.

DESCRIPTION OF PROJECT:

a. Background.

Sudden oak death, caused by *Phytophthora ramorum*, has recently become epidemic in California, killing large numbers of coast live oak (*Quercus agrifolia*), black oak (*Q. kelloggii*), and tanoak (*Lithocarpus densiflorus*). As many as 21 other forest plant species are susceptible to the pathogen. *P. ramorum* is thought to be exotic to west coast forest ecosystems. *P. ramorum* spores are dispersed aurally, and the disease is capable of rapid spread. In addition to fear of spread throughout western forests, there is much concern that the pathogen could be transported to the deciduous forests of the eastern United States and cause widespread mortality.

The first two years of the project established reliable aerial survey, ground-verification, and laboratory procedures for early detection of SOD. Although the aerial surveys were effective at detecting dead overstory tanoak, they could not detect mortality occurring in the understory or non-lethal damage that typically occurs in several known hosts of *P. ramorum*. Because of this, ground surveys are an essential complement to focused aerial surveys. Continued aerial and ground surveys are necessary to further delineate the extent of disease and to allow measures to be taken that would reduce the risk of fire associated with the disease.

b. Methods.

Aerial survey: Aerial sketch-map surveys will be flown with a fixed wing aircraft in spring and fall. Immediately following the fixed wing survey, a helicopter will be used pinpoint GPS coordinates for ground-truthing. All dead or dying trees of susceptible host species will be ground-checked and analyzed for *P. ramorum*. Additional helicopter surveys will occur in late winter and again in early spring.

Aerial photography: All currently known Sudden oak death sites plus any new sites may be photographed in stereo at a scale of 1:4000, true color, in fall of 2004. The photographs will provide a check on the aerial sketch-map survey, and will be used to monitor rate of spread of the disease.

Ground surveys: At selected high risk areas and any areas with recently killed tanoak trees, dead or dying trees will be examined for indicators of Sudden Oak Death. Ground surveys will occur in spring and fall. Samples will be collected and sent to Oregon State University for culturing of pathogen. All tools and footwear will be disinfected with 10% Clorox after visiting dead or dying trees.

Soil sampling: Soil samples will be collected from the forest inside and outside of eradication sites. Samples will be sent to Oregon State University and assayed for presence of *Phytophthora* species using approved quarantine facilities.

c. Products: Maps and databases will be produced showing areas where oak and tanoak are dead and dying. A report stating the methods, findings and future research needs will be presented to the Forest Health Monitoring group and at an Oak Mortality Task Force Conference. The information will also be shared among the Oregon Department of Forestry, Oregon State University, CA Department of Forestry and Fire Protection, and CA Department of Agriculture.

d. Timeframe:

The ground surveys, soil sampling, and laboratory assays will take place at various times beginning in winter 2004 and continue through fall of 2004. Major aerial surveys will occur in July and October 2004. Supplemental helicopter surveys will occur in February and May 2004. Reports and maps will be completed in December 2004.

e. Progress/Accomplishments. In July of 2001, as part of an Evaluation monitoring aerial survey, Sudden oak death was discovered in Oregon. As of January 2002, nine sites were infested with *P. ramorum* in Oregon, all within a nine square-mile area near Brookings, Curry County. This discovery triggered a state quarantine action and an eradication program. The infested sites occur in forested areas of various ownership, including Bureau of Land Management, industrial, and non-industrial private. All host plants on these sites were cut and burned in an attempt to eradicate the pathogen.

From January through August 2002, ten new sites with SOD were detected during the course of eradication and monitoring activities. All of these sites were quite small (0.2 to 1 acre), and in close proximity to previously identified sites. Most of these new sites have already been cut and burned; the remainder will be treated as soon as safely possible. In July 2002, an aerial survey of the tanoak forest types in Southwest Oregon (2.1 million acres) detected 89 sites with recently killed tanoak trees. As of August 31, 2002, 83 sites had been checked, and *P. ramorum* has not been found. To date, *P. ramorum* has only been detected within the 9 mi² regulated area that was established by the Oregon Department of Agriculture in 2001. Other agents associated with tanoak mortality included Armillaria root disease, and unidentified species of Phytophthora (similar to *Phytophthora ilicis*), and mechanical injury. Ambrosia beetles were commonly observed attacking dead and dying tanoaks.

Since January 2003 we have detected 8 new disease patches (6 acres total area) and numerous infected trees near known infested sites. Despite these new occurrences, *P. ramorum* in forests remains limited to a very small area near Brookings. New isolated infestations as far as 1.8 miles from other infestations suggest aerial or vector transmission. *P. Ramorum* survived cutting and burning on most eradication sites, and is present at low levels in stump sprouts and soils. *P. Ramorum* has been detected in several streams associated with eradication sites, and rarely in streams not clearly associated with known infestations. Efforts to eradicate the pathogen from Oregon forests will continue.

COSTS:

	Item	Requested FHM EM Funding	Other- Source Funding	Source
2004				
Administration	Salary	15,680	\$16,000	See below
	Overhead	6,260		
	Travel	8,960		
Procurements	Contracting	36,000		
	Equipment			
	Supplies	1,000		
TOTAL REQUEST- 2004		67,900		

Sources of Other Funding:

Non-FHM contributions:

Technical assistance, Alan Kanaskie: <i>OR Department Forestry</i>	\$6,000
Technical assistance, Mike McWilliams: <i>OR Department Forestry</i>	\$4,000
Technical assistance, Nancy Osterbauer: <i>OR Department of Agriculture</i>	\$2,000
Technical assistance, Everett Hansen: <i>Oregon State University</i>	\$2,000
Technical assistance, SW OR I&D Service Center <i>USDA-Forest Service, PNW Region, FHP</i>	<u>\$2,000</u>

TOTAL CONTRIBUTED FROM OTHER SOURCES **\$16,000**