

## Draft Individual Review Form

**Proposal number:** 2001-H209-2

**Short Proposal Title:** Digital Soil Survey Map

**1a) Are the objectives and hypotheses clearly stated?**

Provide detailed comments in support of your conclusion [Note: in the electronic version, this will be an expandable field]

Yes, USDA, Natural Resources Conservation Service and California Conservation Partnership (the applicant, hereafter referred to as NRCS) has clearly stated objective, has explained the relationship of the objective to ecosystem restoration, and has posited a hypothesis ( $H_A$ ) to determine if the objective is achieved. The NRCS proposes to make soils information more accessible to individuals and groups conducting ecosystem restoration in the CALFED Bay/Delta project area. Specifically, NRCS proposes to rectify and digitize most of the remaining county soils maps in the Bay/Delta region that are not yet available in electronic format. Doing so will lead to greater use by those engaged in ecosystem restoration projects.

The NRCS asserts, and I concur that soils are the foundation from which successful restoration planning and implementation must proceed. An accounting of the various properties of soils (e.g., texture, profile, alkalinity, erosion) is essential to re-establishing and maintaining viable species populations because soils are one of the primary factors affecting the vegetation communities and these communities are where species (both wildlife and plant) are central to species survival. This is as true for California hibiscus as it is for the winter-run Chinook salmon, and as true for the Bank Swallow as it is for the Valley Elderberry Longhorn Beetle. I have been engaged in wetland and riparian habitat restoration at Sacramento National Wildlife Refuge Complex (NWRC) and San Luis NWRC for ten years. During this time I have both observed and participated in restoration projects with various levels of success. The most successful projects utilize soils information to insure the establishment of a viable plant and associated animal populations. For example, various phases of mixed riparian and valley oak forests are best established in the Columbia-Vina soil series, where as alkali meadow and associated vernal pools can be “restored” in soils of the Willows-Riz-Rossi-Waukena series. Transposing these soil-vegetation types will result in almost complete (i.e., plant, animal, and community) failure, which I have seen. Consider that soil surveys are a primary form (probably the earliest form) of landscape ecology because it is here that land is classified on the basis of the soil association, which represents repeating patterns of soil series on identifiable geomorphic surfaces.

**1b1) Does the conceptual model clearly explain the underlying basis for the proposed work?**

Provide detailed comments in support of your conclusion [Note: in the electronic version, this will be an expandable field]

Yes, the conceptual model is presented in a logical fashion that clearly describes the foundation for this proposal. The NRCS conceptual model is developed through the sound, fundamental ecological principles and is summarized with my commentary as follows. The presence and success of an organism or a community of organisms depends upon a complex set of physical and biological factors that limit the quantity and quality of necessary environmental components (including those that influence habitat) and also set limits of tolerance of these organisms to these environmental components. In the study of ecology, soils are one of the physical factors (i.e., the edaphic factor) that affect the survival of species. As an example, composition, density, and distribution of plant species at various spatial scales (i.e., vegetation, the plant community) and temporal scales (i.e. plant succession) is influenced, in part, by soils. These biotic communities include animal species that respond to individual plant and/or vegetation changes. Since vegetation also affects on soil texture and chemistry, the soil micro- and macrobiotic community also responds to special and temporal vegetation changes. Accordingly, the success of restoration efforts that are ultimately related to population and community responses of native species rests, in part, to an understanding of soils. Therefore, the study of soils as a limiting factor or variable that affects species survival will address some of the important scientific uncertainties identified in the Ecosystem Restoration Project (ERP) Strategic Plan.

NRCS further describes other scientific uncertainties outlined by the ERP plan in their conceptual model that knowledge of soils will help address. For example, an understanding of soils and geology is important to hydrogeomorphic processes that directly influence river channel meander, erosion and deposition with important implications for riparian forest succession, habitat components for anadromous fish, and non-structural flood control.

**1b2) Is the approach well designed and appropriate for meeting the objectives of the project?**

Provide detailed comments in support of your conclusion [Note: in the electronic version, this will be an expandable field]

Yes, and furthermore, the approach has a proven record of success for meeting the objectives of this proposal. The NRCS and their partners, such as the U.S. Geological Survey (USGS) have cooperated in similar projects with great success. For example, a large portion of California has certified digitized soil data that is available to users in electronic format at their web site ([http://www.ftw.nrcs.usda.gov/ssur\\_data.html](http://www.ftw.nrcs.usda.gov/ssur_data.html)). The NRCS Cooperative Soil Survey and USGS are nationally (if not internationally) experts in their fields and have set standards for cartographic presentation of soil and geologic data.

**1c1) Has the applicant justified the selection of research, pilot or demonstration project, or a full-scale implementation project?**

Provide detailed comments in support of your conclusion [Note: in the electronic version, this will be an expandable field]

Yes, the NRCS has justified a full implementation of the proposal. The approach warrants full implementation because of demonstrated success with past projects of a similar nature.

**1c2) Is the project likely to generate information that can be used to inform future decision making?**

Provide detailed comments in support of your conclusion [Note: in the electronic version, this will be an expandable field]

Yes, this is the one of the most important features of this project. Soils information is critical to ecosystem restoration planning and implementation. I have first hand experience using several of the county-based soil surveys NRCS is proposing to digitize –Tehama County, Glenn County, Merced Area, Eastern Stanislaus Area. I have used these soil surveys during planning and implementation phases of wetland, grassland, and riparian habitat restoration at Sacramento NWRC and San Luis NWRC. One of the frustrations using these soil survey data in the current format is that soil polygons from adjoining counties do not match up. Therefore, I must make decisions on soil distribution. Because of my appreciation for edaphic factors in ecology, management and conservation of native species, I confer with NRCS soil scientists before making such decisions. While this is an inconvenience for both parties, the results are worth the effort. I have serious concerns that others engaged in restoration projects take similar measures when using soil survey data.

Many of the county-based soil surveys are no longer available. Of those I am familiar with that are part of this proposal they include Tehama County, Glenn County, and the Eastern Stanislaus Area surveys –the Merced Area soil survey is available as a reprint only. The CALFED Bay/Delta Ecosystem Restoration Program will likely attract new watershed restoration proponents and applicants. Many of these are more likely to use electronic soil data. Thus, with the many of the original county-based soils surveys out of circulation the need for digitized information becomes greater. The result will be an increasing number of users referring to soils information. Ultimately, these users will make new discoveries in restoration and through adaptive management improve the success of their projects. Long-term decision making will be influenced when restoration managers and ecologists present and publish their discoveries.

Watershed planners will benefit from digitized soil information in the CALFED Bay/Delta region. For example, achieving some the goals of the Sacramento River Conservation Area is dependent on GIS-based soils, geology, and fluvial geomorphologic data. Long range planning for habitat conservation, species

survival, flood control, and economic development is facilitated by use of this data because it brings science to the forefront of conservation.

**2a) Are the monitoring and information assessment plans adequate to assess the outcome of the project?**

Provide detailed comments in support of your conclusion [Note: in the electronic version, this will be an expandable field]

Probably, but since this proposal is not a for restoration implementation quantitative measurements and numerical analysis are absent. Experimental design is important to test for an effect from an experimental treatment. Paired groups –a treatment group paired with a control group– for both pre-treatments and post-treatments (i.e., before and after availability of digital soil survey in this proposal) is necessary to determine statistically significant differences associated with requests for and assumed use of soils information. No paired treatments or even before/after measurements without controls are planned. However, this proposal stresses education and restoration planning and as part of their approach, NRCS plans to use the frequency with which soil survey databases are requested from NRCS offices as a basis for hypothesis testing. Additional qualitative data will come from the development of additional soil attributes tables that are linked to soils line work, which in turn, will be used an indicator of use of digital soil survey information for future restoration projects.

**2b) Are data collection, data management, data analysis, and reporting plans well-described, scientifically sound and adequate to meet the proposed objectives?**

Provide detailed comments in support of your conclusion [Note: in the electronic version, this will be an expandable field]

Yes, data collection, data management and analysis, and deliverables are clearly outlined as specific tasks to their approach and described in sufficient detail. The final product will be digital soils maps scaled to 7.5-minute USGS topographic quadrangles, and the associated certified electronic soils database with soils attribute tables linked to linework. This information will be available on their web site, at their field offices and as Compact Disks. Additionally, NRCS provides personal technical assistance with interpretation of soil information. NRCS Soil Scientists are important partners to consider as consultants to ecosystem restoration projects. In fact, I have established a strong working relationship with the Chico Soil Survey Office, which is mutually beneficial in that the NRCS gains an appreciation for natural resources conservation needs associated with soil surveys and the USFWS has expert soils consultation for restoration projects.

**3) Is the proposed work likely to be technically feasible?**

Provide detailed comments in support of your conclusion [Note: in the electronic version, this will be an expandable field]

Yes, again, the technical aspects of the approach have a proven record of success for meeting the objectives of this proposal. The NRCS and their partners have successfully cooperated in similar projects. Evidence supporting the technical feasibility of this proposal is found in the completion of certified digitized soil data for portions of California that is available to users in electronic format ([http://www.ftw.nrcs.usda.gov/ssur\\_data.html](http://www.ftw.nrcs.usda.gov/ssur_data.html)).

**4) Is the proposed project team qualified to efficiently and effectively implement the proposed project?**

Provide detailed comments in support of your conclusion [Note: in the electronic version, this will be an expandable field]

The NRCS Cooperative Soil Survey has a long history of conducting soil surveys and publishing the completed work. The Cooperative Soil Survey has been at the forefront of sampling, analyzing, describing, and publishing soil information throughout the United States. The NRCS holds the center of a nationwide technical resources conservation network that includes federal, regional, state, county, and district-level agencies and groups. This network includes partnerships with government, land grant universities, quasi-government, and both private profit and non-profit interests. The primary role of these partnerships is to provide soil survey information necessary for technical assistance for the sustained use of soils-dependant

natural resources. Soil information forms the foundation for science-based decisions concerning natural resources management and the NRCS is recognized by national legislative authority as the primary agency for conducting soil conservation.

**Miscellaneous comments**

[Note: in the electronic version, this will be an expandable field]

The NRCS has also engaged in updating soil classification that is based on their increased and cumulative knowledge and expertise. The advent of computer technology has increased their ability to correlate soils that in turn has yielded an ever-increasing finer resolution of soil information. Please note that most of the counties identified in this proposal are in the process of updating their soil surveys. From my own experience I can say this is necessary because the last published soil information for the Llano Seco Unit of the Sacramento River NWR was published in 1925 –that is why I am so eager to cooperate with the Chico Soil Survey Office. This proposal is not for updating those surveys, but rather to digitize existing county-based surveys. This too is a good and necessary endeavor because many years will pass from the initiation of fieldwork to completion of published, revised soil surveys. Ecosystem restoration will begin before the updated surveys are completed and in the interim seamless, digitized surveys are needed to increase the success of restoration projects and survival and viability of native species.

<p><b>Overall Evaluation Summary Rating</b></p> <p><input checked="" type="checkbox"/> Excellent  <input type="checkbox"/> Very Good  <input type="checkbox"/> Good  <input type="checkbox"/> Fair  <input type="checkbox"/> Poor</p>	<p><b>Provide a brief explanation of your summary rating</b></p> <p>Seamless, digitized soil survey data is needed for ecosystem restoration planning and implementation in the CALFED Bay/Delta region. Soil information forms the basis for science-based conservation and management. The NRCS has a record of success for implementing projects similar to what is proposed. The project is technically feasible and the NRCS is recognized through national legislation as the primary and sole experts in soil science.</p>
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