



Indicate the type of applicant (check only one box)

- State agency
- Public/Non-profit joint venture
- Local government/district
- University

Indicate the type of project (check only one box):

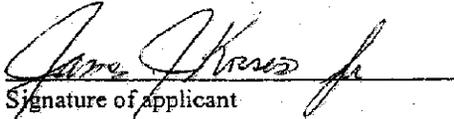
- Planning
- Monitoring
- Research

By signing below, the applicant declares the follow-

- 1.) The truthfulness of all representations in their
- 2.) The individual signing the form is entitled to applicant (if the applicant is an entity or orga-
- 3.) The person submitting the application has read confidentiality discussion in the PSP (Section and confidentiality of the proposal on behalf Section.

Jeffrey R. Vonk  
State Conservationist

Printed name of applicant

  
Signature of applicant

## **Title Page**

**Project Title:** Digital Soil Survey Mapping and Digital Orthophotoquad Imagery Development for the Bay-Delta Region

**RFP Project Group Type:** Local Watershed Stewardship

**Applicant:** USDA, Natural Resources Conservation Service, Davis, California, and the California Conservation Partnership

**Primary Contact:** Eric N. Vinson, State Soil Scientist  
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E-mail: Eric.Vinson@ca.usda.gov

**Type of Organization:** Federal Government Agency, Exempt Tax Status

**Tax Identification Number:** 72-0564834

**Participants/Collaborators:** The primary participants and collaborators of this proposal are the members of the California Conservation Partnership and the National Cooperative Soil Survey Program. These members include the USDA, Natural Resources Conservation Service, CA Department of Conservation, CA Association of Resource Conservation Districts, CA's Resource Conservation Districts, USDA Forest Service, U.S. Environmental Protection Agency, USDA Farm Services Agency, USDI Bureau of Reclamation, USDI Bureau of Land Management, USDA Agricultural Research Service, CA Air Resources Board, CA Conservation Corps, CA Coastal Commission, CA Coastal Conservancy, CA Energy Commission, CA Department of Boating and Waterways, CA Department of Fish and Game, CA Department of Food and Agriculture, CA Department of Forestry and Fire Protection, Resources Agency, CA Department of Water Resources, CA Water Resources Control Board, CA Department of Pesticide Regulation, Cooperative Extension Service, CA's Land Grant Universities, County Supervisors Association of California, and County Governments.

## Executive Summary

**Project Title:** Digital Soil Survey Mapping and Digital Orthophotoquad Imagery Development for the Bay-Delta Region

**Applicant:** United States Department of Agriculture, Natural Resources Conservation Service (USDA, NRCS) and the California Conservation Partnership

**Project Description:** The USDA, NRCS and the California Conservation Partnership are seeking CALFED funding to rectify and digitize a large portion of the county-based soil maps in the Bay-Delta Region. If fully funded, NRCS would recompile and digitize 12 published Soil Survey Reports covering 9,042,112 acres, or 400 quad sheets of data (USGS 1:24,000 scale). These 12 Soil Survey areas are East Stanislaus Area, Merced Area, Madera Area, East Fresno Area, Tehama County, Glenn County, Shasta County, Mariposa County Area, East Santa Clara Area, Nevada County Area, El Dorado Area, and Amador Area (*see Figure 2 - Current Status of Digital Surveys - CALFED Proposed Project Area Map*). Deliverable products would include two digital data layers for 12 Soil Survey Areas: 1) Digital Orthophotoquads (DOQ) data layer, and 2) a certified digital soils data layer with accompanying attribute tables.

**Approach/Tasks/Schedule:** The basic approach will include the use of NRCS permanent full-time staff and contracted services to complete the following tasks: 1) obtain updated imagery, 2) recompile original soil survey atlas sheets, 3) develop soil attribute tables, 4) digitize soil boundaries and certify digital linework and attribute tables, 5) release the data to the public, and 6) manage the project. The implementation schedule covers a 31-month time period.

**Justification for Project and Funding by CALFED:** A tremendous need exists in the United States for quality digital soils data. With new information technologies and increased accessibility to electronic tools for processing and displaying information (such as Geographic Information Systems, or GIS), there has been an increasing demand for digital data products.

Digital soils data is recognized as one of the foundation layers for natural resources analysis. The data include 21 associated tabular databases (*see Appendix A for a list of these tabular soil attributes*). Demand for the data has increased in the past five years to a level that cannot be met by NRCS without a dramatically accelerated program. To meet this need, NRCS has accelerated its efforts to digitize soil surveys (*see Figure 1 - Current Status of Digital Surveys Map*). Even with this acceleration, the State of California, and specifically, the Bay-Delta Region, is a long way from achieving digital soils data. NRCS and the California Conservation Partnership's strategy has been to seek additional partners to help accelerate the completion of digital soil surveys.

NRCS has developed a prioritized list of digital soil surveys to be completed in the next 10 years. Without additional funding, we anticipate a 20-year time frame to complete the update and digitizing of survey areas listed in this proposal. This delay in providing digital soils data will result in many planning efforts being initiated in the Bay-Delta region without using soils information. In addition, private consultants are increasingly taking on the task of developing digital soil survey products for their clients, in the absence of any other product. The methodologies being used vary with each consulting firm, leading to questions associated with quality control. Funding from CALFED for this proposal will assure that digital soils data and quality controls, consistent with the National Soil Survey Program, are achieved for 12 additional soil survey areas within the Bay-Delta region. CALFED funds will be used to accelerate CA's Soil Survey Program, not replace existing funds.

**Primary Biological/Ecological Objectives:** The use of digital spatial soils information in a GIS database is an important tool for identifying specific stressors impacting priority species and habitats, and establishing

linkages and interactions between stressors, species and habitats. The primary biological and ecological objectives of this proposal are to assure that soils information becomes a part of any long-term comprehensive plan to restore the ecosystems and ecological health of the Bay-Delta system.

**Budget Costs:**

<u>Item</u>	<u>CALFED Funds</u>	<u>NRCS Funds</u>	<u>TOTAL Cost</u>
Imagery Production	\$329,108	17,380	346,488
Map Recompilation	568,420	61,343	629,763
Development of Soil Attribute Tables	32,716	44,985	77,701
Soil Survey Digitizing & Certification	449,496	81,790	531,286
Official Public Release	1,150	8,179	9,329
Project Management	<u>231,151</u>	<u>0</u>	<u>231,151</u>
<b>TOTAL</b>	<b>1,612,040</b>	<b>213,676</b>	<b>1,825,717</b>

**Adverse and Third Party Impacts:** There are no adverse impacts anticipated as a result of this project. Primary "third party" impacts will be improved quality of planning efforts and the subsequent restoration of natural resources and systems in the Bay-Delta ecosystem. Planners and managers using GIS will benefit from this proposal by having soils data available to them, free of charge, in digital format. These users typically include local governments, planning commissions, state government agencies, federal government agencies, universities, resource conservation and other special districts, water contractors, local watershed groups, and private businesses. Secondary impacts include increased economic activity from private businesses developing value-added products and services from basic digital soils data.

**Applicant Qualifications:** The NRCS (formerly, the Soil Conservation Service) has been collecting, organizing and managing information on the nation's soils, geology and landscapes since its authorizing legislation in 1935. This long track record of experience and expertise has resulted in NRCS developing internationally-accepted methodologies for data definition, collection, organization, interpretation and retrieval associated with classifying and interpreting soils, geologic and landscape information.

**Monitoring and Data Evaluation:** The NRCS and associated partners in the National Cooperative Soil Survey Program have national responsibility for coordinating the development and maintenance of the digital soil survey data layer for the United States. As such, the agency has developed very specific, detailed, and stringent quality assurances and control guidelines for the editing, production, and certification of digital soils data. These standards can be referenced in the USDA-NRCS National Soil Survey Handbook, Title 430-VI, Part 647, Soil Map Development, and Part 648, Soil Geographic Databases.

**Local Support/Coordination and other Programs/Compatibility with CALFED objectives:** There is a strong demand for digital soil survey products. Users of GIS as an analysis and planning tool typically require soils information in digital format. NRCS regularly receives, and is unable to meet all requests for this data. NRCS has also received several calls of support since expressing an interest in submitting a proposal for CALFED funding to accelerate the delivery of digital soils data. The National Soil Survey Program has developed its digitizing and certification procedures in coordination with the needs of its soils data users and other programs. Any activities undertaken as a result of this proposal will be coordinated with other programs. This proposal is compatible with the objectives of CALFED by providing resource information to better plan activities to restore ecosystems and ecological health in the Bay-Delta ecosystem.

## Project Description

### **Project Description and Approach:**

The USDA, Natural Resources Conservation Service (NRCS) is seeking CALFED funding to rectify and digitize a large portion of the county-based soil maps in the Bay-Delta Region. If fully funded, the NRCS would recompile and digitize 12 NRCS published Soil Survey Reports covering 9,042,112 acres, or 400 quad sheets of data (USGS 1:24,000 scale).

The basic approach will include the use of NRCS permanent full-time staff and contracted services to obtain updated imagery, recompile original soil survey atlas sheets, digitize soil boundaries, and develop soil attribute tables for release to the public. The project will be coordinated and managed by three full-time NRCS soil scientists located in Davis, California. Their tasks will include oversight of the imagery production and recompilation tasks. The proposal includes funds to hire a full-time project coordinator (soil scientist position) to oversee overall completion of the digital soil surveys, and two full-time positions (soil scientist) to handle the correlation issues (part of recompilation task). The primary contractor for development of the Digital Orthophotoquad (DOQ) and hardcopy imagery products will be U.S. Geological Survey. The primary contractor for portions of the recompilation, digitizing and certification tasks will be the NRCS National Digitizing Center.

The project will comply with all applicable laws and regulations, and will be implemented under NRCS's soil survey authorities (PL74-46). Any quality assurance activities requiring field investigation will be coordinated with private landowners. This project is not anticipated to have any impact on the development or selection of alternatives in the CALFED long-term program (i.e. Programmatic EIR/EIS).

**Proposed Scope of Work:** The project will be implemented in six major phases, called tasks. The tasks, deliverables, and schedule for completing the digital soil survey and orthophotoquad imagery products are as follows:

**Task #1.** Procure scale-accurate Digital Orthophotoquad (DOQ) and hardcopy imagery from USGS at a scale of 1:24,000 for the 12 priority Soil Survey Areas in the Bay-Delta Region (see Figure 2 - CALFED Proposed Project Area Map). Complete through procurement contracts with USGS. **Deliverables:** DOQ and hardcopy Orthophotography. **Schedule:** Month 1-12.

**Task #2.** Recompile the original NRCS soil survey atlas sheets (mapped at a 1:20,000 scale) to a photo base with a scale of 1:24,000 to match USGS Digital Orthophotoquad (DOQ) for image comparison purposes. Produce mylar overlays of the soil survey line work, registered to the USGS DOQ imagery. Resolve minor correlation issues that are primarily cartographic in nature or require minor correlation amendments. More difficult join discrepancies (e.g. soils that don't match up at county boundaries), requiring field investigation to correct, will be resolved in future years, as NRCS updates its soil surveys. Two permanent full-time NRCS soil scientists, staffed at the Davis State Office, will oversee the completion of this task. Task will be completed by contracting with the NRCS Digitizing Centers. **Deliverables:** Recompiled soil survey line work on mylar overlays. **Schedule:** Month 6-18.

**Task #3.** Develop attribute tables (electronic format) for digital soils data. Work to be performed by permanent full-time NRCS soil scientist. **Deliverables:** Electronic soil attribute tables for linking to digital linework. **Schedule:** Month 6-18.

**Task #4.** Mylar linework scanned and digitized by NRCS Digitizing Centers for agency quality control and certification. **Deliverables:** Certified digital soil database - linework only. **Schedule:** Month 10-30.

**Task #5.** Official release of digital soils information for all Soil Survey Areas. **Deliverables:** Certified digital soil database, including linework and attribute tables. **Schedule:** Month 31.

**Task #6.** Project Management. **Deliverables:** Certified digital soil database, including linework and attribute tables. **Schedule:** Month 31.

Several of the tasks will be completed simultaneously. For example, as DOQ's and Orthophotography are completed for each Soil Survey Area, they will be sent, with the original soil survey atlas sheets, to the NRCS Digitizing Center for recompilation and digitizing. As a result, digital soil survey products will be available, beginning in Month 12 and continue until all 12 survey areas are complete in Month 31.

Written progress reports will be sent to CALFED at each milestone event/date, or as requested by CALFED.

**Location and/or geographic boundaries of project:** The following 12 published Soil Survey Areas in the Bay-Delta Region are being proposed for digitizing and development of Digital Orthophotoquad (DOQ) imagery (see Figure 2 - Current Status of Digital Surveys - CALFED Proposed Project Area Map):

#### Proposed Digital Soil Survey Areas

	Soil			
Priority	Survey Area	Name of Published Soil Survey	Acres	County
1a	644	*East Stanislaus Area	481,946	Stanislaus Co.
1b	648	*Merced Area	651,544	Merced Co.
1c	651	*Madera Area	874,880	Madera Co.
1d	654	*East Fresno Area	1,109,156	Fresno Co.
2a	645	*Tehama County	1,851,601	Tehama Co.
2b	021	*Glenn County	849,197	Glenn Co.
3	607	Shasta County	1,025,000	Shasta Co.
4	649	Mariposa County Area	478,852	Mariposa Co.
5	646	East Santa Clara Area	539,080	Santa Clara Co.
6	619	Nevada County Area	341,966	Nevada Co.
7	624	El Dorado Area	539,898	El Dorado Co.
8	628	Amador Area	298,992	Amador Co.
		TOTAL	9,042,112 acres	

\* Geographically associated. Treat as one project area.

**Watersheds Affected by this Proposal**

**Shasta County:** 18020112, 18020118, 18020101, 18020102

**Tehama County:** 18020101, 18020118, 18020102, 18020113, 18020115, 18020119,  
18020103, 18020114

**Glenn County:** 18020103, 18020104, 18020105, 18020115

**Nevada County:** 18020125, 18020126

**Stanislaus County:** 18040002

**Merced County:** 18040002, 18040001

**Mariposa County:** 18040008, 18040007

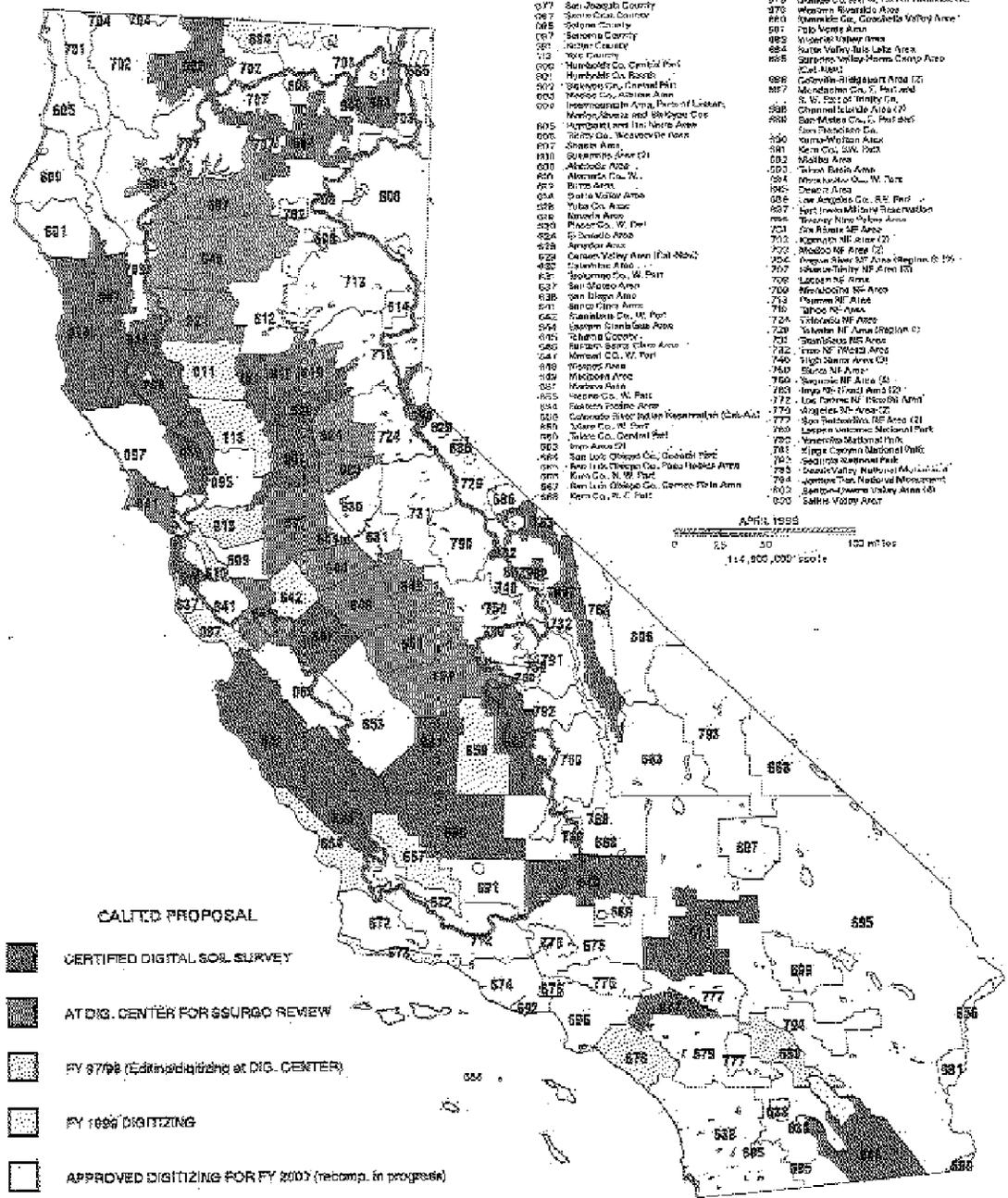
**Madera County:** 18040001, 18040006, 18040007

**Fresno County:** 18030012, 18030009, 18030008, 18030010, 18040006

**El Dorado County:** 18020127, 18020128, 18020129, 18020111, 18040013

**Amador County:** 18040013, 18040005, 18040012

# STATUS OF DIGITAL SOIL SURVEYS CALIFORNIA

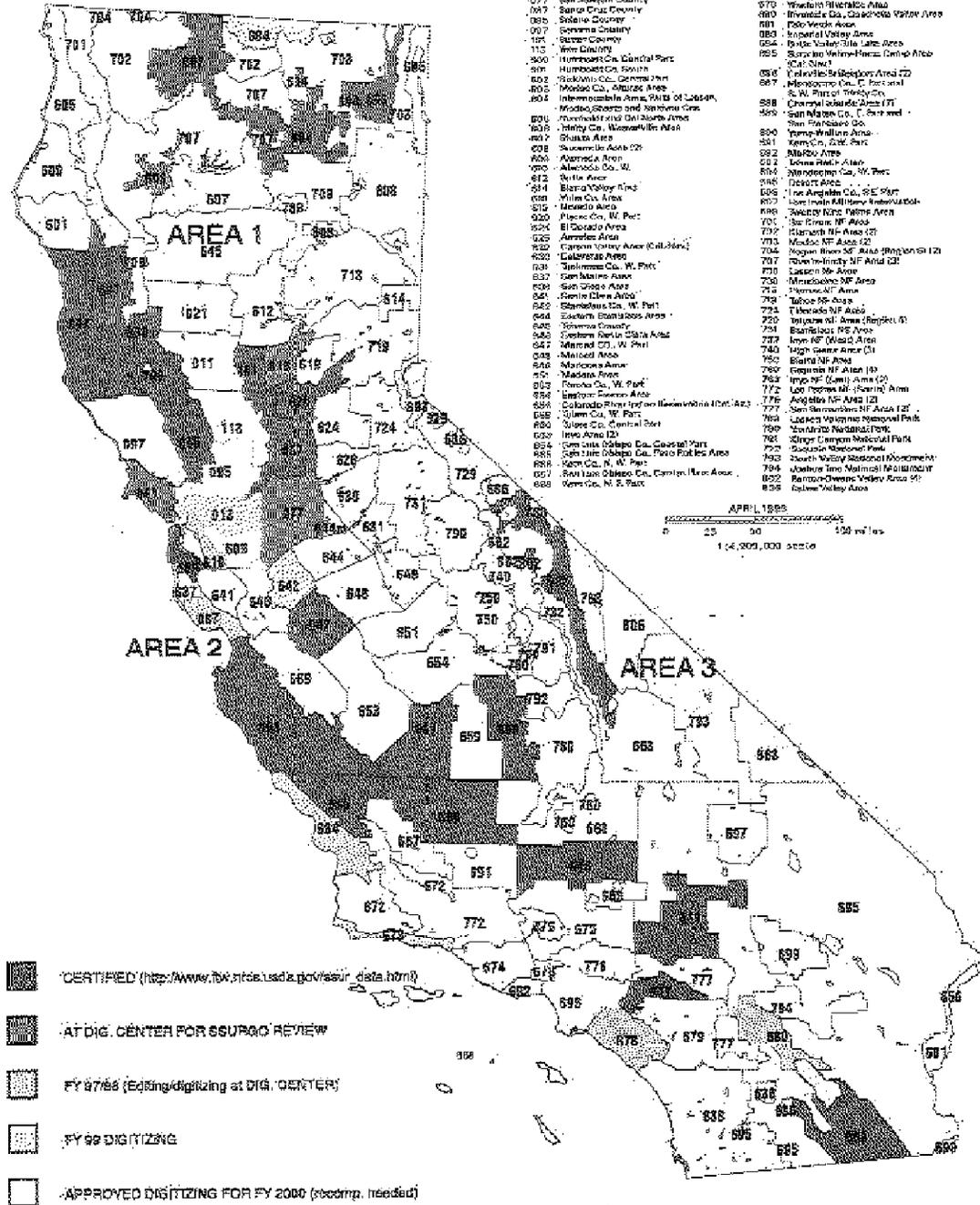


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| 100 | Alameda County |

- CALIF. PROPOSAL**
- CERTIFIED DIGITAL SOIL SURVEY
  - AT DIG. CENTER FOR \$SURGO REVIEW
  - FY 87/88 (Edinburg/Travis) at DIG. CENTER
  - FY 1989 DIGITIZING
  - APPROVED DIGITIZING FOR FY 2003 (recomp. in progress)
  - CALIFED PROPOSED DIGITAL SOIL SURVEY PROJECT AREA

**USDA** United States Department of Agriculture  
 Natural Resources Conservation Service  
 MAP COMPILATION UNIT, DAVIS, CA

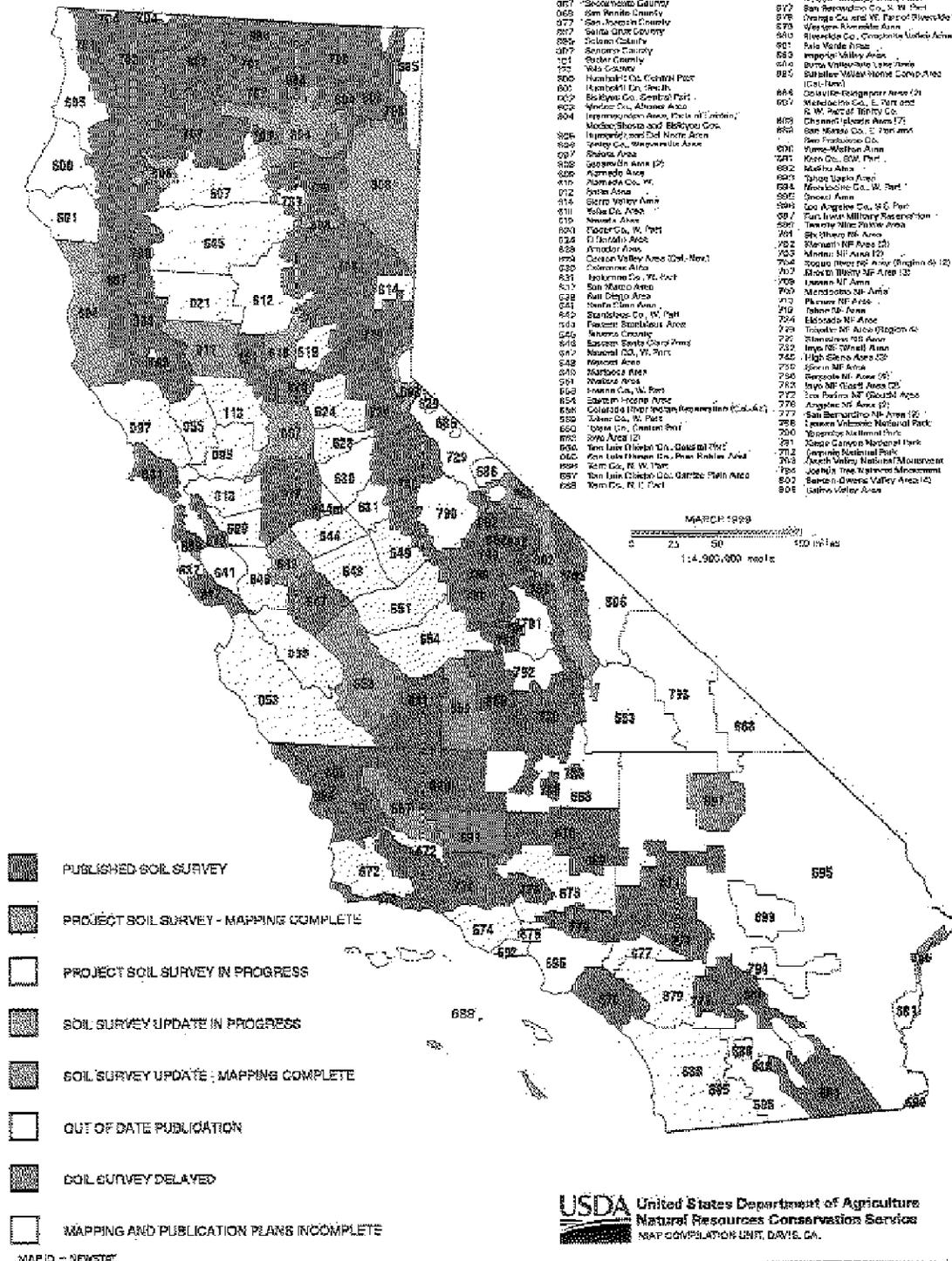
# STATUS OF DIGITAL SOIL SURVEYS CALIFORNIA



011	Alameda County	660	Alameda Area
013	Alameda County	670	San Jose, S.F. Park
015	Alameda County	671	San Bernardino Co. Redwood State Park
017	Alameda County	672	Woodward Canyon Veterinary Area (2)
019	Alameda County	673	San Joaquin Co. South Channel Area
021	Alameda County	674	Marine Area
023	Alameda County	675	Wendover Valley Area
025	Alameda County	676	Los Angeles Co. S. Park
027	Alameda County	677	W. San Francisco Valley Area
029	Alameda County	678	East Sacramento Co. S. S. Park
031	Alameda County	679	Orange Co. and W. Part of Stanislaus Co.
033	Alameda County	680	Woodland Hills Area
035	Alameda County	681	Haywards Co. 2500-5000 Vector Area
037	Alameda County	682	Elko Valley Area
039	Alameda County	683	San Joaquin Valley Area
041	Alameda County	684	Bay Area Valley Area
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319	Alameda County	823	San Joaquin Valley Area
321	Alameda County	824	San Joaquin Valley Area
323	Alameda County	825	San Joaquin Valley Area
325	Alameda County	826	San Joaquin Valley Area
327	Alameda County	827	San Joaquin Valley Area
329	Alameda County	828	San Joaquin Valley Area
331	Alameda County	829	San Joaquin Valley Area
333	Alameda County	830	San Joaquin Valley Area
335	Alameda County	831	San Joaquin Valley Area
337	Alameda County	832	San Joaquin Valley Area
339	Alameda County	833	San Joaquin Valley Area
341	Alameda County	834	San Joaquin Valley Area
343	Alameda County	835	San Joaquin Valley Area
345	Alameda County	836	San Joaquin Valley Area
347	Alameda County	837	San Joaquin Valley Area
349	Alameda County	838	San Joaquin Valley Area
351	Alameda County	839	San Joaquin Valley Area
353	Alameda County	840	San Joaquin Valley Area
355	Alameda County	841	San Joaquin Valley Area
357	Alameda County	842	San Joaquin Valley Area
359	Alameda County	843	San Joaquin Valley Area
361	Alameda County	844	San Joaquin Valley Area
363	Alameda County	845	San Joaquin Valley Area
365	Alameda County	846	San Joaquin Valley Area
367	Alameda County	847	San Joaquin Valley Area
369	Alameda County	848	San Joaquin Valley Area
371	Alameda County	849	San Joaquin Valley Area
373	Alameda County	850	San Joaquin Valley Area
375	Alameda County	851	San Joaquin Valley Area
377	Alameda County	852	San Joaquin Valley Area
379	Alameda County	853	San Joaquin Valley Area
381	Alameda County	854	San Joaquin Valley Area
383	Alameda County	855	San Joaquin Valley Area
385	Alameda County	856	San Joaquin Valley Area
387	Alameda County	857	San Joaquin Valley Area
389	Alameda County	858	San Joaquin Valley Area
391	Alameda County	859	San Joaquin Valley Area
393	Alameda County	860	San Joaquin Valley Area
395	Alameda County	861	San Joaquin Valley Area
397	Alameda County	862	San Joaquin Valley Area
399	Alameda County	863	San Joaquin Valley Area
401	Alameda County	864	San Joaquin Valley Area
403	Alameda County	865	San Joaquin Valley Area
405	Alameda County	866	San Joaquin Valley Area
407	Alameda County	867	San Joaquin Valley Area
409	Alameda County	868	San Joaquin Valley Area
411	Alameda County	869	San Joaquin Valley Area
413	Alameda County	870	San Joaquin Valley Area
415	Alameda County	871	San Joaquin Valley Area
417	Alameda County	872	San Joaquin Valley Area
419	Alameda County	873	San Joaquin Valley Area
421	Alameda County	874	San Joaquin Valley Area
423	Alameda County	875	San Joaquin Valley Area
425	Alameda County	876	San Joaquin Valley Area
427	Alameda County	877	San Joaquin Valley Area
429	Alameda County	878	San Joaquin Valley Area
431	Alameda County	879	San Joaquin Valley Area
433	Alameda County	880	San Joaquin Valley Area
435	Alameda County	881	San Joaquin Valley Area
437	Alameda County	882	San Joaquin Valley Area
439	Alameda County	883	San Joaquin Valley Area
441	Alameda County	884	San Joaquin Valley Area
443	Alameda County	885	San Joaquin Valley Area
445	Alameda County	886	San Joaquin Valley Area
447	Alameda County	887	San Joaquin Valley Area
449	Alameda County	888	San Joaquin Valley Area
451	Alameda County	889	San Joaquin Valley Area
453	Alameda County	890	San Joaquin Valley Area
455	Alameda County	891	San Joaquin Valley Area
457	Alameda County	892	San Joaquin Valley Area
459	Alameda County	893	San Joaquin Valley Area
461	Alameda County	894	San Joaquin Valley Area
463	Alameda County	895	San Joaquin Valley Area
465	Alameda County	896	San Joaquin Valley Area
467	Alameda County	897	San Joaquin Valley Area
469	Alameda County	898	San Joaquin Valley Area
471	Alameda County	899	San Joaquin Valley Area
473	Alameda County	900	San Joaquin Valley Area

United States Department of Agriculture  
 Natural Resources Conservation Service  
 MAP CORRELATION UNIT, DAVIS, CA.

# STATUS OF SOIL SURVEYS CALIFORNIA



001	Alameda County	699	Inyo County
002	Alameda County	699	Inyo County
003	Alameda County	699	Inyo County
004	Alameda County	699	Inyo County
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043	Alameda County	699	Inyo County
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100	Alameda County	699	Inyo County

USDA United States Department of Agriculture  
Natural Resources Conservation Service  
MAP COMPILED BY: DAVIS, CA.

## Ecological/Biological Benefits

**Ecological/Biological Objectives:** The primary biological and ecological objectives of this proposal are to assure that soils information becomes a part of any long-term comprehensive plan to restore the ecosystems and ecological health of the Bay-Delta system. The use of digital spatial soils information in a GIS database is an important tool for identifying specific stressors impacting priority species and habitats, and establishing linkages and interactions between stressors, species and habitats. Digital spatial soils data is also used in looking at watershed-level systems and impacts, which is critical to achieving success in restoration projects. Completion of this proposal (using resources from NRCS and CALFED) will provide digital spatial soils information for most of the counties in the Bay-Delta Region by the year 2002 (see Figure 2).

**Expected Benefits:** The expected benefits of this proposal are closely tied to the expected third party impacts, since soils information is typically the basis from which planners, managers and other "third parties" begin to add value. In general, expected benefits include higher quality planning efforts, greater information for successful completion of restoration projects and their associated benefits, availability of digital soils information to GIS users, improved correlation of resources within a region, reduced conflicts between various stakeholders, and eventual restoration of the Bay-Delta ecosystem.

Soils data and associated information are used by state and federal government agencies involved in natural resource management, local governments trying to improve their land use policies, local groups interested in understanding and better managing the watersheds they live in, and private consultants hired by all of the above to deliver products and services associated with these natural resource goals. Specific uses include land use planning; watershed-level planning; ecosystem management; floodplain management; managing farms, ranches, rangeland, woodland and other private lands; evaluating areas for houses and building site development; siting for road construction; siting for septic filter/leach fields and sewage lagoons; landscaping decisions; purchase of property (and assessing land values); agricultural productivity potential; vegetative cover and production potentials; siting for pond and reservoir construction; development of recreation facilities; wildlife development and habitat improvement; planning soil and water conservation activities to address soil erosion and other resource issues; siting for disposal of liquid and solid wastes; and a host of other applications.

Data collected as a part of these soil surveys includes information on soils properties such as permeability, water-holding capacity, infiltration rate, flooding hazard, seasonal wetness and depth to water table (hydric soils), depth to bedrock, stoniness, texture (amounts of sand, silt, clay), soil erodibility, acidity and alkalinity, slope, salinity, cation exchange capacity, load bearing capacity, shrink-swell potential, corrosivity, structure and a host of other attributes (for a complete list, see Appendix A - Description of Soil Attribute Tables).

Soils characteristics and properties are important pieces of information when trying to address the specific stressors impacting priority species and habitats. For example, the CALFED Bay-Delta Program Technical Team identified the following stressors to priority species and habitats: a) Alteration of flows and other effects of water management, b) Floodplain and Marshplain changes, c) Channel form changes, d) Water Quality, e) Water Temperature, f) Undesirable Species Interactions, g) Adverse Fish and Wildlife Harvest Impacts, h) Population Management, i) Land Use, j) Artificial Propagation of Fish, k) Climate, l) Human Disturbance, and m) Wildfire. Soils information is potentially relevant to all of these categories, especially in terms of runoff potential, erodibility, sedimentation of river systems, land use decisions, degradation or aggradation of channels, recommendations on the use of fire for habitat management, forestry and agricultural practices, identification of floodplains and wetlands, management of floodplains, location of gravel mining operations, control of invasive and exotic plant species, turbidity, analysis of soil salinity,

potential for selenium and other mineral contamination, vegetation establishment in riparian areas, tributary sediment control, gravel armoring, streambank stabilization and fine sediment deposition.

**Linkages:** This project relates to other previously funded projects, future funded projects, and future ERP actions and goals, especially those related to monitoring and assessment and the development of watershed management plans for ecosystem restoration. Watershed-level planning should occur from a scientific basis, using accurate data as its foundation. Soil survey data provides this scientific basis for planning. The soils information, including attribute and interpretations tables, allow planners to assess and analyze conditions in an ecosystem or watershed context, develop and evaluate alternatives, and implement solutions to restore ecosystems.

The CALFED Ecosystem Restoration Program, Strategic Plan, calls for adaptive management and contains a monitoring program to acquire and evaluate data needed regarding indicators, and a research program to acquire additional data needed to evaluate program alternatives and options (p. 15, Volume I, ERP, January, 1999). This project fits in with these objectives and programs. In addition, the ERP (p. 18, Volume I, ERP, January, 1999), calls for "engaging local watershed organizations in planning and implementing the CALFED Program." Local watershed groups are seeking digital spatial soils information from which to plan their ecological and biological restoration projects.

**System-Wide Ecosystem Benefits:** The expected ecological/biological benefits from this proposal are long-term in nature. Soils information is typically used in both planning and implementation phases of projects and the extent to which this soils information is made available to users in various formats will help determine the effectiveness of long-term planning and implementation projects. This project complements other projects by providing soils information to those proposals to develop and implement watershed plans. The extent of the project and its comprehensive nature (i.e. the goal is to have digital spatial soils information available in all counties of the Bay-Delta Region) will provide system-wide benefits by being able to look at the entire Bay-Delta Region in an integrated fashion.

**Compatibility with Non-Ecosystem Objectives:** This proposal will also help meet the CALFED non-ecosystem objectives of providing good water quality for all beneficial uses; reducing the mismatch between Bay-Delta water supplies and current and projected beneficial uses dependent on the Bay-Delta system; and reducing the risk to land use and associated economic activities, water supply, infrastructure, and the ecosystem from catastrophic failure of Delta levees.

## Technical Feasibility and Timing

Tasks, budget costs, and schedule estimates were developed based on NRCS's history in producing these types of products, and represent reasonable estimates. The proposal includes hiring a full-time project coordinator (soil scientist position) to oversee overall completion of the digital soil surveys, and two full-time position (soil scientist) to handle the correlation issues (part of recompilation task). These staff positions will manage the various components of the project to ensure its completion on budget and on time. Portions of the project will be contracted out.

No NEPA or CEQA documents will have to be prepared for the project. No environmental permits will be required.

Timing of the project is outlined in the Costs section, and covers a 31-month time period.

## Monitoring and Data Collection Methodology

In their current published state, the Soil Survey Reports contain descriptive soils information, soils interpretations tables, and aerial photographs depicting soil boundaries on the landscape - all in paper copy format. Although useful in this format, technological advancements in processing data and information electronically have led to a rapidly growing demand for soils information in digital spatial format. Much of this demand is from new users who want soils information as part of their Geographic Information Systems (GIS) to more holistically analyze resource problems, opportunities, solutions and impacts. The use of GIS and other electronic spatial analysis techniques enable resource planners and managers to process lots of information for multiple resources and objectives, and establish linkages in the landscape. Soils information is probably the most basic and one of the most important pieces of information in this system. Soils data can be used to identify natural vegetative regimes and communities, wildlife and fisheries habitats, limitations and hazards for various objectives, improvements needed to overcome the limitations and the impact of selected land uses on the environment. The primary biological and ecological objective of this proposal is to assure that soils information becomes a part of any long-term comprehensive plan to restore the ecological health and improve water management for beneficial uses of the Bay-Delta system.

The NRCS and associated partners in the National Cooperative Soil Survey Program have national responsibility for coordinating the development and maintenance of the digital soil survey data layer for the United States. As such, the agency has developed very specific, detailed, and stringent quality assurances and control guidelines for the editing, production, and certification of digital soils data. These standards can be referenced in the USDA-NRCS National Soil Survey Handbook, Title 430-VI, Part 647, Soil Map Development, and Part 648, Soil Geographic Databases.

No specific hypotheses are being proposed with this project. In general, the hypothesis driving the completion of the project is that digital spatial soils data is important in the planning and implementation phases of ecosystem restoration projects. No additional specific monitoring data will be collected to verify this hypothesis.

## Local Involvement

All of the local counties affected by the completion of digital spatial soils information are being notified in writing of USDA Natural Resources Conservation Service's intent to submit a proposal to CALFED under the Category III RFP (copies of notification letters available upon request). All soil survey mapping conducted by USDA NRCS is coordinated with local county governments. All digital spatial soils information will be made available to local county supervisors, county planning departments, local watershed groups, other federal and state agencies, tribal governments, and others, free of charge.

It is estimated that 100 percent of local county governments and 75 percent of the local watershed groups within the Bay-Delta area are aware of USDA-NRCS's soil survey program and value this soils information as part of their planning processes. A smaller percentage of the counties (estimated at 50%) and local watershed groups (estimated at 25%) have GIS capabilities and would be in a position to currently utilize this digital spatial soils information. Several more counties would have increased GIS capabilities by the end of the project (year 2002). A list of the watersheds most directly affected by this project proposal can be found in the project description section.

The California Association of Resource Conservation Districts, a statewide organization of local Resource Conservation Districts, has passed a resolution supporting the completion of soil survey coverage in California and have requested the California State Legislature to provide matching funding to complete statewide coverage (resolution attached). In addition, Yolo County RCD has indicated specific interest in completing digital spatial soils information in Yolo and adjoining counties.

There are no adverse impacts anticipated as a result of this project. Primary "third party" impacts will be improved quality of planning efforts and the subsequent restoration of natural resources and systems in the Bay-Delta ecosystem. Planners and managers using GIS will benefit from this proposal by having soils data available to them, free of charge, in digital format. These users typically include local governments, planning commissions, state government agencies, federal government agencies, universities, resource conservation and other special districts, water contractors, local watershed groups, and private businesses. Secondary impacts include increased economic activity from private businesses developing value-added products and services from basic digital soils data.

## RESOLUTION 97-7

## Funding for Soil Surveys in California

Whereas, California is the single largest producer of agricultural commodities in terms of timber, fiber, dairy, fruit, nuts and speciality crops, in the world; and,

Whereas California has very diverse natural resources, habitats, sensitive watersheds, and unique ecosystems which support fish, wildlife, and human needs, important to this state and the entire nation; and,

Whereas the soil resource underpins the entire resource base, is responsible for plant propagation, filtering our drinking water, is substrate for habitat and our homes; and,

Whereas current demands on these resources are coming under increasing pressure for production, conservation, preservation and mitigation needs; and,

Whereas approximately 70 percent of the state has completed soil survey coverage, and of that amount, two-thirds is in need of updating, then;

NOW THEREFORE BE IT RESOLVED, that California Association of Resource Conservation Districts requests that the California State Legislature provide matching of \$2 million of baseline annual funding to cost share with NCSS National Cooperative Soil Survey to complete and update the soil survey program for California.

Submitted by the CARCD Soils Committee

Revised by the Soils and Land Use Committee

Adopted by the Delegates at the CARCD Annual Meeting, November 11, 1997, Fish Camp, California

Action: CARCD Board, staff, and Soil and Land Use Committee will work with partners such as the Farm Bureau and members of the Legislature to obtain funding.

## Costs

### Costs and Schedule to Implement Proposed Project

(For project budget details, see Table 1 - Budget Costs Detail)

**a. Budget Costs Summary:**

<u>Item</u>	<u>CALFED</u> <u>Funds</u>	<u>NRCS</u> <u>Funds</u>	<u>TOTAL</u> <u>Cost</u>
<b>Previous Work/Investment in Targeted Area:</b>			
Soil Survey Completed Work in 12 Targeted Areas	\$0	\$22,480,000	\$22,480,000
<b>Current Project Proposal - Digitize Soil Surveys in 12 Targeted Areas (1999-2002):</b>			
Task #1: Imagery Production (DOQ & hardcopy)	\$329,108	\$17,380	\$346,488
Task #2: Map Recompilation	568,420	61,343	629,763
Task #3: Soils Attributes Tables	32,716	44,985	77,701
Task #4: Digitizing and Certification	449,496	81,790	531,286
Task #5: Official Public Release	1,150	8,179	9,329
Task #6: Project Management	231,151	0	231,151
<b>TOTAL CURRENT PROJECT PROPOSAL</b>	<b>\$1,612,041</b>	<b>\$213,676</b>	<b>\$1,825,717</b>
<b>PER ACRE DIGITIZED = \$0.20/acre</b>			

Development of this budget is based on completion of 12 targeted Soil Survey Areas and purchase of updated Digital Orthophotoquads (1993 DOQ). This proposal cost could be reduced by limiting the number of targeted Soil Survey Areas to less than 12.

**Schedule Milestones:**

<u>Milestone</u>	<u>Month Achieved</u>
Procurement of all DOQ's	Month 12
Release of first Certified Digital Soil Survey	Month 12
Soil Attribute Tables Completed	Month 18
Recompilation Complete for all 12 Survey Areas	Month 20
Line Work Digitized and Edited for all 12 Survey Areas	Month 24
Certification Completed by NRCS Digitizing Center	Month 30
Official Release of last Digital Soil Survey	Month 31

Table 1 - Budget Costs Detail - Targeted 12 Soil Survey Areas, Bay-Delta Region										
Project Phase and Task	Direct Labor (Hours)	Direct Salary & Benefits		Overhead, General Admin	Service Contracts	Material & Acquisitn Contracts	Misc & Other Direct Costs	Total Cost		
		\$	\$						\$	\$
<i>A. Previous Work/Investment - Completion of Surveys</i>										
<i>in 12 Soil Survey Areas</i>										
CALFED	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
NRCS	425,000	\$13,547,384	\$2,932,108	\$3,000,000	\$3,000,000	\$3,000,000	\$0	\$22,479,492		
<b>B. Current Project Proposal</b>										
Task #1 - Procure IQO & Hardcopy Imagery										
CALFED	500	\$17,780	\$42,927	\$248,400	\$0	\$20,000	\$0	\$329,108		
NRCS	425	\$15,113	\$2,267	\$0	\$0	\$0	\$0	\$17,380		
Task #2 - Recompile Survey Atlas Sheets										
CALFED	5,000	\$177,804	\$74,142	\$316,474	\$0	\$0	\$0	\$568,420		
NRCS	1,500	\$53,341	\$8,001	\$0	\$0	\$0	\$0	\$61,343		
Task #3 - Develop Soils Attributes Tables										
CALFED	800	\$28,449	\$4,267	\$0	\$0	\$0	\$0	\$32,716		
NRCS	1,100	\$39,117	\$3,868	\$0	\$0	\$0	\$0	\$44,985		
Task #4 - Digitizing & Certification of Lineart										
CALFED	4,500	\$160,024	\$58,630	\$230,842	\$0	\$0	\$0	\$449,496		
NRCS	2,000	\$71,122	\$10,668	\$0	\$0	\$0	\$0	\$81,790		
Task #5 - Official Public Release										
CALFED	0	\$0	\$150	\$0	\$0	\$1,000	\$0	\$1,150		
NRCS	200	\$7,112	\$1,057	\$0	\$0	\$0	\$0	\$8,170		
Task #6 - Project Management										
CALFED	5,624	\$200,000	\$30,130	\$0	\$0	\$1,000	\$0	\$231,130		
NRCS	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		
SUBTOTAL, Current Project Phase										
CALFED	16,424	\$84,058	\$210,266	\$95,716	\$0	\$22,000	\$0	\$1,612,040		
NRCS	5,225	\$85,806	\$27,871	\$0	\$0	\$0	\$0	\$213,676		
TOTAL	21,649	\$769,863	\$238,137	\$795,716	\$0	\$22,000	\$0	\$1,825,717		
Notes: Salaries for current project proposal based on three GS-12, Step 5 Soil Scientist full-time positions @ 31 months. Benefits based on 19% benefits plus 20.4% for leave. Administrative costs based on 1.3% total project cost. Number of hours based on 2087 hours/yr * 3 staff * 31/12 years = 10783 total hours available										

## Cost-Sharing

This project is a continuing project. Total expenditures to date to develop soil surveys (including digital data products) in the entire Bay-Delta Region are estimated to be in the hundreds of millions of dollars. Soil survey work has been ongoing here since before the authorization of the program in 1935. Current annual expenditures by NRCS and other National Cooperative Soil Survey partners for survey work in the Bay-Delta Region are about \$1,000,000 each fiscal year. Progress of this soil survey work is shown in *Figure 3 - Status of Soil Surveys in California*. These expenditures are considered part of the ongoing program and total \$2.9 million for the three-year period (see *Table below*).

**Table: Current NRCS Soil Survey Investment in the Bay-Delta Region:  
(for the years 1999 - 2002)**

<u>Item</u>	<u>Current NRCS Investment</u>
Soil Survey Digitizing Projects Completed (Modoc/Alturas Area, Intermountain Area, Sutter, Placer West, Sacramento, Merced, West, Kings, Kern NW Part, Kern SE Part, Lake, Napa, Monterey Tulare Central, San Luis Obispo/Paso Robles Area)	\$ 200,000
Soil Surveys Starting in FY 1999 and 2000 (Calaveras, Tuolumne, Butte, Santa Clara Area)	\$ 2,600,000
Soil Survey Digitizing Projects in progress (Colusa, West Stanislaus, West Fresno, West Tulare, Yolo, Alameda Area, Solano)	\$ 105,000
<b>TOTAL CURRENT NRCS INVESTMENT IN BAY-DELTA REGION (Soil Survey work)</b>	<b>\$ 2,905,000</b>

A detailed description of program expenditures to date in the targeted 12 Soil Survey Areas are shown in the first section of *Table 1, Budget Costs Detail*. NRCS has invested approximately \$22.5 million in previous years in the 12 targeted soil survey areas. This investment was primarily in the initial development of the published soil surveys. **The NRCS share of the current proposed project cost is \$214,000.**

## Applicant Qualifications

Public Law 74-46, 49 Stat. 163, 16 U.S.C. 590a-f (April 27, 1935), also known as the Soil Conservation and Domestic Allotment Act, vested certain powers in the Secretary of Agriculture with respect to the control and prevention of soil erosion and provided for the Soil Conservation Service (now, the Natural Resources Conservation Service) to be established as the agency to exercise these powers. One of the authorities granted the Secretary in this Act was that of conducting a soil survey program so as to make available soil surveys needed by States and other public agencies, including community development districts. The actual language used in the Act emphasized the use of soils information in community planning and resource development, including improving the quality of the environment:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in recognition of the increasing need for soil surveys by the States and other public agencies in connection with community planning and resource development for protecting and improving the quality of the environment, meeting recreational needs, conserving land and water resources, providing for multiple uses of such resources, and controlling and reducing pollution from sediment and other pollutants in areas of rapidly changing uses, including farmlands being shifted to other uses, resulting from rapid expansions in the uses of land for industry, housing, transportation, recreation, and related services, it is the sense of Congress that the soil survey program of the United States Department of Agriculture should be conducted so as to make available soil surveys to meet such needs of the States and other public agencies in connection with community planning and resource development, and other purposes. (42 U.S.C. 3271)

Soil Surveys are a primary line of business within NRCS. Quality digital soils data is a relatively new product being requested by the agency's customers and clients. The NRCS has stepped up efforts to produce soil surveys in a digital format by establishing a digitizing infrastructure. Map recompilation centers and map digitizing centers have been established as part of this NRCS infrastructure along with trained NRCS state office and survey office staffs.

The National Cooperative Soil Survey (NCSS) is a nationwide partnership of federal, regional, state, and local agencies and institutions that cooperatively inventory, investigate, classify, interpret, disseminate, and maintain information about the soils of the United States and its trust territories and commonwealths. The NRCS provides leadership for the NCSS.

The NRCS soil survey program is carried out under the auspices of the National Cooperative Soil Survey. The NRCS collects soil data, establishes standards for inventorying, describing and interpreting soils, makes maps and databases, interprets the maps and data, promotes their use, conducts research, assists nationally and internationally with the wise use of soil resources, responds to needs of users of soil survey information, and develops and enhances the skills of pedologists.

Program activities include developing and applying scientific methods uniformly to:

1. Define, describe, and record soil characteristics;
2. Classify soils;
3. Map areas of soils with similar response to defined uses and management;
4. Better understand soil genesis and morphology;
5. Maintain current soil information in digital, tabular, text, and other forms that are easily accessible for public use;

6. Interpret basic soil data and soil maps for practical application;
7. Investigate, research, and develop new applications to improve the use of soil resources for the public benefit; and
8. Assist others in the use of soil survey information for specific resource and environmental concerns.

The NRCS State Office in Davis, California is site of one of the agency's Regional MLRA (Soils) Offices, with the infrastructure, technical support and administrative staff to provide the deliverables described in this project proposal. Two new GS-12 soil scientist positions will be established, funded by CALFED, to oversee completion of these digital soils and orthophotoquad products in the Bay-Delta Region. The NRCS Davis State Office is set up to provide the administrative support and systems to successfully complete this project.

## Compliance with Standard Terms and Conditions

The USDA Natural Resources Conservation Service is a federal public agency (entity) submitting a proposal under the Local Watershed Stewardship category. As a result, the requirement to comply with the standard terms of the proposal is to submit DWR Forms 4099A and 4247 (attached). In addition, we are submitting a statement of Non-Discrimination compliance. This statement follows:

Activities conducted under this agreement will be compliance with the nondiscrimination provisions as contained in Titles VI and VII of the Civil Rights Act of 1964, as amended, the Civil Rights Restoration Act of 1987 (Public Law 100-259) and other Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, and in accordance with regulations of the Secretary of Agriculture (7 CFR-15, Subparts A and B) which provide that no person in the United States shall, on the grounds of race, color, national origin, age, sex, religion, marital status, or handicap be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal financial assistance from the Department of Agriculture or any agency thereof.

The Natural Resources Conservation Service agrees to comply with all other standard terms and conditions of the CALFED program. (*Forms DWR 4099A and DWR 4247 attached*).

Agreement No. \_\_\_\_\_

Exhibit \_\_\_\_\_

**ADDITIONAL STANDARD CLAUSES**

**Recycled Materials.** Contractor hereby certifies under penalty of perjury that \_\_\_\_\_ (enter value or "0" here) percent of the materials, goods and supplies offered or products used in the performance of this Agreement meets or exceeds the minimum percentage of recycled material as defined in Sections 12161 and 12200 of the Public Contract Code.

**Severability.** If any provision of this Agreement is held invalid or unenforceable by any court of final jurisdiction, it is the intent of the parties that all other provisions of this Agreement be construed to remain fully valid, enforceable, and binding on the parties.

**Governing Law.** This Agreement is governed by and shall be interpreted in accordance with the laws of the State of California.

**Y2K Language.** The Contractor warrants and represents that the goods or services sold, leased, or licensed to the State of California, its agencies, or its political subdivisions, pursuant to this Agreement are "Year 2000 compliant." For purposes of this Agreement a good or service is Year 2000 compliant if it will continue to fully function before, at, and after the Year 2000 without interruption and, if applicable, with full ability to accurately and unambiguously process, display, compare, calculate, manipulate, and otherwise utilize date information. This warranty and representation supersedes all warranty disclaimers and limitations and all limitations on liability provided by or through the Contractor.

**Child Support Compliance Act.** For any Agreement in excess of \$100,000, the Contractor acknowledges in accordance therewith, that:

1. The Contractor recognizes the importance of child and family support obligations and shall fully comply with all applicable state and federal laws relating to child and family support enforcement, including, but not limited to, disclosure of information and compliance with earnings assignment orders, as provided in Chapter 8 (commencing with Section 5200) of Part 5 of Division 9 of the Family Code; and
2. The Contractor, to the best of its knowledge, is fully complying with the earnings assignment orders of all employees and is providing the names of all new employees to the New Hire Registry maintained by the California Employment Development Department.

## STANDARD CLAUSES - CONTRACTS WITH THE UNITED STATES

**Workers' Compensation Clause.** Contractor affirms that it is aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and Contractor affirms that it will comply with such provisions before commencing the performance of the work under this contract. This provision shall apply to the extent provided by federal laws, rules and regulations.

**Claims Dispute Clause.** Any claim that Contractor may have regarding the performance of this agreement including, but not limited to, claims for additional compensation or extension of time, shall be submitted to the Director, Department of Water Resources, within thirty days of its accrual. State and Contractor shall then attempt to negotiate a resolution of such claim and process an amendment to this agreement to implement the terms of any such resolution. However, Contractor does not waive any rights or duties it may have as may be provided by federal laws, rules and regulations.

**Nondiscrimination Clause.** During the performance of this contract, the recipient, contractor and its subcontractors shall not deny the contract's benefits to any person on the basis of religion, color, ethnic group identification, sex, age, physical or mental disability, nor shall they discriminate unlawfully against any employee or applicant for employment because of race, religion, color, national origin, ancestry, physical handicap, mental disability, medical condition, marital status, age (over 40), or sex. Contractor shall insure that the evaluation and treatment of employees and applicants for employment are free of such discrimination. Contractor shall comply with the provisions of the Fair Employment and Housing Act (Government Code Section 12900 et seq.), the regulations promulgated thereunder (California Administrative Code, Title 2, Sections 7285.0 et seq.), the provisions of Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (Government Code Sections 11135 - 11139.5), and the regulations or standards adopted by the awarding State agency to implement such article. Contractor or recipient shall permit access by representatives of the Department of Fair Employment and Housing and the awarding State agency upon reasonable notice at any time during the normal business hours, but in no case less than 24 hours' notice, to such of its books, records, accounts, other sources of information and its facilities as said Department or Agency shall require to ascertain compliance with this clause. Recipient, Contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement. The Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the contract.

**Availability of Funds.** Work to be performed under this contract is subject to availability of funds through the State's normal budget process.

**Audit Clause.** For contracts in excess of \$10,000, unless otherwise provided by federal laws, rules or regulations, the contracting parties shall be subject to the examination and audit of the State Auditor for a period of three years after final payment under the contract. (Government Code Section 8546.7).

**Payment Retention Clause.** Ten percent of any progress payments that may be provided for under this contract shall be withheld per Public Contract Code Sections 10346 and 10379 pending satisfactory completion of all services under the contract.

**Reimbursement Clause.** If applicable, travel and per diem expenses to be reimbursed under this contract shall be at the same rates the State provides for unrepresented employees in accordance with the provisions of Title 2, Chapter 3, of the California Code of Regulations. Contractor's designated headquarters for the purpose of computing such expenses shall be: \_\_\_\_\_

**Americans With Disabilities Act.** By signing this contract, Contractor assures the State that it complies with the Americans With Disabilities Act (ADA) of 1990, (42 U.S.C. 12101 et seq.), which prohibits discrimination on the basis of disability, as well as all applicable regulations and guidelines issued pursuant to the ADA.

**Conflict of Interest.** Current State Employees: a) No State officer or employee shall engage in any employment, activity or enterprise from which the officer or employee receives compensation or has a financial interest and which is sponsored or funded by any State agency, unless the employment, activity or enterprise is required as a condition of regular State employment. b) No State officer or employee shall contract on his or her own behalf as an independent contractor with any State agency to provide goods or services.

**Former State Employees:** a) For the two-year period from the date he or she left State employment, no former State officer or employee may enter into a contract in which he or she engaged in any of the negotiations, transactions, planning, arrangements or any part of the decision-making process relevant to the contract while employed in any capacity by any State agency. b) For the twelve-month period from the date he or she left State employment, no former State officer or employee may enter into a contract with any State agency if he or she was employed by that State agency in a policy-making position in the same general subject area as the proposed contract within the twelve-month period prior to his or her leaving State service.

# **Appendix A**

## **Soil Attribute Tables and Interpretations Records**