

TITLE:

LOCATION: Southern California Forest Heath Assessment – Analysis of Status and Trend, Post Drought –induced Bark Beetle Mortality Events of 2002-2003

DURATION: Year 1 of 1 year project **FUNDING SOURCE:** Fire EM

PROJECT LEADER: Ralph Warbington, Ecosystem Planning Staff, Pacific Southwest Region, 916-454-0809, rjwarbington@fs.fed.us

COOPERATORS: California Division of Forestry, Mark Rosenberg; Forest Service, State and Private Forestry, Lisa Levien; Pacific Northwest Station, Sue Willitts

PROJECT OBJECTIVES: Enable the completion of the Pest Detection and Monitoring work associated with the Southern California Forest mortality event by re-measuring FIA plots within this area, enabling statistical estimates of tree mortality by species, size, and volume as well as area extent.

JUSTIFICATION: How does project address Evaluation Monitoring selection criteria? This proposal meets three out of the five criteria:

- Drought – deviations from normal precipitation and related effects;
- Tree mortality – deviations from expected levels;
- Insects and diseases – deviations from expected damage levels;

DESCRIPTION:

a. Background: Roughly one million acres of forest, primarily within and directly adjacent to the San Bernardino, Cleveland and Angeles National Forests of the Pacific Southwest Region, has experienced severe to moderately severe tree mortality. (See figure 1.) For many of the mature forest stands in the affected area, this is a total or near total stand replacement event. Tree mortality is widespread, in Jeffery and Ponderosa Pine species, in Big Cone Douglas Fir, Black Oak and Live Oak and other minor species. Drought induced mortality has also been observed in the hard chaparral shrubland species found extensively in this same geographic area, typically found on the drier and lower elevation slopes.

These Southern California forests are surrounded by and directly adjacent to major metropolitan areas of San Diego, Riverside and San Bernardino Counties. Key resort areas, specifically Lake Arrowhead, are at major fire risk and hazard due to this mortality event. There is a need to assess both qualitatively and quantitatively, the status and change to the forests of this area, for various on-going emergency efforts, as well as long term planning for forest recovery and rehabilitation efforts to follow. Another eminent need is to provide more up-to-date vegetation map and inventory information for the ongoing Southern California Forest Plan Revisions, for developing both short term and longer term vegetation management strategies.

If funded, this work will be accomplished under the guidance and authority of the Pacific Northwest Research Station, FIA Unit and Pacific Southwest Region, Ecosystem Planning Staff. Fortunately, field work in this area can be accomplished throughout the fall, winter and spring months, due to the mild climate of southern California. Contract field crews are scheduled to be in this same area to accomplish the regular scheduled work. New tasks orders can be awarded as soon as funds are available to measure additional plots. Therefore we expect to complete re-measurements by spring of 2004 and have information available for compilation and analysis by summer of 2004.

Similar work in change detection and mortality inventory was accomplished by the Pacific Southwest Region and Boston University for the 1998-2000 mortality events within the Lake Tahoe Basin. See Macomber and Woodcock, 1994.

Currently the FS and CDF conduct a Land Cover Mapping and Monitoring Program (LCMMP) that addresses statewide [vegetation mapping](#) and long-term monitoring using remotely sensed data. This collaborate approach to land cover mapping and monitoring includes coordinated acquisition of resource photography, satellite imagery, and geo-processing on a five-year cycle. This five-year cycle covers approximately 65 million acres of mixed federal, state and private forestland. We are well poised as we are in our second re-visit year of the cycle in southern California. Previous effort publications are included in the bibliography.

Macomber, Scott A., and Curtis Woodcock. 1994. "Mapping and Monitoring Conifer Mortality Using Remote Sensing in the Lake Tahoe Basin, Remote Sens. Environ. 50:255-266.

Levien, L., P. Roffers, B. Maurizi, J. Suero, C. Fischer, and X. Huang. 1999. A Machine-Learning Approach to Change Detection Using Multi-Scale Imagery. In proceedings from the American Society of Photogrammetry & Remote Sensing 1999 Annual Conference, Portland, OR.

Levien, L., C. Fischer, S. Parks, B. Maurizi, J. Suero, L. Mahon, P. Longmire, and P. Roffers. 2002. [Monitoring land cover changes in California, a USFS and CDF cooperative program, South Coast Project Area](#). State of California, Resources Agency, Department of Forestry and Fire Protection, Sacramento, CA.

b. Methods: A comprehensive Pest Detection and Monitoring project has begun to augment and expand the current efforts of several aerial sketch mapping projects completed to date. 1:15,840 color resource photography is being flown this September to help with various emergency efforts, and will be of use to everyone involved in various aspects of pest detection and monitoring. A change detection project, using 2002 and 2003 TM imagery has been funded and planned to augment the current 1997-

2002 change detection mapping which is part of the on-going 5 year change detection and monitoring program in California. Re-measurement of FIA plots will enable statistical estimates of number of mortality trees, by size, volume, species and forest type, when used in conjunction with the mortality change maps, and vegetation maps. Information of area extent will also be available for these same attributes using GIS and post stratification methodologies.

c. Products: Re-measurement of FIA plots will enable statistical estimates of number of mortality trees, by size, volume, species and forest type, when used in conjunction with the mortality change maps, and existing forest type maps. Information of area extent will also be available for these same attributes using GIS and post stratification methodologies. Products will be tables and a report with an associated GIS coverage of mortality strata and related mortality items.

d. Schedule of Activities:

Aerial Mortality Sketch Mapping - 2002-2003 completed
 Aerial Photo Acquisition – Sept. 2003 (under contract)
 2003 TM Imagery Acquisition – Oct. 2003
 2002-2003 Change Detection - Nov. 2003 – May 2004.
 FIA Plot Re-measurement - Oct. 2003 – March 2004.
 Inventory Compilation and GIS products – April - June 2004.
 Reporting – July – Sept. 2004

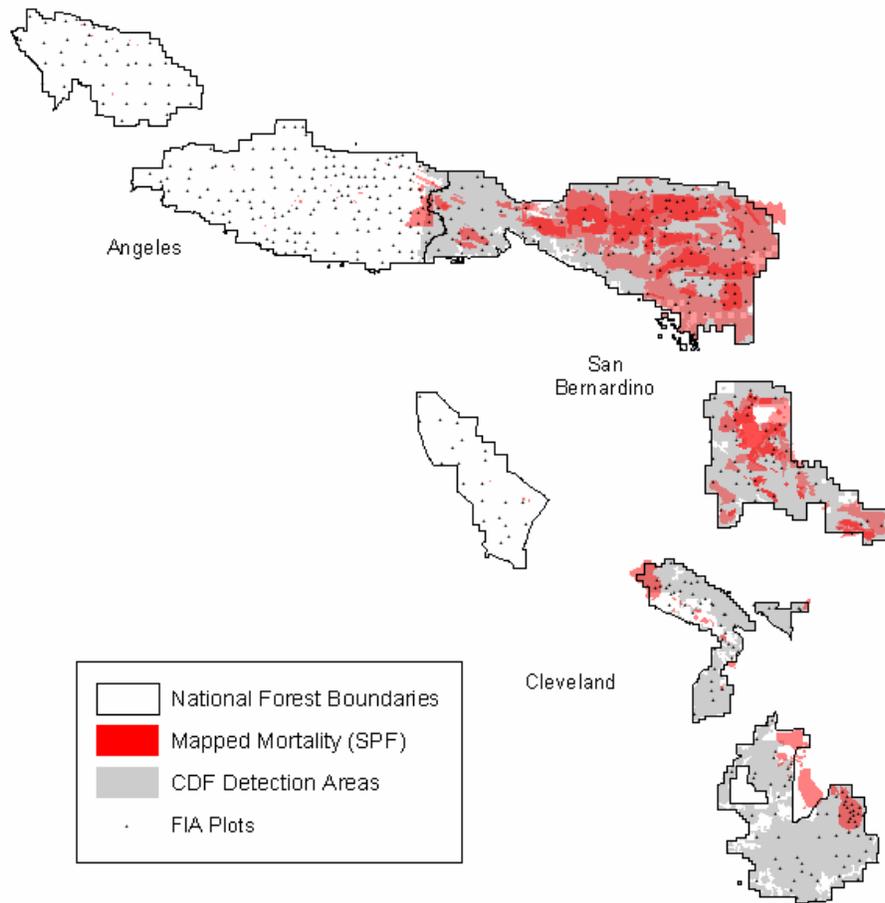
e. Progress/Accomplishments: Project is scheduled for completion within one year. However, further needs may arise if mortality event continues and spreads to other areas.

COSTS:

	Item	Requested FHM EM Funding	Other-Source Funding	Source
YEAR fy2004				
Administration	Salary	20,000	25,000	CDF
	Overhead	3,000	4,000	CDF
	Travel	2,000	3,000	CDF
				CDF
Procurements	Contracting	75,000	270,000	CDF
	Equipment	n/a	n/a	
	Supplies	n/a	n/a	

Figure 1.

MAPPED MORTALITY OVER CDF PEST DETECTION AREAS ON NATIONAL FORESTS IN SOUTHERN CALIFORNIA



0 4.5 9 18 27 36 45 54 63 72 81 90 Miles