

A. PROJECT TITLE: Developing Nutrient Management Guides from FREP Research

PROJECT LOCATION: California

PROJECT LEADER: Renee Pinel, President/CEO
Western Plant Health Association
4460 Duckhorn Dr., Ste. A
Sacramento, CA 95834
(916) 574-9744
reneep@healthyplants.org

PROJECT COOPERATOR: Robert Mikkelsen
4125 Sattui Ct.
Merced, CA 95348
(209) 725-3371
rob.mikkelsen@gmail.com

DURATION: Three years

FUNDS REQUESTED:

<u>Year</u>	<u>Requested from CDFA</u>
1	\$16,400
2	\$16,400
<u>3</u>	<u>\$16,400</u>
Total	\$49,200

B. EXECUTIVE SUMMARY:

Problem: The FREP program has funded over 150 research and education projects since its inception over 20 years ago. The majority of these projects have resulted in completion reports that fulfill the contract requirements, but have not always included an effective outreach component to disseminate the major conclusions. There is an urgent need to deliver the results of the FREP-supported programs to the end users where improvements in nutrient management can be undertaken.

CDFA/FREP is in the process of constructing an electronic library of completed FREP projects for internet delivery under the direction of Dr. Will Horwath (UCD). This current proposal will augment this UCD effort by enlisting an experienced team of experts who can identify high-priority research reports and deliver them in a timely manner and in practical language. These two projects will complement each other very well to meet FREP outreach objectives.

Project Objectives: Use completed FREP research to develop a series of high priority "Nutrient Management Guides". These guides will be primarily delivered to users through the internet (pdf format). In addition to the FREP research report, additional information is required in order to put the FREP research into the proper context for decision making. A literature search will be conducted of the scientific information from global research that supports the FREP projects. These supplemental literature references will be valuable to the reader who is interested in more detailed information on a specific research topic.

Approach: The Soil Improvement Committee (SIC) of the Western Plant Health Association (WPHA) will annually prioritize all of the completed FREP projects to identify research reports with the highest potential for immediate impact. Dr. Mikkelsen will work with the FREP investigators to prepare draft Management Guides and conduct the literature review. The SIC will review the draft Guide and verify the recommendations are applicable to real-life field conditions. After incorporating the revisions, the document will be prepared for publishing, reviewed again, and then distributed for posting on the CDFA/FREP and WPHA websites. Since the members of WPHA make up the majority of the fertilizer industry in California, they will receive regular notification of the completed Guides. A notice of the release of each Guide will be sent to the agricultural press in California, and copies supplied to California CCA's at various venues.

Evaluation: The performance outcomes for this project will be based on measured attitudes and programmatic outcomes. One measure will include tracking the distribution of material and internet downloads. A survey will be conducted at the annual CCA conference to assess awareness of the Guides and receive feedback to improve their effectiveness and monitor implementation.

Audience: Certified Crop Advisers, users of commercial fertilizers (all scales of farmers, and homeowners), fertilizer retailers. A world-wide audience is also expected to access and benefit from this valuable FREP information through the internet.

C. JUSTIFICATION

1. Problem: The need for locally developed nutrient management practices has never been greater. Recent activity from the Regional Water Control Boards, the California Air Resources Board, and the San Joaquin Valley Air Pollution Control District provides additional incentive to use nutrients more efficiently. The significant expense of fertilizers in agricultural production also provides urgency to deliver accurate information to the end users.

The FREP-funded research programs have primarily resulted in “completion reports” as project deliverables. However these reports have not been easily accessible, nor in a form that is useful for most end users. A new initiative is now organizing the FREP reports into an accessible and searchable format. However, most reports do not include the essential background information needed to put the findings into a perspective greater than a single completion report. Each research report needs to be summarized and put into context with other California research and other relevant peer-reviewed work from the scientific literature before practices will change.

2. CDFA/FREP Goals:

- Education and training of fertilizer management in areas with impaired water bodies.
- Programs to educate growers, fertilizer dealers, students, teachers, and the general public about the relationships between fertilizers and the environment.
- Preparation of publications and other outreach activities.

3. Impact: FREP research often results in peer-reviewed journal articles which are primarily written to communicate with other scientists. These articles contain language and statistical interpretation that are not user friendly in communicating with most farmers or their advisers. They are often narrowly focused on the reported research and frequently do not include the greater context required to implement the results in the field. The Guides will bring the FREP research information to those who can benefit from the information and can implement it in the field with improved nutrient management.

This effort will be coordinated by a scientist who is skilled in fertilizer education, the original FREP researchers (when available) and an experienced advisory team of industry and academic professionals.

4. Long-term Solutions: Voluntary changes in agricultural practices are generally slow to occur. Behavior changes typically begin with information from a trusted source. This project will facilitate transfer of research data from trusted academic researchers to crop advisors who can implement it in the field. These changes will result in improved nutrient efficiency, increased productivity, and reduced nutrient losses to the environment.

5. Related Research: This work will be done in close cooperation with Dr. Will Horwath (UCD). This work could be viewed as the “interpretation” and “extension” phase of the Horwath project on the FREP database.

6. Contribution to Knowledge Base: This project will not involve the development of new information, but will place existing FREP information into a context and format that will be readily accessible by fertilizer users for a variety of California crops.

7. Grower Use: This proposal will synthesize existing priority FREP research to produce Nutrient Management Guides that can be used by many levels of nutrient users (including the >80,000 individual farms in California). Through the network of crop advisors, Cooperative Extension, NRCS, the agricultural media, and the internet, information transfer will occur and improved nutrient management will result.

D: OBJECTIVES:

This project will result in a series of 24 educational Nutrient Management Guides to transmit the findings of FREP-sponsored research projects in an easy-to-understand format. The depth of the scientific findings will be retained, but they will be interpreted into a condensed and understandable format for the agronomic practitioner. The valuable FREP research will be made accessible to a much wider audience and improvements in nutrient management will result.

As the collection of Guides grows, FREP projects funded in the future could be encouraged to develop additional Guides, with the Principal Investigator working with FREP and WPHA staff.

E. WORK PLANS AND METHODS

The Soil Improvement Committee (SIC) of the present Western Plant Health Association was established early in the 1900's. It currently consists of approximately 30 volunteer members from academia (e.g. UC Davis, CSU Fresno, CSU Chico, etc), UC Cooperative Extension (Specialists and Farm Advisors), and leading agronomist from the fertilizer industry. Other qualified agronomic professionals and representatives from CDFA are invited to participate in the SIC.

Using the WPHA-SIC to steer the development of the Nutrient Management Guides will provide a unique oversight for their accuracy and real-life applicability. Academic researchers and practitioners sometimes have difficulty in communicating their science and real-life needs. This WPHA-led group will provide guidance needed to communicate the excellent FREP-developed science into language that can be used by field practitioners to improve nutrient management in California.

Each year during a meeting of the WPHA-SIC, members will be asked to review the list of completed FREP projects and prioritize their order of importance for developing the Management Guides. There are more than 150 completed and on-going FREP projects. Some of the projects are of higher priority for immediate or long-term impact than others. Some of the completed FREP projects are exploratory in nature and not well suited for practical Nutrient Management Guides yet. The SIC will recommend which projects should receive priority attention.

General Procedure for developing each Guide:

1. After receiving the priority list from the SIC, Dr. Mikkelsen works with CDFA to collect the relevant FREP reports and conference proceedings; reviews specific research results and conclusions; obtains and adds supporting peer-reviewed findings from a literature search of global databases. Initial interaction with Dr. Horwath to share project information and coordinate efforts.
2. Dr. Mikkelsen extracts the key conclusions and writes the initial interpretative Guide with preliminary formatting. It is expected that each completed Guide will be two to four pages in length.
3. The principal investigators [or appropriate academic expert from California if the original investigator is no longer available] will review the draft Guide to assure proper interpretation of the research results. If the original investigators have retired, contact will be made to request their cooperation.
4. Dr. Mikkelsen revises the Guide based on the suggestions of the principal investigator.
5. The SIC reviews the revised Guide for accuracy, clarity, and appropriateness of the recommendations for California conditions.
6. Dr. Mikkelsen revises the Guide based on the SIC comments and returns the Guide to the investigators and SIC for final comments.
7. Final editing and formatting of Guide by publishing expert for internet posting in a pdf-format.
8. CDFA and WPHA become owners of the Management Guides. WPHA works with CDFA for posting/distribution on FREP website and WPHA website. Members of WPHA (comprising most of the California fertilizer industry) will be notified of their availability during the project. The Guides will also be linked with the web database that is being concurrently developed by Dr. Horwath at UCD.
9. A press release will be sent to key agricultural media in California (such as Western Farm Press, Capital Press, and California Farmer) notifying them of completion of each Guide. The print media appreciate short press releases of this type that can be used to complete the formatting of their publications.

Timeline: This process will be repeated for each of the Management Guides produced. It is expected that 8 Guides will be produced during each year of the contract.

F. PROJECT MANAGEMENT, EVALUATION & OUTREACH

Management: WPHA will provide overall management of the project. It will organize the approximately 30 members of the SIC in regular meetings (two to four meetings each year) to prioritize topics and review the documents.

WPHA will coordinate the communication during the review phase of each Management Guide with the SIC and Dr. Mikkelsen. WPHA is responsible for distributing the content when each Guide is completed. This includes providing content to FREP management, posting on the WPHA website, and sending out press releases to the California agricultural media. Coordination with the Certified Crop Advisors will also let them know of the completion of the Management Guides. Content will also be provided to the CAPCA Advisor magazine which is circulated to all to California PCA's and CCA's.

Dr. Mikkelsen will be responsible for gathering and reviewing the research reports and supporting scientific literature, and writing the Guides. He will coordinate the review of the Guides with the PI and with the SIC. He will coordinate efforts with Dr. Horwath to most effectively use resources and avoid duplication of efforts. He will work with the publishing expert to develop each final document in a format suitable for posting on the internet (low resolution for web viewing and high resolution for printing). This work is not directly affiliated with the International Plant Nutrition Institute.

Evaluation: The performance outcomes will be measured through both formative evaluation (during the process) and summative evaluation (at the end of the process). These two steps have been described as: "when the cook tastes the soup, that's formative evaluation; when the guest tastes it, that's summative evaluation."

Formative feedback will come from the repeated scientific review that will occur by the PI and the multi-disciplinary group represented by SIC. These groups will preserve the rigor of the science and the practical application of the results. The summative evaluation will occur through stakeholder surveys conducted at the annual CCA meeting and during the regional WPHA Nutrient Seminars. Prompt changes will take place as these two evaluation steps identify other information needs.

Outreach: Distribution of paper copies of the Management Guides will occur during the annual CCA Nutrient Seminars organized by WPHA at multiple locations in the state. They will also be distributed at the annual FREP conference, and at the annual CCA conference. This will require an initial printing expense during their first distribution. Subsequent printing will be done "on demand" by the user from pdf's.