

97 JUL 28 AM 10: 32

Executive Summary

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

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

b. **Project Description and Primary Biological/Ecological Objectives:** 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 15 published Soil Survey Reports covering 10,602,798 acres, or 469 quad sheets of data (USGS 1:24,000 scale). Deliverable products would include two digital data layers for 15 Soil Survey Areas: 1) Digital Orthoquads (DOQ) data layer, and 2) a certified digital soils data layer with accompanying attribute tables. The primary biological and ecological objective of this proposal is to assure that soils information, including their capabilities and limitations, become 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.

c. **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, 5) certify digital linework, and 6) release the data to the public. The implementation schedule covers a 31-month time period.

d. **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 15 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.

e. Budget Costs and Third Party Impacts:

Budget Costs Summary:

<u>Item</u>	<u>CALFED</u> <u>Funds</u>	<u>NRCS</u> <u>Funds</u>	<u>TOTAL</u> <u>Cost</u>
Imagery Production	\$905,890	17,380	923,270
Map Recompilation	631,237	61,343	692,580
Development of Soil Attribute Tables	72,476	44,985	117,461
Soil Survey Digitizing	366,173	40,895	407,068
Certification of Digital Linework	180,185	40,895	221,080
Official Public Release	<u>1,150</u>	<u>8,179</u>	<u>9,329</u>
TOTAL	2,157,111	213,677	2,370,788

Third Party Impacts:

Primary "third party" impacts will be on the 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.

f. Applicant Qualifications: The Natural Resources Conservation Service (and 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.

g. 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.

h. 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 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 ecological health and improve water management in the Bay-Delta ecosystem.

Title Page

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

b. **Applicant:** USDA, Natural Resources Conservation Service, Davis, California

Principal Investigator: Eric N. Vinson, State Soil Scientist
USDA, Natural Resources Conservation Service
2121-C 2nd Street, Suite 102
Davis, CA 95616-5475
Telephone: (916) 757-8271, FAX: (916) 757-8382
E-mail: evinson@ca.nrcs.usda.gov

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

d. **Tax Identification Number:** 72-0564834

e. **Technical Contact Person:** Daryl D. Lund, Resource Inventory Specialist
USDA, Natural Resources Conservation Service
2121-C 2nd Street, Suite 102
Davis, CA 95616-5475
Telephone: (916) 757-8262, FAX: (916) 757-8382
E-mail: dlund@ca.nrcs.usda.gov

Financial Contact Person: Eric N. Vinson, State Soil Scientist
USDA, Natural Resources Conservation Service
2121-C 2nd Street, Suite 102
Davis, CA 95616-5475
Telephone: (916) 757-8271, FAX: (916) 757-8382
E-mail: evinson@ca.nrcs.usda.gov

f. **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.

g. **RFP Project Group Type:** Other Services

Project Description

a. 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 15 NRCS published Soil Survey Reports covering 10,602,798 acres, or 469 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 two full-time NRCS soil scientists located in Davis, California. Their tasks will include oversight of the imagery production and recompile 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 a second full-time position (soil scientist) to handle the correlation issues (part of recompile task). The primary contractor for development of the Digital Orthoquad (DOQ) and hardcopy imagery products will be U.S. Geological Survey. The primary contractor for portions of the recompile, 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).

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

Proposed Digital Soil Survey Areas

<u>Priority</u>	<u>Soil Survey Area</u>	<u>Name of Published Soil Survey</u>	<u>Acres</u>	<u>County</u>
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.
2	113	Yolo County	653,478	Yolo Co.
3a	645	*Tehama County	1,851,601	Tehama Co.
3b	021	*Glenn County	849,197	Glenn Co.
4	607	Shasta County	1,025,000	Shasta Co.
5	095	Solano County	582,208	Solano Co.
6	649	Mariposa County Area	478,852	Mariposa Co.
7	646	East Santa Clara Area	539,080	Santa Clara Co.
8	619	Nevada County Area	341,966	Nevada Co.
9	624	El Dorado Area	539,898	El Dorado Co.
10	609	Alameda County Area	325,000	Alameda Co.
11	628	Amador Area	298,992	Amador Co.
TOTAL			10,602,798 acres	

* Geographically associated. Treat as one project area.

c. 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 management methodologies, 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; managing farms, ranches, rangeland, and woodland; 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; watershed planning and modeling; floodplain management, 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), 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 become 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.

The use of digital spatial soils information in a GIS database is an important tool for establishing linkages and interactions of these stressors with the priority species and habitats. Completion of this proposal (using resources from NRCS and CALFED) will provide that information for most of the counties in the Bay-Delta Region by the year 2000 (*see Figure 2*).

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 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.

d. Background and Biological/Technical Justification:

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.

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*. A detailed description of program expenditures to date in the targeted 15 Soil Survey Area are shown in the first section of *Table 1, Budget Costs Detail*. An accounting of the anticipated expenditures by NRCS for all soil survey work in the entire Bay-Delta Region for the next three years is shown in *Table 2 - Other NRCS Operations in the Bay-Delta Region*. These expenditures are considered part of the ongoing program and total \$2.96 million for the three-year period.

e. 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 orthoquad imagery products are as follows:

Task #1. Procure scale-accurate Digital Orthoquad (DOQ) and hardcopy imagery from USGS at a scale of 1:24,000 for the 15 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 Orthoquad (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. Scan the mylar line work into digital format. Contract out this service. **Deliverables:** Digital soil survey linework. **Schedule:** Month 8-20.

Task #5. Send digitized line work to NRCS Digitizing Centers for agency quality control and certification. **Deliverables:** Certified digital soil database - linework only. **Schedule:** Month 12-30.

Task #6. Official release of digital soils information for all Soil Survey Areas. **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 15 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.

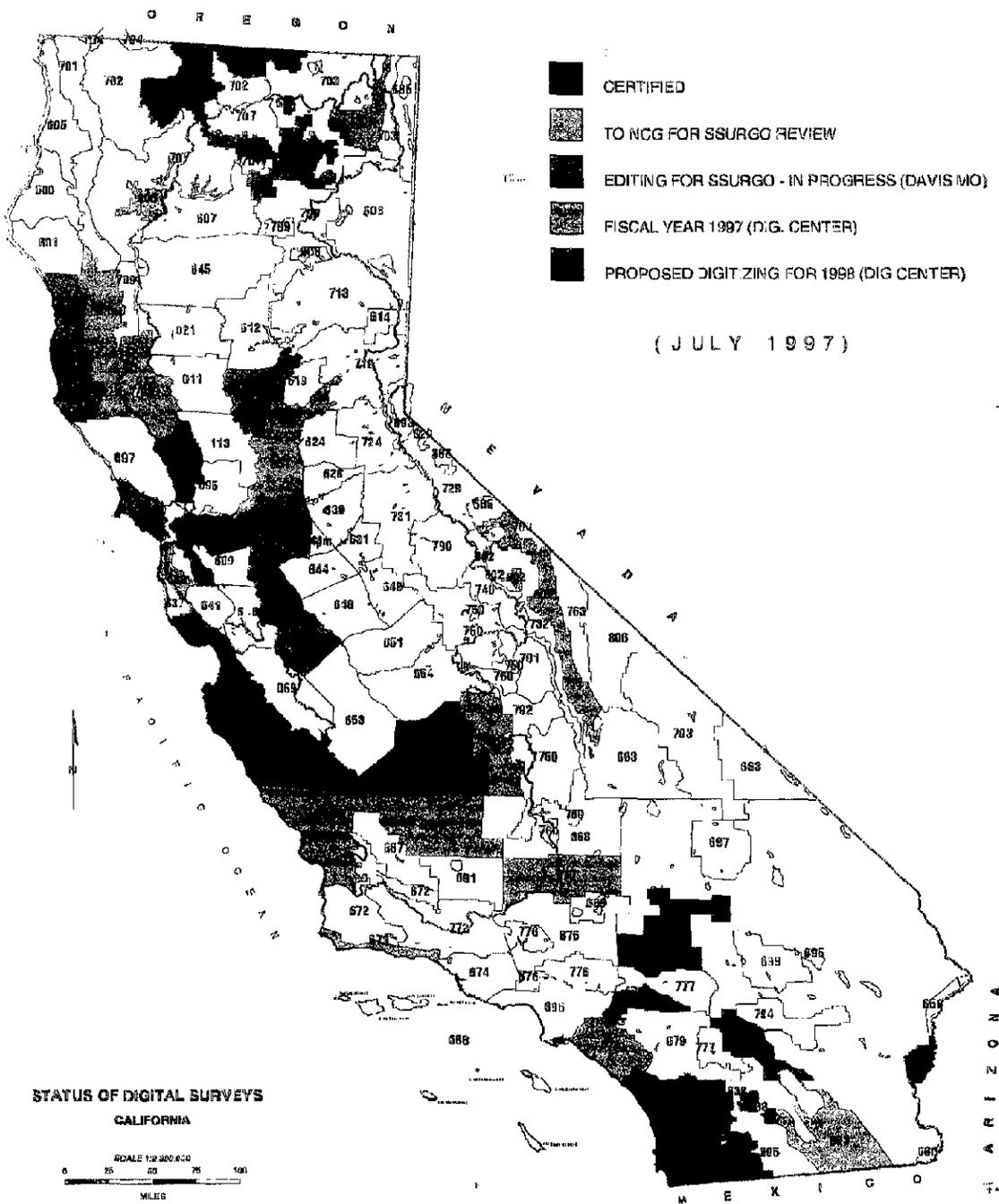
f. Monitoring and Data Evaluation: The NRCS and associated partners in the National Cooperative Soil Survey Program have national responsibility for coordinating the development and maintenance of the digital soil survey data layer for the United States. As such, the agency has developed very specific, 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.

g. Implementability: 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 a second 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.

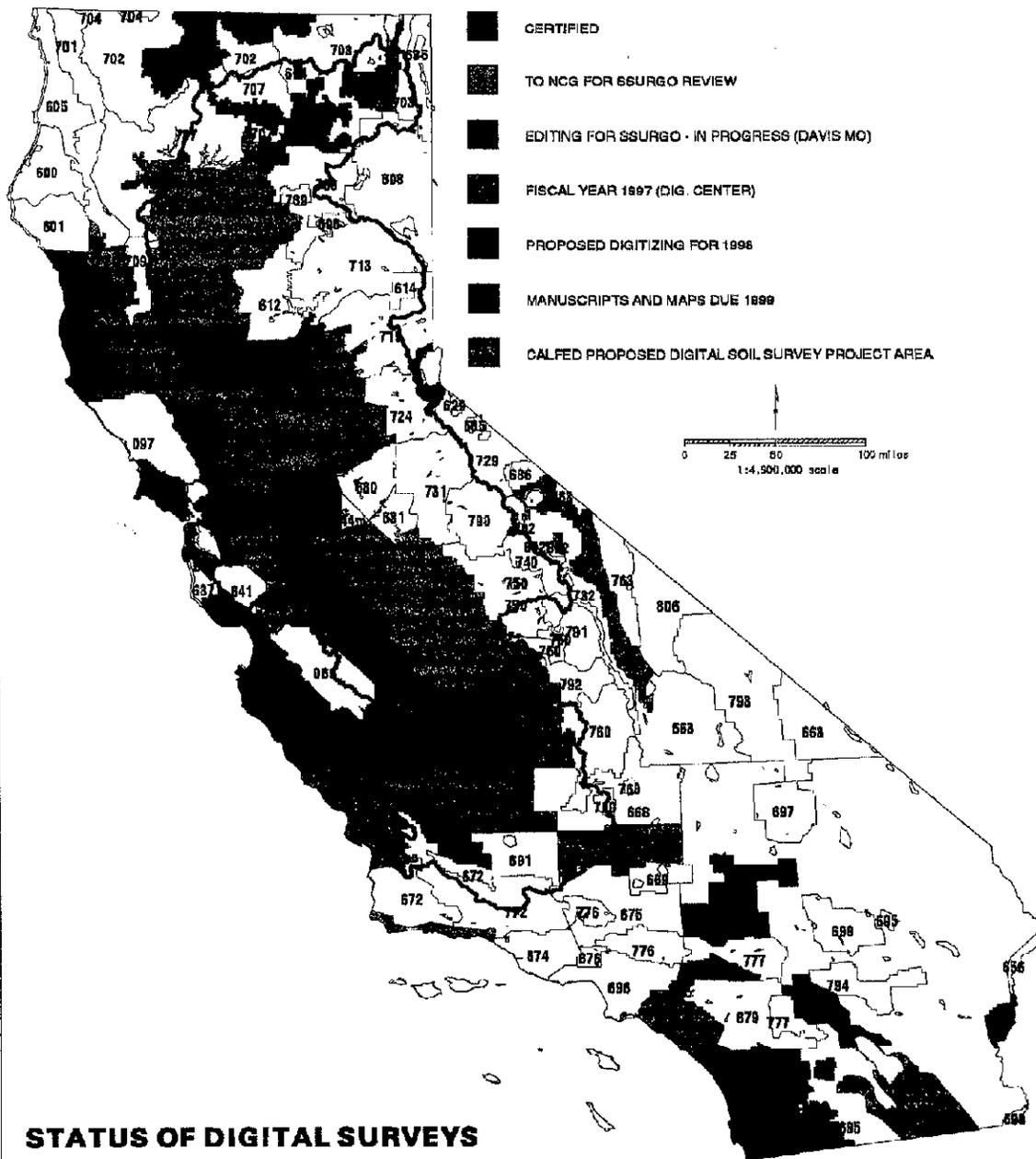
FIGURE 1

U.S. DEPARTMENT OF AGRICULTURE

NATURAL RESOURCES CONSERVATION SERVICE



SOURCE: STATUS DATA DERIVED FROM 1992 SURVEY STATUS DATA FILES
 ALLY AND ALLY CONSULTING AND OTHER CONSULTING FIRMS
 PROJECT: NAT. RES. CONSERVATION SERVICE



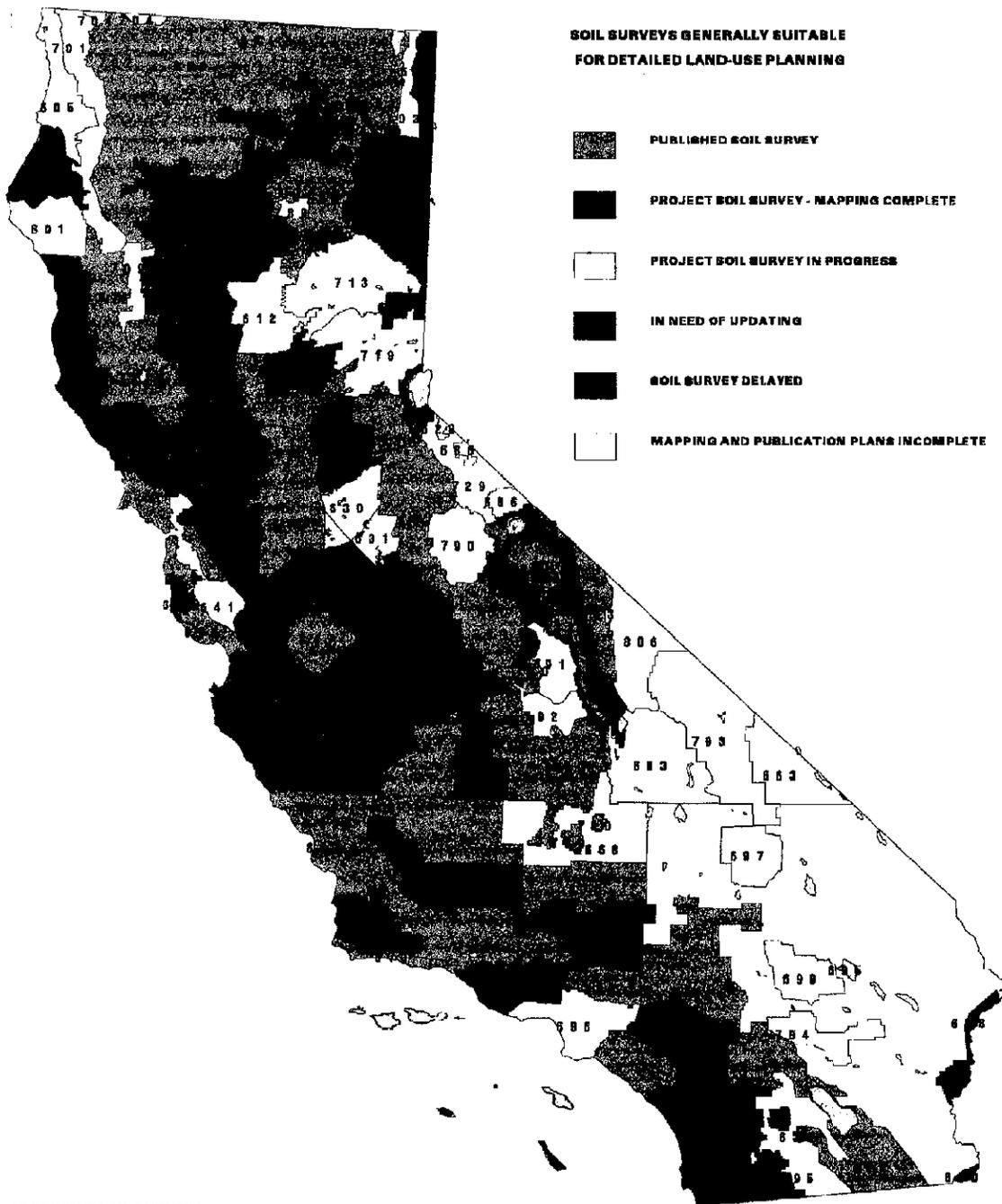
**STATUS OF DIGITAL SURVEYS
CALIFORNIA**

(UPDATED JULY 1987)

USDA United States Department of Agriculture
Natural Resources Conservation Service
Davis, California. December 19, 1988

U.S. DEPARTMENT OF AGRICULTURE
 NATURAL RESOURCES CONSERVATION SERVICE

SOIL SURVEYS GENERALLY SUITABLE
 FOR DETAILED LAND-USE PLANNING



STATUS OF SOIL SURVEYS
 CALIFORNIA
 (OCTOBER 1986)

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 Funds</u>	<u>NRCS Funds</u>	<u>TOTAL Cost</u>
Previous Work/Investment in Targeted Area:			
Soil Survey Work in 15 Targeted Areas	\$0	\$22,479,492	\$22,479,492
Current Project Proposal:			
Task #1: Imagery Production (DOQ & hardcopy)	\$905,890	\$17,380	\$923,270
Task #2: Map Recompile	631,237	61,343	692,580
Task #3: Soils Attributes Tables	72,476	44,985	117,461
Task #4: Digitizing	366,173	40,895	407,068
Task #5: Certification	180,185	40,895	221,080
Task #6: Official Public Release	1,150	8,179	9,329
TOTAL CURRENT PROJECT PROPOSAL	\$2,157,112	\$213,676	\$2,370,788
PER ACRE DIGITIZED = \$0.22/acre			
TOTAL INVESTMENT IN TARGETED AREA (Includes Current Project Proposal)	\$2,157,112	\$22,693,168	\$24,850,280

Development of this budget is based on completion of 15 targeted Soil Survey Areas and purchase of updated Digital Orthoquads (DOQ). This proposal cost could be reduced by either limiting the number of targeted Soil Survey Areas to less than 15, or eliminating the purchase of updated DOQ's. If updated DOQ's were not purchased, the soil surveys would be digitized using existing non-digital Orthophotography. Most of the existing Orthophotography for these 15 Soil Survey Areas was last flown during the 1970's.

If CALFED is interested in reducing the cost of this proposal by limiting the number of targeted Soil Survey Areas, a rough estimate of project cost can be obtained by multiplying the new acres targeted for digitizing by the average \$0.22/ac cost listed above.

If CALFED is interested in reducing the cost of this proposal by eliminating the purchase of updated DOQ's, the cost of Task #1 should be reduced by \$800,000 CALFED funds and \$17,380 NRCS Funds, for a total reduction in project cost of \$817,380.

b. 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
Recompilation Complete for all 15 Survey Areas	Month 18
Soil Attribute Tables Completed	Month 18
Line Work Digitized and Edited for all 15 Survey Areas	Month 20
Certification Completed by NRCS Digitizing Center	Month 30
Official Release of last Digital Soil Survey	Month 31

c. Third Party Impacts:

The third party impacts from implementation of this proposal are extensive. The primary impacts will be on the quality of planning efforts and the subsequent restoration of natural resources and systems in the Bay-Delta ecosystem. Essentially, anyone using Geographic Information Systems to help plan for, or manage, resources will benefit from this proposal by having soils data available to them 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. By including soils information in these planning efforts, projects and activities to restore the habitats and biological benefits of the Bay-Delta ecosystem will be based on the capabilities and limitations of the natural systems, and have a higher likelihood of success. The specific use of GIS as a tool in planning has been demonstrated to help establish linkages between resources within a region, and to reduce conflicts between various stakeholders by providing a scientific and mostly bias-free approach to defining problems, opportunities, alternative solutions and impacts. A key component of any natural resource-based GIS database is the soils data layer.

Secondary "third party impacts" from implementation of this proposal include increased economic activity associated with contracting out for services under this proposal and from private businesses and consulting firms developing value-added products and services from basic digital soils data.

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 Orthoquad 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 public agency (entity) submitting a proposal under the Services category. As a result, the only requirement to comply with the standard terms of the proposal is to submit 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.

Table 1 - Budget Costs Detail - Targeted 15 Soil Survey Areas, Bay-Delta Region							
Project Phase and Task	Direct Labor (Hours)	Direct Salary & Benefits \$	Overhead, General Admin \$	Service Contracts \$	Material & Acquistn Contracts \$	Misc & Other Direct Costs \$	Total Cost \$
<i>A. Previous Work/Investment - Completion of Surveys</i>							
<i>in 15 Soil Survey Areas</i>							
CALFED	0	\$0	\$0	\$0	\$0	\$0	\$0
NRCS	423,000	\$13,347,384	\$2,932,168	\$3,000,000	\$3,000,000	\$0	\$22,479,492
B. Current Project Proposal							
Task #1 - Procure DOQ & Hardcopy Imagery							
CALFED	500	\$17,780	\$118,169	\$699,600	\$70,350	\$0	\$905,890
NRCS	425	\$15,113	\$2,267	\$0	\$0	\$0	\$17,380
Task #2 - Recompile Survey Atlas Sheets							
CALFED	5,000	\$177,804	\$82,335	\$371,098	\$0	\$0	\$631,237
NRCS	1,500	\$53,341	\$8,001	\$0	\$0	\$0	\$61,343
Task #3 - Develop Soils Attributes Tables							
CALFED	800	\$28,449	\$44,028	\$0	\$0	\$0	\$72,476
NRCS	1,100	\$39,117	\$5,868	\$0	\$0	\$0	\$44,985
Task #4 - Develop Digital Linework							
CALFED	1,500	\$53,341	\$47,762	\$265,070	\$0	\$0	\$366,173
NRCS	1,000	\$35,561	\$5,334	\$0	\$0	\$0	\$40,895
Task #5 - Certification of Digital Linework							
CALFED	3,000	\$106,683	\$23,502	\$50,000	\$0	\$0	\$180,185
NRCS	1,000	\$35,561	\$5,334	\$0	\$0	\$0	\$40,895
Task #6 - Official Public Release							
CALFED	0	\$0	\$150	\$0	\$1,900	\$0	\$1,150
NRCS	200	\$7,112	\$1,067	\$0	\$0	\$0	\$8,179
SUBTOTAL, Current Project Phase							
CALFED	10,800	\$384,057	\$315,937	\$1,385,768	\$71,350	\$0	\$2,157,112
NRCS	5,225	\$185,806	\$27,871	\$0	\$0	\$0	\$213,676
TOTAL	16,025	\$569,863	\$343,808	\$1,385,768	\$71,350	\$0	\$2,370,788
TOTAL, Previous and Current Project Work (A & B), Targeted 15 Soil Survey Area							
CALFED	10,800	\$384,057	\$315,937	\$1,385,768	\$71,350	\$0	\$2,157,112
NRCS	430,225	\$13,733,190	\$2,959,978	\$3,000,000	\$3,000,000	\$0	\$22,693,168
TOTAL	441,025	\$14,117,247	\$3,275,915	\$4,385,768	\$3,071,350	\$0	\$24,850,280
Notes: Salaries for current project proposal based on two 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 15% total project cost.							
Number of hours based on 2087 hours/yr * 2 staff * 31/12 years = 10783 total hours available							

Table 2 - Other NRCS Soil Survey Operations in the Bay-Delta Region during Proposed Project Period
Present NRCS Work in Progress - 3-year Period, 1998-2000

<u>Ongoing Soil Surveys</u>	<u>NRCS Budgeted Expenses</u>			<u>TOTAL</u>
	<u>Fiscal year 1998</u>	<u>Fiscal year 1999</u>	<u>Fiscal year 2000</u>	
1. Butte County Field Mapping	\$170,000	\$170,000	\$170,000	\$510,000
2. MLRA 17 Soil Survey Update (20-Year Project in Sacramento & San Joaquin Valley)	\$150,000	\$300,000	\$350,000	\$800,000
3. Soil Surveys with Field Work Completed (Includes manuscript and digital data development, and publication and distribution)				
Colusa County	\$200,000	\$0	\$0	\$200,000
West Stanislaus County	\$150,000	\$0	\$0	\$150,000
West Fresno County	\$200,000	\$100,000	\$0	\$300,000
West Tulare County	\$100,000	\$0	\$0	\$100,000
Subtotal, Surveys with Completed Field Work	\$650,000	\$100,000	\$0	\$750,000
4. MLRA Office Assistance to Items #1-3	\$300,000	\$300,000	\$300,000	\$900,000
TOTAL	\$1,270,000	\$870,000	\$820,000	\$2,960,000

1-001079

1-001079

California Counties



U.S. Department of Agriculture
Natural Resource Conservation Service

Source: Tomi, Data Center, County Boundaries, 1:625,000 scale, 1984

Wright 1/23/95

I - 001080

I-001080

Appendix A

Soil Attribute Tables and Interpretations Records

Digital Soil Survey Mapping and Digital
Orthoquad Imagery Development for the
Bay-Delta Region

I - 0 0 1 0 8 1

Map Unit Interpretations Record Schema

Soil Survey Area Tables

ssarea
state:c
ssanum:c
ssasid:c
ssaid:c
ssaname:c
ssacres:i
cordate:c
status:c
cdstat:c
eddate:c
comment:c
ssacoac:i

Map Unit Tables

mapunit
stssaid:c
ssaid:c
musym:c
muid:c
mukind:c
mitra:c
primfml:c
maures:i

inclasn

stssaid:c
muid:c
seqnum:i
inclsoil:c
inclpct:i
hydric:c
landfmo:c
condition:c
hydrtr:c
onsite:c

mucoacre

stssaid:c
muid:c
catycode:c
mucoacre:i

helclass

stssaid:c
muid:c
helfact:i
helrct:i
muwndhel:i
muwathel:i
munefcl:i

myyld

stssaid:c
muid:c
croprame:c
nirryld:f
irryld:f

Component Tables

comp

stssaid:c
muid:c
musym:c
compname:c
seqnum:i
s3id:c
compct:i
slope:i
slope2:c
surfex:c
otherph:c
compkind:c
compare:c
classcode:c
anflood:c
anfloodr:c
anflobeg:c
anfloodc:c
gsflood:c
gsfloodr:c
gsflobeg:c
gsflobed:c
wideph:f
widephr:f
wrkng:c
wrbeg:c
wrbend:c
wnddpt:f
pnddph:f
pnddut:c
pndbeg:c
pnndend:c
rockdph:i
rockdphr:i
rockhard:c
pandep:i
pandeph:c
panhard:c
subnith:i
subnithr:i
subtot:i
subtoth:i
hydgpr:c
frostact:c
drainage:c
hydric:c
corcon:c
corsteel:c
chirr:c
schirr:c
schirrc

interp

stssaid:c
muid:c
seqnum:i
grpcode:c
rating:c
restct1:c
restct2:c
restct3:c

compyld

stssaid:c
muid:c
seqnum:i
croprame:c
nirryld:f
irryld:f

woodmgt

stssaid:c
muid:c
seqnum:i
ordsym:c
wderosn:c
wdequip:c
wdseed:c
wdwind:c
wdplant:c

forest

stssaid:c
muid:c
seqnum:i
plantsym:c
plantcov:i

hydcomp

stssaid:c
muid:c
seqnum:i
condition:c
landfmo:c
hydrtr:c
onsite:c

plantcom

stssaid:c
muid:c
seqnum:i
plantsym:c
plantpct:i

windbrk

stssaid:c
muid:c
plantsym:c
wndbrkht:i

wlhabit

stssaid:c
muid:c
seqnum:i
wgrass:c
wlherb:c
wlhard:c
wlcomf:c
wlshrub:c
wlwtpit:c
wlshwat:c
wlopen:c
wlwood:c
wlwet:c
wlrange:c

rsprod

stssaid:c
muid:c
seqnum:i
rsid:c
rsname:c
prodfrm:i
prodnorm:i
produnfv:i

woodland

stssaid:c
muid:c
seqnum:i
suitcode:c
plantsym:c
sitind:i
woodprod:i

Layer Table

layer

stssaid:c
muid:c
seqnum:i
s3id:c
layernum:i
layertid:i
laydcpil:i
laydph:i
textur:c
kfact:f
tfact:i
wegc
inch10l:i
inch10h:i
inch3l:i
inch3h:i
no4l:i
no4h:i
no10l:i
no10h:i
no40l:i
no40h:i
no200l:i
no200h:i
clayhi
clayli
llh:i
llh3:i
plh:i
plh3:i
unfiel:c
unfiel:c
ashshd:f
ashshd:f
awchl:f
bdh:f
bdh3:f
omh:f
omh3:f
phh:f
phh3:f
salinh:i
salinh3:i
sarh:f
sarh3:f
cechl:f
cechl3:f
cacodh:i
cacodh3:i
gypsumh:i
gypsumh3:i
permh:f
permh3:f
shrinksw:c
wetl

State Tables

starea

stssaid:c
ssaid:c
ssafact:i
ssarfact:i

stcomp

stssaid:c
muid:c
seqnum:i
aspect:c
slopeshp:c
slopesos:c
geomorph:c
landform:c

stlayer

stssaid:c
muid:c
seqnum:i
layernum:i

stmu

stssaid:c
muid:c
elevh:i
elevh3:i
pptli:i
pptli3:i
fsh:i
fsh3:i
intensity:c

Lookup Tables

taxclass

class:c
classc:c
order:c
suborder:c
grtgroup:c
subgroup:c
partsize:c
minalogy:c
reaction:c
soltemp:c
otherfam:c

plantam

plantsym:c
sciname:c
comname:c

yldunits

croprame:c
yldunits:c

rangenm

rsid:c
rsname:c

Nontechnical Soil Descriptions

nitechdes

desat:c
desnum:c
nitechdes:c

deslink

muid:c
desat:c
desnum:c

APPENDIX A
DEFINITION OF SOIL DATA ELEMENTS

Element	Long Name	Tables	Description
aashind	AASHTO Group Index	layer s5layer	AASHTO (American Assoc. of State Highway and Transportation Officials) group index. A modification to AASHTO group classification of a soil.
aashto	AASHTO Group Classification	layer s5layer	AASHTO (American Assoc. of State Highway and Transportation Officials) group classification. A code for AASHTO group classification for a soil.
agency	Agency	ssamou	The lead agency responsible for the survey
airtemph	Air Temperature	s5	Maximum value for the range in average annual air temperature.
airtempl	Air Temperature	s5	Minimum value for the range in average annual air temperature.
anflobeg	Annual Flooding Month Begin	comp s5	Month in which annual flooding (flooding likely to occur during the year) begins in a normal year.
anflodur	Flood Duration Class	comp s5	The duration of annual flooding in a normal year.
anfloend	Annual Flooding Month End	comp s5	Month in which annual flooding (flooding likely to occur during the year) ends in a normal year.
anflood	Annual Flooding Frequency	comp s5	Descriptive term used to describe the frequency of annual flooding (flooding likely to occur during the year) that is likely to occur. Frequent (FREQ) - > 50% chance of flooding; Occasional (OCCAS) - 5-50% chance of flooding; Rare (RARE) - 0-5% chance of flooding.
aracrel	county 1, Acreage in Area	S6/ssa	The survey area acreage within the county. For a survey in a single county this equals the survey to acreage.

Element	Long Name	Tables	Description
aracre2	County2, Acreage in Area	S6/ssa	The survey area acreage within the county.
aracre3	County3, Acreage in Area	S6/ssa	The survey area acreage within the county.
aracre4	County4, Acreage in Area	S6/ssa	The survey area acreage within the county.
aracre5	County5, Acreage in Area	S6/ssa	The survey area acreage within the county.
aracre6	County6, Acreage in Area	S6/ssa	The survey area acreage within the county.
aspect	Aspect	stcomp	The dominant direction the slope of the soil is facing.
awch	Available Water Capacity	layer s5layer	Maximum value for the range of available water capacity for the soil layer or horizon, expressed as inches/inch.
awcl	Available Water Capacity	layer s5layer	Minimum value for the range of available water capacity for the soil layer or horizon, expressed as inches/inch.
bdh	Bulk Density	layer s5layer	Maximum value for the range in moist bulk density of the soil layer or horizon, expressed as grams per cubic centimeter.
bdl	Bulk Density	layer s5layer	Minimum value for the range in moist bulk density of the soil layer or horizon, expressed as grams per cubic centimeter.
caco3h	Carbonate as CaCO3	layer s5layer	Maximum value for the range of calcium carbonate (CaCO3) in the soil layer or horizon, expressed as a percent.
caco3l	Carbonate as CaCO3	layer s5layer	Minimum value for the range of calcium carbonate (CaCO3) in the soil layer or horizon, expressed as a percent.
calledby	Called By	files	Data dictionary - Identifies the files called by (used by) the routine.
calls	Calls	files	Data dictionary - Identifies the files the routine calls (uses).

SSSD User's Manual - Appendix A-2

Element	Long Name	Tables	Description
cech	Cation Exchange Capacity	layer s5layer	Maximum value for the range in cation exchange capacity for the soil layer or horizon.
cecl	Cation Exchange Capacity	layer s5layer	Minimum value for the range in cation exchange capacity for the soil layer or horizon.
chwhat	Change What?	ssaudit	Tracks which field is being changed for surveys with a firm final field review date
clascode	Taxonomic Classification Code	comp s5 taxclass	Code for the taxonomic classification for the soil. Definition of codes are in .he taxclass table.
class	Taxonomic Classification	taxclass	The taxonomic classification (name) of the soil.
clayh	Clay	layer s5layer	Maximum value for the range in clay content of the soil layer or horizon, expressed as a percentage of the material less than 2 mm in size.
clayl	Clay	layer s5layer	Minimum value for the range in clay content of the soil layer or horizon, expressed as a percentage of the material less than 2 mm in size.
clirr	Irrigated Capability Class	comp	Irrigated Capability Class. A rating of the soil for irrigated agricultural use. The number indicates progressively greater limitations and narrower choices for use.
clnirr	Nonirrigated Capability Class	comp	Nonirrigated Capability Class. A rating of the soil for nonirrigated agricultural use. The number indicates progressively greater limitations and narrower choices for use.
cname1	First Component: Component Name	S6/map	Component name.
cname2	Second Component: Component Name	S6/map	Component name.

SSSD User's Manual - Appendix A-3

Element	Long Name	Tables	Description
cname3	Third Component: Component Name	S6/map	Component name.
cntycode	County (FIPS) Code	mucoacre ssacoac	FIPS code identifying an individual county within a soil survey area.
cntycode1	County 1 FIPS Code	S6/ssa	County 1 FIPS code.
cntycode2	County 2 FIPS Code	S6/ssa	County 2 FIPS code.
cntycode3	County 3 FIPS Code	S6/ssa	County 3 FIPS code.
cntycode4	County 4 FIPS Code	S6/ssa	County 4 FIPS code.
cntycode5	County 5 FIPS Code	S6/ssa	County 5 FIPS code.
cntycode6	County 6 FIPS Code	S6/ssa	County 6 FIPS code.
cntyname	County Name	ssacoac	The name of a county within a soil survey area.
code	Database Code	codes	A listing of codes used in the specified database.
codedesc	Code Description or Meaning	codes	Narrative description or explanation of a codes used in the database.
codename	Code Name	codes	The long name (unabbreviated) for the code.
comment	Survey Area Comments	ssarea	Remarks used to clarify or document information for a soil survey area. A list of sources, and other information for the survey area.
comname	Plant Common Name	plantnm	The common name for the plant most widely used by the state.
compacre	Component Acres	comp	The acreage of the component of a soil mapunit. Component acres are normalized to 100 percent to exclude inclusions. The sum of all the component acres for a mapunit will equal 100 percent.

Element	Long Name	Tables	Description
compkind	Kind of Component	comp	Code identifying the kind of component of the mapunit. Example: Series (S); Family (F); Variant (V); Taxadjunct (T); Taxon above family (G) Miscellaneous area (M).
compname	Component Name	comp	The name of the component (series, taxonomic unit or miscellaneous area) of the mapunit.
compct	Component Percent	comp	The percentage of the component of the mapunit.
corcon	Corrosion - Concrete	comp s5	An interpretation rating of the susceptibility of concrete to corrosion when in contact with the soil.
cordate	Correlation Date	ssarea	The date of final correlation of the soil survey area (MMYY).
cordue	Correlation Due	ssamou	Projected date for the correlation
cormo	Correlation Month	S6/ssa	Month the survey was correlated.
corsteel	Corrosion - Uncoated Steel	comp s5	An interpretation rating of the susceptibility of uncoated steel to corrosion when in contact with the soil.
coryr	Correlation Year	S6/ssa	Year the survey was correlated.
cropname	Crop Name	compyld muyld s5yld yldunits	The common name for the crop for which a yield is given.
dataset	Data Set	files table	Data dictionary - Identifies the data set the table or file is used in. Example: MUIR, S5...
desc	S5 Description	s5desc	Text description on the top of the SOI-5.

Element	Long Name	Tables	Description
descat	Nontechnical Description Category	deslink ntechdes	Code to identify the category or subject matter of a nontechnical soil description. Example: URB - Urban subject.
desnum	Nontechnical Soil Description Number	deslink ntechdes	A number used to uniquely identify a nontechnical soil description.
directory	Directory	files table	Data dictionary - Identifies the directory the file or table is in.
domid	Domain ID	codes	A code identifying the domain for the data element. Domain contains the broad definition and codes used for all data elements within its domain.
drainage	Soil Drainage Class	comp s5	Code identifying the natural drainage condition of the soil and refers to the frequency and duration of periods when the soil is free of saturation. Example: Well Drained (W); Excessive (E); Moderately Well (MW); Poorly (P); Somewhat Excessively (SE); Somewhat Poorly (SP).
eddate	Date SSA Data Edited	ssarea	The date as month/day/year the data for the soil survey area was certified by the state soil scientist as edited and available for public use.
edstat	SSA Editing Status	ssarea	Code identifying the status of editing or certification level for the soil survey.
elevh	Elevation	stmu s5	Maximum value for the range in elevation, expressed in feet above MSL.
elevl	Elevation	stmu s5	Minimum value for the range in elevation, expressed in feet above MSL.
engleddate	English Edit Date	ssadates	Actual date of English edit

Element	Long Name	Tables	Description
engleddue	English Edit Due	ssadates	Projected date for English edit
ffrdate	Final Field Review Date	ssadates	Actual date of final field review
ffrdue	Final Field Review Due	ssadates	Projected date for final field review
ffrfirm	Final Field Review Firm?	ssadates	Is the final field review date firm? (Y or N)
ffsh	Frost Free Season	stmu s5	Maximum value for the range in the average number of frost free days (above 32 degrees F) expected.
ffsl	Frost Free Season	stmu s5	Minimum value for the range in the average number of frost free days (above 32 degrees F) expected for the mapunit.
filedesc	File Description	files	Data dictionary - Text description of the functions of the file.
filenm	File Name	files	Data dictionary - Identifies the name of the file.
filetyp	File Type	files	Data dictionary - Identifies the type of file, ie., SHELL, C Program, Basic Program...
fips	Numeric fips codes	none	List of numeric fips codes for each state and ntc
fld1	First Component: Flood Class	S6/map	Flooding frequency class.
fld2	Second Component: Flood Class	S6/map	Flooding frequency class.
fld3	Third Component: Flood Class	S6/map	Flooding frequency class.
fmuname1	Field Mapunit Name, 1st part	S6/map	The first 55 characters of the mapunit name.
fmuname2	Field Mapunit Name, 2nd part	S6/map	The last 55 characters of the mapunit name

Element	Long Name	Tables	Description
fmusym	Field Symbol for Mapunit	S6/map	A field map symbol that is incorporated into the mapunit.
frostact	Potential Frost Action	comp s5	An interpretation rating of the susceptibility of the soil to frost heaving.
geomorph	Geomorphic Component (hillslope)	stcomp	Code which identifies the geomorphic (hillslope) component(s) most typical for the soil. Example: FS - Footslope.
gpo date	GPO Date	ssadates	Actual date of maps and manuscript to GPO
gpo due	GPO Due	ssadates	Projected date for maps and manuscript to GPO
grpcode	Interpretative Group Code	interp s5interp	Code identifying the interpretative group or category for the interpretation specified. Examples of interpretative groups are septic tank absorption fields and shallow excavations.
grtgroup	Great Group	taxclass	Code for the taxonomic GREAT GROUP category.
gsflobeg	Growing Season Flooding Begins	comp s5	Month in which growing season (season for common field crops in the area) flooding begins in a normal year.
gsflodur	Growing Season Flood Duration	comp s5	The duration of flooding during the growing season (season for common field crops in the area).
gsfloend	Growing Season Flooding Ends	comp s5	Month in which growing season (season for common field crops in the area) flooding ends in a normal year.
gsflood	Growing Season Flooding Frequency	comp s5	Descriptive term describing the frequency of flooding during the growing season (season for the common field crops in the area). Frequent (FREQ); Occasional (OCCAS); Rare (RARE).

Element	Long Name	Tables	Description
gypsumh	Gypsum	layer s5layer	Maximum value for the range in sulfates reported as gypsum (CaSO ₄) in the soil layer or horizon, expressed as a percent.
gypsuml	Gypsum	layer s5layer	Minimum value for the range in sulfates reported as gypsum (CaSO ₄) in the soil layer or horizon, expressed as a percent.
helcfact	HEL C Factor	helclass	C factor for the mapunit used in the calculation of Highly Erodible Lands Classification (HEL).
helrfact	HEL R Factor	helclass	R factor for the mapunit used in the calculation of Highly Erodible Lands Classification (HEL).
hydgrp	Hydrologic Group	comp s5	The hydrologic group for the soil. Example: A, A/D.
hydric	Hydric Soil Rating	comp includn	The symbol (Y/N) identifying hydric soils.
ifrcode	Initial Field Review Date	ssadates	Actual date of initial field review
ifrdue	Initial Field Review Due	ssadates	Projected date for initial field review
inch10h	Weight Percent Greater than 10 in.	layer s5layer	The maximum value for the range in percent by weight of the rock fragments greater than 10 inches size in the soil layer or horizon.
inch10l	Weight Percent Greater than 10 in.	layer s5layer	The minimum value for the range in percent by weight of the rock fragments greater than 10 inches size in the soil layer or horizon.
inch3h	Weight Percent 3 to 10 inches	layer s5layer	The maximum value for the range in percent by weight of the rock fragments three to 10 inches size in the soil layer or horizon.

Element	Long Name	Tables	Description
inch3l	Weight Percent Material 3 to 10 inches	layer s5layer	The minimum value for the range in percent by weight of the rock fragments three to 10 inches size in the soil layer or horizon.
inclpct	Included Soil Percent	includn	The percentage of the mapunit occupied by the specified included soil.
inclsoil	Included Soil	includn	Name of soil included in the mapunit.
indextyp	Index Type	table	Data dictionary - Identifies the type of index operation used to manage the table, ie., sort, index, gindex...
intesty	Mapping Intensity	stmu	Code identifying the intensity or level of detail at which the mapunit was mapped. This is related to the order of the survey. A character (H,M,L) may be appended to specify the intensity within an order. Example: 2L - Order 2, low intensity survey.
iprdue	Initial Progress Review Date	ssaprog	Date of the initial progress review
irryld	Irrigated Crop Yield	compyld muyld s5yld	The expected yield of the specific crop with irrigation. Defined as the yield expected in an average year under a high level of management.
k1	First Component: Component Kind	S6/map	Component kind.
k2	Second Component: Component Kind	S6/map	Component kind.
k3	Third Component: Component Kind	S6/map	Component kind.
keycols	Key Columns	table	Data dictionary - Identifies the key columns used for indexing or sorting the table.

Element	Long Name	Tables	Description
kfact	Soil Erodibility Factor, includes rock fragments	layer s5layer	An erodibility factor which is adjusted for the effect of rock fragments.
kffact	Soil Erodibility Factor, rock fragments free	layer s5layer	An erodibility factor which quantifies the susceptibility of soil particles to detachment and movement by water. This factor is used in the Universal Soil Loss Equation to calculate soil loss by water.
landform	Landform	stcomp	Code identifying the most typical land form(s) associated with the mapunit. Example: ST - Stream or lake terrace.
lay11	First Component: Layer 1	S6/map	Adjusted depth of layer.
lay12	First Component: Layer 2	S6/map	
lay13	First Component: Layer 3	S6/map	
lay14	First Component: Layer 4	S6/map	
lay15	First Component: Layer 5	S6/map	
lay16	First Component: Layer 6	S6/map	
lay21	Second Component: Layer 1	S6/map	
lay22	Second Component: Layer 2	S6/map	

Element	Long Name	Tables	Description
lay23	Second Component: Layer 3	S6/map	
lay24	Second Component: Layer 4	S6/map	
lay25	Second Component: Layer 5	S6/map	
lay26	Second Component: Layer 6	S6/map	
lay31	Third Component: Layer 1	S6/map	
lay32	Third Component: Layer 2	S6/map	
lay33	Third Component: Layer 3	S6/map	
lay34	Third Component: Layer 4	S6/map	
lay35	Third Component: Layer 5	S6/map	
lay36	Third Component: Layer 6	S6/map	
laydeph	Layer Depth	layer s5layer	The depth to the lower boundary of the soil layer or horizon, expressed in inches.
laydepl	Layer Depth	layer s5layer	Depth to the upper boundary of the soil layer or horizon, expressed in inches.
layerid	Layer Identification Number	layer s5layer	A convention to identify the original layers on the SOI-5 record. Example: layerid 11 for the first surface of a multisurface record, 12 for the second surface layer, 2 thru 9 for subsurface layers.

Element	Long Name	Tables	Description
layernum	Layer Number	layer	The sequence number identifying layers in the soil profile. A layer number of 1 would indicate the layer is the surface layer.
1lh	Liquid Limit	layer s5layer	The maximum value for the range in liquid limit of the soil layer of horizon, expressed as percent moisture by weight.
1ll	Liquid Limit	layer s5layer	The minimum value for the range in liquid limit of the soil layer of horizon, expressed as percent moisture by weight.
lrr	Land Resource Region	ssamou	The Land Resource Region that the survey is in (calculated from mlra)
m1	Additional Symbols on field sheets: #1	S6/map	Field map symbol incorporated into the mapunit.
m2	Additional Symbols on field sheets: #2	S6/map	
m3	Additional Symbols on field sheets: #3	S6/map	
m4	Additional Symbols on field sheets: #4	S6/map	
m5	Additional Symbols on field sheets: #5	S6/map	
m6	Additional Symbols on field sheets: #6	S6/map	

Element	Long Name	Tables	Description
m7	Additional Symbols on field sheets: #7	S6/map	
m8	Additional Symbols on field sheets: #8	S6/map	
m9	Additional Symbols on field sheets: #9	S6/map	
ma	Additional Symbols on field sheets: #10	S6/map	
mandate	Manuscript Date	ssadates	Actual date of manuscript to NSSC
mandue	Manuscript Due	ssadates	Projected date for manuscript to NSSC
mapsdate	Maps Date	ssadates	Actual date of maps sent to Carto
mapsdue	Maps Carto	ssadates	Projected date for maps sent to Carto
mb	Additional Symbols on field sheets: #11	S6/map	
mc	Additional Symbols on field sheets: #12	S6/map	
md	Additional Symbols on field sheets: #13	S6/map	
me	Additional Symbols on field sheets: #14	S6/map	

Element	Long Name	Tables	Description
mf	Additional Symbols on field sheets: #15	S6/map	
mg	Additional Symbols on field sheets: #16	S6/map	
mh	Additional Symbols on field sheets: #17	S6/map	
mi	Additional Symbols on field sheets: #18	S6/map	
minalogy	Mineralogy	taxclass	Code for the MINERALOGY class of the Family category of taxonomic classification.
mj	Additional Symbols on field sheets: #19	S6/map	
mk	Additional Symbols on field sheets: #20	S6/map	
ml	Additional Symbols on field sheets: #21	S6/map	
mlra	Major Land Resource Area	mapunit, S6/map	The code used to identify the dominant Major Land Resource Area (MLRA) within which the soil mapunit is mapped.
mm	Additional Symbols on field sheets: #22	S6/map	
mn	Additional Symbols on field sheets: #23	S6/map	

Element	Long Name	Tables	Description
mo	Additional Symbols on field sheets: #24	S6/map	
modifier	Unit Modifier	s5	Soil property which is used as phase criterion, indicating a change in interpretation drastic enough that a separate SOI-5 must be used.
moucor	MOU Data	ssamou	The completion date listed on the MOU
mousign	MOU Signed	ssamou	The date the MOU was signed
moustart	MOU Start	ssamou	The start date listed on the MOU
mp	Additional Symbols on field sheets: #25	S6/map	
mq	Additional Symbols on field sheets: #26	S6/map	
mr	Additional Symbols on field sheets: #27	S6/map	
ms	Additional Symbols on field sheets: #28	S6/map	
mua1	Mapunit Acreage County #1	S6/map	
mua2	Mapunit Acreage County #2	S6/map	
mua3	Mapunit Acreage County #3	S6/map	
mua4	Mapunit Acreage County #4	S6/map	
mua5	Mapunit Acreage County #5	S6/map	

Element	Long Name	Tables	Description
mua6	Mapunit Acreage County #6	S6/map	
muacres	Mapunit Acres	mapunit	The acreage of the soil mapunit in the soil survey area.
mucoacre	Mapunit County Acres	mucoacre	The acreage of the mapunit in the county specified.
muhelcl	Mapunit HEL Class	helclass	The overall HEL class for the soil mapunit based on the rating of its components and the wind and water HEL classification.
muid	Mapunit Identification Symbol	comp compyld deslink forest helclass inclusn interp layer mapunit mucoacre muyld plantcom rsprod stcomp stlayer stmu windbrk wlhabit woodland woodmgt S6/map	A symbol created by concatenation of the soil survey area symbol (ssaid) and mapunit symbol (musym). It uniquely identifies a mapunit within a state. For example, ssaid 061 and musym 1 is stored as muid 061001. The muid is used as a key for linking information in the MUIR tables.
mukind	Mapunit Kind	mapunit S6/map	Code identifying the kind of mapunit: Consociation (C); Association (A); Undifferentiated Group (U); Complex (X).
muname	Mapunit Name	mapunit	Correlated name of the mapunit (recommended name or field name for surveys in progress).
musym	Mapunit Symbol	mapunit comp	The symbol used to identify the soil mapunit on the soil map.

Element	Long Name	Tables	Description
muwathel	Mapunit HEL Class (water)	helclass	The highly erodible lands rating for the soil mapunit. The rating is based an evaluation of the water erosion hazard of the components of the mapunit. If all components are of a single class that class applies, if not then a 2 (Potential Highly Erodible) is assigned.
muwndhel	Mapunit HEL Class (wind)	helclass	The highly erodible lands rating for the soil mapunit. The rating is based an evaluation of the wind erosion hazard of the components of the mapunit. If all components are of a single class that class applies, if not then a 2 (Potential Highly Erodible) is assigned.
newdate	New Date	ssaudit	The new projected date for the field being changed (for surveys with a firm final field review date)
nirryld	Nonirrigated Crop Yield	compyld muyld s5yld	The expected yield of the specific crop without supplemental irrigation. Defined as the yield expected in an average year under a high level of management.
no10h	Percent Passing Sieve Number 10	layer s5layer	The maximum value for the range in percent by weight of the soil material in a layer or horizon which is less than three inches in size and passes a no. 10 sieve.
no10l	Percent Passing Sieve Number 10	layer s5layer	The minimum value for the range in percent by weight of the soil material in a layer or horizon which is less than three inches in size and passes a no. 10 sieve.
no200h	Percent Passing Sieve Number 200	layer s5layer	The maximum value for the range in percent by weight of the soil material in a layer or horizon which is less than three inches in size and passes a no. 200 sieve.

Element	Long Name	Tables	Description
no200l	Percent Passing Sieve Number 200	layer s5layer	The minimum value for the range in percent by weight of the soil material in a layer or horizon which is less than three inches in size and passes a no. 200 sieve.
no40h	Percent Passing Sieve Number 40	layer s5layer	The maximum value for the range in percent by weight of the soil material in a layer or horizon which is less than three inches in size and passes a no. 40 sieve.
no40l	Percent Passing Sieve Number 40	layer s5layer	The minimum value for the range in percent by weight of the soil material in a layer or horizon which is less than three inches in size and passes a no. 40 sieve.
no4h	Percent Passing Sieve Number 4	layer s5layer	The maximum value for the range in percent by weight of the soil material in a layer or horizon which is less than three inches in size and passes a no. 4 sieve.
no4l	Percent Passing Sieve Number 4	layer s5layer	The minimum value for the range in percent by weight of the soil material in a layer or horizon which is less than three inches in size and passes a no. 4 sieve.
ntechdes	Nontechnical Description	ntechdes	A narrative paragraph written in the vernacular of the users. Each paragraph describes the use and management of soils for specific categories of use.
oldate	Old Date	ssaudit	The latest projected date for the field that is being changed (for surveys with a firm final field review date)
omh	Organic Matter	layer s5layer	The maximum value for the range in organic matter content of the soil layer or horizon, expressed in percent by weight.

Element	Long Name	Tables	Description
om1	Organic Matter	layer s5layer	The minimum value for the range in organic matter content of the soil layer or horizon, expressed in percent by weight.
order	Order	taxclass	Code for the taxonomic ORDER category of the record.
ordsym	Ordination Symbol	woodmgt	The ordination symbol is the class and subclass part of the woodland suitability group. The first element in ordination symbol is the productivity class. This is a number that denotes potential productivity in cubic meters of wood per hectare per year for an indicator tree (1 m ³ /ha is equal to 14.3 ft. ³ /ac.). The second part of the ordination is the subclass, a capital letter symbol which indicates certain soil or physiographic characteristics that contribute to important hazards or limitations in management. Example: Excessive wetness (W); Clayey soils (C)...
oth1	First Component: Other Phase Criteria	S6/map	
oth2	Second Component: Other Phase Criteria	S6/map	
oth3	Third Component: Other Phase Criteria	S6/map	
otherfam	Other Family	taxclass	This field consists of OTHER FAMILY codes for soil depth class, slope class, consistence class, classes of coatings and classes of cracks of the Family category of taxonomic classification.

Element	Long Name	Tables	Description
otherph	Class-Determining Phase Criteria	comp	Class-determining phase criteria, other than slope and texture, recorded on the SOI-6 and used to select appropriate interpretation and rating from the SOI-5 Record.
pandeph	Depth to Cemented Pan	comp s5	Maximum value for the range in depth to the upper boundary of a cemented pan, expressed in inches.
pandepl	Depth to Cemented Pan	comp s5	Minimum value for the range in depth to the upper boundary of a cemented pan, expressed in inches.
panhard	Cemented Pan Thickness	comp s5	The degree of induration and thickness of the cemented pan. A pan is rated as "THICK" if it is more than 3 inches thick and continually indurated or more than 18 inches thick and discontinuous or fractured. Pans not meeting these criteria are rated THIN.
partsize	Patticle Size	taxclass	Code for the PARTICLE-SIZE class of the Family category of taxonomic classification.
pct1	First Component: Percent of mapunit	S6/map	Percent of mapunit.
pct2	Second Component: Percent of mapunit	S6/map	Percent of mapunit.
pct3	Third Component: Percent of Mapunit	S6/map	Percent of mapunit.
perctot	Percent Total	ssaprog	The percentage of acres mapped for the survey
permh	Permeability Rate	layer s5layer	The maximum value for the range in permeability rate for the soil layer or horizon, expressed as inches/hour.

Element	Long Name	Tables	Description
perml	Permeability Rate	layer s5layer	The minimum value for the range in permeability rate for the soil layer or horizon, expressed as inches/hour.
phh	Soil Reaction (pH)	layer s5layer	The maximum value for the range in soil reaction (pH) for the soil layer or horizon.
phl	Soil Reaction (pH)	layer s5layer	The minimum value for the range in soil reaction (pH) for the soil layer or horizon.
phother	Phases - Other	s5cap s5forest s5interp s5plantcom s5rsprod s5windbrk s5wlhabit s5woodland s5woodmgt s5yld	Phase criterion, other than slope and texture, used to identify phases on the SOI-5.
phslopeh	Phase Slope	s5cap s5forest s5interp s5plantcom s5rsprod s5windbrk s5wlhabit s5woodland s5woodmgt s5yld	Maximum value for the range in slope used as phase criterion on the SOI-5.
phslopel	Phase Slope	s5cap s5forest s5interp s5plantcom s5rsprod s5windbrk s5wlhabit s5woodland s5woodmgt s5yld	Minimum value for the range in slope used as phase criterion on the SOI-5.
pih	Plasticity Index	layer s5layer	The maximum value for the range in plasticity index for the soil layer or horizon, expressed as percent of moisture by weight.

Element	Long Name	Tables	Description
pil	Plasticity Index	layer s5layer	The minimum value for the range in plasticity index for the soil layer or horizon, expressed as percent of moisture by weight.
plantcov	Plant Ground Cover	forest s5forest	The percentage of the ground covered by the plant (forest understory).
plantpct	Plant Production Percentage	plantcom s5plantcom	The percentage of total site production attributed to the specified plant, expresses as percent of air dry plant material weight.
plantsym	Plant Symbol	forest plantcom plantnm windbrk woodland s5forest s5plantcom s5windbrk s5woodland	Symbol used to identify a specific plant.
pmuname1	Approved Mapunit Name, 1st part	S6/map	The first 65 characters of the correlated mapunit name.
pmuname2	Approved Mapunit Name, 2nd part	S6/map	The last 65 characters of the correlated mapunit name.
pmusym	Publication Map Symbol	S6/map	Correlated Mapunit Symbol
pndbeg	Ponding Begin	comp s5	Month in which soil surface ponding begins in a normal year.
pnndepth	Ponding Depth	comp s5	The maximum value for the range in depth of surface water ponding on the soil.
pnndepl	Ponding Depth	comp s5	The minimum value for the range in depth of surface water ponding on the soil.
pnnddur	Ponding Duration	comp s5	The duration of surface water ponding.
pnndend	Ponding End	comp s5	Month in which surface water ponding ends in a normal year.

Element	Long Name	Tables	Description
ppth	precipitation	s5 stmu	Maximum value for the range in average precipitation.
pptl	precipitation	s5 stmu	Minimum value for the range in average precipitation.
primfml	Prime Farmland Classification	mapunit s5cap	The prime farmland classification of the mapunit. State codes have been developed for some states.
prmfrm	Prime Farmland	S6/map	
prodfav	Range Production Favorable	rsprod s5rsprod	The estimated annual potential production of range forage for the soil in a year with favorable or above average growing conditions.
prodnorm	Range Production Normal	rsprod s5rsprod	The estimated annual potential production of range forage for the soil in a year with normal or average growing conditions.
produnfv	Range Production Unfavorable	rsprod s5rsprod	The estimated annual potential production of range forage for the soil in a year with unfavorable or below average growing conditions.
pubdate	Publication Date	ssadates	Publication date
rating	Soil Interpretative Rating	interp s5interp	Rating of soil for specified use. Suitability ratings are good, fair, and poor. Limitation ratings are slight, moderate, and severe,
reaction	Reaction	taxclass	Code for the REACTION class of the Family category of taxonomic classification.
reason	Reason	ssaudit	The reason for changing the projected date for the field (for surveys with a firm final field review date)
rec1	First Component:SIR	S6/map	Interpretation Record Number
rec2	Second Component:SIR	S6/map	Interpretation Record Number

Element	Long Name	Tables	Description
sarh	Sodium Absorption Ratio	layer s5layer	The maximum value for the range in Sodium Absorption Ratio (SAR) for the soil layer or horizon.
sarl	Sodium Absorption Ratio	layer s5layer	The minimum value for the range in Sodium Absorption Ratio (SAR) for the soil layer or horizon. indextyp:c
sciname	Scientific Plant Name	plantnm	The scientific name of a plant.
sclirr	Irrigated Capability Subclass	comp s5cap	Irrigated Capability Subclass. Concatenation of capability class and subclass codes: Example: class 2 and subclass e are combined and entered as 2E.
sclnirr	Nonirrigated Capability Subclass	comp s5cap	Nonirrigated Capability Subclass. Concatenation of capability class and subclass codes. Example: class 2 and subclass e are combined and entered as 2E.
seqnum	Sequence Number	comp compyld forest interp layer plantcom rsprod stcomp stlayer windbrk wlhabit woodland woodmgt	A number identifying the sequence of components in a mapunit. The first component of a multitaxa mapunit has a seqnum of 1, the second component 2, and so on.
shrinksw	Shrink-Swell Potential	layer s5layer	An interpretation rating of the soil layer or horizons behavior of changing volume (shrinking and swelling) upon wetting and drying.
sitind	Site Index	s5woodland woodland	The height in feet of the larger trees at some given age, normally 100 years in the western U.S., and 50 years in the east. The pinyon-juniper forest type is an exception, where the site index is determined by basal area.

Element	Long Name	Tables	Description
slopeh	Soil Slope	comp s5	The maximum value for the range of slope of a soil component within a mapunit.
slopel	Slope of Soil	comp s5	The minimum value for the range of slope of a soil component within a mapunit.
slopepos	Slope Position (geomorphic component)	stcomp	Code identifying the placement of the pedon site within the segment of the geomorphic component.
slopeshp	Slope Shape	stcomp	The most typical generalized shape(s) of the slope on which this soil is mapped.
slp1	First Component: Slope	S6/map	Slope ranges
slp2	Second Component: Slope	S6/map	Slope ranges
slp3	Third Component: Slope	S6/map	Slope ranges
soilname	Soil Name	s5	The name for the series, variant, etc. used to identify the SOI-5.
soiltemp	Soil Temperature	taxclass	Code for the SOIL TEMPERATURE class of the Family category of taxonomic classification.
sortnum	Sort Number	table	Data dictionary - Identifies the hierarchical sort sequence for a printing of a list of tables in a data set.
ssa184	Soil Survey Area 184 Acres	ssaprogr	Number of additional 184 (project) acres for the survey
ssa184an	Soil Survey Area 184 Annual Acres	ssaprogr	Total 184 (project) acres for the fiscal year
ssa185	Soil Survey Area 185 Acres	ssaprogr	Number of additional 185 (update) acres for the survey
ssa185an	Soil Survey Area 185 Annual Acres	ssaprogr	Total 185 (update) acres for the fiscal year

Element	Long Name	Tables	Description
rec3	Third Component: SIR	S6/map	Interpretation Record Number
revdate1	Review Date 1	ssareviews	Scheduled date for the first field review
revdate2	Review Date 2	ssareviews	Scheduled date for the second field review
revdate3	Review Date 3	ssareviews	Scheduled date for the third field review
revdate4	Review Date 4	ssareviews	Scheduled date for the fourth field review
revdate5	Review Date 5	ssareviews	Scheduled date for the fifth field review
revdate6	Review Date 6	ssareviews	Scheduled date for the sixth field review
revdate7	Review Date 7	ssareviews	Scheduled date for the seventh field review
revdate8	Review Date 8	ssareviews	Scheduled date for the eighth field review
rmuname1	Recommended Mapunit Name, 1st part	S6/map	The first 65 characters of the Recommended Mapunit Name
rmuname2	Recommended mapunit name, 2nd part	S6/map	The last 65 characters of the Recommended Mapunit Name
rmusym	Recommended Mapunit Symbol	S6/map	
rockdeph	Depth to Bedrock	comp s5	The maximum value for the range in depth to bedrock, expressed in inches.
rockdepl	Depth to Bedrock	comp s5	The minimum value for the range in depth to bedrock, expressed in inches.
rockhard	bedrock hardness	comp s5	The degree of hardness of the underlying rock. Rated as: HARD - Excavation requires blasting or special equipment or SOFT - Excavation can be made with trenching machines, backhoes, or small rippers.

Element	Long Name	Tables	Description
rsid	Range Site Identification	rsprod s5rsprod	Code used to identify the SCS range site.
rsname	Range Site Name	rsprod	Name for the SCS range site.
rsname1	First Component: Range Site Name	S6/map	
rsname2	Second Component: Range Site Name	S6/map	
rsname3	Third Component: Range Site Name	S6/map	
s5date	SOI-5 Date	s5	Date (MMYY) on which the SOI-5 was prepared or revised.
s5id	Soil Interpretations Record Number	comp layer s5 s5cap s5desc s5forest s5interp s5layer s5plantcom s5rsprod s5windbrk s5wlhabit s5woodland s5woodmgt s5yld	The Soil Interpretations Record (SOI-5) identification number assigned to the particular SOI-5. Example: C00034.
s5mlra	SOI-5 MLRA	s5	Major Land Resource Areas (MLRA) the SOI-5 record applies to.
salinh	Salinity	layer s5layer	The maximum value for the range in soil salinity of the soil layer or horizon measured as electrical conductivity of the soil in a saturated paste. Values are expressed in mmhos/cm.
salinl	Salinity	layer s5layer	The minimum value for the range in soil salinity of the soil layer or horizon measured as electrical conductivity of the soil in a saturated paste. Values are expressed in mmhos/cm.

<u>Element</u>	<u>Long Name</u>	<u>Tables</u>	<u>Description</u>
ssaacres	Soil Survey Area Acres	ssarea	The acreage of the soil survey area.
ssacfact	SSA Climatic Factor	stssarea	Average Climatic factor for the soil survey area. The climatic factor is used to express the influence of moisture on the surface soil particles and the average level of wind velocity on soil movement. This factor is used to calculate soil loss by wind.
ssacoac	SSA County Acres	ssacoac	The acres of a county within a soil survey area.
ssacum184	Soil Survey Area 184 Cumulative Acres	ssaprog	Total of 184 (project) acres for the survey
ssacum185	Soil Survey Area 185 Cumulative Acres	ssaprog	Total 185 (update) acres for the survey
ssaid	Soil Survey Symbol	mapunit ssarea stssarea ssarea S6/ssa S6/map	Three character numeric code which identifies the soil survey area. For survey areas covering a single county the ssaid is the county FIPS code. For multicounty survey areas the ssaid is identified in the Soil Survey Schedule. Example: 617,...012.
ssalen	Soil Survey Area Length	ssaprog	Number of years for completion of survey
ssamlra	Soil Survey Area MLRA	ssamou ssaudit	The Major Land Resource Area that the survey is in
ssaname	Soil Survey Area Name	ssarea ssaudit	The name given to the survey.
ssaname1	Soil Survey Area Name, 1st part	S6/ssa	First 45 characters of the Soil Survey Area Name
ssaname2	Soil Survey Area Name, 2nd part	S6/ssa	The next 45 characters of the Soil Survey Area Name

Element	Long Name	Tables	Description
ssaname3	Soil Survey Area Name, 3rd part	S6/ssa	The last 45 characters of the Soil Survey Area Name
ssanum	State/SSA Identification number	ssarea	A five character identification number for the soil survey area. Created by combining the numeric state code and the soil survey area symbol (ssaid). Example: 08617.
ssanum1	State Alpha/Soil Survey Area Id	S6/ssa	State FIPS numeric plus Soil Survey Area Id; only state number is stored on card formats
ssarfact	SSA Rainfall Factor	stssarea	Average Rainfall factor for the soil survey area. Rainfall factor is used to express the influence of rainfall amount, time and intensity on soil movement. This factor is used to calculate soil loss by water.
state	State Code (Alpha)	ssarea S6/ssa S6/map	FIPS alpha code for the state. Example, CO..AR.
status	SSA Status	ssarea	Code identifying the completion status for a soil survey. Example: Published (P); Nonpublished (N).

Element	Long Name	Tables	Description
stssaid	State/Survey Survey Area ID	comp compyld forest helclass includn interp layer mapunit mucoacre muyld plantcom rsprod ssacoac ssarea stcomp stlayer stmu stssarea windbrk wlhabit woodland woodmgt S6/ssa S6/map ssadates ssamou ssaprog ssareviews ssaudit	A concatenation of FIPS alpha code for a state and the soil survey area symbol (ssaid). Example: CO017.
subgroup	Subgroup	taxclass	Code for the taxonomic SUBGROUP category of the record.
subinith	Initial Subsidence	comp s5	Maximum value for the range in initial subsidence that can be expected when drained, expressed in inches (organic soils only).
subinitl	Initial Subsidence	comp s5	Minimum value for the range in initial subsidence that can be expected when drained, expressed in inches (organic soils only).
suborder	Suborder	taxclass	Code for the taxonomic SUBORDER category of the record.
subtoth	Total Subsidence	comp s5	Maximum value for the range in total subsidence that can be expected when drained, expressed in inches (organic soils only).

Element	Long Name	Tables	Description
subtotl	Total Subsidence	comp s5	Minimum value for the range in total subsidence that can be expected when drained, expressed in inches (organic soils only).
suitcode	Woodland Tree Suitability	woodland s5woodland	Code indicating if the tree is common to the site; Existing (E), or a tree which could be planted as a tree crop; Potential (P). Trees which area both existing and have a potential for planting are giving a dual code (EP).
surftex	Surface Soil Texture	comp	Code for the USDA texture for the surface layer or horizon. Example: Loam (L); Sandy loam (SL).
tabledes	Table Description	table	Data dictionary - Text description of the relationship and contents of a data table.
tablelbl	Table Label	table	Data dictionary - Identifies the long label or name for a table.
tablenm	Table Name	table	Data dictionary - Identifies the short name used to identify the table in the database.
tblowner	Table Owner	table	Data dictionary - Identifies the owner of the database table.
tblperm	Table Permissions	table	Data dictionary - Identifies the access permissions set for the database table.
tdate	Today's Date	ssaudit	Takes the system date for tracking changes to surveys with a firm final field review date
techdate	Technical Review Date	ssadates	Actual date of the manuscript's technical review
techdue	Technical Review Due	ssadates	Projected date for the manuscript's technical review

Element	Long Name	Tables	Description
tex1	First Component: texture	S6/map	Texture class and includes the modifier of the survey layer
tex2	Second Component: texture	S6/map	Texture class and includes the modifier of the survey layer
tex3	Third Component: texture	S6/map	Texture class and includes the modifier of the survey layer
texture	Soil Texture Class	layer s5layer	Code for the USDA texture for the specified layer or horizon of the soil. Example: Sandy Loam (SL); Loam (L).
tfact	T Factor	layer s5layer	Soil loss tolerance factor. The maximum rate of soil erosion that will permit a high level of crop production.
totacre1	County 1, Total Acreage	S6/ssa	
totacre2	County 2, Total Acreage	S6/ssa	
totacre3	County 3, Total Acreage	S6/ssa	
totacre4	County 4, Total Acreage	S6/ssa	
totacre5	County 5, Total Acreage	S6/ssa	
totacre6	County 6, Total Acreage	S6/ssa	
unified	Unified Soil Classification	layer s5layer	The Unified soil classification. An engineering classification of soils.
unitkind	Unit Kind	s5	The kind of unit: Series, Variant, Family, ...
user	User	ssaudit	Gets the logname of the current user for tracking changes to surveys with a firm final field review date

Element	Long Name	Tables	Description
wdequip	Woodland Equipment	woodmgt s5woodmgt	Woodland limitation rating for the use of equipment, year round or seasonal.
wderosn	Woodland Erosion	woodmgt s5woodmgt	Woodland limitation rating identifying the probability that damage may occur as a result of site preparation and following cutting operations where soil is exposed.
wdplant	Woodland Plant Competition	woodmgt s5woodmgt	Woodland limitation rating for the likelihood of the invasion or growth of undesirable species when openings are made in the canopy.
wdseed	Woodland Seeding Mortality	woodmgt s5woodmgt	Woodland limitation rating identifying the probability of death of naturally occurring or planted tree seedlings as influenced by kinds of soil or topographic conditions.
wdwind	Woodland Windthro Hazard	woodmgt s5woodmgt	Woodland limitation rating identifying the windthrow hazard. Windthrow is the likelihood of trees being uprooted by wind as a result of insufficient depth of the soil to give adequate root anchorage.
weg	Wind Erodibility Group	layer s5layer	The wind erodibility group (weg) assigned to the soil layer or horizon.
wlconif	Wildlife Habitat Element (coniferous trees)	wlhabit s5wlhabit	Suitability of the soil to produce the wildlife habitat element coniferous trees.
wlgrain	Wildlife Habitat Element (grain)	wlhabit s5wlhabit	Suitability of the soil to produce the wildlife habitat element grain.
wlgrass	Wildlife Habitat Element (grass)	wlhabit s5wlhabit	Suitability of the soil to produce the wildlife habitat element grass.
wlhard	Wildlife Habitat Element (hardwood trees)	wlhabit s5wlhabit	Suitability of the soil to produce the wildlife habitat element hardwood trees.

Element	Long Name	Tables	Description
wlherb	Wildlife Habitat Element (herbaceous plants)	wlhabit s5wlhabit	Suitability of the soil to produce the wildlife habitat element herbaceous plants.
wlopen	Wildlife Habitat Potential (openland)	wlhabit s5wlhabit	Suitability of the soil to produce the habitat requirements for openland wildlife.
wlrange	Wildlife Habitat Potential (rangeland)	wlhabit s5wlhabit	Suitability of the soil to produce the habitat requirements for rangeland wildlife.
wlshlwat	Wildlife Habitat Element (shallow water)	wlhabit s5wlhabit	Suitability of the soil to produce the habitat element shallow water.
wlshrub	Wildlife Habitat Element (shrub)	wlhabit s5wlhabit	Suitability of the soil to produce the wildlife habitat element shrubs.
wlwet	Wildlife Habitat Potential (wetland)	wlhabit s5wlhabit	Suitability of the soil to produce the habitat requirements for wetland wildlife.
wlwetplt	Wildlife Habitat Element (wetland plant)	wlhabit s5wlhabit	Suitability of the soil to produce the wildlife habitat element wetland plants.
wlwood	Wildlife Habitat Potential (woodland)	wlhabit s5wlhabit	Suitability of the soil to produce the habitat requirements for woodland wildlife.
wndbrkht	Windbreak Tree Height	windbrk s5windbrk	Windbreak tree height in feet at age 20 years of age.
woodprod	production class	woodland s5woodland	Production class information for a specific tree measured in cubic meters per hectare per year (1 m ³ /ha = 14.3 ft. ³ /ac.).
wtbeg	Water Table Begins	comp s5	Month in which seasonal water table occurs at the depth specified in a normal year.
wtdeph	Water Table Depth	comp s5	Maximum value for the range in depth to the seasonally high water table during the months specified.

Element	Long Name	Tables	Description
wtdepl	Water Table Depth	comp s5	Minimum value for the range in depth to the seasonally high water table during the months specified.
wtend	Water Table Ends	comp s5	Month in which seasonal water table subsides below the depth specified in a normal year.
wtkind	Water Table Kind	comp s5	The type of water table: Apparent (APPAR); Artesian (ARTES); Perched (PERCH).
yldunits	Yield Units	yldunits	The units used to record the yield for the specified crop.