RESEARCH PROBLEM STATEMENT #DC-507

I – Problem Title
Evaluation of Oak Mitigation Plantings, successes, failures and recommendations for the future. (LAP-02)

II – Research Problem Statement
Caltrans is regularly required to undertake oak plantings to mitigate transportation construction impacts throughout the state. Methods for accomplishing these plantings vary considerably and involve such factors as contract type (landscape contractor, California Conservation Corps, etc), size and type of plant material, plant exposure (i.e., in sun or shade), soil amendments, presence or absence of plant protective devices, weed mats and especially watering methods and schedule. More comprehensive data is needed by practitioners to establish cost effective methods or standards for successful oak plantings in the future.

III – Objective
This research will provide a scientific basis for Caltrans to develop specifications and details for planting native oak seedlings that reflect natural processes. The first phase of the research will evaluate past oak planting projects through a literature search and field reviews. This will provide Caltrans with information on a variety of current construction methods and success rates. A cost benefit analysis of these different techniques will provide data that can be evaluated in determining the most cost effective methods for attaining success. For example California's roadsides show evidence that planting oak seedlings in shady conditions – rather than full sun - will increase their survival rate. This study will attempt to work with natural processes looking at the symbiotic relationship of nurse crop planting by planting oak seedlings with small native shrubs, such as Ceanothus sp., as companion plants.

Information learned from the first phase will be applied to the second phase of work that will include developing demonstration field plots.

This work will contribute to the Caltrans' ability to successfully mitigate construction impacts and create sustainable (i.e., drought resistant) roadsides, which in turn will improve its performance in meeting environmental and regulatory commitments.

IV – Background
Oak mitigation is currently being done throughout the state to mitigate construction impacts due to transportation projects. This effort is performed under a variety of budgets and methods. Differences in contracting methods, total costs, or maintenance periods can be significant between projects. Native trees require at least 3 years to become acclimated to the soil conditions where they are planted, and require supplemental watering, even though the species are native to the area. Providing a more natural habitat environment through planting techniques that simulate the natural seedling environment could lead to more successful plantings at a low cost. Little information is

available on long-term success rates and cost/benefits of specific planting techniques undertaken by Caltrans.

V – Statement of Urgency and Benefits

Information that improves Caltrans oak mitigation projects can be immediately incorporated into contract specifications leading to better performance in meeting environmental and regulatory commitments. As water shortages continue to be an issue across the State, development of effective strategies for lessening supplemental water for native plantings becomes crucial. If successful, the results of this research can result in more environmentally and economically viable native plantings, and may have applicability beyond large-scale native plantings.

VI – Related Research

Effectiveness of "Tap-Root Bags" in Establishing Plantings of Oak, June 1995

VII – Deployment Potential

Caltrans will benefit economically by reducing maintenance costs and by increased success in plant establishment. The specifications and details based on this research would have similar economic benefits for agencies and organizations engaged in native plantings in the western states. This is a stand-alone project.