CULTURAL RESOURCES STUDY

For

SANTA ROSA SUBREGIONAL LONG-TERM WASTEWATER PROJECT

Volume I

Prepared for

City of Santa Rosa
and
U. S. Army Corps of Engineers

July 1996

Prepared by

ANTHROPOLOGICAL STUDIES CENTER
SONOMA STATE UNIVERSITY ACADEMIC FOUNDATION, INC.
1801 EAST COTATI AVENUE, ROHNERT PARK, CALIFORNIA 94928
(707) 664-2381

For

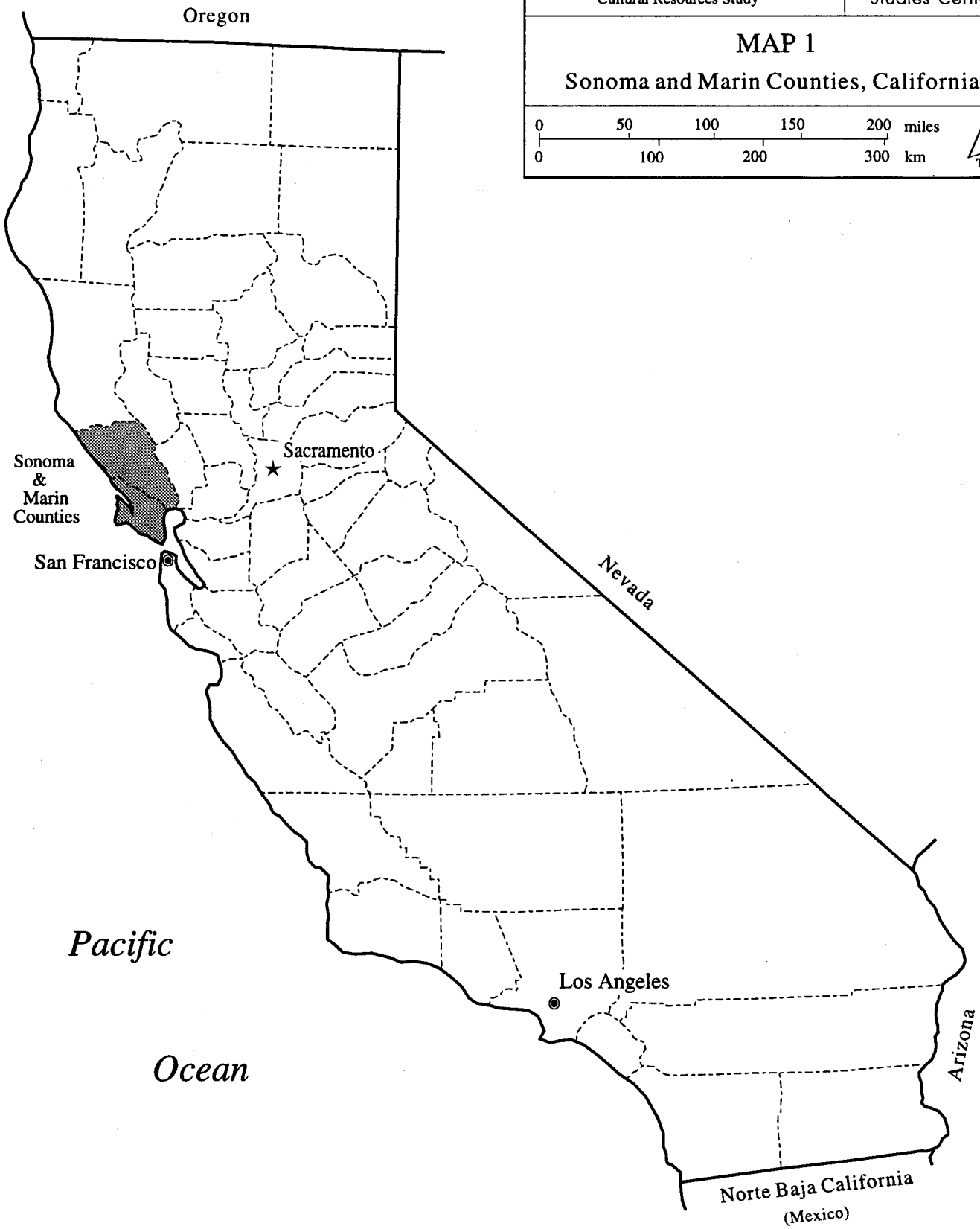
HARLAND BARTHOLOMEW & ASSOCIATES, INC.

Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study

SSU
Anthropological
Studies Center

MAP 1

Sonoma and Marin Counties, California



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Volume I

by

Christian Gerike, B.A., Seana L. S. Gause, B.A., Suzanne Stewart, M.A., and Katherine Johnson, M.A.

under the direction of

Adrian Praetzellis, Ph.D., Director

ANTHROPOLOGICAL STUDIES CENTER

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1. PURPOSE

1.1 INTRODUCTION

1.1.1 THE CITY OF SANTA ROSA SUBREGIONAL LONG-TERM WASTEWATER PROJECT

The City of Santa Rosa is proposing the expansion of current facilities and the development of new facilities for the management of the City's wastewater. The four alternatives together with a No Project/No Action alternative encompass a large geographic area in Sonoma County and a portion of northern Marin County (see Maps 1 and 2). The substantial study area extends from The Geysers in the north, to San Pablo Bay in the south, west to Valley Ford and east to the Sonoma Mountains. The Project area includes the cities of Santa Rosa, Sebastopol, Rohnert Park, Cotati, and Petaluma.

The alternatives under consideration include 10 candidate reservoirs for the storage of reclaimed water, pipeline routes, irrigation areas, discharge at The Geysers geothermal steam fields, and discharge into the Russian River.

Lead agencies for the Project are the City of Santa Rosa and the U. S. Army Corps of Engineers, San Francisco District (Corps). Cooperating agencies include the National Oceanic and Atmospheric Administration (NOAA) and the Bureau of Land Management (BLM). Harland Bartholomew and Associates, Inc. (HBA), of Sacramento, California, is responsible for producing the Environmental Impact Report/Statement. This study was developed in consultation with the California State Office of Historic Preservation (OHP) and the Corps.

In August of 1993, Harland Bartholomew and Associates, Inc., contracted with the Sonoma State University Academic Foundation, Inc., Anthropological Studies Center, to undertake a cultural resources study for the Environmental Impact Report/Statement for the Project. Work for the Project was done under account/job numbers 52032-107/93, 52033-117/94, and 52033-38/95.

Project Alternatives

The City of Santa Rosa is developing a long-term wastewater project for the expansion of headworks capacity and treated wastewater disposal. Five project alternatives, including No Project/No Action alternative, are currently being evaluated for their impacts on the environment. Alternatives are comprised of storage reservoirs for reclaimed water, transmission pipelines, pump stations, discharge of treated water, recharge of The Geysers geothermal steamfields, and irrigation of both urban and agricultural areas with reclaimed water. The alternatives under consideration involve approximately 64,000 acres, hundreds of miles of pipelines, and 10 candidate reservoirs for the storage of reclaimed water (see Map 2 and Appendix A). The summary descriptions of the alternatives are as follows:

Alternative 1 No Project / No Action

The No Project/No Action alternative is an evaluation of impacts that would occur if no project is implemented. In this case, the No Project/No Action alternative is the existing wastewater disposal system and Interim Master Plan components. This alternative was not evaluated during the current study.

Alternative 2 South County Reclamation

The South County Reclamation Alternative focuses on the use of reclaimed water for agricultural irrigation in areas south and east of Santa Rosa. It includes five possible storage reservoir locations, and agricultural irrigation areas east of Rohnert Park, east of Adobe Road, east of Lakeville Highway, in the Sebastopol area, in the San Pablo Bay flats, and an area north of Petaluma. In addition, urban irrigation in the Bennett Valley and Fountain Grove areas is being proposed.

Alternative 3 West County Reclamation

The West County Reclamation Alternative focuses on the use of reclaimed water for agricultural irrigation in areas west of Cotati and Petaluma. It includes five possible storage reservoir locations, and agricultural irrigation of land in areas along Stemple and Americano Creeks and in the area west of Sebastopol. Also being proposed is urban irrigation in the Bennett Valley and Fountain Grove areas.

Alternative 4 Geysers Recharge

The Geysers Recharge Alternative provides for transmission of reclaimed water to the Sonoma Geysers, located northeast of Healdsburg, for recharge of the steamfields that are currently used as a source of geothermal energy.

Alternative 5 Russian River Discharge

This Alternative provides for the discharge of reclaimed water to the Russian River.

1.1.2 Purpose and Scope of Work

This cultural resources study identified, through archival and field study, cultural resources that may be affected by the Santa Rosa Subregional Long-Term Wastewater Project to address the California Environmental Quality Act (CEQA), the National Environmental Policy Act (NEPA), and the requirements of Section 106 of the National Historic Preservation Act of 1966 as amended. The study was done concurrently with the development of the Project, responding to design changes from a variety of ongoing engineering, monetary, environmental, and political constraints.

The purposes of this study have been (1) to identify prehistoric and historic archaeological sites, historic architectural sites, traditional cultural properties, and historic landscapes; and (2) to preliminarily identify ways to avoid or lessen impacts on cultural resources that may be caused by the Subregional System in order to fulfill requirements of the National Historic Preservation

Act (1966, as amended), the California Environmental Quality Act (1970) and the National Environmental Policy Act (1969). Once a preferred alternative is chosen, further evaluation of each affected area will need to be conducted.

1.1.3 THE CULTURAL RESOURCES STUDY

Because of the substantial area of the Project and because elements of the Project are as yet undefined, only the candidate reservoir locations and sites of ground disturbance from other environmental studies (e.g., geotechnical testing) were field studied. Sensitivity studies were conducted of all irrigation areas, pipeline routes, and construction zones including access roads, diversion ditches, tunnel portals, spillways and riprap areas. Once a preferred alternative for the Project is chosen, all lands within the areas of potential effect (APE) will require further study.

Jody Brown (HBA) coordinated the cultural resources study by Anthropological Studies Center with Richard Stradford, Army Corps of Engineers, San Francisco District. Mr. Stradford submitted the proposed scope of work and the APE to be studied to the State of California Office of Historic Preservation for review. The Office of Historic Preservation, in a letter dated 12 July 1995, concurred with the proposed scope of work and APE as proposed. The APE consists of the proposed reservoirs, pipeline routes, and irrigation areas depicted on Maps 4.1-4.25, and a 1-mile radius around each proposed reservoir which was reviewed for historic buildings that might have their settings affected.

Archival and literature searches were conducted for all areas of potential effect, involving tens of thousands of acres of proposed irrigation land and hundreds of miles of proposed pipelines. Intensive field study was conducted of all candidate reservoir locations to identify, record, and make preliminary evaluations of historic and prehistoric archaeological sites, historical architectural properties, and historic landscapes.

An archival geoarchaeological study was done to assess the potential for subsurface archaeological sites in the area. The results of this study are reported in "Preliminary Assessment of Subsurface Archaeological Potential for the Santa Rosa Wastewater Project, Sonoma and Marin Counties, California" (Meyer 1995). Project subsurface geological and hydrological investigations were archaeologically monitored. Contacts with Native American groups, historical societies, government agencies, local museums, and other interested groups and individuals were made to identify specific concerns regarding cultural resources in the project area.

1.1.4 RECORDS SEARCH, LITERATURE AND ARCHIVAL STUDY

Records searches were conducted at the Northwest Information Center of the Historical Resources Information System intermittently from February 1995 through January 1996. At the same time, an archival study and a search of environmental, archaeological, and historical literature were done of the proposed agricultural irrigation lands in West County, South County, in urban centers, and in the Sebastopol area; pipelines leading to all irrigation areas, The Geysers, and candidate reservoir locations; pump station locations; and candidate reservoirs and associated construction zones.

1.1.5 Field Survey

Field surveys were conducted at all candidate reservoir locations in western and southern Sonoma County (see Maps 5.1 - 5.4), totaling more than 3,500 noncontiguous acres. Due to adverse weather and property access difficulties, these surveys were conducted intermittently over a period of seven months between February and September 1995. Multiple visits to most candidate reservoirs were necessary due to adverse weather and access conditions.

1.1.6 Constraints on Field Investigation

The winter of 1994-1995 proved to be a year of record rainfall. Heavy rains began in October and continued through April. The rains, saturated soils, and standing water were a hindrance to field survey. Ground visibility was often poor due to dense vegetation. Also, some property owners were reluctant to allow field crews access under these conditions.

Frequent schedule changes due to property owners' access restrictions presented continual challenges to effective and successful survey. Landowners were concerned about animal control, crop harvesting or growing crops, and ground disturbance. In some instances, court orders were required to obtain access to the Project area, usually resulting in severe time constraints on conducting surveys.

Generally these constraints were not significant enough to prevent effective survey.

1.1.7 Report Preparers / Reviewers

This study was completed under the supervision of Dr. Adrian Praetzellis (Member, Society of Professional Archeologists [SOPA]), Director, Anthropological Studies Center, Sonoma State University Academic Foundation, Inc. The current volume was written by Christian Gerike, B.A.; Seana L. S. Gause, B.A.; Suzanne Stewart, M.A. (SOPA); and Katherine Johnson, M.A. In-house review was done by the ASC Director, and the authors reviewed each other's work. Technical and substantive editing of the report was done by Suzanne Stewart. Qualifications of the Anthropological Studies Center personnel that worked on the study are presented in Appendix B.

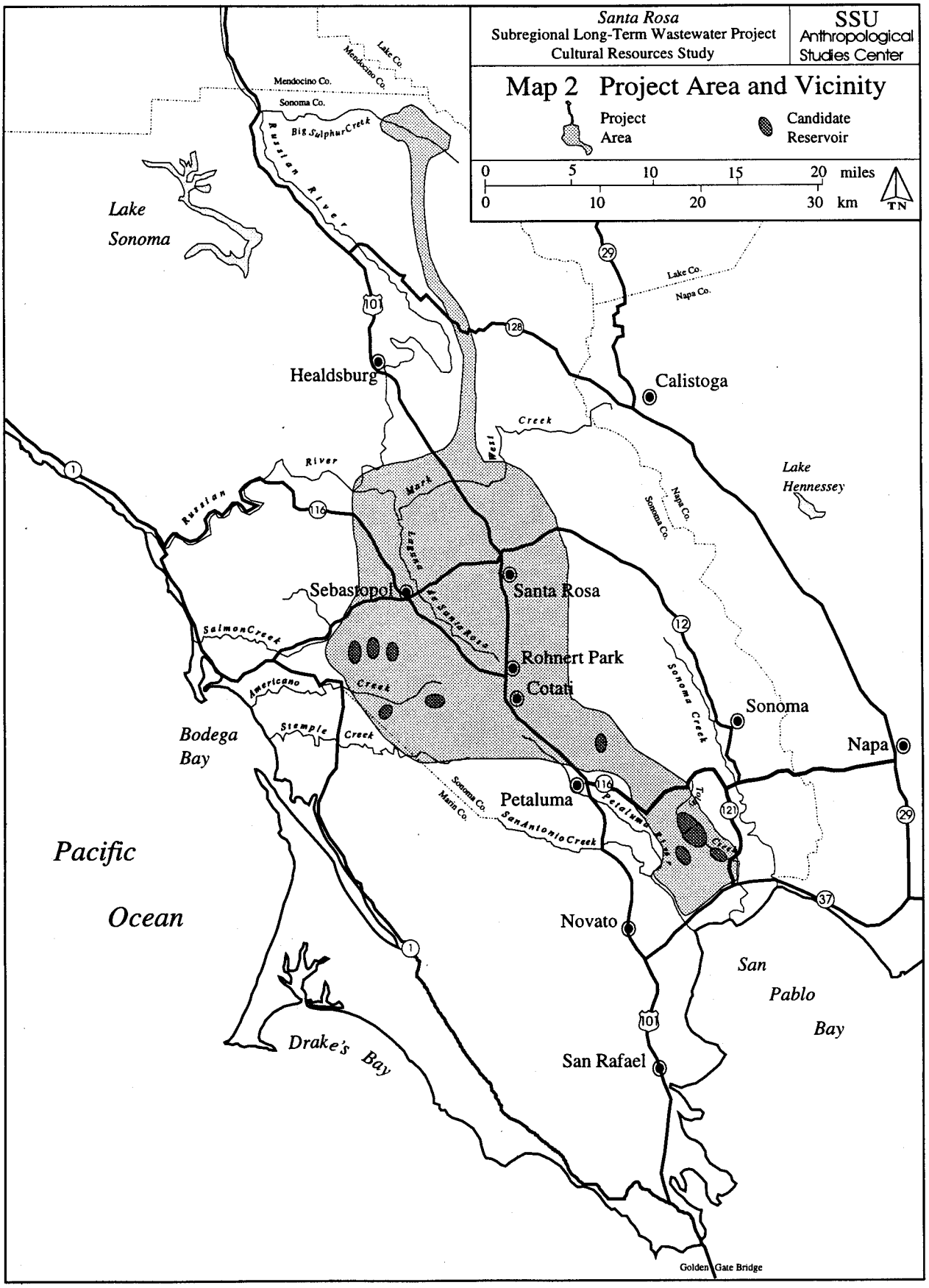
The report was also reviewed by Jody L. Brown, M.A., Harland Bartholomew and Associates, Sacramento, California; and J. Sanderson Stephens, M.A., Parsons Engineering Science, Fairfax, Virginia.

1.1.8 Disposition of Files

All field notes, survey and monitoring forms, correspondence, project administration files, and photographs and negatives are archived at the Anthropological Studies Center, Sonoma State University, Rohnert Park, California 94928.

1.1.9 CONFIDENTIALITY OF CULTURAL RESOURCES INFORMATION

Cultural resources are nonrenewable and their scientific, cultural, and aesthetic values can be significantly impaired by disturbance. To deter vandalism, artifact hunting, and other activities which can damage cultural resources, the locations of cultural resources are kept confidential. The legal authority to restrict cultural resource location information is in the National Historic Preservation Act of 1966, Section 304, and California Government Code 6254.1. The locations of the cultural resources identified during this study are depicted on the maps in Volume II, which is available only on a need to know basis.


Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
Map 2 Project Area and Vicinity
Project Area
Candidate Reservoir
0 5 10 15 20 miles
0 10 20 30 km
TN
Lake Sonoma
Mendocino Co.
Sonoma Co.
Lake Co.
Napa Co.
Big Sulphur Creek
Russian River
Healdsburg
Calistoga
Lake Hennessey
West Creek
Mark
Laguna de Santa Rosa
Sebastopol
Santa Rosa
Rohnert Park
Cotati
Salmon Creek
Americano Creek
Stemple Creek
Sonoma Creek
Sonoma
Napa
Bodega Bay
Petaluma
Petaluma River
Tolay Creek
San Antonio Creek
Marin Co.
Pacific Ocean
Novato
San Pablo Bay
Drake's Bay
San Rafael
Golden Gate Bridge

1.2 REGULATORY CONTEXT

1.2.1 INTRODUCTION

A purpose of this cultural resources study by the Anthropological Studies Center was to produce a technical report to address the requirements of the California Environmental Quality Act, the National Environmental Policy Act, and Section 106 of the National Historic Preservation Act for the Santa Rosa Subregional Long-Term Wastewater Project EIR/S.

1.2.2 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) states that it is the policy of the State of California to "take all action necessary to provide the people of this state with clean air and water, enjoyment of aesthetic, natural and scenic, and *historic environmental qualities,...* and preserve for future generations representations of all plant and animal communities and *examples of the major periods of California history*" [emphasis added] (California Governor's Office of Planning and Research [OPR] 1992:5). Under CEQA, a project will have a significant effect on the environment if it will "disrupt or adversely affect a prehistoric or historic archaeological site or a property of historic or cultural significance to a community or ethnic or social group" or if it will "conflict with established recreational, educational, religious or scientific uses of the area" (OPR 1992:194).

Appendix K of the CEQA Guidelines states that "Public agencies should seek to avoid damaging effects on an archaeological resource whenever feasible. If avoidance is not feasible, the importance of the site shall be evaluated . . . In-situ preservation is the preferred manner of avoiding damage"; as the artifactual contents of the site are preserved in their proper context, it keeps the site available for more sophisticated future research methods and may also avoid conflict with religious or cultural values of groups associated with the site (OPR 1992:205).

Impacting an archaeological resource is considered a significant effect on the environment if that resource is important in terms of specific CEQA criteria. CEQA (OPR 1992:205-206) states that an "important archaeological resource" is one which:

A. Is associated with an event or person of:

   1. Recognized significance in California or American history, or
   2. Recognized scientific importance in prehistory;

B. Can provide information which is both of demonstrable public interest and useful in addressing scientifically consequential and reasonable or archaeological research questions;

C. Has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind;

D. Is at least 100 years old and possesses substantial stratigraphic integrity; or

E. Involves important research questions that historical research has shown can be answered only with archaeological methods.

1.2.3 THE CALIFORNIA REGISTER OF HISTORICAL RESOURCES

The California Register of Historic Places (California Public Resources Code 5024 et seq.) establishes a comprehensive listing of California's historical resources, including those of local, state, and national significance. While the significance criteria for the California Register of Historic Places are similar to those used by the National Register (see below), the California Register documents the unique history of California. The California Register is the definitive guide to properties which are automatically afforded consideration during the CEQA review process. Guidelines for implementing the California Register of Historic Places are currently being developed (OHP 1994).

1.2.4 NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act states that it is the responsibility of the federal government to use all practicable means to "preserve important historic, cultural, and natural aspects of our national heritage . . ." Although NEPA does not have its own evaluation criteria, archaeological and historic preservation are always considered in project analyses.

1.2.5 NATIONAL HISTORIC PRESERVATION ACT

Section 106 of the National Historic Preservation Act (NHPA) requires that every federal agency "take into account" how each of its undertakings could affect historic properties. An undertaking includes a broad range of Federal activities: construction, rehabilitation and repair projects, demolition, licenses, loans, loan guarantees, grants, federal property transfers, permits, and other types of federal involvement. Whenever one of these activities affects a historic property, the sponsoring agency is obligated to seek comments from the Advisory Council on Historic Preservation (ACHP). For the purposes of Section 106, any district, site, building, structure or object listed in or eligible for listing in the National Register of Historic Places is considered a historic property (ACHP 1989:1).

The criteria for determining whether or not a property is eligible for the National Register of Historic Places are found at 36 CFR 60 and are reproduced below:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

B. That are associated with the lives of persons significant in our past; or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded, or may be likely to yield, information important in prehistory or history.

As stated in National Register Bulletin 15, *How to Apply the National Register Criteria for Evaluation* in order for a property to qualify for the National Register, it must meet one of the National Register Criteria for Evaluation by:

- Being associated with an important historic context *and*
- Retaining historic integrity of those features necessary to convey its significance.

Information about the property based on physical examination and documentary research is necessary to evaluate a property's eligibility for the National Register [National Park Service 1991a:3].

National Register Bulletin 15 also notes that "Properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register." Properties less than 50 years old qualify for National Register listing only in exceptional cases (National Park Service 1991a:2).

If properties included in or eligible for inclusion in the National Register are found during an inventory phase, the effect that the undertaking may have on them is assessed. If the undertaking will affect a historic property, consultation with the State Historic Preservation Officer and others is done to find ways to make the undertaking less harmful. Others consulted may include local governments, Indian tribes, property owners, other members of the public, and the Advisory Council. Consultation is designed to result in a Memorandum of Agreement that outlines measures to reduce, avoid, or mitigate the adverse effect (ACHP 1989:2)

1.3 STUDY SUMMARY

1.3.1 FINDINGS OF STUDY

A total of 282 cultural resources have been identified within Alternatives 2, 3, 4, and 5 of the Santa Rosa Subregional Long-Term Wastewater Project as a result of field and sensitivity studies. These resources include prehistoric and historic archaeological sites, historic architectural sites, historic architectural districts, potential archaeological districts, and historic landscapes. At this stage of the project, each of these resources has the potential to be affected. Upon selection of a preferred alternative, however, the number of cultural resources that may be affected by any one of the alternatives will be significantly reduced.

During a preliminary evaluation following the identification process, sites within the candidate reservoir boundaries were examined for their potential eligibility for listing on the National Register of Historic Places as required by the Section 106 process. The evaluations were based upon information collected during the field surveys, interviews with persons knowledgeable about the resources, and background literature and archival research. Archaeological test excavations were not conducted as part of the evaluation process.

The field study resulted in the identification of 32 properties that may be eligible and that have the potential to be disturbed by the Santa Rosa Subregional Long-Term Wastewater Project. Of the 246 resources identified by the sensitivity study, three have already been listed on the National Register of Historic Places: the Luther Burbank House and Garden within the East Santa Rosa/Bennett Valley Irrigation areas; the Petaluma Adobe along the S Pipeline Route; and the Llano Road Roadhouse along the W Pipeline Route. The Railroad Square District, along the Urban Irrigation Pipeline route, is also listed on the National Register. Numerous other sites identified during the sensitivity study may be eligible for listing on the National Register pending additional survey, testing, and evaluation.

1.3.2 RECOMMENDATIONS

Much of the Project is still subject to final design. Only those portions of the proposed Subregional System that have been firmly delineated (i.e., candidate reservoirs) have been field studied. Upon selection of a preferred alternative, the following is recommended:

- Conduct research and field studies to identify any additional cultural resources, including traditional cultural properties, and to identify possible subsurface archaeological site locations;

- Evaluate the cultural resources for their National Register of Historic Places eligibility;

- Evaluate the cultural resources for their local significance in accordance with California Historic Resources Inventory Survey Workbook (Office of Historic Preservation 1986:18) [see Section 3.6 Preliminary Evaluations, Local Significance]; and

- Establish management procedures for the avoidance or mitigation of adverse effects on those cultural resources determined eligible to the National Register or locally significant (Cultural resources not eligible for listing on the National Register, or not locally significant, require no protection or mitigation procedures).

- The assessment of effects on historic properties and development of procedures for this treatment shall be done in consultation with the State of California Office of Historic Preservation.

Discussion

If implemented, the Santa Rosa Subregional Long-Term Wastewater Project could affect a large number of cultural resources. As a result of literature, archival, and field research this study identified numerous and diverse cultural resources on local, state, and national listings, as well as 32 previously unrecorded cultural resources. Although further study and formal evaluations would be necessary to determine their significance, preliminary evaluation suggests that many of these cultural resources may be eligible for listing on the National Register of Historic Places or may be of local importance (see Recommendations).

This study's identification of deeply buried cultural resources in the West County area is an important contribution to the area's archaeological database. West County has been particularly notable for a paucity of surface archaeological sites. The present study has significantly revised our understanding of the potential distribution of archaeological sites in both West and South county and has pointed out the need for a reconsideration of the area's prehistory based on study of prior landscapes and the phenomenon of the buried site.

Another important finding of the cultural resources study is the identification of numerous archaeological sites in the Two Rock and Tolay Valley areas. These sites appear to represent a broad range of time and a wide variety of prehistoric and historic activities. It seems probable that these sites, particularly if studied in relationship to each other, have a potential to contribute important information to the archaeological understanding of the San Francisco Bay Area and the North Coast Ranges.

Many of the cultural resources in the project area appear to meet Criteria A, B, C, or D of the National Register of Historic Places, and thus may be eligible for listing. Continuing degradation of cultural resources due to urbanization, construction and development projects, natural disasters, and other factors cause the remaining cultural resources to increase in significance. As such, all reasonable efforts should be made to avoid adverse impacts to significant resources. Avoidance of adverse effects can include adequate mitigation to produce significant data about the cultural resources affected.

2. METHODOLOGY

2.1 METHODS

2.1.1 INTRODUCTION

The primary goal of this study has been to identify cultural resources that might be affected by implementation of the Santa Rosa Subregional Long-Term Wastewater Project. The following tasks were conducted to achieve this goal:

- a records search to identify previously recorded cultural resources and previous studies within the APE;
- extensive literature and archival research to (1) identify unrecorded cultural resources and (2) develop context;
- a geoarchaeological study was conducted to identify the locations of potential subsurface cultural resources;
- field survey of the candidate reservoir localities and recording of identified cultural resources;
- monitoring of ground-disturbing geotechnical studies associated with the Project;
- a sensitivity study of those portions of the APE not field studied; and
- contact with historical societies, Native American organizations and individuals, government agencies, and other interested parties, and attendance at public meetings.

Based on the background research as well as the authors' personal familiarity with the Project area, the nature and distribution of various site types within the candidate reservoir localities were predicted. These expectations are outlined below.

Prehistoric Sites

Prehistoric habitation and resource-procurement/processing archaeological sites were expected in environmental settings similar to those in which they have been previously recorded in northern California (i.e., near sources of water, on gentle terrain, and near vegetation ecotones). Petroglyph sites were expected to be present in areas of suitable rock outcrops, particularly schist outcrops (see also Hotz-Steenhoven 1986). Emergent period prehistoric archaeological sites were anticipated at those locations identified by ethnographic studies as habitation, resource-processing, or ceremonial sites.

While the nature and distribution of natural resources can help to predict site locations, the environment has been altered significantly in some locations. For example, the West County area, prior to historical times, probably had a denser and wider distribution of mixed-forest species. Today the area lacks resources that could support prehistoric populations.

Based on research conducted specifically for this Project, as well as previous knowledge of the study areas, subsurface (i.e., buried) prehistoric archaeological sites were anticipated, particularly in alluvial areas.

Overall, a greater density of prehistoric archaeological sites was expected than were previously known to exist in the Project area.

Historical Sites

Though historic archaeological and architectural sites have been increasingly identified in Sonoma and Marin county archaeological studies over the past 15 years, only a few such sites had been identified in the Project's field-survey areas and vicinity. Background research, based on historical maps, literature and historical architectural studies, indicated the possibility of a variety of historic archaeological and architectural resources. It was anticipated that some of the historical archaeological sites, as well as some small-scale landscape elements associated with historical architectural resources, would have been subject to the soil movement (see Subsurface Sites below) that occurs in southern and western Sonoma County and northern Marin County, and would consequently have been buried.

Traditional Cultural Properties

Traditional cultural properties (TCPs) are resources that are associated with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. Few traditional cultural properties have been identified in southern Sonoma or northern Marin counties. Contacts were made with local Native American organizations and representatives and historical societies to specifically elicit information about traditional cultural properties in the Project area.

Historic Landscapes

Identified as well during the course of the study were historic cultural landscapes. Due to the rural locations of the candidate reservoirs the focus of the study was on rural historic landscapes. National Register Bulletin 30, *Guidelines for Evaluating and Documenting Rural Historic Landscapes*, defines "rural historic landscape" as

> A geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features [National Park Service 1990:1-2].

An important aspect of landscapes is that they can consist of large areas, often covering many square miles. The countryside of the candidate reservoirs consists of two historic landscapes representing the dairying industry--one in West County and the other in South County. Archival and literature study also indicated that historical landscapes exist in the Sebastopol apple-growing area and in the "wine country" of northern Sonoma County.

Subsurface Sites

To address the potential of subsurface cultural resources, a study was conducted by the ASC staff geoarchaeologist (Meyer 1995). Background research was done to gain an understanding of soil deposition and movement within the project area. Research indicated that soil movement in several portions of the Project area may have obscured cultural resources. Such soil movements include slides, slumps, debris flows, creep, slips, landslides, alluviation, and flood deposits (see also section 3.2.1, Geology).

Archaeological District

The archaeological sites within the Tolay Creek watershed and Two Rock candidate reservoir may be most appropriately treated as National Register Archaeological districts. From a research perspective, studying archaeological sites in a district context--rather than as individual resources--permits a more comprehensive approach to realizing the data potential of these sites. National Register Bulletin 15, *How to Apply the National Register Criteria for Evaluations*, states that

> A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.
>
> A district derives its importance from being a unified entity, even though it is often composed of a wide variety of resources. The identity of a district results from the interrelationship of its resources, which can convey a visual sense of the overall historic environment or be an arrangement of historically or functionally related properties...a district can also be a grouping of archaeological sites related primarily by their common components; these types of districts often will not visually represent a specific historic environment [National Park Service 1991a:5].

While physiographic boundaries do not necessarily define a National Register district or contribute to its formation, such boundaries have been successfully used to define archaeological districts (see SSUAF 1992:78). The Tolay Creek watershed and the valley of Two Rock candidate reservoir provide unifying elements to the archaeological sites found in them. In addition, the archaeological sites at both locations appear to be linked by representing a long continuum of occupation and use.

Site Recording Criteria

To be eligible for listing on the National Register of Historic Places (NRHP) a property should be at least 50 years old. The California State Office of Historic Preservation states, “any physical evidence of human activities over 45 years old may be recorded for inclusion in the OHP’s filing system. That broad threshold allows for the collection of data about resources that may become eligible for the NRHP or the California Register of Historic Resources (CRHR) within five years--commonly the lag time between when resources are identified and when planning decisions are made” (California Office of Historic Preservation 1995c:2).

This study used the definitions for prehistoric and historic archaeological sites in National Register Bulletin 15, *How to Apply the National Register Criteria for Evaluation* (National Parks Service 1991a); for historic landscapes in Preservation Briefs 36, *Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes* (Birnbaum, 1994), and *Guidelines for Evaluating and Documenting Rural Historic Landscapes* (National Park Service 1990); for traditional cultural properties in Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties* (National Park Service 1992), and *CRM* 16, Traditional Cultural Properties, What You Do and How We Think (Parker 1993).

2.1.2 RECORDS AND LITERATURE SEARCH

In-depth records searches were conducted to gather data for the various aspects of the cultural resources study, including (1) the field study of candidate reservoir localities; (2) the sensitivity study for the portions of the Project area that were not field studied; (3) the identification of historical settings that might be affected by reservoirs, pump stations, and pipelines; and (4) monitoring of ground-disturbing geotechnical studies.

Records searches were conducted at the Northwest Information Center of the Historical Resources Information System (Information Center), Sonoma State University, Rohnert Park, for all portions of the study area. The Information Center, an affiliate of the State of California Office of Historic Preservation, is the official state repository of archaeological and historical records and reports for an 18-county area that includes Sonoma and Marin counties. These searches were conducted intermittently from February 1995 to January 1996 in response to Project alterations. Base maps were reviewed for previously recorded resources and studies that had been conducted within the Subregional System area. Information from the Center's base maps was duplicated on United States Geological Survey (USGS) 1:24,000 topographic maps for reference during the course of the study. Archaeological site records were collected for each previously recorded site within the Project APE. References, along with project summaries, were collected for all studies that had been conducted. For those sites and studies within the candidate reservoir locations, the entire report or record was obtained and reviewed.

Literature searches included review of the following local, state, and federal inventories:

National Register of Historic Places Index by Property Location - computer listing generated by the State Office of Historic Preservation, 7 June 1995.

Directory of Properties in the Historic Property Data File for Sonoma County - computer listing generated by the State Office of Historic Preservation, 31 March 1995.

Directory of Properties in the Historic Property Data File for Marin County - computer listing generated by the State Office of Historic Preservation, 6 June 1995.

California Inventory of Historic Resources - California Department of Parks and Recreation, 1976.

Five Views: An Ethnic Sites Survey for California - State of California Department of Parks and Recreation, 1988.

California Historical Landmarks - State of California Department of Parks and Recreation, 1990.

Points of Historical Interest - State of California Department of Parks and Recreation, 1992.

Sonoma County Landmarks Listing - Sonoma County Department of Planning, 1993.

City of Santa Rosa Designated Landmarks and Preservation Districts - City of Santa Rosa Cultural Heritage Board, 1995.

Historic Civil Engineering Landmarks of San Francisco and Northern California - American Society of Civil Engineers, 1977.

Historic Highway Bridges of California - Stephen D. Mikesell, California Department of Transportation, 1990.

Literature searches were also conducted to identify possible archaeological site locations based on reports of Native American villages, campsites, and resource-processing locations in the ethnographic literature. Historical maps and literature were reviewed to identify potential architectural and historical archaeological resources and for context in evaluating architectural properties. Publications on paleo-botanical reconstructions, geological and soils surveys, and maps were also examined as background for the field survey of the candidate reservoirs and the geologic- and groundwater-monitoring sites. For a complete listing, see References Consulted.

2.1.3 RESERVOIR FIELD SURVEYS

Prior to field work, all reservoirs were reviewed to ascertain the number and type of resources anticipated and identify known cultural resources included on federal, state, and/or local inventories. Background research, for context and to identify areas of probable cultural resource locations, included review of previous reports and site records, as well as archaeological, ethnographic, historical, environmental, and cartographic information.

Archaeological Field Survey

The survey area included all candidate reservoir localities, with a 100-foot buffer zone around each (see maps 5.1-5.4). The combined acreage totaled more than 3,500 noncontiguous acres. The field studies were focused on candidate reservoir locations near the towns of Two Rock, Bloomfield, and Valley Ford in western Sonoma County, and in the Petaluma, Lakeville, and Sears Point areas of southeastern Sonoma County. Due to adverse weather and property-access difficulties, these surveys were conducted intermittently between 27 February and 25 September 1995.

Cultural resources previously recorded within the candidate reservoir locations were field reviewed to determine whether the site was recorded according to current standards and if the site had been altered since its original recording. If site records were found to be out-of-date, these resources were re-recorded. Newly identified cultural resources were recorded on Office of Historic Preservation DPR 523 (1/95) forms.

Each crew member maintained a project field notebook to document observations on topography, soil, water sources, bedrock outcroppings, field methods, personal communications, and constraints on investigation. Crew members depicted their transects on a topographic map. A master map of surveyed areas and crew member's transects was maintained to track which areas were surveyed and which areas were not surveyed due to constraints.

In all instances, the perimeter of the candidate reservoirs were walked. On flat and gently sloping land (<15% slope), 15- to 20-meter-wide corridors were walked in a zig-zag manner. On moderately steep slopes (15-30%), 30- to 40-meter-wide corridors were used. On slopes that were difficult to walk (>30%), a sufficient number of transects were walked to allow visual inspection of all terrain. Any slope too steep to walk was visually observed from the top and the bottom of the slope. All terrain depicted on Maps 5.1-5.4 as surveyed was either walked over or visually observed.

Receiving more intensive scrutiny were areas adjacent to watercourses; level ground, including terraces, valleys, and ridgetops; areas around springs; landform and vegetation anomalies; rock outcrops; and creekbeds and banks, where accessible. Gravel bars were thoroughly examined to identify prehistoric cultural material (e.g., chert and obsidian flakes) washing down from upstream.

If prehistoric and/or historical cultural material was identified, an intensive search was conducted of the immediate area. If a concentration of cultural material was identified, then a Primary Record form, an Archaeological Site form, and a sketch map were completed, as were any other additional forms required by the Office of Historic Preservation guidelines. In addition, most sites were photographed (see Photograph Records, Volume II).

Archaeological sites were assigned field numbers based on candidate reservoir name, field team number, and then individual consecutive numbers in sequence of discovery. For example, the first site found by Team A at Tolay Reservoir would be assigned the temporary number T-A-1, the second site T-A-2, and so on. A strict no-collection policy was adhered to within all of the field-study areas. All cultural materials were left where they were found with the exception of materials that were delivered to landowners upon their request.

If the intensive survey of the immediate area of a prehistoric item did not identify any other cultural materials, the item was considered to be an isolate. The item was described in the field notebook, given an identification number; and plotted on a USGS topographic map. Most isolates were drawn or photographed. See Table C-1 for a list of isolated artifacts noted per reservoir locality.

Historical isolates were often found near recorded historical sites, particularly in drainages. Due to much dumping of historical cultural materials into drainages to control erosion -- an activity still practiced today -- it was difficult to establish historic context for such isolated historical items. Isolated historical artifacts were assumed to be associated with the historic farm complexes on which they were located.

Locations where buildings were depicted on topographic or historic maps, but were no longer extant were carefully reviewed by the archaeological field crew for archaeological remains.

Several sites identified during the records searches were found to be misplotted during field study. In all cases, the field crew was able to determine true site location based on the sketch map included with the site record and then replot the site on a USGS topographic map.

Field Identification of Architectural Historical Cultural Resources

Based on archival, literature, and cartographic research, locations of potentially historical buildings were identified in the candidate reservoirs. A field visit was then made by an architectural historian to record the building. Notes and photographs were taken in the field to record the building's architectural features and setting. A Primary Record form and a Building, Structure, and Object Record form were completed for each building or structure noted in the field study area.

Architectural historians were informed of any buildings encountered in the field that had not been identified through prefield research. A field visit was then made by an architectural historian to determine its age. If it appeared to be at least 45 years old, it was recorded. Architectural historians were also informed of roads encountered during archaeological surveys that may meet the 45-year age consideration.

Field Survey Constraints

Field survey was conducted at times under a wide range of adverse conditions, including weather conditions (rain, hail, severely muddy terrain, standing water), unrestrained animals, and access postponement or rescheduling. As a part of legal agreements between the City of Santa Rosa and landowners, all of the candidate reservoirs had specific access requirements limiting times of survey and locations that could be studied. For example, fences within the Project area were not to be crossed, requiring significant detours to find a gate through which access to the adjacent field could be gained. Owner concerns included animal control, crop harvesting or growing crops, ground disturbance, and artifact collection.

Further constraint to effective survey was lack of access to all parcels within the reservoir boundary at one time, which required return trips in most cases. Because the survey was done in late winter and early spring after heavy rainfall, dense vegetation made identification more difficult. Livestock (especially bulls) that was not contained during crew visits to the reservoir areas posed a threat to crew members, and the areas the livestock occupied were not surveyed. Steep slopes were often saturated and unstable, so only visual observations were made of these areas.

In most instances, these constraints were not significant enough to prevent effective survey.

Postfield Work

Postfield research was conducted at the Petaluma and Santa Rosa branches of the Sonoma County Library, at the Ruben Salazar Library at Sonoma State University, and at the Sonoma County Recorder's and Assessor's offices.

For architectural historical cultural resources, research was done at (1) the Assessor's and Recorder's offices to determine the legal description of the property and previous owners; (2) the Sonoma County Library - Special Collections, in which census data, county histories, and county directories were reviewed to establish an overall history of a particular property; and (3) at the Ruben Salazar Library, in which agricultural production census data for Sonoma County, agricultural histories, and historic maps were utilized.

Subsequent to field survey, the DPR 523 forms were word processed and the site maps were produced from field sketch maps using computer graphics. These forms will be submitted to the Information Center for assignment of site trinomials and archiving.

2.1.4 Sensitivity Study

A sensitivity study was conducted of those portions of the Project APE that were not field surveyed. These unsurveyed areas consist of the agricultural and urban irrigation areas; pipelines to and connecting urban irrigation areas and reservoirs; and The Geysers and Russian River discharge pipelines. Pipelines within irrigation areas, however, were not treated as separate elements and are included in the irrigation areas.

All formally recorded cultural resources on the Information Center base maps that occur in the sensitivity-study areas were plotted on USGS 1:24,000 topographic maps. Plotted as well, were any resources within a 300-foot buffer zone around the project areas to ensure that resources on or near the boundary would be identified. Bibliographic references for these studies were then collected.

Estimates were made of the acreage within the Project APE that had been surveyed and the acreage that had not. Then, a count was made of the number of recorded sites within the surveyed areas, noting how many of the recorded sites were prehistoric, historic, or both. Linear studies were not taken into account when computing acreage in the sensitivity study.

The estimates of unrecorded resources are based on the assumption that unsurveyed areas will contain similar densities and types of resources as surveyed areas in similar settings. Only those cultural resources identified as a result of formal studies were used to estimate the number of resources in unsurveyed areas. Due to limited information from linear surveys, unrecorded resources were not estimated for the pipelines of the Subregional System. In addition, these linear portions pass through diverse environments, and it is not meaningful to estimate the number and type of resources in one environment based on information from a different environment.

2.1.5 Geologic Studies and Groundwater Well Monitoring

Areas subjected to disturbance by drilling and trenching by the geologic and groundwater research teams were studied to avoid adverse effects to surface and subsurface cultural resources (see Maps 4.14, 4.15, and 4.18-4.25). Before field monitoring occurred, records searches were conducted to assure that drill locations did not affect known archaeological sites.

Before drilling occurred, the route the drilling and trenching machinery was to take was surveyed, as well as the drill location, to identify surface archaeological material. As it had been determined that there was a high likelihood of buried sites within the Project area, ASC personnel monitored the drilling and trenching in order to aid in early identification and avoidance of archaeological materials. Drilling and trenching activities were observed until a depth was reached that had been previously determined to be without cultural material. Factors used in making this determination were groundwater, depth below soils identified as deposited before human occupation of the area, and bedrock.

2.1.6 ARCHITECTURAL AND HISTORICAL SETTING

Reservoir

Buildings, that may be historically significant, for which settings would be affected by reservoir and/or dam construction were identified. Determination of affected setting was based on the possibility that elements of the reservoir or dam could be seen as part of the resource or part of its background. This determination of which buildings would or would not have their settings affected is strictly preliminary.

A 1-mile radius around each candidate reservoir site was reviewed for historic buildings that might have their settings affected by reservoir and/or dam construction. Noting the initial date of the topographic map, along with the photorevised date, it was determined that buildings depicted as part of the original mapping had the potential to be historical, while buildings plotted as a result of the photorevision did not. For instance, the Sears Point 7.5' topographic quadrangle was first produced in 1951, and then photorevised in 1968, indicating that buildings and structures depicted in black were built before 1951, and thus older than 45 years, whereas buildings depicted in purple were probably built between 1951 and 1968. There is the possibility, however, that buildings depicted in purple were built earlier, but not noted until the maps were photorevised.

The location of the possible historical resource was compared to the Office of Historic Preservation's Directory of Properties to determine whether or not the building was a recorded historic resource. In addition, A.B. Bowers's 1867 *Map of Sonoma County, California,* and Thomas H. Thompson's 1877 *Historical Atlas Map of Sonoma County, California,* were reviewed to determine if any of the buildings dated back to either 1867 or 1877, and whether or not it was part of a larger building complex. Where a building was part of a larger farm or ranch, it was noted that landscape features and small scale-elements (such as fence posts, culverts, foundations, and foot bridges) associated with this farm or ranch could be located within the reservoir footprint and consequently could be affected by reservoir and/or dam construction, such as is the case with the Sears Point candidate reservoir. Each historic resource whose setting might be affected was designated by "AHS-#" or "Architectural Historical Site-#" (see Tables 5, C-12, C-13, C-14, and Volume II; Maps 6-1 through 6-25).

Field review of potentially affected settings was conducted upon completion of the records and literature search. If the property could be viewed from a public road, a determination was made as to whether the building was historical and whether its setting could be affected by reservoir and/or dam construction. Field review did not take place in all instances because access to the

property from a public road was not possible. In some cases--as various Project components were added or deleted--affected AHS's were identified during post-field research.

Pump Stations and Watertanks

The methods used for reservoirs were also used for pump stations and the watertanks, with the following exceptions: the size of the area studied was a half-mile radius around the pump station, Bowers's and Thompson's maps were not reviewed, and no field check was conducted. In the case of the pump stations, obstruction of view was based on the elevation of the building in relationship to the pump station. In some cases it was not clear as to how a building or complex would have its view obstructed; it was assumed, however, that if the pump station could be viewed from the property, then some sense of setting would be affected by the station.

2.1.7 CONTACTS

Interested parties were contacted by letter and/or telephone for any comments they might have on cultural resources (including TCPs) that could be affected by the Project. Parties contacted include Native American groups, historical organizations, museums, and government agencies. Informal contacts were made with landowners, residents, and local archaeologists. The Contacts section of this report provides a full listing of persons and agencies contacted and their responses.

3. FINDINGS

3.1 INTRODUCTION

This section presents the findings of the archival and field research conducted on cultural resources for the Santa Rosa Subregional Long-Term Wastewater Project. The topics are presented in the order listed below.

Overviews

Environmental and cultural overviews of the Project area are presented in this section to provide context for the cultural resources identified in the sensitivity studies and the field studies.

Field Study Results

During field study a total of 46 cultural resources were identified. Of these, 32 were previously unrecorded cultural resources, including 15 prehistoric archaeological sites, 2 subsurface prehistoric finds, 7 historic archaeological sites, 11 historic architectural sites, and 2 historic vernacular landscapes. These resources, except for the landscapes which require further study to delineate their extent and nature, were recorded during the field study. Records for 12 previously recorded prehistoric archaeological sites and 2 historic archaeological sites were updated. Some of these resources overlap, as there is more than one type of resource present at a single location (see Table 2).

Sensitivity Study Results

The sensitivity study was conducted on those portions of the Project area that were not field-studied. The sensitivity study identified previously known cultural resources within the Project area in locations that may be affected by pipeline construction, irrigation, and other Project activities.

Contacts

Interested parties contacted for this study included Native American groups and individuals, historical societies and museums, and government agencies. Responses to our inquiries are discussed below and listed in Table 7; correspondence received is presented in Appendix D.

Preliminary Evaluations

All sites identified during field survey were evaluated on a preliminary basis according to National Register of Historic Places/California Register of Historical Resources criteria. There are 32 cultural resources in the surveyed portion of the Project area that may be eligible for listing on the National Register (see Table 2).

3.2 OVERVIEWS

3.2.1 ENVIRONMENTAL OVERVIEW

Introduction

The Santa Rosa Subregional Long-Term Wastewater Project area is in the California Coast Ranges geomorphic province, which extends along two-thirds of the state's coast from Santa Barbara County in the south to Humboldt County in the north. The Coast Ranges province is about 500 miles long from north to south and about 70 miles wide. The Golden Gate, the entrance to San Francisco Bay, divides the Coast Ranges into the North and South Coast Ranges; the Project area is at the southern end of the North Coast Ranges. The Pacific Ocean is 7 miles to the west of the Project area; San Pablo Bay, the northern arm of San Francisco Bay, is at the Project area's southern extent. Santa Rosa, the county seat of Sonoma County, is at the center of the Project area, and is approximately 50 miles north of the city of San Francisco (see Map 2).

The Project area, about 50 miles long from north to south and about 20 miles wide at its widest point, comprises a diversity of environments. Elevation is more than 3,000 feet above sea level in the rugged chaparral and forest uplands of The Geysers, Sonoma County, to the north. The elevation is almost at sea level in the grassy valleys, plains, and rolling hills of southern Sonoma County and northern Marin County.

The climate is Mediterranean--warm and humid, with summer droughts and winter rains. The eastern portion of the Project area lies in the Lower Sonoran life zone, and the western part is in the Transition life zone. These life zones support chaparral, oaks, pines, and redwoods (Durrenberger with Johnson 1976:25-27, 39-40).

The Project area contains a mixture of urban and rural land. Agriculture is the dominant land use and includes vineyards, orchards, and dairy ranching and other livestock grazing. A north-south interstate freeway bisects the Project area, and there are several state highways passing through the area. Sonoma and Marin counties are experiencing increasing urbanization, and much of the area serves as San Francisco Bay Area bedroom communities. A state university is located at Rohnert Park, and a junior college has campuses at Santa Rosa and Petaluma. High-technology industry is becoming increasingly common in Santa Rosa and its vicinity.

Climate

The Mediterranean climate of the Project area, found in only a few other regions worldwide, is a subtropical climate with hot, dry summers and a mild, rainy winter (Critchfield 1974:175; Durrenberger with Johnson 1976:26). The Pacific Ocean moderates the effects of seasonal temperature changes, an influence that declines inland (Helley et al. 1979:7-9; Scheuring and McCandless-Grossman 1982:89). Heavy fog is common throughout much of the Project area, particularly at lower elevations that are subject to coastal influence.

Precipitation, in the form of rain and occasional snow that quickly melts, occurs mostly between November and March and ranges in the Project area from 10 to 60 inches annually (Helley et al. 1979:7-9). This precipitation pattern results in a green groundcover during winter and a brown one during summer, particularly in areas of grassland.

Average annual temperatures are about 55° Fahrenheit (F.) along the coast; in the interior valleys, the temperatures are about 60°F. (Johnson 1972:170). Summer temperatures at Fort Ross on the coast, for example, have a maximum average of 67° F. (Scheuring and McCandless-Grossman 1982:89); inland at the city of Healdsburg, temperatures range from an average of 48° F. in the winter to 72° F. in the summer (Hornbeck 1983:25). Occasionally, the Project area experiences temperatures below freezing and above 100° F.

Geology

Mountains, rolling hills, small canyons, and alluvial plains and valleys comprise the Project area. The valleys and uplands trend in a northwest-southeast direction, as is typical of the North Coast Ranges. The Mayacmas Mountains in the north and the Sonoma Mountains in the south form the eastern side of the study area. The central portion of the study area consists of a large trough formed by Alexander Valley in the north, alluvial Santa Rosa Plain (approximately the area from Windsor to Cotati) in the center, and Petaluma Valley in the south. The western area has small hills and valleys in the Sebastopol area and large gently sloping east-west trending valleys divided by moderate-to-steep rolling hills in the southwestern portion of the study area.

The area is subject to much earthquake activity. The San Andreas fault zone, which extends along much of California, also trends northwest-southeast just to the west of the study area. Several significant earthquake zones are in the Project area: the Rodgers Creek zone and the Tolay and Bloomfield fault lines in the south; and the Healdsburg, Maacama, and Geyser Peak fault zones and the Mercuryville fault line in the north (Wagner and Bortugno 1982). At The Geysers, in the northeastern Project area, are hot springs and fumaroles.

The geological formations in the Project area derive from alluvial, ocean floor, and volcanic deposits that are often very intermixed. The descriptions below are primarily from the Santa Rosa 1:250,000 quadrangle (Wagner and Bortugno 1982) of the California Department of Mines and Geology regional geologic map series.

The Mayacmas uplands at the north end of the Project area consist mostly of the Jurassic Franciscan Complex, which is comprised of sandstone, shale, chert, greenstone, metagraywacke, conglomerate, and serpentinized ultramafic rocks.

At the east side of the Project area are the Sonoma Mountains, which consist of Pliocene Sonoma Volcanics of basalt, andesite, rhyolite, tuff, and other pyroclastics. There is also the Pliocene Petaluma Formation of mostly nonmarine claystone, siltstone, and mudstone.

The central portion--Alexander Valley, the Santa Rosa Plain, and Petaluma Valley--consists mostly of Quaternary Pleistocene and Holocene alluvium, containing a variety of gravels, sands, silts, and clays originating from marine and continental environments. Some of these deposits

have been described as locally containing "aboriginal artifacts and skeletal remains" (Helley et al. 1979).

The western portion of the Project area is dominated by the Wilson Grove Formation, which consists of Pliocene marine sandstone, conglomerate, and tuff. Holocene intertidal deposits of peaty-mud are at the south end of the Project area, adjacent to San Pablo Bay and at the mouths of the Petaluma River and Sonoma Creek.

The topography, geology and soils, and climate of the Project area contribute to an environment that is conducive to such soil and rock movements as landslides, soil and debris flows, and slumps (Nilsen et al. 1979). Soil movement is also caused by the large amount of seismic activity in the area. In addition, more than a century of human alteration of the land surface in Marin and Sonoma counties has accelerated erosion in uplands, with concomitant accelerated deposition in lowlands (Brown and Jackson 1974:3).

Soils

The *Generalized Soil Map of California* (Storie and Weir 1951) depicts the Subregional System study area as consisting of mostly upland and terrace soils, with some minor amounts of valley and valley basin soils. Upland soils, which dominate the rolling, hilly to steep topography, are mostly dark residual soils of moderate depth to bedrock. At the north end of the study area, in The Geysers, are stony upland residual soils of very shallow depth to bedrock. They are variable in color and normally have brush as the vegetative cover.

The plains and valleys of the central portion of the study area contain gently sloping to undulating terrace land, with brownish grass or woodland-grass soils. At the southern-most end of the Project area are minor amounts of deep alluvial fan and flood-plain valley soils on gently sloping, smooth topography, as well as nearly level, valley basin grassland soils.

The Project area contains 13 of the 15 soil associations in Sonoma County and 3 of the 17 soil associations in Marin county. A soil association names a broad area with a distinctive pattern of soils, relief, and drainage constituting a unique natural landscape (Kashiwagi 1985:5). The soil association descriptions below are taken from *Soil Survey of Sonoma County, California* (Miller 1972:General Soil Map), and *Soil Survey of Marin County, California* (Kashiwagi 1985:General Soil Map).

Soils of the high terraces, foothills, uplands, and mountains of the northeastern, eastern, and South County portions of the Project area are comprised of the following:

- Spreckels-Felta association: Well-drained, gently sloping to very steep very gravelly loams to clay loams; on mountain foothills and on high terraces;

- Yorkville-Suther association: Moderately well drained, moderately sloping to very steep loams and clay loams; on uplands;

- Goulding-Toomes-Guenoc association: Well-drained, gently sloping to very steep clay loams to loams; on uplands;

- Los Gatos-Henneke-Maymen association: Well-drained to excessively drained, moderately sloping to very steep loams, gravelly loams and gravelly sandy loams; on mountains; and,

- Hugo-Josephine-Laughlin association: Well-drained, gently sloping to very steep gravelly loams and loams; on mountains.

Soils in the basins and on tidal flats, flood plains, terraces, and alluvial fans of the central portion of the Project area--Alexander Valley, the Santa Rosa Plain, and Petaluma Valley--are comprised of the following:

- Clear Lake-Reyes association: Poorly drained, nearly level to gently sloping clays to clay loams; in basins and on tidal flats;

- Haire-Diablo association: Moderately well drained and well drained, gently sloping to steep fine sandy loams to clays; on terraces and uplands;

- Huichica-Wright-Zamora association: Somewhat poorly drained to well-drained, nearly level to strongly sloping loams to silty clay loams; on low bench terraces and alluvial fans;

- Pajaro association: Somewhat poorly drained, nearly level to gently sloping fine sandy loams to clay; on low terraces and flood plains; and,

- Yolo-Cortina-Pleasanton association: Well-drained to excessively drained, nearly level to moderately sloping very gravelly sandy loams to clay loams; on flood plains, alluvial fans, and low terraces.

Soils of the valleys, terraces, and uplands of northern Marin County, West County, and the Sebastopol area are comprised of the following:

- Steinbeck-Los Osos association: Moderately well drained and well drained, gently sloping to steep loams and clay loams; on uplands;

- Kneeland-Rohnerville-Kinman association: Well drained and moderately well drained, nearly level to steep loams to clay loams; on coastal benches, terraces, and uplands;

- Goldridge-Cotati-Sebastopol association: Moderately well drained and well drained, gently sloping to steep fine sandy loams and sandy loams; on coastal terraces and uplands;

- Blucher-Cole association: Very deep, gently sloping, somewhat poorly drained soils; in basins and alluvial fans;

- Tomales-Steinbeck association: Deep, gently sloping to steep, moderately well drained and well drained soils underlain by soft sandstone; on uplands; and

- Tocaloma-Saurin association: Moderately deep, gently sloping to very steep, well drained soils underlain by sandstone and shale; on uplands.

Water

The largest watercourse in the study area is the approximately 100-mile-long Russian River, which originates in Mendocino County and flows south into Sonoma County. At Healdsburg the Russian River turns westerly, continuing about 25 miles before emptying into the Pacific Ocean. The only other river is the Petaluma, a short navigable watercourse originating in central southern Sonoma County and flowing southward for about 17 miles, where it enters San Pablo Bay.

There are several substantial perennial creeks in the Project area. From north to south they include Big Sulphur Creek, Mark West Creek, and Santa Rosa Creek, which are tributaries of the Russian River; Americano Creek and Stemple Creek, both of which flow directly into the Pacific Ocean at Bodega Bay; and Tolay Creek, which flows into San Pablo Bay. A unique watercourse is the Laguna de Santa Rosa, a system of vernal marshes tributary to Mark West Creek. Common on the Santa Rosa Plain are vernal pools--small bodies of water forming from winter and spring rains, with a distinctive flora and fauna. There are numerous other perennial and intermittent creeks, as well as springs, marshes, and vernal pools in the study area.

Vegetation

The vegetation is dominated by plants adapted to mild climatic conditions, which include summer drought (Helley et al. 1979:9). As is typical of the Coast Ranges, there is a diversity of plant life. Major vegetation communities include chaparral, redwood, grassland, riparian, coastal, and marsh. These communities are highly intermingled, resulting in a complex vegetative mosaic across the landscape. The vegetation community descriptions that follow are excerpted from *The Map of the Natural Vegetation of California* (Küchler 1977).

Blue oak-gray pine forest is common at The Geysers in the northern portion of the Project area. This medium-tall, dense to open, broad-leaved deciduous forest has an admixture of needle-leaved evergreen trees. Low, broad-leaved evergreen trees and/or shrubs are common. Inclusions of chaparral may be numerous. In addition, The Geysers region has extensive areas of chaparral. These dense communities of needle-leaved and broad-leaved evergreen sclerophyll shrubs vary in height from 3 to 9 feet, rarely to 15 feet. An understory is usually lacking. Chaparral is found on the lower elevations of most mountains. Chamise, manzanita, and California lilac are dominant species.

Mixed hardwood forest is found near Petaluma, in the Sebastopol area, on Sonoma Mountain, and in the Mayacmas uplands. This dense, low to medium tall, broad-leaved evergreen forest, with an admixture of broad-leaved deciduous and needle-leaved evergreen trees, is found throughout the central and southern North Coast Ranges. At higher elevations, the forest's height may be so low as to make it appear shrubby. Inclusions of chaparral are common. Dominant species include coast live oak, canyon oak, and madrone, along with several other species of oaks and pines.

Redwood forest occurs intermittently on stream terraces and in small canyons where ample water is found and is dominated by redwoods and Douglas firs. A characteristic of redwood forest is its restriction to the coastal fog belt, with fog drip providing a large amount of moisture

during the dry season (Bakker 1971:95). Redwood forest is a very tall, dense, needle-leaved evergreen forest with an increasing number of medium tall, broad-leaved evergreen trees in the east. Undergrowth is patchy; on alluvial sites it consists mainly of forbs, with shrubs and low trees in the uplands.

In the southern and western portions of the Project area the vegetative community is coastal prairie-scrub mosaic in a narrow, interrupted belt along the coast; inland the scrub disappears and the prairie prevails. Coastal scrub is an open to dense, broad-leaved evergreen shrub community, about 4 feet high. Evergreen and/or deciduous shrubs, vines, perennial forbs, and graminoids form a dense lower layer, about 1 to 1.5 feet high. This community is dominated by coyote brush. Coastal prairie is a dense community of perennial bunchgrasses about 1 to 1.5 feet high tall when in flower, with a lower layer of annual and perennial forbs, about 4 inches high.

At the extreme south end of the Project area is coastal saltmarsh, adjacent to San Pablo Bay. This community consists of perennial graminoids and succulent forbs about 3 feet tall. Forbs dominate at higher elevations, and algae may colonize frequently flooded areas of bare ground. Coastal saltmarsh occurs around sheltered bays, estuaries, and coastal lagoons, usually above mean high-water level, and inland from intertidal sand and mud flats. Glasswort and cordgrass are dominant plants.

Wildlife

The largely rural environment of the region supports a diversity of wildlife. While this wildlife is not particularly distinctive, the diversity can be seen as illustrating "a remarkable pattern of biologic differentiation caused by the interaction of climatic and geologic history" (Schoenherr 1992:305).

Coyotes, skunks, possums, raccoons, black-tailed deer, jackrabbits, badgers, bobcats, gophers, and squirrels are some of the mammals common in the Project area. Up into the 1800s, the area also supported grizzly bears, herds of pronghorn antelope, and tule elk (Marryat 1855:37-38)

The Russian River and its tributaries, as well as other watercourses in the Project area, support runs of salmon. Amphibians and reptiles include salamanders and newts, the western pond turtle, a variety of lizards, frogs, and snakes.

Waterfowl, such as egrets, herons, and several species of ducks, are common. Raptors include the golden eagle and a variety of hawks. Woodpeckers, starlings, Oregon junkos, crows, meadowlarks, red-wing blackbirds, vultures, and owls are a few of the many other species of birds in the region.

Despite the increasing urbanization of the area, the diverse and rural environments of the Project area allow these animals to flourish.

3.2.2 PREHISTORIC ARCHAEOLOGICAL OVERVIEW

Introduction

The first archaeological investigations in central California occurred along the San Francisco bayshore at the beginning of the 20th century, when archaeologists associated with the University of California at Berkeley dug the deep shellmounds at Emeryville and Ellis Landing (Nelson 1910; Uhle 1907). At the same time, Nels C. Nelson (1909) conducted an inventory of the shellmounds that lined San Francisco and San Pablo bays, recording more than 400 individual sites, including dozens in Marin and Sonoma counties. Beginning in 1903, Jesse Peter of Santa Rosa Junior College was the first to extensively survey interior Sonoma County, recording scores of sites in the northern and eastern Santa Rosa Plain (Stewart 1982a:17). While numerous sites were identified, it was a half a century before further work occurred on the bayshore or the Santa Rosa Plain.

The focus of archaeological work in central California shifted instead to the Central Valley, where Sacramento Junior College crews began an intensive investigation of deep stratified mounds of the Delta region. After a decade of analysis, Lillard, Heizer, and Fenenga (1939) reported on three temporally discrete archaeological cultures distinguished by differing burial modes and artifact assemblages; their scheme ultimately gave rise to the Early, Middle, and Late horizon sequence, applied to the Central Valley, the Delta region, and the San Francisco Bay area. Although this early work has been faulted for its single-minded focus on grave goods and other mortuary practices, distinctive patterns were revealed that have been found to apply, with variations, throughout much of central and northern California. In his doctoral dissertation, Richard Beardsley (1948, 1954) revised this system to incorporate the early San Francisco Bay findings and those of more recent work on the Marin County coast in order to allow comparisons of archaeological patterns over broader geographic areas. His scheme, called the Central California Taxonomic System (CCTS), attempted, "but did not quite achieve," the equal use of "three significant factors, time, space and culture content" (Beardsley 1954a:6). Although there were no interior Sonoma or Marin county data available, Beardsley did incorporate findings from CA-SON-299, an occupation and cemetery site on Bodega Bay as part of his McClure facies of the Middle horizon.

Revisions to the CCTS began soon after Beardsley's publication of the scheme. In the North Coast Ranges, Meighan (1955) developed a scheme incorporating data from Mendocino and Napa counties. A more extensive revision was begun by Bennyhoff and Fredrickson (1969), who were dissatisfied with the CCTS database, the system's inability to allow interpretive statements not bound by the temporal labels of Early, Middle, and Late, and the confusion caused by the use of terms that could not be integrated into a larger, more general framework (Bennyhoff and Fredrickson 1969:16).

Based on continued collaboration with James Bennyhoff and his own analysis of excavations at CA-LAK-261 in Lake County, David A. Fredrickson's (1973) dissertation entitled "Early Cultures of the North Coast Ranges, California" presents a cultural sequence that has been used extensively. His work, which focused mainly on the Clear Lake area, did not address Sonoma County, where only a few small-scale excavations had been conducted in the 1960s (Upson 1966; King, Upson, and Milner 1966). The appearance of Fredrickson's sequence, however,

coincided with the growth of cultural resources management (CRM), a field developed in response to new environmental legislation requiring mitigation of impacts to important archaeological sites (i.e., CEQA 1970, NEPA 1968, NHPA 1966). At the same time, the Anthropology Department at Sonoma State University was developing an active CRM-oriented archaeological facility under Fredrickson's direction. The result was a proliferation of archaeological studies on the Santa Rosa Plain, beginning in the mid-1970s, that have produced a large database for the region and inspired several preliminary syntheses. Also predominant in the Sonoma County work has been the development of obsidian-hydration analysis, with one of the first laboratories in the country centered at the university; the focus on obsidian-hydration dating has been particularly amenable to chronological syntheses in an area where large stratified mounds are virtually absent while obsidian is the dominant lithic material archaeologically.

While the majority of the studies have been small-scale evaluation excavations, some important investigations have contributed to the development of a local sequence. Important studies have included those in the Laguna de Santa Rosa area for an earlier phase of the Santa Rosa Wastewater Project (Origer and Fredrickson 1980); the multi-year survey and excavations at The Geysers (Fredrickson 1985); the investigations of more than 60 prehistoric sites in the Lake Sonoma-Warm Springs Dam area (Basgall and Bouey 1984; Baumhoff and Orlins 1979); and some single-site data-recovery investigations (Jones and Hayes 1989; Villemaire and Huberland 1986). Some important academic syntheses, including Origer's (1987) and Wickstrom's (1986) work with obsidian-hydration analysis, have been developed, and some new approaches to interpretation have been proposed (Jones and Hayes 1993; Stewart 1993).

Throughout this period, Fredrickson's sequence has been the primary analytic framework used for interpreting Sonoma County prehistory. The scheme is widely used throughout northern and central California, although the archaeological community has not reached a consensus and Fredrickson himself has made alterations to dates and nomenclature (see below). Sufficient research has been done, however, to identify local variants of the cultural entities detailed by Fredrickson for the Clear Lake basin and to begin reconstructing Sonoma County's unique past. (Much less is known about the prehistory of Marin County and The Geysers district, which are discussed separately below).

Fredrickson's scheme is used below to provide an outline of Sonoma County prehistory, focusing on the Santa Rosa Plain. The area conforms roughly to an archaeological *district*, a term employed by Bennyhoff and Fredrickson (1969) to designate a spatial unit that includes a group of politically distinct but closely interacting and culturally indistinguishable groups. Key terms used are *period*, *pattern*, *aspect*, and *phase*. Period, the broadest and most general term, refers to a temporal unit characterized by a dominant adaptive mode, including economic life and basic social structure, into which more specific cultural entities can be fitted (Fredrickson 1973:112-113). In this scheme, human history in California is broken into three broad periods: the Paleoindian period; the three-staged Archaic period; and the Emergent period. This last period is seen as the "nonagricultural equivalent of the Formative" (Fredrickson 1973:3). Refer to Figure 1 for a summary based on dominant adaptive modes of each time period. Pattern, which focuses on the cultural dimension, is defined as

> an adaptive mode extending across one or more regions, characterized by particular technological skills and devices, particular economic modes, including

participation in trade networks and practices surrounding wealth, and by particular mortuary and ceremonial practices [Fredrickson 1973:7-8].

Aspect is defined as "a sequence of phases in a district," while "phases are analyzed out of the aspect as greater control of the temporal dimension is achieved"; further, "it is conceptually important that patterns are not built up from phases, but that phases are analyzed out of larger units" (Fredrickson 1973:7-8). With these terms in mind, examination of the cultural sequence of the Sonoma district is possible.

			Period Characteristics
1800	Emergent Period	Upper	Clam disk bead money economy appears. Increasing quantities of goods moving farther and farther. Growth of local specializations re: production and exchange. Interpenetration of south and central exchange systems.
1500		Lower	Bow and arrow introduced, replace dart and atlatl; south coast maritime adaptation flowers. Territorial boundaries fairly well established. Evidence of distinctions in social status linked to wealth increasingly common. Regularized exchanges between groups continue with more material entering into the network of exchanges.
500 AD / BC	Upper Archaic Period		Growth of sociopolitical complexity; development of status distinctions based upon wealth. Emergence of group-oriented religions. Greater complexity of exchange systems; evidence of regular, sustained exchanges between groups. Shell beads gain in significance, possibly indicators of both exchange and status. Possible origins of Kuksu religious system at the end of period.
1000	Middle Archaic Period		Altithermal may have ended by ca. 3000 B.C.; climate becomes more similar to present-day. Mortars and pestles and inferred acorn technology introduced. Hunting important. Possibility of entry of new population. Diversification of economy; sedentism more fully developed, population growth and expansion. Technological and environmental factors provide dominant themes. Little evidence for significant changes in exchange relations.
3000	Lower Archaic Period		Altithermal may have begun about 6000 B.C.; ancient lakes drying up. Milling stones develop or are introduced; plant food emphasis, little hunting. Although semi-sedentary life style, exchange seems similar to previous period. Most artifacts manufactured of local materials. Little emphasis upon wealth.
6000	Paleo-Indian Period		First demonstrated entry and spread of humans into California. Lakeside sites with a probable but not clearly demonstrated hunting emphasis. No evidence for a developed milling technology although cultures with such technology may exist in state at this time depth. Exchange probably ad hoc, individual, one-to-one. Social unit not heavily dependent upon exchanges; resources acquired by changing habitat.
10,000			(No satisfactory information from the preceding Early Lithic Period.)

Figure 1. Characteristics of Archaeological Periods (from Fredrickson 1974).

Sequence for the Sonoma District

The following paragraphs present the Sonoma district sequence within the framework of Fredrickson's (1974, 1984) chronological sequence for the North Coast Ranges. The Sonoma district variants were identified by Sonoma State University archaeologists in the 1980s and are described in Keswick (1990) and Villemaire and Huberland (1986). The dates used below are specific to the Clear Lake basin and should be considered only broadly applicable to the local sequence. In addition, because there are still insufficient data to determine how local cultural units break down into more distinct entities, the term *culture* rather than phase or aspect is used below when referring to the local variants of the regional patterns. The time periods for each archaeological culture (e.g., Spring Lake, Black Hill) depicted in Figure 2 are represented by

hydration spans (e.g., 7.0 to 5.0 microns), which have been obtained through obsidian hydration analysis. Obsidian hydration analysis is based on the phenomenon that a newly exposed surface of obsidian begins to absorb water, resulting in a small but measurable layer--called the hydration band--which increases in thickness with time. Diagnostic artifacts associated with these archaeological cultures are also shown in Figure 2.

Paleoindian Period: 10,000 - 6000 B.C.

This earliest documented period of human use of California occurred at a time of variable climate, rising sea levels, and other broad-scale environmental change. It is assumed that people living in this early period were organized into small, highly mobile groups occupying broad geographic areas. Because of this type of adaptation and the small populations involved, most occupations would not have been of sufficient intensity or duration to leave significant remains. Perhaps more importantly, natural forces such as soil slump and alluviation would likely have obscured most cultural material over the thousands of years since its deposition. This possibility has been dramatically demonstrated during recent geoarchaeological work at CA-SON-2098, the Memorial Hospital site in eastern Santa Rosa, where Meyer (1993) identified a stable, early Holocene land surface yielding a mean calibrated radiocarbon date of 8600 before present (B.P.) (ca. 6600 B.C.), buried at a depth of 3.4 meters (about 11 feet) below surface; above this stratum lay a second buried land surface, containing artifacts and radiocarbon-dated material representing two buried occupations (Origer 1993:i; see below). While the deeper stratum was culturally sterile in this location, Meyer suggests that cultural deposits may be present on the buried surface elsewhere on this or similar alluvial fans in the Project area. He notes an important implication of this find: “If this is true, then previous interpretations regarding human settlement patterns in the area may need to be revised, since they probably reflect a bias created by the over-represented number of recent sites at the surface” (Meyer 1993:122). The few sites that have been dated to this time period have been found in lacustrine environments, where deposition may be slower.

The Borax Lake site (CA-LAK-36) in the Clear Lake basin, where the Paleoindian Post pattern was first identified, has been dated based on artifact types, obsidian-hydration analysis, and radiocarbon dating. The pattern is manifested by “fluted points, single-shoulder points, and crescents” (Fredrickson 1985:23). These items probably represent an adaptation to lacustrine gathering and hunting of large and small game, including fowl. Evidence of Paleoindian occupation in the Sonoma district is tantalizing at best. Small, chert crescentics found by Origer and Fredrickson (1980) at CA-SON-977 on the Laguna de Santa Rosa could not be dated because of lack of association with either a carbon-based material or obsidian; their similarity to those found at the Borax Lake site, however, suggests early habitation in a similar environmental setting. Another site, at Duncan’s Landing (CA-SON-348) near Bodega Bay, possesses extensive cave deposits, the bottom layers of which have yielded dates of ca. 7000 B.C., suggesting Paleoindian occupation with an estuarine adaptation along the central California coast (Jones 1991:427).

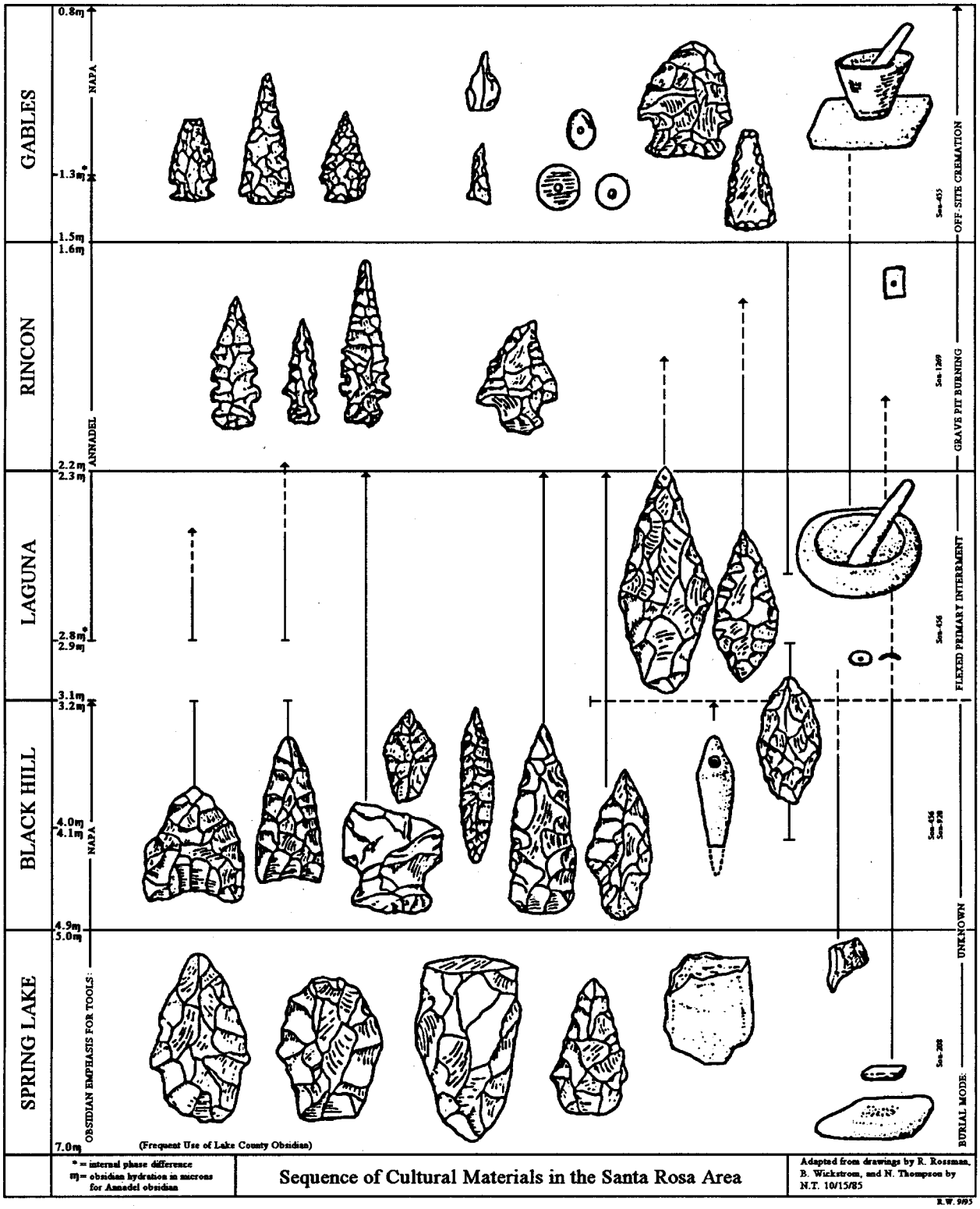


Figure 2. Sequence of Cultural Materials in the Santa Rosa Area (from Villemaire and Huberland 1986).

Lower Archaic Period: 6000 - 3000 B.C.

The gradual warming of the Paleoindian period accelerated during the Lower Archaic, no doubt altering the extensive wetlands that would have characterized the Laguna de Santa Rosa during Paleoindian use. This period, also referred to as the Altithermal, was a time of persistent warm and dry climatic conditions. Adaptations to these more arid conditions, as available water decreased and grasses became more abundant, included relatively widespread use of the millingstone and handstone. First identified in the Clear Lake area, this period is represented by the Borax Lake aspect of the Borax Lake pattern. In the Santa Rosa Plain, the local variant of this pattern is the Spring Lake culture, well represented only at CA-SON-20B by obsidian wide-stem projectile points, lanceolate points, and small stemmed points, unifacial basalt cobble tools, small angular obsidian cores, and the millingslab and handstone (see Figure 2). The assemblage is unique in the massiveness of the points and the wide variety of forms, occurring in all four of the North Coast Ranges' obsidians. Little can be inferred about the lifeways of these people. The wide range of obsidians procured indicates ad hoc exchange. Burials have not been reported for this time period in the Sonoma district. At Clear Lake, burials from the Mostin phase, dating to this period, had relatively low frequencies of grave goods; included were a few dorsally extended and semi-extended individuals, but the majority were buried in loosely to tightly flexed positions (White and Fredrickson 1992:56).

A fragmentary Borax Lake wide-stem point of Napa Valley obsidian, along with two other point types fitting with this time period, were recovered from CA-SON-120 between Glen Ellen and Kenwood, but the relative paucity of hydration readings for this time period suggest limited use of the site (Jones and Hayes 1989). Occupation of the buried Memorial Hospital site, CA-SON-2098, may have had its inception during the latter end of this period. Several obsidian-hydration readings on debitage from sites in the area also date to this period.

Middle Archaic Period: 3000 - 1000 B.C.

The Mendocino aspect of the Borax Lake pattern (since recognized as the separate Mendocino pattern, see below) appears at numerous sites in the Clear Lake area. It is also the first well-represented culture on the Santa Rosa Plain, probably reflecting larger populations and a more sedentary settlement pattern. Locally identified as the Black Hill culture, this pattern is distinguished by obsidian or chert concave-base points, obsidian or chert narrow leaf-shaped points, chert stemmed points, obsidian biface blanks, biconically drilled schist charmstones, and a continuation of angular obsidian cores. While use of the millingslab and handstone continues, some mortars and pestles appear at this time. The bifaces are made of Napa Valley and Annadel obsidians, while the rest of the obsidian tools are of Annadel glass.

The early component at the Memorial Hospital site fits temporally with the Black Hill culture, although concave-base points--the hallmark of this culture--are absent. Instead, the dominant projectile points associated with this component are large, nonshouldered lanceolate forms, primarily of Napa Valley obsidian. In the neighboring Napa Valley, the Hultman site (CA-NAP-131) was recognized by Meighan in 1951 to contain a similar assemblage to the Borax Lake Aspect, with "manos, willow-leaf points, and Borax Lake fluted points" (Stewart 1982a:27). This assemblage (the Hultman aspect) has also been realigned, to represent the Mendocino pattern. Origer (1993:43) notes that this component may represent the time when the probable Yukian inhabitants "owned" both the Annadel and Napa Valley obsidian sources;

Napa obsidian's significantly superior flaking qualities would have made it the preferred source wherever readily available.

As with the preceding Paleoindian and Lower Archaic periods, no information has been recovered in the Sonoma district from site features (e.g. housepits, ovens, hearths) or mortuary practices to allow inferences on demography, settlement practices, social structure, and status differentiation during the Middle Archaic period. In the contemporary Windmiller pattern burials in Central Valley sites, mortuary practices included scrupulous adherence to burial position--ventral extension (lying face down) with the head to the west--and grave goods in the form of perforated charmstones and distinctive abalone ornaments; there is little evidence, however, for status differentiation or formal ceremonialism.

Upper Archaic Period: 1000 B.C. - A.D. 500

Changes during this period may represent either a local adaptation to changing (cooler, wetter) climatic conditions and/or the arrival of a new cultural group. Fredrickson (1984:524-525) has suggested that the appearance of Berkeley pattern traits and mode of settlement may reflect Miwokan expansion from the San Francisco Bay--a response to intensified resource competition as a result of increasingly large, relatively sedentary populations focusing on the bayshore. In a cooler climatic regime, the string of marsh habitat along Marin's and Sonoma's bayshore may have become more productive, while the Laguna de Santa Rosa's productivity may have been refreshed after the long, relatively arid Lower and Middle Archaic periods. The southern Santa Rosa Subregional Long-Term Wastewater Project area contains lands that would have been targeted by such expanding populations. Tracking this hypothesized intrusion archaeologically is difficult, however, due to the paucity of intensive investigations between the San Francisco Bay and the Laguna.

Whatever the cause, it is clear that some variant of the Berkeley pattern--with its well-developed middens and reliance on acorn-processing--appeared not only at the resource-rich Laguna and adjacent Santa Rosa Plain, but also up into Alexander Valley (Psota 1994), into the Lake Sonoma area on the Dry Creek drainage (Basgall and Bouey 1991; Stewart 1993), into some of the more well-watered areas of The Geysers (Peak and Associates 1985), and into the Clear Lake basin (Fredrickson 1973, 1974; White 1984; White and Fredrickson 1992).

Changes in adaptive strategy evidenced at this time resulted in a pattern similar to that found along the bayshore itself: relatively large semi-sedentary populations; indications of more elaborate social differentiation; and evidence of the development of formalized exchange.

At Clear Lake, the Houx aspect of the Berkeley pattern shows itself distinctly with shouldered lanceolate points, burin-faceted projectile points, a reworked biface industry, bowl mortars and pestles, and split beveled *Olivella* beads. Locally, the Berkeley pattern is represented by the Laguna culture, with its nonshouldered lanceolate forms, as well as the addition of obsidian shouldered lanceolate points, *Olivella* saddle beads, and the bowl mortar and pestle, while the millingslab and handstone drop out of use. Although the mortar and pestle first appear in assemblages from the Middle Archaic period, it is in the Laguna and similar Berkeley pattern variants that a focus on acorn-processing becomes a dominant subsistence trait.

Mortuary practices during this period reflect widespread Berkeley pattern customs: loosely and tightly flexed burials with no obvious orientation usually in midden sites; frequent occurrence of

red ochre in graves; and differential distribution of grave goods--including occasional high frequencies of *Olivella* shell beads--indicating status distinctions based on wealth. Another possible sign of status distinction and specialization during this period has been identified at two locations outside the Santa Rosa Plain--the Warm Springs locality at Lake Sonoma and Tiburon on the lower Marin bayshore: the presence of small, specialized living sites with evidence of considerable wealth and exchange, in the vicinity of larger, more egalitarian village sites. Concave-base points yielding hydration readings congruent with this time period are found on the Santa Rosa Plain, often co-occurring with Laguna culture materials. Wickstrom (1986) attributes these findings to Berkeley and Mendocino pattern cultures utilizing valley resources during the same time period, specifically the edges of the Laguna de Santa Rosa. In southeastern Clear Lake, White (1984, 1986) found evidence of Berkeley and Mendocino peoples living "side by side" on a seasonal basis. It was this finding that led to the reassessment of Fredrickson's 1974 scheme; the revised sequence is depicted in Figure 3.

Lower Emergent: A.D. 500 - 1500

Unsettled climatic activity and widespread population movements have been hypothesized for much of California and the western Great Basin at roughly the transition from the Upper Archaic to the Emergent period (Moratto 1984:560). At buried site CA-SON-2098, the first strong suggestion of such an episode on the Santa Rosa Plain is provided. Here, the same buried surface first made available for human use some 6,000 years ago was still exposed around 2,000 years ago, when the second, nearly 1,000-year occupation took place. "The site was then buried by a significant episode of aggradation that took place during the last 1,100 years or less" (Meyer 1993:120-121). Inception of the Lower Emergent was originally dated by Fredrickson (1973) to ca. A.D. 500; a later dating has been suggested by more recent work. The new evidence from the Memorial Hospital site gives some additional support for a later date. The events represented at the site may, however, be entirely localized phenomena.

Whether the result of climatic events or sociocultural change, the Lower Emergent period is also suspected as marking the arrival from the north and east of Pomoan-speaking peoples into the Santa Rosa Plain, and westward to the coast. The Miwokan people of the Laguna culture--if indeed that is the group represented by this phase--would have refocused their occupation further south. At the same time, the Black Hill culture represented by the Mendocino pattern assemblage--co-occurring with the Laguna on the Santa Rosa Plain during the Upper Archaic--fades out of the archaeological record.

The Clear Lake aspect of the Augustine pattern replaced the Berkeley pattern at Clear Lake. Locally, the Lower Emergent (also known as Phase 1 of the Late horizon) is represented by the Rincon culture, named for the type site CA-SON-1269 in Rincon Valley in eastern Santa Rosa. An important innovation in the new assemblage is the introduction of the bow and arrow, replacing the earlier atlatl and dart point; the predominant Phase 1 projectile point here and throughout much of central California is the small, serrated, corner-notched point. The rectangular *Olivella* bead, another widespread marker for the Lower Emergent period, also

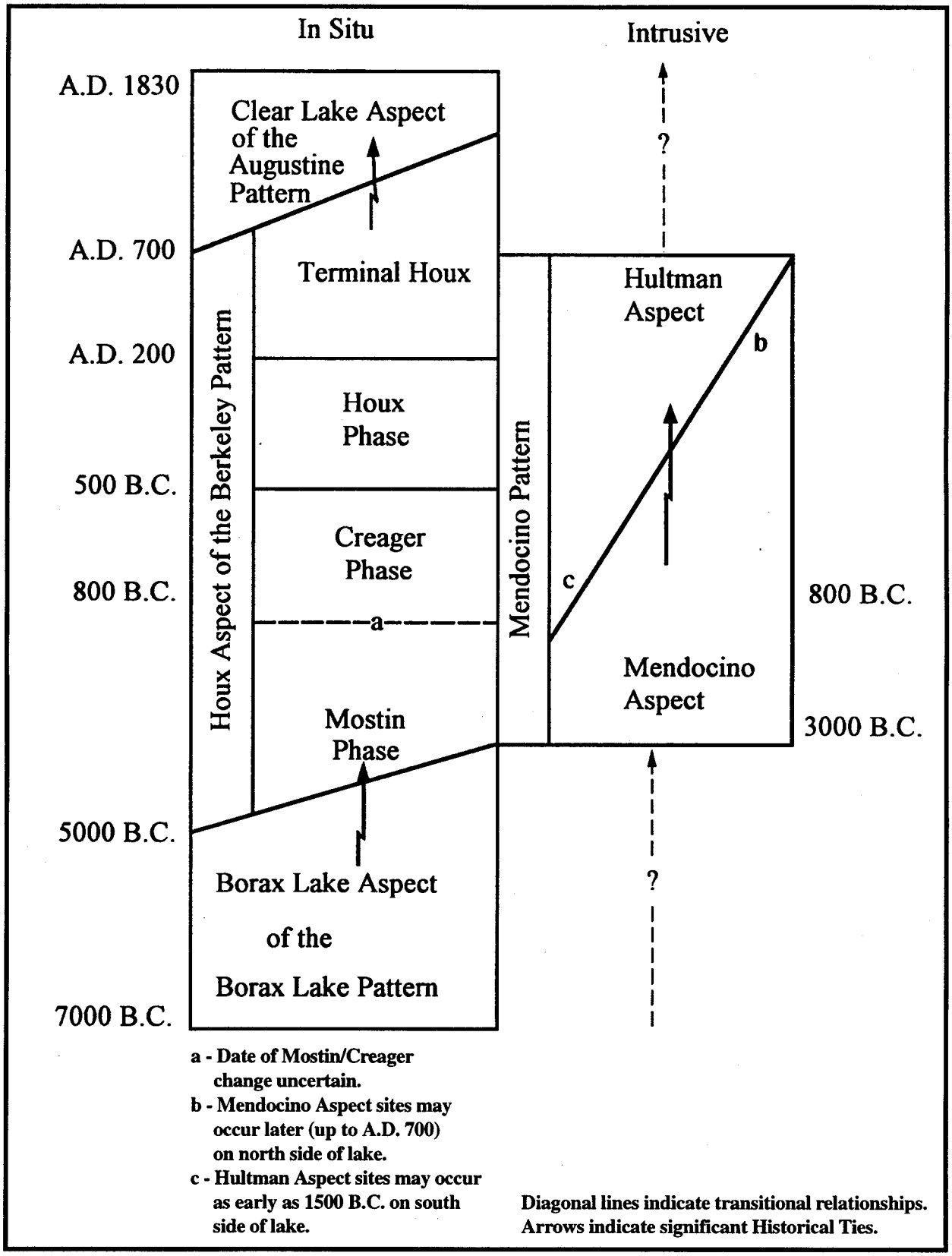


Figure 3. Revised Chronological Sequence for the Clear Lake Region (from White and Fredrickson 1992).

appears in the Rincon culture assemblage. Mortars and pestles become especially abundant during this time period, attesting to a well-developed acorn economy.

Little information has been recovered on the mortuary practices of the Rincon culture. Elsewhere during the Lower Emergent, burials are loosely flexed, accompanied by moderate quantities of *Olivella* beads and *Haliotis* ornaments; the Banjo ornament that appears at this time is believed to represent the introduction of the Kuksu cult, but no evidence of its use has been found in the Sonoma district. Primary and secondary cremations also become important during this time period. Of all the hydration spans in Wickstrom's (1986) sequence for the Santa Rosa Plain, the span representing this time period has the greatest number of sites in use and obsidian flaking debris is most abundant. Some sites also appear in previously little-used areas, perhaps suggesting the firming up of tribelet territories and, with it, a more formalized seasonal round that would result in regular reuse of outlying areas. At The Geysers for example, most of the datable sites were used initially during this period.

Some locations were reinhabited during this period; at CA-SON-120 near Kenwood, for example, where there was a virtual hiatus in occupation during the Upper Archaic period, an intensive deposit indicating semipermanent village use appears in the Lower Emergent. Jones and Hayes (1989) suggest that this deposit represents a Wappo village site, with its predominance of Napa obsidian waste flakes and artifacts. In contrast, Annadel obsidian debitage and tools found in the surrounding area suggest Pomoan seasonal resource use of the area at the same time. This pattern is seen to continue through the Upper Emergent.

Upper Emergent: A.D. 1500 - Historic Period

The lifeways represented by the Upper Emergent Augustine pattern, also termed the Protohistoric period or Phase 2 of the Late horizon, are believed to be similar to those at the time of historic contact. Included in the assemblage are obsidian nonserrated corner-notched points, the obsidian notchless point preform, chert bead drills, clam disc beads, *Olivella* lipped beads, and the hopper mortar and pestle. Clam disc beads were manufactured at Sonoma district sites and used as a form of currency for exchange in a network that ranged throughout California and into the Great Basin. These beads were also a major marker of wealth, worn in life to indicate status and buried in great quantities with their owners at death. Cremation was generally preferred for the wealthy, with remains placed in the midden, while persons of lesser status were usually buried in flexed positions, often away from the village.

In the Sonoma district, the Upper Emergent culture is termed the Gables, named for type site CA-SON-455 located on the low hills above the Laguna de Santa Rosa. The Gables site location typifies the settlement shift proposed for this period--a movement away from the Laguna in favor of more elevated, creekside locations, at the same time that a drastic reduction in the number of sites occurred. The Three Bridges sites on Occidental Road near Sebastopol, for example, were intensively used throughout the Upper Archaic and Lower Emergent, but occupation appears to have ceased by about 400 years ago. One of the Laguna sites excavated during an earlier phase of the Santa Rosa Wastewater Project in the late 1970s (Origer and Fredrickson 1980) also evidenced site abandonment about 500 years ago. Some large occupation sites on the Laguna, however, continued to be in use--probably as permanent villages. At the southern edge of the

Laguna, and in close proximity to the current Project area, CA-SON-159 shows evidence of intensive occupation and bead-manufacturing through both Phases 1 and 2; excavation of nearby CA-SON-518 (Upson 1973) revealed the well-preserved remains of a large circular house floor, radiocarbon-dated to ca. A.D. 1700. This latter site, much of it buried under 1 meter of soil, also contained evidence of shell-bead manufacturing.

The Geysers

Although cursorily addressed above, The Geysers, located in the northernmost portion of the Project area, possesses a sufficiently distinctive environment to warrant special attention. An area of no less than 64,000 acres has been intensively surveyed for archaeological remains in conjunction with geothermal steam field development, with hundreds of sites recorded in the process. Fredrickson states that "the vast majority appear to have either Clear Lake Aspect or, to a lesser extent, Mendocino Aspect affiliation" (1984:519). At that time no site clearly identifiable with the Upper Archaic Berkeley pattern had been found, although such sites were known to occur just to the east in Lake County and to the west in the Warm Springs area of Sonoma County. Archaeologists have since identified intensive Berkeley pattern use in The Geysers area. The sites are located in the extreme uplands of ethnographic Cloverdale Pomo territory, a short distance from the current Project area (Peak and Associates 1985). Of particular interest is CA-SON-1406, a single-component Berkeley pattern site with deep midden soil, milling equipment, and evidence of use as a biface-manufacturing and distribution center. More excavation and synthesis will be necessary before The Geysers' position in the area's prehistory can be understood.

The Marin District

Adjoining the Sonoma district on the south is the Marin district, which Fredrickson (1973:98) placed in the San Francisco Bay archaeological region. The boundaries of the two districts are uncertain, however, because of the paucity of excavated sites in northern Marin and southern Sonoma counties. Moreover, no large-scale archaeological surveys had been conducted prior to the Santa Rosa Subregional Long-Term Wastewater Project, disallowing the ability to propose district boundaries on the basis of site distribution.

While it is likely that northern Marin County was first occupied early, the oldest reported archaeological site in the general area is CA-MRN-152, the Pacheco site near Novato. This site was radiocarbon-dated to the Middle/Upper Archaic transition at just prior to 1000 B.C. (Goerke et al. 1983). Beads and a projectile point from the site correspond to materials from the University Village site in Palo Alto, suggesting that San Pablo Bay had associations with the Early Bay Culture to the south. Possibly related to this early use of Marin County are the "pecked curvilinear nucleated" petroglyph forms located on ridges overlooking the bay (Stewart 1982b:38-40).

Upper Archaic occupation of Marin County is well documented, primarily on the coast where Beardsley's McClure facies was recognized. On San Antonio Creek, on the Sonoma-Marin county boundary, an eastern variant of the McClure facies was identified. There, eight sites were "subjected to repeated amateur investigations in the 1950s and early 1960s, including excavations by [Thomas] King and his friends at the age of 14" (Stewart 1982a:15). Analysis of MRN-357, the most productive of the sites, indicated an early dependence on bayshore molluscs

during the Upper Archaic; nine burials in loose to tight flexure were recovered, six of which were elderly males. King, Upson, and Milner (1966) identified this component as representing the Perry phase of the McClure facies; the upper levels were called the Veronda phase, represented by a shift from shellfish and greater emphasis on vegetal food.

While some Lower Emergent period sites have been investigated in northern Marin County, more attention has been given to protohistoric and historic-period Native American sites in the area. Substantial investigation has occurred approximately 7 miles to the south, at the ethnographic village of *Olompali* (CA-MRN-193), first looked at by Adan Treganza and further studied by Charles Slaymaker. The extensive deposits, covering some 320,000 square meters, make it the largest known Coast Miwok village site. Excavations have recovered house floors, including the remains of a dancehouse, burials and cremations, and an array of historic-period artifacts suggesting very early contact (Moratto 1984:273). Investigations by Stephen Dietz (1976) near Nicasio, a few miles south of the Project area, focused on historic-period Native American use of Halleck Creek Valley. Work focused on the study of acculturation at the ethnographic village of *Echa-tamal*; inhabited for about 400 years, the site was finally abandoned in 1884.

The only archaeological studies within the northern Marin/southern Sonoma Counties portion of the Project area occurred at Tolay Valley, currently a candidate reservoir site. The first report on the valley's prehistory was Albert Elsasser's (1955) article about CA-SON-371, his "Charmstone site," at the location of an extinct lake estimated to have covered several hundred acres. Large numbers of charmstones were exposed when the lake was drained, and "some hundreds" have been collected; Elsasser reports that these were being sold to collectors as early as 1900. Unlike the finely shaped charmstones often found as grave goods in the Delta region, the plummet-shaped stones from Tolay Lake shared "a general crudity of manufacture" that Elsasser attributed to a more utilitarian function. He suggested that the charmstones had been used as slingstones for killing or crippling waterfowl, which would have found Tolay Lake a favorable stopping place.

In the early 1960s, Tolay Valley was repeatedly visited by avocational archaeologist George Phebus, Jr., who excavated and surface-collected nine prehistoric sites, recovering human burials and cremations and an abundant and diverse collection of artifacts. The Tolay investigations were described only recently, when Phebus (1990) produced a report on some 90 archaeological sites in Solano, Napa, and Sonoma counties. The Tolay sites, consisting of middens and nonmidden lithic scatters, represent a long period of use. Initial occupation was identified at "Cardoza 8," an apparent Early period site with an assemblage similar to the Early Bay Culture of the San Francisco Peninsula. Midden site "Cardoza 4" yielded 69 charmstones and a variety of lanceolate points suggesting Middle period (Berkeley pattern) affiliations, while the Late period is represented at a number of sites, including "Cardoza 5," from which 252 charmstones--including some finely worked specimens--were recovered. At least one site containing cremations and burials was also used in the historic period. Phebus (1990:151-175) presents a cultural sequence for the region based on work done prior to the 1970s. The artifact collections from Tolay Valley are curated at the Smithsonian Institution in Washington D.C.

3.2.3 ETHNOGRAPHIC OVERVIEW

At the time of historic contact, the Native Americans controlling the lands of the Santa Rosa Subregional Long-Term Wastewater Project area spoke languages derived from three distinctly separate linguistic stocks: Yukian, Hokan, and Penutian. Within the Project area, these stocks were represented by the Wappo, Southern Pomo, and Coast Miwok languages, respectively. The speakers of each of these languages were sociopolitically organized into several tribelets that controlled specific territories and were distinct from each other. These people also shared similar cultural traits (see Driver 1940:196-198, 200; Kroeber 1925: 221, 275; Sawyer 1978:261), probably as a result of similar economies in similar environments, with centuries of contact with each other (See Map 3).

In an evolutionary typology of human societies, Johnson and Earle (1987) identify three fundamental types of social organization: the Family-Level Group, the Local Group, and the Regional Polity. The native peoples of the Project area fit well in the Local Group classification, which Johnson and Earle describe as

> Subsistence is focused heavily on agriculture, pastoralism, or *extremely productive natural resources* [emphasis added]. The local community of perhaps 300-500 people is a territorial division, typically containing multiple clan or lineage segments that either live together in a village or are dispersed throughout the well-defined territory of the group.
>
> A frequent settlement pattern is a village of perhaps 100-200 people subdivided into clan or lineage segments of hamlet size (i.e., 25-35 persons). The local group forms a ritually integrated political group and may have a headman; but it typically fragments into its constituent kin groupings either seasonally or periodically as a result of internal disputes. . . . Ceremonialism is important for publicly defining groups and their interrelationships. Resources are held exclusively by kin groups, and territorial defense is common.
>
> The local group is represented by a Big Man, a strong charismatic leader who is essential for maintaining internal group cohesion and for negotiating intergroup alliances. The Big Man is also important in risk management, trade, and internal dispute settlement, and represents his group in the major ceremonies that coordinate and formalize intergroup relationships. His power, however, is dependent on his personal initiative; if his support group deserts him for a competitor, little may be left of the reputation he has tried to build for himself and his local group, or of the alliances he has contracted [1987:20-21].

Within the Project area, tribelets of the Western and Central Wappo were situated in Alexander Valley and the adjacent eastern uplands; Southern Pomo tribelets were south of these people to about the Cotati area; and Coast Miwok tribelets were in southern Sonoma and Marin counties. These peoples' cultures were disrupted and their populations radically declined with the intrusion of foreigners beginning in the latter half of the 18th century. As such, there is a paucity of information about their lifeways. The information that is available about these people

and their lifeways comes from investigations of archaeological sites, historical and ethnographic accounts beginning in the 16th century, and continuing oral histories and traditions.

Territory and Settlements

Generally, these groups are described as holding defined territories and exercising control over the land's resources. In the anthropological literature for California, such a political group is commonly referred to as a tribelet, which constitutes a political, social, ceremonial, and geographical unit (see Kroeber 1962; Merriam 1967:356). Depending on the ethnographic source, the boundaries of these peoples' territories differ. In part, this may be due to the boundaries being described decades after the native peoples exerted effective political control. It may be, however, that these people focused upon the center of the territories, with no emphasis on specific boundaries (e.g., Castro 1995:43). There is also the possibility that boundaries, though well-defined and defended, fluctuated over time in response to seasonal and environmental changes that altered the amount of land needed to assure a sufficient food supply (see McLendon and Oswalt 1978:276).

Within each tribelet's territory were several semipermanent settlements, along with campsites in outlying areas that were used on a seasonal basis. Settlement locations were chosen for such factors as proximity to water, firewood, and food resources; well-drained soils; and incoming solar radiation. Smaller occupation sites were often clustered around a tribelet's principal village, which was the location of the ceremonial roundhouse.

Western Wappo

Land occupied by the Wappo extended from the general vicinity of the City of Napa up to The Geysers, and a portion of Alexander Valley on the west, with a small settlement at Clear Lake (Kroeber 1925:218, Plate 27). The territory was mostly mountainous, with the settlements situated in the valleys of major watercourses (Kroeber 1925:218), including the Napa River, Big Sulphur Creek, and the Russian River. The precontact Wappo population has been estimated to have been about 1,650 people (Cook 1976:174). The Wappo appear to have settled in Napa Valley about 2000 B.C. (Sawyer 1978:258).

The Western Wappo, who spoke one of the five Wappo dialects, held the northern portion of the Project area, approximately from The Geysers to Healdsburg. Their overall territory extended from Alexander Valley northeast to Cobb Mountain and south to Mount St. Helena. A very small portion of the Project area, in the area of Chalk Hill Road, was held by the Central Wappo. These people were culturally similar to the Western Wappo and are not discussed separately.

There were several villages in Wappo tribelet territories, with a larger and continuously inhabited town as the primary center of the community (see Kroeber 1925:218-219). Major Western Wappo villages in and near the Project area included *Tekenan-tso-noma* at The Geysers in the Sulphur Creek drainage, and *Pipoholma* on the Russian River near Geyserville (Kroeber 1925:219). One Wappo village has been described as containing 11 houses, with each housing more than one family and from 4 to 21 occupants; other villages were said to have had as many as 40 houses. Other structures in a village included one or two sweathouses (Sawyer 1978:259) and small granaries that stored acorns (Driver 1940:187).

Southern Pomo

The Pomo, who spoke seven different, mutually unintelligible languages, occupied an area that extended from central Mendocino County south into central Sonoma County. Their territories included the entire Russian River drainage and areas east into the Clear Lake basin, with a separate group in the Stony Creek drainage in western Glenn and Colusa counties (McLendon and Oswalt 1978:274).

Speakers of the Southern Pomo language held that portion of the Project area from central Alexander Valley to about Cotati. The Southern Pomo language division was perhaps the largest and most numerous of the seven Pomo groups with a precontact population of from 1,500 to 2,000 (Cook 1976:174). The ancestors of the Pomo people described here probably settled the upper Russian River area sometime after 3000 B.C., with population radiation into their ethnographic territories beginning as late as 500 B.C. (Fredrickson 1984:510).

Southern Pomo territory consisted mostly of land that "can be characterized as primarily composed of a succession of grassy, oak-dotted valleys separated by rolling hills" (Bean and Theodoratus 1978:289), as well as a small area of the coast-redwood zone. The Russian River, Santa Rosa Creek, Mark West Creek, and the extensive wetlands of the Laguna de Santa Rosa were significant watercourses.

Southern Pomo tribelets include *Kataictemi*, north of Santa Rosa, *Bitakomtara* occupying the area from Santa Rosa to Cotati, and *Konhomtara* in the Sebastopol area (Stewart 1943:53-54). Specific boundaries defined the territories of these groups, within which the people had established rights of property and use. These village communities consisted of a principal village, where the chief resided, with several secondary settlements. A village community averaged about 100 people. Within the lands claimed by the community, everyone could hunt, fish, or gather plant food without limitations of private ownership (Kroeber 1925:228, 238)

Coast Miwok

Ethnographers divide the Miwok people into eastern and western divisions. The eastern groups were located in the foothills of the Sierra Nevada, the plains of the Great Central Valley, and lands south of Suisun Bay. The western division encompassed the Coast Miwok and the Lake Miwok at Clear Lake. The Coast Miwok territory consisted of what is today Marin County and the southern portion of Sonoma County, encompassing the western and southern portions of the Project area. Archaeological evidence indicates that the Coast Miwok settled the area between 2000 and 1000 B.C. (Moratto 1984:279-281).

Coast Miwok territory contained large stretches of coast and bayshore--with beaches, cliffs, extensive bays, lagoons, sloughs, and marshes--and an inland environment comprising open valleys alternating with low, rolling hills (Kelly 1978:415). The settlements were focused on the bays and estuaries or along the perennial interior watercourses (Kroeber 1925:273). Some Miwok villages defended their territory against trespassers, but land was not considered privately owned. Certain food-producing trees (e.g., oak, buckeye) and some hunting, fishing, and clam-digging tracts were considered private (Kelly 1978:418).

It is estimated that at the time of historic contact the Coast Miwok had a population of about 2,000 people living in 57 villages (Cook 1976:182-183). The Coast Miwok in and near the Project area spoke differing dialects. Speakers of the Bodega (or Western) dialect occupied the Salmon Creek drainage, as well as that portion of the Estero Americano drainage north and west of the town of Valley Ford (Kelly 1978:415). Speakers of the Southern dialect occupied the Petaluma River and Sonoma Creek drainages and the Marin Peninsula (Barrett 1908:305-306).

Villages in and near the Project area included *Petaluma (*where Mariano Vallejo established the headquarters of his Petaluma Rancho, to take advantage of laborers from this village), the village of *Ewapaii* at Valley Ford, and *Kotati*, from which *Cotate Rancho* and the city of Cotati derived their names (Barrett 1908:308, 310-311, and Map 1; Gudde 1969:77).

A large village typically contained conical grass-covered dwellings, each accommodating 6 to 10 persons, and a semisubterranean earth-roofed sweathouse, which served as a social and work center for the men. Major settlements also had a dance house that served as a "secret society" ceremonial center. The dance house was of similar construction to that of the sweathouse. A secret society that included both sexes had a ceremonial chamber excavated about 2 feet into the ground and about 15 feet in diameter. If there was a separate female society, their chamber was smaller and roofed with grass or tule without earth (Kelly 1978:417).

Subsistence

Economically the Wappo, Pomo, and Miwok can be characterized as collectors who engaged in hunting and plant gathering. Collectors have complex subsistence and settlement organization to address a high variability in the quantity and seasonal distribution of resources (Bettinger 1991:64-68). In such an economy, "logistically organized collectors supply themselves with specific resources through specially organized task groups . . . characterized by the storage of food for at least part of the year" (Binford 1980:10).

The Southern Pomo and Coast Miwok lands had coastal scrub, redwood forest, pine-fir forest, oak woodland, chaparral, and grassland environments, while the Western Wappo lands had all but the coastal and redwood zones (Baumhoff 1963:193). The wide variety of plants, animals, and minerals available in the valleys and mountains and on the coast was the economic basis of these people’s lifeways. Seasonal trips to outlying resource areas, and even to locations outside of their territories, augmented locally obtained resources.

Using an ecological classification, these people can be described as coastal tideland collectors, foothill hunters and gatherers, and riverine and lake fishers (see Heizer and Elsasser 1980:57-73).

Seasonal Round

The seasonal round involved traveling to and residing in differing environmental zones during various seasons to take advantage of resources that were locally unavailable or were available only at certain times of the year. This resulted in a more varied and plentiful diet than would have been available in any one environmental zone, allowed rejuvenation of resources that may otherwise have been overexploited, and provided people with the stimulation and information that comes from living in different places.

During the winter, people would concentrate in the main villages, while during the summer much of the population would disperse among smaller village and camp sites, occupying them for a few days to many weeks while resources were collected and processed. During these times, the elderly and ill, specialists, and/or those that so desired, stayed at the main villages.

The Wappo in the Russian River area, for example, would move from permanent villages on high ground, out of the broad flood zone, to camps along the river in the summer. They also appear to have made annual excursions to Clear Lake and to the Pacific Ocean. During spring and summer trips to Clear Lake, fish and magnesite were obtained; during summer journeys to the coast, clam, abalone, and mussel shells, as well as fish, shellfish, and seaweed were collected and processed (Sawyer 1978:257, 260).

Plant Resources

The three native groups of the Project area shared a specialized economy whose focus was the acorn, which was the main staple of the California Culture Area Indians. At some point, probably more than 2,000 years ago, native Californians "discovered or acquired a technology enabling them to concentrate on the magnificent acorn crops" (Baumhoff 1963:189-190). The acorn was shelled, ground into a flour using a mortar and pestle, and then leached to remove the tannic acid. The acorn was used to make bread, mush, and soups.

The buckeye, processed in much the same way as the acorn, was also greatly favored. The nut of the pepperwood (bay laurel), which required roasting to remove its bitterness, was also popular. After roasting, the pepper nuts were cracked and eaten or were ground and shaped into cakes to be baked as bread (Balls 1962:15). Prior to processing, these foods could be stored for long periods of time.

In addition to the acorn and buckeye, the Wappo ate a variety of roots and "clovers," and seaweed was used as a flavoring (Sawyer 1978:261). Grapes, blackberries, toyon and manzanita berries were eaten, and manzanita berries and elderberries were made into a beverage. Pine pitch served as a "sugar" (Driver 1940:187).

The Pomo used acorns from seven different species of oaks. Buckeye, berries, and the seeds from 15 kinds of grasses, as well as roots, bulbs, and greens were eaten fresh or stored. Seaweed and kelp were considered delicacies (Bean and Theodoratus 1978:290).

The Coast Miwok favored the tanbark-oak acorn for mush and the valley-oak acorn for bread. They made cakes from pepperwood fruits, which were also used to make a beverage. Seeds were collected and eaten as pinole; greens were eaten fresh or cooked; and a few roots and fruits were consumed. Stored acorns and seeds and dried kelp were the mainstay for the Coast Miwok during winter and early spring, when there were shortages (Kelly 1978:415-417).

Basketry manufacture of exceptional quality was a well-developed art among the California Indians (Elsasser 1978:626). The Wappo, Pomo, and Miwok are all renowned for their utilitarian, ceremonial, gift, and trade baskets. The Pomo, for example, manufactured baskets using the bark, roots, leaves, or branches of grasses and trees, using such elements as feathers

and shells for decoration (Benson 1986: 12-36). Plant fibers were also used for making nets and cordage.

Animal Resources

A variety of technologies were used to hunt, trap, and fish. Fish and game were obtained through individual and communal efforts, which ranged from simple trapping with snares or hunting with the bow and arrow, to the construction of fish dams and weirs and building of brush fences used to direct deer during drives. The game not only provided food but also hides and furs, which were used for clothing, bedding, and fashioned into containers. Bone and antlers were made into a variety of tools, as well as ornamental and ceremonial items, such as ear spools and whistles.

Deer, rabbit, ducks, quail, turtles, salmon, abalone, and mussels were just a few of the animals used for food by the Wappo, who also procured honey (Sawyer 1978:261). The Wappo caught fish using nets, lines, weirs, or harpoons. Geese and ducks were killed using slings, and smaller birds were trapped with snares or nets. The bow and arrow were also used in hunting birds. Deer were clubbed or shot with the bow and arrow, and nooses were also used. Raccoons were snared, and other small mammals, such as rabbits, squirrels, mice, and gophers, were clubbed or shot with the bow and arrow. The Wappo collected clams, crab, mussel, and abalone on their trips to the coast (Driver 1940:187).

The Southern Pomo were mostly dependent upon large and small mammals, though the streams and rivers were fished. Deer, elk, and antelope were the main big-game animals taken, but rabbits and squirrels were also important food sources. The Pomo would hunt as individuals or communally. The bow and arrow was used in the taking of large land animals, spears and clubs were used against bears, and spears were used for seal and sea lion. The smaller animals and birds were taken with a variety of nets, snares, and traps. Fish from lakes, streams, and the ocean were caught with weirs, traps, and by line (Bean and Theodoratus 1978:290).

The Coast Miwok diet was quite varied and included deer and crab, which were available all year, with seasonal salmon runs, geese in late winter; in the spring, small fish stranded at low water in pools were obtained. They also ate mussels, clams, a wide assortment of fish, rabbit, elk, squirrels, and birds. Despite their availability in the coastal environment, sea mammals were not eaten. The Coast Miwok caught fish with a circular dip net, in a seine strung between two tule balsas (small boats made of reeds), on lines, in weirs, and using stabbing spears (Kelly 1978:415-416).

Trade

The Wappo, Pomo, and Miwok traded with each other and with neighboring groups (Davis 1961:18,35,41). Such exchange provided resources that were not available locally and augmented local resources when they were in low supply, such as at times of acorn-crop failure.

Coast Miwok traded clams, clamshells, clam disc beads, and abalone shells to the Wappo and clamshells and clam disc beads to the Pomo. The Coast Miwok would travel to Wappo territory to collect medicinal plants. The Pomo supplied the Wappo with tule mats, magnesite beads,

sinew-backed bows, and fish. The Wappo obtained salt "from a lake near Valley Ford" (Sawyer 1978:261) and traded salt to neighboring groups (Davis 1961:41).

Of particular significance to these people was the clamshell bead industry. The Coast Miwok owned the clam beds from which the neighboring groups were provided shell. Beads made from these shells served as a form of currency. The Coast Miwok also used magnesite cylinders, apparently obtained from the Pomo, as money. The currency was used to purchase venison, obsidian, and magnesite from the Pomos and yellow paint and obsidian from the Wappos (Kelly 1978:418-419). The Wappo used clamshell beads and magnesite cylinders for money but also wore them as decoration (Sawyer 1978:261).

Trade was not always direct, but at times involved reciprocal visits to each other's territories to collect resources. For example, in Southern Pomo territories the Miwok would collect turtles, willows for basketry, and angelica at Sebastopol, angelica at Santa Rosa, and datura and tobacco at Healdsburg. In turn, the Southern Pomo visited the Miwok coast to fish and dig clams (Kelly 1978:419). In other instances, the right to access other territories for resources was purchased. The Coast Miwok used clamshell disc beads to purchase obsidian from the Wappo. The Miwok would break up the obsidian at the quarries in Wappo territory and bring back the usable pieces to make knives and arrow points (Kelly 1978:418).

Controlled Burning

"Most California plant communities are to some degree adapted to fire. Some of them depend on periodic burning to maintain their vigor or dominance on a site, and many . . . need fire in order to complete their life cycles or to eliminate competitors that would otherwise crowd them out" (Whitney 1979: 177). Bakker (1971:78-91) specifically notes vegetation communities in Sonoma and Marin counties that have been adapted to a fire ecology. The Indian people of California took advantage of this situation to use periodic burning of selected areas as a land-and resource-management tool (see Lewis 1993). The Southern Pomo of the Dry Creek and Cloverdale areas, for example, engaged in burning "as a resource management tool for improving and maintaining the floral environment" (Peri et al. 1982:21).

Some of the benefits of controlled burning included clearing of underbrush to facilitate travel and stalking of game; stimulating growth of desirable grasses and shrubs to attract game; enhancing the production of certain food and medicine plants; clearing campsite areas to reduce fire hazard and camouflage for enemies; and protecting villages and forests from major fires (Barrett and Arno 1982:648-649; Biswell 1989:49-50; see also Bartlett 1956:693).

Political Structure

Tribelets were not rigidly organized, nor was authority imposed. People and families allied and resided with those they respected or were related to. The authority of headmen, or "chiefs," was largely dependent upon the person's demonstrated ability to lead with the concurrence of the people being governed.

Among the Wappo, male or female chiefs were elected, appointed, or chosen for their ability to perform specific tasks. Sometimes there was more than one chief, depending on the tasks that

needed to be done. The basic functions of the chief were to coordinate (1) relations with other villages; (2) internal functioning of the village; (3) dances, ceremonies, and medicine; and (4) transmission of news and information. The position was held until death. A "chief" might choose a successor, or a successor might assert themselves as being appropriate for the job (Sawyer 1978:259).

The Pomo had three levels of chieftainship: elected tribelet chiefs; kin-group chiefs; and assistant kin-group chiefs. These chiefs were usually males, though some tribelets had women chiefs. The tribelet chiefs arranged for and presided over ceremonies, entertained visitors, gave advice, and consulted with kin-group chiefs regarding community welfare. The kin-group chief's responsibilities were similar to that of the tribelet chief, except the focus was on consanguineal kin. The assistant kin-group chief distributed food for feasts and stood in for the group chief in his absence. The chiefs handled financial aspects of trade and provided the aged, disabled, and unfortunate with food and clothing. Succession to the office of kin-group chief was always hereditary; while the tribelet chief's position was elective, an old chief often "nominated" a close relative for the electorate's approval (Bean and Theodoratus 1978:295-296).

A large Coast Miwok village had a male chief who "took care" of the people, gave advice, and harangued the population daily. An old chief and female elders would tutor a future headman; when the successor was ready the incumbent stepped down, or someone was hired to poison him. Two important female leaders were in charge of organizing and providing the supplies (firewood, food) for various ceremonies and new dance-house construction. One of these women was the head of the woman's ceremonial house (Kelly 1978:419).

Life Cycle

Among all groups, childbirth involved certain restrictions on food and activities. For the Southern Pomo and Wappo, both father and mother were confined in the house for four days, while the Coast Miwok father remained secluded in the sweathouse. Pomo mothers remained confined for six weeks after delivery, while fathers were restricted from hunting and travel for a prescribed time (Bean and Theodoratus 1978:296; Kelly 1978:421; Sawyer 1978:259).

Pomo boys were presented with bow and arrow and a dance hairnet at about age 12, but no formal ceremony was held for them among any of the three groups. In contrast, observation of the Pomo girl's first menses was "her most significant life event" (Bean and Theodoratus 1978:296), as it was throughout much of California. The girl was confined to a special menstrual hut adjoining the family dwelling and placed under stringent food and activity restrictions for four days, while receiving rigorous instruction about her new role as a woman. After a four-day confinement, both Coast Miwok and Pomo girls were greeted by villagers and given gifts; among the Wappo, a more extreme confinement kept the girl separated from the community until the end of her second menses (Sawyer 1978:259). Women were confined each month thereafter, while their husbands were also restricted from hunting and travel.

Marriage was relatively informal and could occur between any nonrelated persons, whether from the same village, different villages within the tribelet, or different tribelet groups. The last situation was the most advantageous, as it resulted in important economic liaisons between the two groups; people who married into a group often served as go-betweens to their original group in times of strained relations. Marriage between members of different language groups was

uncommon. There were no set residence rules after marriage, although a couple tended to spend a short time with one group and then reside permanently with the other (Bean and Theodoratus 1978:296).

The dead were mourned for four days among the Pomo, during which time friends and relatives brought gifts--some to be burned with the body and others for the grieving family. Among the Pomo, the deceased's house was burned with all his/her possessions inside, except that certain sacred paraphernalia may have been inherited or buried (Bean and Theodoratus 1978:296-297). While Kroeber (1925:253) states that there was no subsequent anniversary of the death among the Pomo, Bean and Theodoratus (1978:297) report that a second burning took place a year later, with friends and relatives again contributing items. Cremation was also the preferred treatment at death among the Wappo and Coast Miwok, but less information is available. Kelly (1978: 421) states that the Coast Miwok carried the dead to cremation grounds near the village, where both personal possessions and sacred items were burned with the body. Although scant archaeological evidence suggests that some individuals were buried among all three groups, in flexed position within small holes, this practice is not reported ethnographically for the Southern Pomo (Gifford and Kroeber 1939:152). Cremation ceased among the Pomo after 1850, under pressure from White settlers. While acquiescing to coffin burials in the late 19th and 20th centuries, friends and relatives have been known to continue placing offerings with the dead (Bean and Theodoratus 1978:297). Sawyer (1978:260) states that cremation did not cease among the Wappo until the 20th century.

Historic Period

Many of the traditional lifeways and land-use patterns, which had served these native peoples well for centuries, were to change radically and rapidly after 1776, with the establishment of the Spanish Mission at San Francisco. Change began slowly at first, but by the time Americans began to actively settle the land in the late 1840s, impacts to the Native Americans had become substantial.

A major impact to the native peoples was the mission system, whereby they were brought to the missions--willingly at first, but later by force--to be converted to Christianity, to learn farming and other "civilized" skills, and to serve as laborers. Many of the people at the mission died of diseases introduced by the foreign settlers, such as measles and diphtheria. Generally accustomed to a rich and varied diet, the native people received monotonous, starchy meals and succumbed to the effects of malnutrition. They also suffered from the harsh, often violent, discipline imposed at the missions (Castillo 1978:101-103).

By the end of the 1830s, most of the native people in the Project area had begun to experience the effects of foreign settlers on their lands (McLendon 1993:49). Settlement by foreigners affected the native peoples through displacement of their villages and exclusion from the lands from which they had traditionally obtained their livelihood. This displacement and exclusion not only disrupted their resource base but also the culturally and economically significant seasonal round (see Cronon 1983). Violent acts of racial prejudice also took their toll.

In addition to direct effects upon the population, the new settlement by foreigners brought about major changes in the environment. The environment was greatly altered by new land-use

practices and a variety of introduced animals and plants. New activities, such as cattle-raising, hunting, farming, logging, and mining, not only resulted in the native peoples being displaced from their lands but also altered the environment: native plants were replaced by introduced species; cattle-grazing damaged native vegetation communities; mining disturbed fish resources; and market-hunting directly competed for native food sources.

The Western Wappo escaped being taken to the missions, but the large number of Spanish words in their language indicates a strong influence (Sawyer 1978:258). From 1856 to 1860, 240 Wappo were reported to have been relocated from the Russian River above Healdsburg to the Mendocino Reservation (Kroeber 1925:221). Pomo people were also relocated to this reservation, which was located on the Mendocino coast between Noyo and Ten Mile rivers, before it was closed in 1865 (McLendon 1993:49). The 1910 census reported 73 Wappo people in California (Kroeber 1925:221). In the 1930s, some Wappo people living in the Geyserville area worked for local farmers, with a few managing or owning their own farms (Driver 1940:180). At least 50 persons of Wappo parentage were still living in 1970 (Sawyer 1978:259).

"The Southern Pomo population was decimated early, especially in the southern part of their territory, by missionization, Mexican slave raids, disease, and denser settlements by immigrants" (McLendon and Oswalt 1978:279). In the 1870s, a group of Southern Pomo living south of Healdsburg, in exchange for food and clothing, would perform services for the farmer on whose land they lived, while continuing with such traditional practices as processing acorns (Powers 1877:175); this pattern of mixing traditional and new subsistence practices was not uncommon at that time. The 1910 census reported 1,200 Pomo (Kroeber 1925:237); in 1976, the Southern Pomo were said to be represented by a dozen or so speakers originating from the area north of Healdsburg (McLendon and Oswalt 1978:279).

The Coast Miwok were rapidly incorporated into the mission system, with only a few individuals escaping conversion (Cook 1976:182). Enforced conversion occurred from the time that the missions were established at San Francisco (1776), San Rafael (1817), and Sonoma (1823), which dislocated the population and resulted in cultural disintegration. Some Coast Miwok were taken as far away as Mission San Jose at Fremont in the East Bay (Milliken 1994). Subsequent to 1846, Americans occupied the traditional Coast Miwok land with a focus on lumbering, dairying, and agriculture. Some of the surviving Coast Miwok worked in sawmills and agricultural fields (Kelly 1978:414).

Over many years, numerous and varied Indian organizations in California have fought for religious, educational, political, and employment rights (see The Santa Barbara Indian Center and Dutschke 1988). As anthropological research continues, and as racism is fought by Indian people asserting their heritage, more people of Native American descent are being identified. To this day, Wappo, Pomo, and Miwok people continue to live in Sonoma and Marin counties.

Despite decades of impacts, the Wappo, Pomo, and Miwok continue to engage in traditional practices. Traditional foods are served at community gatherings, traditional ceremonies involving music and dancing are held; some still speak native languages and engage in such arts

as basketmaking. In recent years, the native Indian peoples of Sonoma and Marin counties have been working concertedly to preserve cultural information and traditions, to prevent the desecration of their cemeteries, and to protect the archaeological sites that reflect their heritage.

3.2.4 HISTORICAL OVERVIEW

Introduction

The primary historic-period land uses of Sonoma County, as well as most of the county's environmental zones, are represented in the vast Santa Rosa Subregional Long-Term Wastewater Project area. The Project area includes portions of the lands controlled by two missions, more than one dozen Mexican land grants, and most of the county's population centers. Excluded from the Project area is the coastal zone and the mountainous timber region in the northwest. Despite this exclusion, even the early 19th-century Russian presence on coastal California is represented by farming outposts in and near the Project area. Thus, the history of settlement and land use in the Project area is essentially a history of Sonoma County. A portion of northwestern Marin County, along the Sonoma-Marin border in the Americano and Stemple creek drainages east of the towns of Tomales and Fallon, is also included.

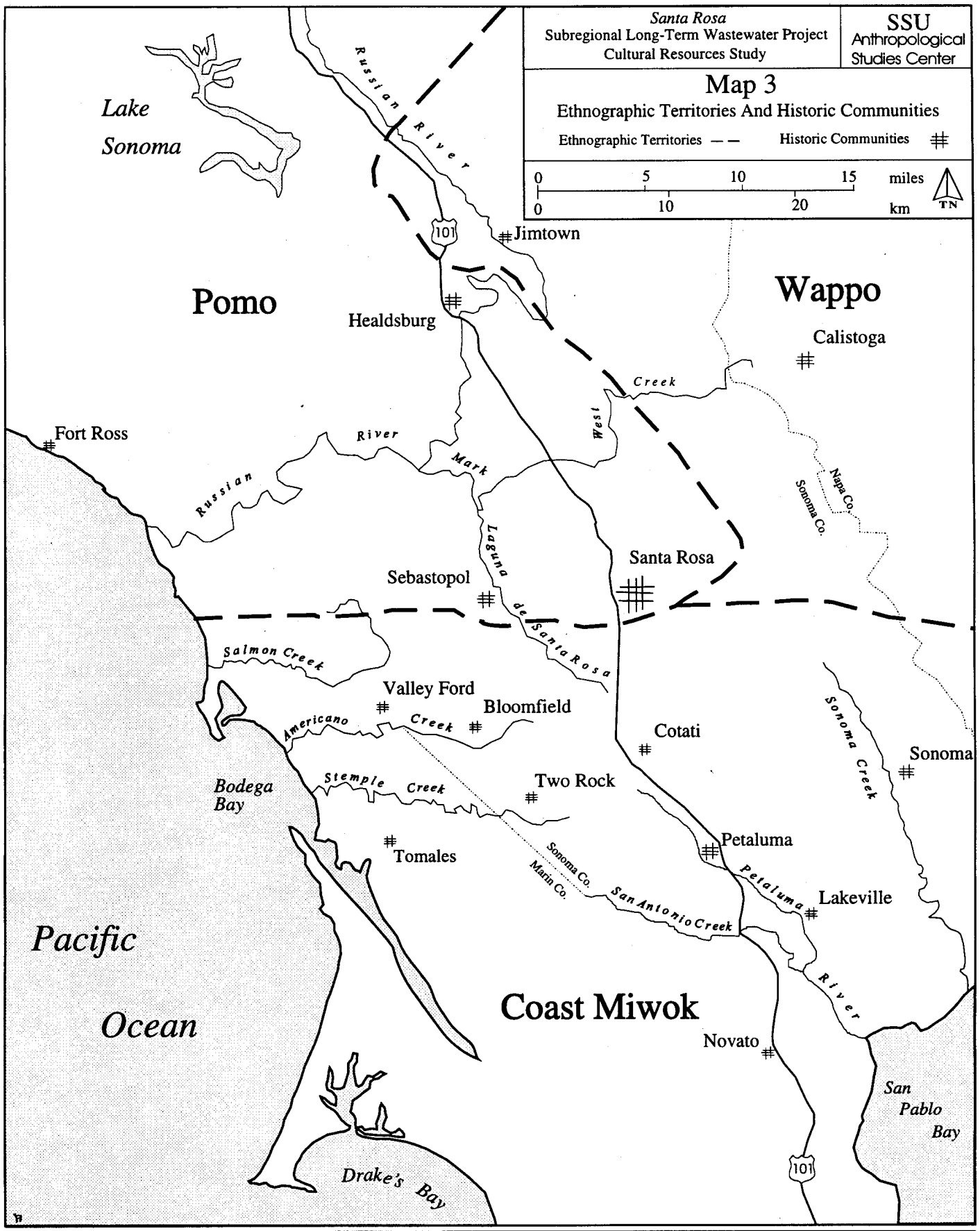
Sonoma and Marin were among California's original 27 counties, indicating that they were seen culturally and politically as separate entities as early as 1849. Their names were derived from the local Indian languages: *Sonoma*, a probable Wappo place name, and *Marin*, the name of a Coast Miwok leader. While the early history of the two counties was similarly shaped by Mexican events, they later diverged, with Sonoma focusing on agriculture while Marin was influenced by its proximity to San Francisco. The portion of Marin County in the Project area is today a part of the North Bay Dairyshed, which straddles both sides of the Marin/Sonoma border (see Maps 2 and 3). As a landscape historian of this area has noted, there is no line to distinguish one county from another in this region, with each side of the boundary sharing much of its history and a similar natural setting with the other (Abbott 1986:2). Marin County is therefore not singled out in this overview.

The broad patterns that determined the timing and nature of the Project area's settlement and land use are first described below, followed by a focused look at local developments from the mid-19th through the early 20th centuries.

European Advances

Exploration

California was claimed by Spain as a result of the Cabrillo expedition, which landed at San Diego and discovered Alta California in 1542. The expedition, consisting of two small ships, continued northward along the coast as far as southern Oregon but made no landings and returned to Mexico. The first European to sojourn on the coast of northern California was Francis Drake and his company. For more than one month in 1579, they harbored on the Marin County coast, claiming "Nova Albion" for the British crown. Their probable anchorage was at today's Drake's Bay, about 15 miles from the western limits of the Project area. Sixteen years


Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
Map 3
Ethnographic Territories And Historic Communities
Ethnographic Territories
Historic Communities
0 5 10 15 miles
0 10 20 km
TN
Lake Sonoma
Russian River
Jimtown
Pomo
Healdsburg
Wappo
Calistoga
Fort Ross
Russian River
Mark West Creek
Napa Co.
Sonoma Co.
Laguna de Santa Rosa
Santa Rosa
Sebastopol
Salmon Creek
Valley Ford
Bloomfield
Americano Creek
Cotati
Sonoma Creek
Sonoma
Bodega Bay
Stemple Creek
Two Rock
Tomales
Sonoma Co.
Marin Co.
Petaluma
Petaluma
Lakeville
San Antonio Creek
Pacific Ocean
Coast Miwok
Novato
River
San Pablo Bay
Drake's Bay
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later, Sebastían Cermeño of Spain was shipwrecked at what may have been the same spot; like the English company, these Spaniards explored inland and met and traded goods with the Coast Miwok people. Bodega Bay on Sonoma's coast, first recognized by the Vizcaíno expedition of 1602-1603, was not visited until two centuries later. Then, in the fall of 1775, six years after the Spanish had discovered San Francisco Bay, explorer Juan Francisco de la Bodega y Caudra arrived at the bay that was to take his name (Hoover et al. 1990:172-174, 331, 474).

The next spring, the presidio and mission were founded at San Francisco, followed by Mission Santa Clara in 1777 and Mission San José in 1797. The Spanish made no formal explorations in the North Bay, however, and local lifeways among the native Coast Miwok, Wappo, and Pomo people remained relatively unchanged by European influence into the 19th century.

Far to the north, along the coast of Alaska, other events that would affect Sonoma County's history were developing at the same time. Russian sea-mammal hunters had been working the Alaskan coast for several decades, but their efforts were not centrally administered. In 1799, the czar granted the Russian-American Company exclusive monopoly to exploit Pacific marine mammals, as well as other resources, in North America, and a number of colonies were soon established along the coastline (Lightfoot, Wake, and Schiff 1991:11). The company quickly recognized that the poor soil and short growing season of Alaska required looking south to potential farming land that could be used to raise food for the colonists, as well as to serve as a trade center for other goods.

Russian Settlement

The Russians first explored Bodega Bay and vicinity with an eye for settlement in 1809. Soon the Spanish sent Gabriel Moraga to investigate the rumors of Russian interest in the coast, initiating in 1810 the first of a series of expeditions through Marin and Sonoma counties to Fort Ross. These forays apprised the Spanish of the new burgeoning Russian settlement on the coast at Fort Ross (Beck and Haase 1974:18). In March 1812, the Russian-American Company began construction of the fort. For three decades, the Russians ran Fort Ross and a network of settlements, farms, and outposts stretching over 55 miles of coastline--from the fort to the Farallon Islands--using a work force of native Alaskans, Creoles, and local Kashaya Pomo, Southern Pomo, and Coast or Bodega Miwok (Lightfoot, Wake, and Schiff 1991). The main port was at Bodega Bay, while the Klebnikov Ranch was inland in the vicinity of the town of Bodega in the upper Salmon Creek Valley, just west of the Project area.

One of the Russian farms, the 200-acre Chernykh Ranch, may have been within the Project area; it was established in the 1830s on Purrington Creek, between Graton and Occidental (Lightfoot, Wake, and Schiff 1991:12). There, the Russians planted 2,000 grape vines and a few fruit trees. They built a six-room barracks, a large kitchen, a warehouse for supplies, and a plank circular floor for winnowing wheat (Haase 1952:63).

The Mission Response

Containing the growth of Fort Ross was the primary impetus for the northern expansion of the mission system and the Mexican settlement of the North Bay. Under the Spanish, a mission had been established in 1817 at San Rafael to provide a healthier setting for the neophytes then housed at San Francisco. In 1822 the newly formed Mexican government took a more

aggressive stance against the Russians; Father José Altamira founded Mission San Francisco Solano at the site of present-day Sonoma the following year with the express purpose of establishing a Mexican presence on the northern frontier. Altamira may have been the first non-native to visit Tolay Lake (site of the proposed Tolay Reservoir); he found it shallow and choked with tules and, therefore, an unsuitable water source (Heig 1982:2).

The mission buildings were centered at today's Sonoma Plaza, with a network of agricultural lands and vaquero outposts fanning out for miles in all directions. By the end of 1824, the mission had nearly 700 neophytes, vineyards, orchards, and livestock. Local Indian resistance toward the intrusion culminated in the burning of the mission building in 1826; the buildings were rebuilt and the mission continued. But fear of the Indians, as well as the padres' proprietary surveillance of the land, kept secular Mexicans and the slowly growing number of foreigners in California from settling the North Bay.

Irishman John Reed may have been the first earnest foreign settler outside the mission system; he built a shack and planted crops in 1828 near today's intersection of Petaluma Hill Road and Crane Canyon Road (east of Rohnert Park, within the Project area). His stay was short-lived. When his cornfield was burned by Indians, Reed retreated south to the Marin peninsula, where he became a well-known early pioneer of that area (Heig 1982:4; LeBaron et al. 1985:8), claiming the first Mexican land grant in Marin, Rancho Corte Madera del Presidio, in 1834 (Winzler and Kelley 1977:VII-50).

Mexican Settlement Of The North Bay

Vallejo and the Pueblo of Sonoma

The secularization of the missions between 1833 and 1835 was intended to result in the return of half the lands of California back to the native peoples, with the remainder to be distributed to clerical authorities. These plans were thwarted, however, by internal conflicts in the Mexican government and a strong anticlerical sentiment among *Californios*, the Mexican citizens of Alta California. In 1833, Mariano Guadalupe Vallejo, a 24-year-old officer from Monterey, was sent to establish a pueblo on the northern frontier. Vallejo tried to found settlements at present-day Petaluma, Santa Rosa, and Fulton, but in each case local Indians retaliated (Hoover, Rensch, and Rensch 1966:528). Ultimately, the new pueblo was sited at Sonoma, where Mexican presence had become tolerated. Vallejo claims to have made a treaty with the Indians and to have entertained them lavishly before surveying the 6,000-acre pueblo in 1835 (Heig 1982:7). A few years later, the smallpox epidemic of 1838 so decimated the remaining Indian population that resistance to the new settlers virtually ceased.

Vallejo built his home on the plaza; at the same time he personally received the 66,000-acre Rancho Petaluma land grant, the largest grant in the North Bay and one of the largest in the entire state (Beck and Haase 1974:24-39). The center of the rancho, which served as Vallejo's country home, was his grand adobe, now the focal point of a state historic park east of Petaluma, immediately adjacent to a Project component. The "several adobe houses" also built on his grant during the 1840s have not been relocated (Gebhardt 1963:28-31). The complex at the Petaluma Adobe became a center of population and industry, with its village of Native American laborers and a large *Californio* and foreign work force. The primary economic enterprise at all Mexican ranchos was the hide-and-tallow trade--Vallejo reportedly owned 50,000 head of cattle in 1845

(Heig 1982:9)--which brought traders from around the world to San Francisco Bay. The land proposed for the Adobe Road Reservoir, just over 1 mile northwest of the adobe, would have been used during this period. The Tolay, Sears Point, and Lakeville Hillside reservoirs are within the extreme eastern portion of the Petaluma grant; they too would likely have been used during Vallejo's tenure.

Sonoma Land Grants

Twenty-five additional grants were made within the area to become Sonoma County during Mexican rule. The Mexican governor was the official grantor, but Vallejo could make provisional concessions and his recommendations were always approved. Vallejo appears to have been designing the social and economic setting of the North Bay. The grants fell into three primary zones: the northcentral core, consisting of some of the best lands given to relatives of Vallejo and his wife; the southcentral interior, which were granted to some of Vallejo's Mexican soldiers; and the western redwood area, granted to Yankees and British sailors who formed a buffer to Russians on the coast. Some examples of Project area grants demonstrate this trend.

The Northcentral Core

One of the first grants was Rancho El Molino, including the present-day sites of Forestville and Graton in the northwestern portion of the Project area. El Molino was granted in 1836 to Vallejo's brother-in-law J.B.R. Cooper, a British ship captain, who is attributed with building the first power-operated commercial sawmill in California. The following year, Rancho Cabeza de Santa Rosa was granted to Doña Maria Carrillo, Vallejo's widowed mother-in-law. This important landholding, consisting of nearly 9,000 acres that included the future location of the city of Santa Rosa, soon became the social and agricultural center of the Santa Rosa Plain. Joining her rancho on the west, Doña Maria's son Joaquin Carrillo held the Rancho Llano de Santa Rosa, which included the site of today's town of Sebastopol; the grant also included the area's most distinctive natural resource, the Laguna de Santa Rosa--a seasonally flooded watercourse that flows for some 15 miles along the west side of the Santa Rosa Plain. North of Doña Maria's lands was the small (ca. 6,600-acre) land grant of Rancho San Miguel, near today's Fulton, the site of the failed Mexican pueblo of the early 1830s. The grantee, English sailor Marcus West, was a carpenter whose industry helped develop many of the rancho centers; the location of West's adobe and trading post may be within the northern portion of the Project area. Rancho Sotoyome to the north was granted in 1841 to Massachusetts-born Henry Fitch, a brother-in-law of Vallejo's wife. The size of this grant (nearly 49,000 acres) was exceeded only by Vallejo's own holdings; it contained peerless agricultural land in the Alexander Valley (named for Fitch's manager and caretaker, Cyrus Alexander), a long stretch of the Russian River, and the site of the future town of Healdsburg. The Project's linear route toward The Geysers runs along the eastern portion of this grant.

This northcentral cluster of ranchos, along with some neighboring grants outside the Project area, was owned by a small circle of friends and relatives who held nearly 200,000 acres of some of the finest land in California. Their short tenure was typically *Californio*, supported primarily by the hide-and-tallow trade and replete with rodeos, fandangos, and legendary hospitality.

Around the edges of these dominant ranchos in the north, some marginal lands were also granted. In the small foothill valleys and rough slopes of The Geysers region northeast of Alexander Valley and within the Project area, Rancho Caslamayomi was granted to Eugenio

Montenegro in 1844. Montenegro's willingness to settle such poor quality land may have allowed him to obtain the grant without apparent influence.

Southcentral Sonoma/Northern Marin

Most of the lands in the southcentral Project area, west and south of the Petaluma Adobe, were granted to Mexican soldiers, whose fealty to Vallejo would have served to protect the Petaluma Rancho. Juan Miranda, granted Rancho Arroyo de San Antonio in the southernmost tip of the Project area, had a vast herd of livestock though no laborers and few improvements. His claim, which included most of the future site of the town of Petaluma, was ultimately declared invalid, becoming one of the few areas of public land within the Project area (Heig 1982:21). To the west was Rancho Laguna de San Antonio, which included the community of Two Rock and the Chileno Valley in northern Marin County, granted to soldier Bartolo Bojorques. Adjoining that grant to the north, Rancho Roblar de Miseria contained lands that would include the northern portion of Petaluma and the Roblar and Stony Point areas. Grantee Juan Padilla, who settled for a short time on Mecham Hill, outside the Project area, was run out of the area by new settlers because of his anti-American actions during the Bear Flag Revolt. Padilla transferred his land to speculators and took flight to southern California (Heig 1982:14). Adjoining Padilla's grant on the east, Rancho Cotate was awarded in 1844 to Captain Juan Castaneda, a Texan. Held briefly by Thomas O. Larkin, the American Consul at Monterey, the property was in the hands of Dr. Thomas S. Page by 1849 (Johnson 1994:11).

The "British Zone"

The western portion of the Project area was of a distinctly different character. To discourage advances inland from the Russian coastal outpost at Bodega Bay, Ranchos Estero Americano, Cañada de Pogolimi, and Cañada de Jonive were awarded in the 1830s to British sailors James Dawson, James Black, and Edward McIntosh, who had worked at sea with J.B.R. Cooper and had been recommended by him to Vallejo (Hoover, Rensch, and Rensch 1966:534). Dawson and McIntosh had erected a sawmill on Salmon Creek as early as 1834. To acquire the grants, these foreigners--like Cooper, West, and Fitch--had to accept the Catholic faith and become Mexican citizens. Despite these acts and their settlement during the early years of Mexican rule, these land grants were not to acquire the traditional rancho flavor of those in the north. English Hill, directly north of candidate reservoirs Valley Ford East, Carroll Road North, and Bloomfield, may have been named for these distinctive grantees.

James Black originally held the Rancho Cañada de Jonive, north of English Hill and ranging from Freestone to western Sebastopol; the grant included a stretch of the Atascadero drainage in the Project area and may have encompassed the Russian-American Company's Chernykh Ranch. By 1847, Black had traded the rancho to Jasper O'Farrell for property the latter held in Marin County. O'Farrell, a surveyor with considerable influence in the North Bay and San Francisco, was to name the area Annaly (later corrupted to Analy) for his homeland in Ireland.

The Last Grants

During this period of land granting, instigated primarily because of the threat from Fort Ross, the Russian-American Company gradually shut down its operations, leaving all movable goods

at the fort in 1841 to the highest bidder, Sacramento's John Sutter. The port at Bodega Bay and the outpost near Valley Ford were part of a land grant to another non-Mexican grantee, Stephen Smith from Maryland, who had also set up a sawmill to take advantage of the resources of the redwood region. Smith claimed both the Bodega and Blucher ranchos, the latter containing the site of the Huntley Reservoir. In 1851, Smith built an adobe at the former Klebnikov Ranch (Hoover, Rensch and Rensch 1966:535), establishing a trading post for western Sonoma County.

The Mexican thrust against Russian encroachment had resulted, by the mid-1840s, in the granting of virtually all arable land in the North Bay--more than half of what was to become Sonoma County. Meanwhile scores of foreigners--most from the United States and Great Britain--began arriving to settle on the Santa Rosa Plain and Alexander Valley in the early 1840s. The newcomers' numbers were sufficiently small and the grants so enormous that they were welcomed by the *Californios*, particularly Vallejo, who acknowledged that California was destined to become a part of the United States (LeBaron et al. 1985:8).

The Early American Period

The Bear Flag Revolt

The Bear Flag Revolt of June 1846 put an end to this easy sharing of the northern frontier. With the United States on the verge of its war with Mexico, the Mexican commander General Castro vowed to drive out all Americans from California. The threatened American settlers of the North Bay responded by banding together, capturing the unfortified pueblo of Sonoma and Vallejo himself, and proclaiming victory for the California Republic. The revolt was short-lived, and resulted in minimal bloodshed. The most serious outcome may have been embitterment between the *Californios* and Americans, in violation of U.S. policy and the government's interests (Bean 1978:81). On the Cabeza de Santa Rosa, for example, Americans were no longer welcome (LeBaron et al. 1985:9-12).

With the end of the Mexican War, the signing of the Treaty of Guadalupe Hidalgo in January 1848 assured that all legitimate Mexican land grants would be upheld, a promise that the U.S. Land Commission largely fulfilled. But before the treaty was signed, gold was discovered on the American River in the Sierra foothills. The resulting Gold Rush completely crushed all chances of a smooth and gradual transition from Mexican to American rule.

The Gold Rush

Most North Bay residents packed up and left for the goldfields; nearly every biographical sketch of an early Sonoma County pioneer reveals a brief stint in the Sierra. As late as September 1850, a newspaper editor could report traveling from Petaluma to present-day Santa Rosa and seeing only one settlement, a farm that had been abandoned when its operator left for the mines (Heig 1982:27). When the new state's county lines were drawn in 1850, the former pueblo of Sonoma was chosen as the county seat by default, being the only settlement of any size. The only rival population centers were the Petaluma Adobe, Stephen Smith's small outpost at Bodega, and a few other rancho headquarters.

As the census figures over the next decade indicate (summarized by Harris 1983 and LeBaron et al. 1985:16), most early settlers did return, along with hundreds of new California immigrants.

In 1850, the census lists 562 non-Indian residents, comprising 132 households. The population here as elsewhere in California was predominantly male, young, and American-born (83 percent of Sonoma County's residents were born in the United States). Southerners, one-third of whom were from Missouri, made up 30 percent of the county's population; as LeBaron et al. (1985:16) note, the size of the Missourian population equaled that of the *Californios*. Because the federal figures were considered too low, the State of California conducted its own census in 1852, identifying 2,208 individuals in the county in that year.

Early Settlement and Economy

About half the population reporting an occupation on the 1850 census listed themselves as farmers, but only one-quarter of all heads of household owned land. The rest were squatters who were taking their chances that the claims they chose to settle would be declared invalid by the U.S. Land Commission. The majority of the claims were ultimately confirmed to the original grantees; most, however, had already transferred their lands in desperation due to the tremendous costs involved in court battles and fending off aggressive squatters. The squatters, in turn, were frustrated by the Mexican land-grant system that allowed so much land to be held by so few; most were indignant at the land use itself, which allowed a few hundred cattle to take up an area that would have supported a dozen or more farming families. They were also bewildered at a government that had no system in place for disposing of public land, which had been liberally apportioned in other states: It was not until land grants were confirmed and surveyed that the extent of available public land could be known. The uncertainty of land claims dictated the early economy of the area.

Up to the time of statehood, three primary land uses had prevailed in the North Bay: the hide-and-tallow trade on the Mexican ranchos; the timber production on the grants of the redwood region; and the small subsistence farms of the scattered foreign squatters and landless *Californios*. After the initial rush to the goldfields, Sonoma County's attraction shifted to its commercial agricultural potential; the area held expansive arable land in close proximity to the new bustling city of San Francisco, which in 1850, boasted a population of 25,000. It was also close to the shipping routes to the mines, which continued to have a seemingly limitless demand for food.

Cash Crops

For squatters and new landowners, wheat was the crop of choice; it could be planted with little investment, quickly yielded a cash crop, and was a valued commodity at the mines and in San Francisco. Potatoes also gave a high return for a relatively low investment. One area became specially focused on potato farming; called Big Valley (Finley 1937:202; Menefee 1873:263), the area began north of Petaluma and continued in a swath to the west through Bloomfield and out to Valley Ford. Here the climate and soil were ideal for this pursuit. In addition, the land was available, Cañada de Pogolimi having a relatively uncontested title that was confirmed early by the Land Commission. Johnson summarizes the potato boom: "Between 1850 and 1852, potato production in the County rose from 6,000 bushels to more than 300,000 bushels per year. By 1860, 18% of California's potatoes came from Sonoma County, many of which were stored in Petaluma warehouses" (1994:16).

The End of Cattle Ranching

The demand for meat at the mines resulted in the last fluorescence of California's cattle ranches elsewhere in the state; the period between 1850 and 1860 has been called the Age of Cattle. The shift in the market from hides to beef placed a new demand on California ranchers, and the boom soon led to bankruptcy for many. As the North Bay valleys filled up with American squatters, however, the basis of the rancho system--the huge open land grants with their free-ranging cattle herds--was undermined. Many *Californios* left the area to take up residence in the south, where large-scale ranching still prevailed. Others subdivided, exacerbating the remaining rancheros' problems. Doña Maria Carrillo had died in 1849, leaving the land grant to her children, who began selling off parcels as the need arose (LeBaron et al. 1985:15-19). Vallejo also began disposing of his grant in the 1850s, "selling nearly 30,000 acres and giving away thousands more by 1857" (Heig 1982:11). Thus, the successful Sonoma settlers were the farmers. Large-scale livestock production retreated to the uplands in the northwestern portion of the county, where rugged public land could be had for the asking.

Market Hunting

A distinctly different economy prevailed in the southeastern Project area. Beginning about 1849, a market-hunting camp developed on the river within the current city limits of Petaluma. The marshes and sloughs in the area had abundant game, which these hunters and trappers sold to the hotels in San Francisco for Gold Rush-inflated prices. Residents included small river-boat captains, who offered their services for hire; by 1851 there was a "floating general store" that carried game to San Francisco and returned with supplies for trade (Heig 1982:28). These economic pursuits represented a solution to the problem of unavailable land--the harvesting of natural resources. Further south on the Marin peninsula, wood-chopping to provide firewood for San Francisco was a similar pursuit.

Service Enterprises

With the tremendous increase in population in the county, services began to appear. Prior to 1851 there was only the pueblo of Sonoma, which had few useful supplies for the settler. The serious settler traveled to San Francisco to purchase farm equipment and household staples or ordered these goods from the few bayshore traders. Way-stations for individual travelers, and later for formal stage routes, began to appear; the first--possibly within the Project area--was run by Guadalupe Vásquez West, who continued to run the Rancho Miguel after her husband's death in 1849 (LeBaron et al. 1985:141-142). The Carrillo Adobe served as the post office and supply center for the area that became Santa Rosa, operated by one of Carrillo's daughters and her husband (LeBaron et al. 1985:15).

Land Claims and Wars

Some squatters were soon able to purchase lands at reasonable prices from the legal grantees, such as Vallejo and the Carrillos. Others found that claims to the land they had settled were mired in the courts, with disputed claims making any purchase risky. Still others felt that all land should be in the public domain, free to any American citizen who filed a claim. Squatters'

wars--complete with fatalities and property destruction--ensued at Ranchos Bodega, Sotoyome, and Tzabaco in Sonoma County.

In many portions of the Project area, land speculators moved in to get the squatters their land, usually with no legal right to do so. The city of San Francisco, only a few hours away, had an unending supply of savvy speculators with capital to invest and legal advisors, who quickly threw themselves into North Bay real estate. Rancho Roblar de la Miseria (site of the Two Rock candidate reservoir) was one of the many land-grant holdings throughout the state to have had numerous conflicting titles held by city investors. Settlers on the Roblar grant may have ended up paying for their claims more than once between 1850 and 1860, depending on which rival claim was currently being upheld (Stewart 1988:6).

Early Population Centers

The New "Cities"

The small market-hunting camp on the Petaluma River increased in size; a trading post was set up in 1851, another store soon followed, and Petaluma was on its way to becoming a town. There were two rival claims to Rancho Arroyo de San Antonio, making would-be settlers hesitant to buy land from either source. An enterprising pioneer, Garrett Keller, took it upon himself to claim the 158 acres of what was to become downtown Petaluma and sell city lots at $10 a piece; according to Heig (1982), no record of his legal right to do so has been found. In the winter of 1851-1852, families began to arrive, and soon the population was sufficient that the settlers asked Keller to survey streets for a new town. In January the survey was done, and a new wharf built to accommodate the increasing number of guests and goods. By July of 1852, Petaluma had become a bustling town with several hotels and an ever-growing population; in September 1853, there were a cluster of about 50 houses in the town (Heig 1982:27-30).

In contrast, the town of Santa Rosa consisted of only a few shacks in 1853. More prosperous at first was the nearby planned community of Franklin, envisioned by a French trapper on 640 acres purchased from Julio Carrillo. Franklin soon boasted a public house and store, a blacksmith shop, and a hotel. Then three German-born business partners--Barney Hoen, Ted Hahman, and William Hartman--purchased and operated the tavern and store at the Carrillo Adobe, from which they sold groceries, cattle, and real estate. They soon devised a plan to make the town of Santa Rosa the county seat. Local settlers nominated Bennett Valley pioneer James Bennett for the state legislature, with the unstated goal to wrest the county seat away from the city of Sonoma to a more central location. Bennett won and promptly presented a bill calling for an election for the fall of 1854. The towns of Petaluma and Sonoma voted for the status quo, but the rest of the county's population overwhelmingly voted for Santa Rosa. The population had elected as the county seat a town that did not yet exist; there was, however, a bond posted by Barney Hoen and Julio Carrillo, promising to furnish all the lands necessary for new public facilities (LeBaron et al. 1985:21). The promise of a modern town and the rejection of the old Mexican lifeways typified by the town of Sonoma turned the vote. According to Carrillo's wish, however, the town was laid out with a central plaza like that of a Hispanic city. A store, a saloon, and a Masonic hall were built by the spring of 1854, and in the fall the first court of sessions was held. The businesses, and even some of the buildings, of the town of Franklin were moved to the new town of Santa Rosa, and Franklin was soon forgotten (LeBaron et al. 1985:23).

The contrasts between the two "cities" of Sonoma County were clear in the mid-1850s. Petaluma had a larger population, a bustling spirit that reflected the mercantile enterprises focused on the river and San Francisco, and a more cosmopolitan population with a marked absence of Mexican influence. The American-born settlers of Petaluma were nearly all Yankees. In contrast, Santa Rosa was described as a "shabby little village" in 1856, and was not to have its first newspaper until the end of the following year. The primary occupation was farming, for many at only subsistence level, and the population was overwhelmingly Southern-born. Feelings ranging between friendly rivalry and open hostility existed between the two communities for decades, with Petalumans regularly attempting to bring the county seat south. In 1859 Petaluma had a population of nearly 2,000; Santa Rosa, only 400 (Heig 1982:43).

The New Towns

The mid-1850s was a time of sudden and rapid growth in the county. The autobiography of a pioneer woman who had settled within the Project area in Green Valley, near Graton, in 1850 describes the nature of the change:

> in 56 our country around sonoma county begins to improve, towns spring up all over & the people building houses & leaveing old cabbins to be used for outhouses. & the people beginning to talk county fairs & improve their stock. & farms improveing more & better fences & more useful emplements to work with [Gregson 1940:130].

Schools, churches, fraternal organizations, and a variety of other symbols of Euro-American settlement were altering the nature of the North Bay.

By the mid-1850s, nearly all of the present-day population centers were on the map. Sebastopol was founded in 1855, although a large rural population had already sprung up around the Miller & Walker Store, about 1 mile south of town. In 1853, the town of Freestone added a hotel and blacksmith shop to its already existing public buildings, which included a saloon and general store (Finley 1937:203). In the same year, the first house was built in Bloomfield, named for F.G. Blume, who had married the widow of grantee James Dawson and became the owner of the Rancho Cañada de Pogolimi grant. Within a few years, Bloomfield quickly surpassed the other small towns in Big Valley; as an important stop on the Petaluma-Gualala stage route and the capital of the potato-growing region, it had a population of several hundred residents (Clayborn 1976). North of Bloomfield, the village of Two Rock also got its start in the early 1850s, when farmer John Schwobeda chose the name of the local landmark (*Dos Piedras*) for the settlement. Just west of the Project area in Marin County, the town of Tomales was settled early due to its proximity to boat transportation on Tomales Bay; settlers John Keys and Alexander Noble moved there in 1850, a store was opened in 1852, and a post office followed two years later (Gudde 1969:340, 349). Keys ran a small schooner between Tomales Bay and San Francisco, selling potatoes and other produce grown by the area's settlers (Winzler and Kelley 1977:VII-51).

Traffic between Sonoma County and San Francisco did not pass through the Marin peninsula, as it does today, but by stage along the Petaluma River to the steamers docked at the town of Lakeville, in the vicinity of the Project's Tolay and Lakeville Hillside candidate reservoirs. Established in the early 1850s, Lakeville was the social and commercial center for several farming families who had purchased Vallejo's Rancho Petaluma holdings. One of the area's

large landholders was German immigrant William Bihler, who bought the land containing 1,100-acre Lake Tolay in 1859, "dynamited the southern end of the lake, watched the water drain off toward San Pablo Bay and planted potatoes and corn in the lake bed" (LeBaron 1987). The little town also provided services for travelers, including a hotel, blacksmith shop, and other facilities, and showed promise of becoming an important population center. South of the Lakeville area, the area to become the town of Novato in the 1880s consisted of fruit orchards in the 1850s (Winzler and Kelley 1977:VII-52). Just northeast of Lakeville, the town of Sonoma was said to have stagnated after it lost its role as the county seat; two decades later it was described as “the same old Mexican town it was in 1846” (Menefee 1873:259).

By 1860, the population of Sonoma County had increased by more than 500 percent from the state census eight years before; the new federal census counted 11,867 residents. By that year, some of the land-grant litigation had been resolved, and the farm map surveyed in 1863 by A.B. Bowers (1867) shows that most ranchos had been subdivided and occupied by new residents. In many cases, the poor settler who complained in the 1850s of the lack of available farming land due to the rancho system had greater reason to complain a decade later; a few individuals with money and influential contacts had bought up most of the best land. An example is Harrison Mecham in the Roblar area. The 1860 census indicates he owned no real estate; three years later he owned large parcels of the Roblar land grant (Bowers 1867); on the 1870 census, Mecham's real-estate value was $100,000. Later that decade, T. Thompson (1877) listed Mecham's holdings at 10,000 acres, almost all arable land.

The Railroads

Poor transportation hindered development of the North Bay, particularly commercial production of perishable foods, which required speedy transport to the city markets. For several years, unsuccessful attempts were made to bring rail traffic north of the bay. Then in November 1869, Col. Peter Donahue stepped in and organized the San Francisco & North Pacific Railroad, laying tracks and developing a system of steamers between San Francisco and the north bayshore. In only 13 months, the trains were operating between San Francisco and Santa Rosa, and two years later the railroad extended to Healdsburg and Cloverdale. One of Donahue's primary goals was to gain access to the virgin redwood stands around the Russian River, as construction in San Francisco had depleted all closer timber stands by the 1860s (Heig 1982:87).

The southern terminus of the railroad, where the steamers met the tracks, was situated near the mouth of the Petaluma River about 8 miles downstream from the city of Petaluma and 1 mile south of the town of Lakeville. Called Donahue, the primarily company-owned town had houses, stores, a firehouse, steamer docks, a schoolhouse, and a modern 40-room hotel (Heig

1982:88). As population increased in Marin County, Donahue was forced to move the terminus in 1882; he dismantled his town and floated it by barge to Tiburon, where he reconstructed the new terminus (Heig 1982:89). Most of Sonoma County benefited from this move, as travel time across the bay decreased. Lakeville, however, lost not only the revenue from its commercial establishments for travelers but also the residents' own direct access to steamer traffic. Bloomfield was another town to lose with the coming of the railroad. In the 1860s, Bloomfield boasted four hotels, a flour mill, and a growing population and was making its bid to become the county seat. When the railroad failed to connect with the town, the overnight trade diminished; soon the railroad eliminated most stagecoach travel as well. Bloomfield stabilized at a population of about 250 in 1877--the same figure reported a century later (Clayborn 1976).

For settlers further west near Tomales, Valley Ford, and Bodega, a railroad connection to San Francisco came in 1875, with the establishment of the North Pacific Coast Railroad, which connected coastal and adjacent towns in Marin and Sonoma counties and north to the Russian River. Both lines were later called the Northwestern Pacific Railroad (Abbott 1986:6).

The Geysers

The rugged country of The Geysers portion of the Project area held important resources within relatively easy access of Sonoma's towns. Thus the area became the site of considerable population, if only on a seasonal or intermittent basis.

The Geysers Resort

While towns began growing up in the west and south, another kind of community began developing early in Sonoma's history--the rural resort, which by definition was some distance from the growing population centers. The North Bay had numerous such resorts, but The Geysers--at the northern terminus of the Project's linear route--was the first established and probably the most widely known. It offered a series of hot springs and spectacular scenery less than a few hours from Healdsburg or Calistoga, in Napa County. The area became a commercial resort soon after American settler William Elliot saw the hot springs in 1847. Initially the area was visited by an adventurous sporting crowd, who took the stage up the old Geysers-Healdsburg Road, partly following the current Project's route. By 1854, a broader clientele was attracted when an inn was constructed at The Geysers. Later the renowned stage-driver Clark Foss established his own hostelry at Fossville in Knights Valley, taking another route up the mountain. The Geysers resort eventually gained international attention, attracting political figures and celebrities from the entertainment and literary worlds, as well as vacationing California families. The resort continued in popularity into the 20th century. But when the hotel was destroyed by fire in 1937 (Hoover et al. 1990:486), the attraction of hot-springs resorts had already declined, and no replacement was erected.

The Geysers Quicksilver Mining

Cinnabar was discovered in abundance near The Geysers springs in the early 1850s. The mines were briefly worked in 1861, but they were not economically viable until 1872, when the price of quicksilver (mercury) doubled. The Socrates Mine, located along the Project's linear route, and the adjacent Rattlesnake Mine were the only sources of native quicksilver (i.e., quicksilver without the presence of sulphur) in the county. Like all mining operations, The Geysers mines

opened and closed at the whim of the market, at times employing as many as 500 men. A prolonged period of activity occurred between 1888 and 1906, and again in conjunction with World War I. Sporadic mining continued in the 20th century, with a productive spurt in the 1960s made possible by modern techniques and equipment (Peri, Patterson, and McMurray 1978:210-211). Despite the erratic operations, quicksilver mining was an important county industry.

The miners were mostly single men who lived at camp, since transportation routes were poorly developed for commuting. For this reason, and due to the dangerous and unpleasant working conditions, most workers stayed only a short time before moving on to other work or other mines. Despite the remote location, the local community was involved with the mines. Farmers supplied produce to the mines during the growing season and sometimes worked surface mines during the winter months. The mines also generated a voracious market for timber (Peri, Patterson, and McMurray 1978:212). Some miners did live in the area with their families, in Sonoma County within the towns of Pine Flat (within the Project area) and Mercury. Pine Flat had a permanent population of more than 100 residents in the 1870s (LeBaron et al. 1985:74).

Large numbers of Chinese mineworkers were employed at Napa and Lake County mines in The Geysers region in the 1890s, while the Rattlesnake Mine--2 miles west of the Socrates--was the only Sonoma County mine reported to have employed "considerably more Chinese than White workers" (Hunt 1980:10). American miners, familiar with the health hazards of quicksilver, often refused certain tasks; these were given to Chinese workers, who were given no warning of the dangers (Hunt 1980:11-12). There are detailed accounts of the housing, intergroup relationships, and working conditions of the Chinese population at the Great Western Mine; in contrast, no evidence could be located in documents or in the field to corroborate rumors of a Chinese mining community and cemetery at the Socrates Mine (Hunt 1980). Chinese were dropped from the work force at the Great Western Mine by the turn of the century, in response to the anti-Chinese sentiment and legislation of the 1880s, and replaced by Italian workers. Whether Italians made up an important component of the Socrates Mine work force was not learned.

Agricultural Specialization

The end of the wheat boom and the rise of specialty agriculture in California coincided in the last decades of the 19th century. Specialization could not occur until there was sufficient population for labor-intensive crops and a transportation system capable of moving produce quickly to market. These factors came together for the North Bay beginning in the 1870s; by the turn of the century, nearly all agriculturalists specialized. At the same time, a large commercial population of processors, packers, and distributors grew up around each industry.

Crops

Grain and Potatoes

Wheat and other grain production continued in importance for those who had access to large tracts of land; by 1870, California ranked fourth among the wheat-growing states in the nation (Johnson 1994:15). The Big Valley area was still called the “great potato region of Sonoma County” by one historian in the 1870s (Menefee 1873:263), but it was not long before the

market was swamped with the product. At the same time, over-planted fields were losing their fertility and soils were eroded. By the mid-1870s, most of the area's farmers focused solely on grains.

Much of the agricultural success of Big Valley has been attributed to the area's Chinese population. Pioneer farmer Patrick Carroll (of the Project area's Carroll Road North candidate reservoir) and others in the area are said to have run their ranches as the equivalent of southern plantations, exploiting nearly free Chinese labor, with as many as 300 to 500 Chinese working seasonally on the valley's ranches. A small Chinatown developed in Bloomfield, documented only by oral history. In addition to field labor, Bloomfield Chinese residents are said to have operated an apple-dryer at the corner of Main Street and the Petaluma-Valley Ford Road. The Exclusion Act of 1884, and the anti-Chinese sentiment that had led to it, resulted in the ousting of most Chinese residents of the Bloomfield area (Clayborn 1976:41-42), a pattern that occurred throughout the North Bay.

Wine and Hops

In the early 1860s, wine-grape production began accelerating, spurred by the experiments of Agoston Haraszthy in Sonoma Valley. Barney Hoen, one of the founders of the city of Santa Rosa, was reportedly the first winemaker in the Santa Rosa Valley in the late 1850s, and several small wineries followed suit. By 1869, Sonoma County had surpassed Los Angeles County in the number of planted vines and, soon after, in the quality of the product (Jelinek 1982:47-48). Most commercial vineyards, however, were best suited to settings outside the Project area, away from the fog belts of the bayshore and coast.

Hops were especially well-suited to the alluvial plains and terraces along the Russian River, the Laguna de Santa Rosa, and on the Santa Rosa Plain. First introduced in the late 1850s in the Green Valley area near Graton, they were shown to be an overwhelming success along the Laguna in 1874, when pioneer settler Otis Allen began reaping high yields. The success of hops coincided with a drop in wheat prices, and most grain farmers with the right soils and climate switched to the new crop. By 1890, hops were the leading field crop in the county, and the Santa Rosa area became known as the hop capital of the nation (LeBaron et al. 1985:59-60). Hop kilns, only a few of which remain standing today, sprouted up on farms throughout the area.

Extremely labor-intensive, the hop-growing industry provided seasonal employment for hundreds of county residents--among them Native Americans, who depended on the harvest for their livelihood--as well as drawing migrant workers from long distances. Middle-class county residents also got involved, parents and children working side by side and staying in field camps as a sort of summer vacation. As LeBaron et al. (1985:60) note, "Hop picking took on a folkloric aspect" and became something of a competitive sport. Commercial hop-growing was to continue as one of the county’s most important industries into the mid-20th century, when a combination of technological changes and an infestation of hop mold put an end to the industry.

The Apple Industry

The cultivation of fruit trees and grape vines had begun with the mission at Sonoma. Scientific horticulture, however, was first practiced by the Russians in the 1830s, when E.L. Chernykh--a

trained agronomist--experimented with methods appropriate to the soils and climate of the Graton area. The area surrounding the Chernykh Ranch, including substantial portions of the Project area, was to become world-famous for its apples by the end of the 19th century. The Gravenstein apple was introduced to the Gold Ridge District in 1869 by W.J. Hunt, who had also developed a superior dehydrator on his Sebastopol ranch that year (LeBaron et al. 1985:70). At that time, local farmers still focused production on wheat and potatoes. Two years later, with the coming of the railroad to Santa Rosa, apple ranchers in the Sebastopol/Graton area were already shipping their product. Luther Burbank's arrival in Santa Rosa in the late 1870s and his subsequent horticultural experiments resulted in plums and prunes being the major fruit produced on the Santa Rosa Plain, but the Gold Ridge area became almost completely focused on apples. By 1885, Burbank had purchased 18 acres in the Gold Ridge area and began his apple experiments; Nathaniel Griffith, an orchardist in the Laguna Road area, worked under Burbank's tutelage and became known as the "Grandfather of the Gravenstein." The extension of the railroad to Sebastopol in 1891 further secured the area's economic success.

The farming communities of Sebastopol and Graton were thriving by the 1920s; by the mid-1930s, sales of dried apples and apple byproducts from the Gold Ridge area exceeded those of fresh fruit. Apple-drying sheds became a ubiquitous feature of the area's rural landscape, while large commercial fruit-processing plants lined the highways and clustered in the cities of Sebastopol and Santa Rosa. By the end of World War II, large commercial facilities replaced most of the family apple-drying kilns (Eastman 1994:11). The apple industry continues in importance today, although population increase and the rise in land prices have reduced the number of orchards, and technological changes have decreased the labor requirements of apple production.

Livestock

Cattle were the mainstay of the California rancho hide-and-tallow trade. A shift occurred with the new Yankee and European settlers, as sheep were found to be better adapted to the arid and overgrazed rangelands, which were even more severely taxed by the drought years of the mid-1860s. First raised for mutton, sheep were later kept for wool, sparked by the need to clothe Civil War troops. A wool-growing boom occurred, with Sonoma County becoming one of the country's leading wool producers. In most of the Project area, small flocks of sheep were kept on many farmsteads; the Two Rock and Roblar areas were particularly known for their sheep. Large sheep ranches, however, were operated on the hill country to the northwest, outside the Project area. In contrast, the Project area has had a different, highly specialized livestock orientation--dairying and chicken ranching.

Dairying

The Project area includes much of the North Bay Dairyshed (Abbott 1986), which is focused on a wide belt running along the Marin-Sonoma County line. Other focal points for dairying also occur in the Project area: the Laguna de Santa Rosa region near Sebastopol, the southern Santa Rosa Plain, and the Lakeville area. While there were numerous small dairies operating early in the county's history, it was the establishment of the San Francisco and North Pacific Railroad in 1870 that vitalized the industry. Before the railroad, fluid milk could not be shipped for any distance; thus most dairiers sold milk to a local clientele, taking their cheese and butter for sale

in town. With the refrigerator cars (introduced in 1888) and fast travel of the railroad, Sonoma ranchers began supplying milk to a ready market in San Francisco.

The climate and topography of Big Valley was well suited to dairying; already in the 1850s, a few local dairies had been established where potatoes had formerly covered the hillsides. In the late 1870s, some 8,000 milch cows were reported in the area (Clayborn 1976:41). Throughout the North Bay Dairyshed, the landscape has retained the features of the industry. Abbott (1986) details both the commonalities and diversity of the dairy landscape.

Sonoma County's first dairy farmers were Italian, Portuguese, Swiss, Irish, and Anglo-American (Abbott 1986:6). Italian Swiss immigrants, arriving in the area in the late 1880s through the 1890s, came to dominate dairy ranching on the Santa Rosa Plain and in the Petaluma area. As in the mid-19th century, today's dairies are primarily family operated and managed. Requirements of the dairy industry result in large landholdings and relatively few laborers--usually family members and one or two full-time employees who live on the ranch, often with their families. These requirements result in the relatively isolated setting of dairies, even in the late 20th century.

In 1986, dairying was Sonoma County's largest industry. The California Cooperative Creamery in Petaluma is the urban center of the industry, which also includes "feed mills, auction houses, veterinarians, milk testers, nutritionists, breeder associations, truck drivers, and equipment distributors" (Abbott 1986:8).

Chicken Ranching and the PS&R

Beginning with the invention of the chick incubator in 1879 in Petaluma and followed by nationwide promotion, thousands of outsiders moved to southern Sonoma County to take up egg production, while most of the local farmers turned to that occupation by the turn of the century. In 1885, at least 50 farms in the Petaluma area had purchased incubators and were hatching chicks artificially (Johnson 1994:18); by 1904 a government report estimated that 90 percent of the people living near Petaluma were raising poultry (Heig 1982:111). Supply houses, egg hatcheries, and huge marketing cooperatives sprang up in Petaluma, maintaining the focus of chicken ranching to within a few-mile radius of the town and extending through Penngrove, Cotati, Roblar, Hessel, and out to Two Rock. Two Rock, in fact, was the site of the world's first commercial hatchery, housed on the 100-acre property of Danish farmer Christopher Nisson; in 1898, he moved his Pioneer Hatchery to downtown Petaluma (Heig 1982:110). Two Rock later became known for blending dairies and sheep raising with chicken ranching, and for producing hatching eggs, not table eggs (Lowry 1993:36-37).

Part of the appeal of chicken ranching was the relatively small investment required, as most ranches were 1 to 5 acres in size and family operated (Johnson 1994:18). Selling eggs also brought a daily income, which allowed people with few cash reserves to enter the market. Problems with transportation initially hindered participation. While the Santa Rosa Plain had been connected to the San Francisco steamers via the railroad since the early 1870s, the west side of the plain and the hilly land between Petaluma, Sebastopol, and Santa Rosa were far from the railroad stations, and poor roads made it difficult to transport eggs and other crops to the railroad and bring supplies home. The solution to this problem came in 1903, when the Petaluma and Santa Rosa (P&SR) electric railway connected this outlying country to the main

distribution centers. While the Depression resulted in numerous foreclosures, the industry's peak did not come till the mid-1940s, when "Petaluma produced nearly 100 per cent of the commercial eggs in California and partially supplied the urban populations of the eastern United States as well" (Passarello 1964:69). Competition from other regions in California, as well as technological advances that cut out the small farmer, led to the industry's decline. By the mid-1970s, only a few small ranchers were participating, and the industry shut down soon afterward.

With so many chicken ranchers, the industry was associated with no single nationality or ethnic group. Scandinavians and Germans were well represented, as were Italian and Portuguese families--some of the latter immigrating by way of Hawaii. Researchers in Japan had discovered and perfected the technique of chicken sexing in the 1920s, and it may be partly this connection that led to a large Japanese American contingent among the Petaluma area ranchers. Many Japanese American ranchers lost all their holdings during their incarceration in detention centers during World War II; others returned to participate successfully in the last decades of the industry. Also important were the Jewish chicken ranchers, particularly a group of Russian socialists who banded together for political as well as commercial concerns (Lowry 1993).

The fate of the distinctive landscape of the rural hills around Petaluma was recently described in an anthology of reminiscences of the chicken industry:

> Tangible evidence of the business till exists in the weathered, collapsing chicken houses of southern Sonoma County. Some of them have been converted or spruced up into sturdier structures and now serve other purposes. But most are hollow shells slowly disappearing under the twin onslaughts of weather and neglect. This anthology will outlast the architectural remains (Jud Snyder in Lowry 1993:vii).

Subdividing The North Bay

The focus of this overview has been on the land-based industries of agriculture and mineral extraction, which provided an impetus for the growth of towns. By the beginning of the 20th century, the towns had developed into industries in their own right, with hundreds of services and administrative and professional offices. Although Santa Rosa was still a relatively small town, it did have two railroad stations, automobile traffic, factory smoke, and densely packed residential districts. Developers began promoting the contrast of rural subdivisions with this "urban" scene, a contrast that was at the heart of a national "back-to-nature" movement beginning in the 1890s. The rural subdivision would provide clean, natural surroundings for growing families, while the head of household acquired an income in Santa Rosa or Petaluma. Hundreds of acres were divided up into 1- to 5-acre parcels and sold off beginning in 1905.

The Petaluma and Santa Rosa railroad was one of a number of factors to speed up the subdivision in the Project area. The tracks of the P&SR adjoin the Project area in a few locations between Petaluma and Forestville, and again between Sebastopol and Santa Rosa; there was also a spur to Two Rock. Known locally as the "Chicken and Cow Line" (Heig 1982:94), the car made stops about 1 mile apart. In addition to cargo from and to farms, the trains carried schoolchildren, commuters, and other passengers. Passenger service was eliminated in 1932, when school buses and private automobiles provided more efficient service. Beginning again with the post-war building boom, more densely packed subdivisions were developed throughout the central and northern Project area.

At the brink of the 21st century, the growing edges of the historic centers of Sonoma County population have blended together. While the newspaper editor in 1850 could report that he rode some 20 miles without seeing an occupied homesite, today there are few spots in the county where one can ride without seeing occupied land. The exceptions are those areas with such valuable agricultural potential that they remain open today: the North Bay Dairyshed that encompasses the lands currently proposed for wastewater reservoirs; and the wine country at the northern edges of the Project area. The Geysers, functioning as a geothermal steam-field, continues the extractive tradition of the historic mercury mines.

3.2.5 Historic Archaeological Overview

Excavations and Evaluations

While much historical research has focused on the North Bay region, there has been little historic archaeological work to supplement or reassess the documentary and oral-history record. Primary excavations have been conducted on state-owned lands outside the Project area: the Sonoma Coast at Fort Ross (Lightfoot, Wake, and Schiff 1991; Purser, Beard, and Praetzellis 1990; and Treganza 1954a); the Sonoma Mission (Treganza 1954b); the Petaluma Adobe (Gebhardt 1963; Treganza 1958); and the Bale Grist Mill in adjacent Napa County (Alvarez et al. 1988). In most of the above cases, the focus of the work has been towards verifying subsurface architectural details for the purposes of historic-park reconstruction. The notable exception in the above list is Lightfoot, Wake, and Schiff's long-term study of cross-cultural interaction and adaptations among the Russians, native Californians, and native Alaskans thrown together at Fort Ross--a clear departure from the Great Man or Great Building themes that have guided historical archaeology until recent years.

A second arena for historic archaeological study in Sonoma County has been downtown Santa Rosa, where Adrian Praetzellis investigated an 1870s domestic well shaft (Praetzellis and Praetzellis 1983) and a trash-filled feature containing 19th-century American, English, and Chinese ceramics from beneath the Hoag House (Praetzellis and Praetzellis 1985), while the Anthropological Studies Center (Jordan, Praetzellis, and Praetzellis 1987) investigated historic and prehistoric deposits at the former site of Santa Rosa's Chinatown. Most of these deposits had been severely disturbed by pothunters, diminishing the usefulness of the results. Of greater interest, because of the site's historical associations and substantial integrity, was the investigation of the Day's Inn site (Praetzellis and Praetzellis 1989), which yielded a small but important assemblage of domestic refuse from an 1870s urban household. Some minor studies of the Carrillo Adobe, in eastern Santa Rosa, have been conducted as a part of site stabilization. The adobe was also the topic of a historic archaeological master's thesis (Beard 1993).

Archaeological work on agricultural homesteads in Sonoma County was done as a part of the 17,000-acre Warm Springs Dam-Lake Sonoma development by the U.S. Army Corps of Engineers (Greenwood et al. 1984). Many of the archaeological sites had been damaged or destroyed prior to investigation, in most cases as a part of initial dam construction, limiting the quantity and quality of the data recovered. This fact highlights the state of historical archaeology prior to about 1980; while the proposed dam site had been fully surveyed for prehistoric archaeological sites and most evaluation excavations had been completed, historical sites were not recorded until a public outcry required addressing them. The archaeological

studies and associated historical research nonetheless provide useful information on land acquisition and settlement, local economic development, water systems, transportation, and vernacular architecture. Archival and oral-history study of the Skaggs Springs Resort, a popular hot-springs retreat that has analogues in The Geysers portion of the Project area, provided rich detail on 19th- century recreation; archaeological study of faunal remains from the resort, when compared with assemblages from nearby domestic sites, provided interesting comparisons.

Also a part of the Warm Springs Project were two historic archaeological site evaluations associated with the Rockpile Road relocation project (Stewart et al. 1987). A unique mitigation measure was conducted for a turn-of-the-century site, CA-SON-1470H, which historical research had identified as the homestead of a former worker at Luther Burbank's experimental farm in Sebastopol. Budwood was removed from two antique fruit trees at the site, grafted onto root stock, and the resulting trees were "curated" at an antique tree farm to preserve their genetic material.

Survey

With a few exceptions, archaeological surveyors before the late 1970s either ignored or only minimally recorded historic archaeological sites. Since then, hundreds of historic archaeological sites have been recorded in the North Bay. Most, however, have been found on small survey parcels or narrow linear routes--sometimes in heavily urbanized areas--that do not allow viewing the sites and outlying features in their historical context. An exception is the series of investigations in The Geysers Geothermal Region, including portions of the Project area, where Sonoma State University recorded numerous mining and hot-springs resort sites (e.g., Peri, Patterson, and McMurray 1978). Another large-scale study was the Jack London State Historic Park historical resources inventory, that included survey of about 1,000 rural acres (M. Praetzellis et al. 1987). In addition to the numerous domestic and agricultural features associated with London's tenure on the property, several homesteads and other smaller-scale operations were recorded and researched.

The most notable linear survey to address historic archaeological and architectural concerns is the Stony Point Road Reconstruction Project. The survey corridor, much of which is inside the Project area, consisted of 12 miles of existing Stony Point Road, as well as several proposed alternatives. Five historic archaeological sites, consisting of domestic and commercial remains, were recorded (Gerike and Stewart 1989), and all pre-1942 buildings/complexes along the corridor were recorded and evaluated for their potential National Register eligibility (Praetzellis et al. 1989).

3.2.6 HISTORIC ARCHITECTURAL OVERVIEW

Previous Studies

The Santa Rosa Subregional Long-Term Wastewater Project area contains a variety of buildings and other elements of the built environment that are prominent material-culture representations of themes discussed in the Historical Overview. Several reports, surveys, and studies provide documentation of the various architectural styles and property types discussed here, providing information about the history of residences, farms, retail stores, schools, and churches as well as historical landscapes that are unique to the Project area.

Previous studies include the *Cultural Heritage Survey of the City of Santa Rosa,* which discusses Santa Rosa's architectural history within the context of residential, commercial, industrial, and institutional property types found within the city's current boundaries between 1837 and 1945 (Bloomfield 1989). Architect Dan Peterson has prepared or been a contributor to several historic architectural surveys, including *The Santa Rosa Historic Resource Survey* (Peterson 1977), *Petaluma's Architectural Heritage* (Peterson 1978), *The Valley of the Moon Historic Resources Survey* (Peterson and Associates, 1979a), *The Western Sonoma County Historic Survey* (Peterson and Western Sonoma County Historical Society 1981), and *The Healdsburg Cultural Resource Survey* (Edwin Langhart Museum 1983). Also of importance is *The Historic Architectural Survey Report for Stony Point Road Reconstruction Project*, which was prepared by Mary Praetzellis of Sonoma State University (Praetzellis et al. 1989). A significant study focusing on the dairy industry is *The Changing Landscape of Sonoma County Dairies: An Interpretive Guide* (Abbott 1986). In Marin County, studies near the Project area include the *Marin County Historic Study* prepared for the Local Coastal Program (Duthie et al. 1981) and the *Tomales Historic Resource Survey* (North Marin County Water District and Dan Peterson 1976).

Other useful documents include National Register of Historic Places nomination forms that apply to properties in Sonoma and Marin counties. These forms provide historical background, architectural description, and contextual information that can be applied to buildings and landscape features found within the Project area.

Early Period

Historical architecture in the Project area begins with the Spanish-Mexican settlement period (1776-1846), which subsumes the briefer Russian settlement period (1809-1841). During the Spanish-Mexican period, adobe construction was typical. Due to the impermanence of the building materials used and limited public interest until recent decades, most of the buildings dating to this period have been destroyed; some of the more important have been replicated or renovated in this century. Examples are the missions located in the towns of San Rafael (20th-century replication) and Sonoma (mid-19th-century replacement, along with replication); the Carrillo residence in Santa Rosa (stabilized ruins); and fortifications such as General Vallejo's Petaluma adobe (portions renovated and replicated), a National Register property and the focus of a State Historic Park. Also surviving are several smaller adobes maintained as private residences, with their vulnerable adobe bricks protected by painted stucco exteriors. During the Russian period, buildings reflecting their culture were built in western Sonoma County, including facilities at Bodega Bay and several farms. Particularly notable is the Fort Ross

complex, a California State Park as well as a National Register property. Originally constructed in 1812, much of the Fort was rebuilt following the 1906 earthquake (California Department of Parks and Recreation 1976:135).

Significant numbers of Americans began settling within the Project area during the late 1840s and early 1850s and introduced new building styles. One can find examples of wood-frame construction dating back to the 1850s, such as the ca. 1856 "very early Greek Revival type farmhouse" in Petaluma (Peterson 1978:45). In Santa Rosa, these early houses consisted primarily of small, simple, one-story houses with either a box or L-plan (Bloomfield 1989:6).

Late 19th Century/Early 20th Century

Building styles and construction techniques changed during the 1870s and 1880s in response to the arrival of the railroads. Improved transportation provided individuals with a larger selection of construction materials and exposure to national building trends (McAlester and McAlester 1990:90). As the Greek Revival movement progressed, houses became more ornate and usually front-gabled, such as the ca. 1870 "Greek Revival vernacular" residence at 109 Howard Street noted in Peterson's Petaluma study. During the 1890s through the early 20th century, the Queen Anne style became quite popular. In rural areas, individuals commonly constructed farmhouses and cottages displaying vernacularized Queen Anne stylistic elements. These houses are usually one-story in height, with a hip or gable-on-hip roof and an asymmetrical front facade, typically featuring a gable-roof bay offset to one side. Many of these houses exhibit patterned shingles in the gables and often display decorative stick-work detail. In urban areas such as Petaluma and Santa Rosa, grand homes were professionally designed, such as the National Register 1903 George Strout House in Sebastopol, noted as a Queen Anne in *The Western Sonoma County Study*.

Between 1900 and 1930, residences of the Project area reflected the development of the bungalow, whose plans were nationally advertised and often marketed as mail-order, ready-cut kits. This was a reflection of the Arts and Crafts movement, which emphasized practicality and simplicity. These houses are typically front-gabled and constructed in a simple, rectangular plan; they usually have exposed roof rafters and decorative (false) beams or braces beneath the gables. Front porches are either full or partial width, with a roof that is supported by tapered square columns. These columns frequently extend to ground level. The most common cladding is wood clapboard, shingle, or stucco (McAlester and McAlester 1990:453-454).

The Subdivision

At the national level, construction during the 1930s and early 1940s reflected the Depression and war-time economy of the country, with a minimalistic approach to design. These typically small, one-story homes were usually built in large numbers (McAlester and McAlester 1990:478). A notable example of this type of housing development is found within the Montgomery Village area of Santa Rosa. Following World War II, architectural styles changed once again as people's economic situations and lifestyles altered for the better.

The Ranch style gained popularity during the 1950s and 1960s, with its low-pitched roofs and broad, rambling facades reflecting an optimistic outlook on the future as emphasis was placed on

space and openness. Simple in design and lacking stylistic detail, the Ranch style house symbolized economic stability. A modification to the Ranch was the Split Level, which retained the horizontal lines, low-pitched roof, and overhanging eaves of the Ranch style house, but added a two-story unit intercepted at mid-height by a one-story wing to make three floor levels of interior space (McAlester and McAlester 1990:481). The city of Rohnert Park contains classic examples of late-1950s subdivision-style construction. The Shed style followed the Ranch and Split Level. The Sea Ranch development on the Sonoma County coast contains numerous examples of the Shed style, typified by "colliding geometric shapes" (McAlester and McAlester 1990:484).

Agricultural

Rural buildings are a major component of the built environment in the Project area and act as visual reminders of the importance of agriculture in this region's history. In southern Sonoma and northern Marin counties, buildings associated with dairying are plentiful. An excellent treatment of the dairy industry is found in *The Changing Landscape of Sonoma County Dairies: An Interpretive Guide* (Abbott 1986), which offers an in-depth look at the evolution of the dairy farm and its associated small-scale elements and landscape. The approach taken by Abbott can be applied to much the Project area and is a valuable tool for anyone seeking an understanding of agricultural complexes as a whole.

Other common agricultural buildings in western Sonoma County are chicken houses, in various stages of physical condition, which dot the landscape. Buildings associated with the apple industry, which flourished from the 1890s to the present, can be found in the Sebastopol area. In the alluvial flood plains of the Russian River and its tributaries, the unique building style used in the construction of hop kilns is present. An excellent example are the hop kilns at the Hop Kiln Winery on Westside Road in Healdsburg, which are listed on the National Register of Historic Places as part of the Walters Ranch Historic District. Tank houses, regularly used for water storage between 1870 and 1915 (Pitman 1976:92), are common within the Project area. Continuing to be prominent features of the landscape, they are now seldom used for water storage; many have been converted to unique residences and shops or maintained as storage facilities.

Commercial and industrial buildings associated with the agriculturally based economy include hatcheries, warehouses, poultry-processing plants, feed mills, packing warehouses, canneries, creameries, and winery complexes. Such buildings are found throughout the agricultural areas of Sonoma County.

Transportation

The Washoe House, located west of Cotati, is documented in *The Stony Point Road Reconstruction Historic Architectural Report*, listed as a Sonoma County Landmark, and determined eligible for listing on the National Register of Historic Places. This two-story, side-gabled building exhibiting Greek Revival elements represents a mid-19th-century roadhouse that also served as a stagecoach stop during its early history (Praetzellis et al. 1989). In Petaluma the 1914 Mission Revival Northwest Pacific Railroad Depot located at Lakeville and East Washington streets represents another era of transportation. Other transportation-related features

in Sonoma County include bridges, such as the 1909 Geysers Road Bridge--one of only four bridges in California that features the Phoenix Column (Mikesell 1990:179)--and the drawbridge at the river in Petaluma.

Industry

Structures associated with technological advancements are also represented within the Project area, such as The Geysers Geothermal Power Plant located 21 miles northeast of Geyserville, which is a listed as a Historic Civil Engineering Landmark (Myers 1977:47).

Conclusion

The built environment and landscape of the Project area can provide insight into the region's sociocultural and economic development and act as a prominent visual representation of the agricultural, urban, and industrial histories of Sonoma and Marin counties. In conjunction with background research, the built environment can be understood within its historic context, thereby providing an overall understanding of the area's history.

3.3 FIELD STUDY RESULTS

3.3.1 INTRODUCTION

Results of the field study are detailed below. Of the 10 candidate reservoir locations, portions of 6 had been previously surveyed. A summary of previous studies and recorded sites is presented in Table 1 below. Summaries of the current study's field survey findings are presented in Table 2. The records and mapped locations for sites recorded and/or updated during field survey are contained in Volume II of this report. For a list of isolated artifacts noted per reservoir, see Appendix C, Table C-1.

After the completion of the field surveys, changes were made to the areas to be affected by reservoir construction. Access to the candidate reservoir properties however, was no longer readily available and sensitivity studies were conducted of those portions of the reservoirs that were not field surveyed. Refer to section 3.4.4, Sensitivity Study of the Candidate Reservoir Construction Zones, for additional information.

Table 1

Candidate Reservoirs: Previous Studies and Recorded Resources

Reservoir	Previous Studies	Previously Recorded Cultural Resources
Tolay A	Chavez 1977, 1978a; Elsasser 1955; Holman 1977; Phebus 1990	CA-SON-371; CA-SON-381; CA-SON-383; CA-SON-1152; CA-SON-1155; CA-SON-1156; CA-SON-1158; CA-SON-1159; CA-SON-1903
Adobe Road	Chavez 1978b	None
Lakeville	None	None
Tolay C	Chavez 1977, 1978a; Phebus 1990	CA-SON-381; CA-SON-382; CA-SON-383; CA-SON-1155; CA-SON-1156; CA-SON-1158; CA-SON-1159; CA-SON-1903
Sears Point	None	CA-SON-210 (field study revealed that this site was not located within the reservoir boundary)
Two Rock	Jordan 1990a	CA-SON-1866H; CA-SON-1867; CA-SON-1868; CA-SON-1877H
Bloomfield	None	None
Carroll Road North	Jordan 1990a	None
Valley Ford	None	None
Huntley	King 1977	None

Table 2

South and West County Alternatives: Cultural Resources per Reservoir

Reservoir	Trinomial/ Designation	Site Type	Human Remains Present	Integrity	National Register Eligibility Potential	National Register Criteria
Alternative 2: South County						
Tolay A	CA-SON-371	"Charmstone Site"	Unknown	Fair	Yes	D
	CA-SON-381	Midden Mound	Yes	Fair	Yes	D
	CA-SON-383	Midden Mound	Yes	Fair	Yes	D
	CA-SON-1155	Midden with Petroglyph	Yes	Good	Yes	D
	CA-SON-1156	Lithic Scatter	Unknown	Fair	Unlikely*	None
	CA-SON-1157	Midden	Yes	Fair	Yes	D
	CA-SON-1158	Possible Midden	Unknown	Fair	Yes	D
	CA-SON-1159	Midden	Unknown	Poor	Unlikely*	None
	CA-SON-1903	Midden Mound	Unknown	Fair	Yes	D
	T-A-1	Farm/Ranch, Petroglyph	Unknown	Good	Yes	D
	T-A-2	Lithic Scatter	Unknown	Poor	Unlikely*	D
	T-A-3	Lithic Scatter	Unknown	Fair	Yes	None
	T-A-4	Habitation Site	Unknown	Fair	Yes	D
	T-A-5	Redeposit	Possible	Poor	Unlikely*	None
	T-B-1	Pump House	Unlikely	Poor	Unlikely*	None
	T-B-3	Cardoza Ranch Complex	Unknown	Good	Yes	B, C, D

See Legend, Page 4

* This preliminary evaluation is based on limited research. A final assessment requires further study.

Reservoir	Trinomial/ Designation	Site Type	Human Remains Present	Integrity	National Register Eligibility Potential	National Register Criteria
Alternative 2: South County						
Tolay A (continued)	SP-B-2	Historic Road System	Unlikely	Fair	Yes	A, B, C, D
	Historic Vernacular Landscape	Rural Landscape	Yes	Good	Yes	A
Adobe Road	AR-A-1	Foundation	Unknown	Good	Yes	D
	AR-A-2	Lithic Scatter/Midden	Unknown	Good	Yes	D
	AR-B-1	Architectural Complex	Unknown	Good	Yes	C & D
	Historic Vernacular Landscape	Rural Landscape	Unknown	Good	Yes	A
Lakeville Hillside	Historic Vernacular Landscape	Rural Landscape	Unknown	Fair	Unlikely*	None
Tolay C	CA-SON-381	Large Midden	Yes	Fair	Yes	D
	CA-SON-382	Midden	Possible	Unknown	Unknown	D
	CA-SON-383	Midden Mound	Yes	Fair	Yes	D
	CA-SON-1155	Midden with Petroglyph	Yes	Good	Yes	D
	CA-SON-1158	Possible Midden	Unknown	Fair	Yes	D
	CA-SON-1159	Midden	Unknown	Poor	Unlikely*	None
	CA-SON-1903	Midden Mound	Unknown	Fair	Yes	D
	T-A-2	Lithic Scatter	Unknown	Poor	Unlikely*	None
	T-A-4	Resource Processing Site	Unknown	Fair	Yes	D
	T-B-3	Cardoza Ranch Complex	Unknown	Good	Yes	B, C, D
	SP-B-2	Historic Road System	Unlikely	Fair	Yes	A, B, C, D

* This preliminary evaluation is based on limited research. A final assessment requires further study.

Reservoir	Trinomial/ Designation	Site Type	Human Remains Present	Integrity	National Register Eligibility Potential	National Register Criteria
Alternative 2: South County						
Tolay C (continued)	Historic Vernacular Landscape	Rural Landscape	Yes	Good	Yes	A
Sears Point	SP-A-1	Petroglyph	Unknown	Good	Yes	D
	SP-A-2	Petroglyph	Unknown	Good	Yes	D
	SP-B-1	"Hayshack"	Unknown	Fair	Unlikely*	None
	SP-B-2	Historic Road System	Unlikely	Fair	Yes	A, B, C, D
	SP-C-1	Midden with Petroglyph	Unknown	Good	Yes	D
	Historic Vernacular Landscape	Rural Landscape	Possible	Good	Yes	A
Alternative 3: West County						
Two Rock	CA-SON-1866H	Farm/Ranch	Unknown	Good	Yes	D
	CA-SON-1867	Midden	Unknown	Fair	Yes	D
	CA-SON-1868	Lithic Scatter	Unknown	Fair	Yes	D
	CA-SON-1877H	Farm/Ranch	Unknown	Good	Yes	D
	TR-A-1	Farm/Ranch	Unknown	Poor	Unlikely*	None
	TR-A-2	Lithic Scatter	Unknown	Poor	Unlikely*	None
	TR-A-3	Buried (Artifacts, Flakes)	Unknown	Good	Yes	D
	TR-A-4	Buried (Lithic Scatter)	Unknown	Good	Yes	D
	TR-A-5	Lithic Scatter	Unknown	Fair	Yes	D
	TR-A-6	Lithic Scatter	Unknown	Fair	Yes	D
	Historic Vernacular Landscape	Rural Landscape	Possible	Good	Yes	A

* This preliminary evaluation is based on limited research. A final assessment requires further study.

Reservoir	Trinomial/ Designation	Site Type	Human Remains Present	Integrity	National Register Eligibility Potential	National Register Criteria
Alternative 3: West County						
Bloomfield	B-A-1	Farm/Ranch	Unknown	Poor	Unlikely*	D
	Historic Vernacular Landscape	Rural Landscape	Possible	Good	Yes	A
Carroll Road North	CR-A-1	Farm/Ranch, Buried Lithic Scatter	Unknown	Good	Yes	D
	CR-B-1	Farm/Ranch Complex	Unknown	Fair	Yes	D
	CR-B-2	Cabin	Unknown	Poor	Unlikely*	None
	CR-SF-1	Obsidian Flake, Charcoal (drill core)	Unknown	Unknown	Unknown	D
	CR-SF-2	Obsidian Flake (geological test pit)	Unknown	Unknown	Unknown	D
	Historic Vernacular Landscape	Rural Landscape	Unknown	Good	Yes	A
Valley Ford East	VF-B-1	Farm/Ranch	Unknown	Fair	Unlikely*	B
	Historic Vernacular Landscape	Rural Landscape	Unknown	Good	Yes	A
Huntley	H-A-1	Farm/Ranch (archaeological)	Possible	Good	Yes	D
		Farm/Ranch (architectural)	Possible	Poor	Unlikely*	None
	H-A-2	Farm/Ranch (archaeological)	Unknown	Good	Yes	D
		Farm/Ranch (architectural)	Unknown	Poor	Unlikely*	None
	Historic Vernacular Landscape	Rural Landscape	Possible	Good	Yes	A

* This preliminary evaluation is based on limited research. A final assessment requires further study.

Legend: (For explanation of legend refer to page 2-**)

T - Tolay
AR - Adobe Road
LH - Lakeville Hillside
SP - Sears Point
H - Huntley
TR - Two Rock
B - Bloomfield
CR - Carroll Rd. North
VF - Valley Ford East
A, C - Archaeological Site/Component
B - Architectural Site/Component
SF - Subsurface Findings
1, 2, 3, 4 - Archaeological/Architectural Temporary Site Number

3.3.2 ALTERNATIVE 1: NO PROJECT

The No Project/No Action alternative is an evaluation of impact that would occur if no project is implemented. In this case, the No Project/No Action alternative is the existing wastewater disposal system and Interim Master Plan components. This alternative did not require study as new effects on cultural resources are not anticipated by the use of existing facilities.

3.3.3 ALTERNATIVE 2: SOUTH COUNTY

South County Historic Landscape

Originally the landscape of southern Sonoma County consisted of coastal prairie-scrub mosaic and mixed hardwood forest (Küchler 1977). As a result of the historical use of the land, the environment was changed to its present condition. Features of this historic landscape include cypress- and eucalyptus-tree rows, clusters, and windbreaks; heavily grazed, grassy, rolling hills; and ranch complexes with associated small-scale elements such as fences, feed and water troughs, roads, stone-lined water control systems, vineyards, and farm machinery. Candidate reservoirs Tolay A/C, Sears Point, Lakeville Hillside, and Adobe Road are situated within this landscape.

Tolay A / C

Introduction

Candidate reservoirs A and C have a substantial amount of overlap and in many instances contain the same sites. Each site below will be identified as to whether it is in both Tolay A and C or only in Tolay A or only in Tolay C.

Candidate reservoirs Tolay A and C are located within the northern half of the Tolay Creek drainage, which is in southeastern Sonoma County. The drainage extends from just north of Stage Gulch Road southeast to San Pablo Bay near Sears Point. This northwest-trending valley is about 6 miles long and is drained by intermittent Tolay Creek, which empties into San Pablo Bay. A riparian corridor of oak, willow, buckeye, and bay lines the creek. Occasional stands of these trees are found scattered in the valley, which is predominantly grassland. The valley's cultural landscape includes a ranch complex, agricultural crops, non-native grasses, and eucalyptus trees.

At one time, a lake at the head of the valley formed a lacustrine environment ideal for waterfowl as well as both prehistoric and historical settlement. The constriction of the valley separating the upper and lower extremes of Tolay Creek was dynamited about 1870. Once drained, the lake's silt made prime agricultural soil. The north end of the valley floor has been under cultivation since that time. The rest of the Tolay Creek drainage is used for grazing cattle, with small portions in the south and north used for vineyards.

During the current field survey in the Tolay Valley, human remains were identified at three prehistoric archaeological sites. Additionally, human remains had been reported at three other sites in the valley but were not noted during our investigation. Upon identification of human

remains, the Sonoma County Coroner was notified; he authorized the study team to notify the State of California Native American Heritage Commission (NAHC). The NAHC notified a Coast Miwok Most Likely Descendant (MLD), who contacted the study team with recommendations for treatment of the remains. The study team Project Archaeologist, in coordination with the MLD and the landowner, shallowly reburied the human remains within the archaeological site, at the location they were found.

Discussion of the archaeology of the Tolay area applies to both of the candidate reservoirs in Tolay Valley, Tolay A and Tolay C. Prehistoric archaeological sites dot the valley all the way to San Pablo Bay. The period of prehistoric occupation spans from at least the Middle Archaic period through the Emergent period, based on artifact types observed on the surface of sites in the valley and on interpretation of excavated materials (Phebus 1990). Before the mid-1800s, the presence of an annual lake in the valley would have provided a special environment with a regular water supply. Waterfowl most likely frequented the lake. It has been suggested by Elsasser (1955) and others that the unprecedented amount of charmstones found in the valley may have been used to hunt these birds. The lake would have supported tules and possibly fish, both known to have been exploited by the Native Americans of the area. The hillsides downstream still contain small oak groves, a source of acorns prehistorically. A micro-environment of this kind would have been ideal for occupation, at least on a seasonal basis. During historic times, this valley was still remarkable in its ecological diversity because of the annual water supply. Even today, it is one of the few farms in the county without the need for irrigation. The current landowners have created a museum to display old family photographs and items found within the valley, including, farming equipment, household items, and artifacts collected regularly from the prehistoric sites in the valley.

Tolay A candidate reservoir consists of 1016 acres. Field survey was conducted of 865 acres, including 20 acres that were subsequently removed from the Project area.. An area of 171 acres was not field surveyed but was addressed by the sensitivity study. Tolay C candidate reservoir consists of 537 acres. Field survey was conducted of 499 acres. An area of 38 acres was not field surveyed but was addressed by the sensitivity study (refer to Map 5.4).

The area that includes both Tolay A and C candidate reservoirs is located within the Petaluma land grant. Eleven previously recorded prehistoric archaeological sites are recorded within the boundary of the Tolay candidate reservoirs, two of these sites, however, were found to be outside the reservoir boundary during the current field study. CA-SON-371 was recorded by A. Pilling in 1952, who did not otherwise report on this site. CA-SON-381,-382, and -383 were noted and recorded in 1954 by A. Elsasser of the University of California Archaeological Survey. He later wrote the University of California Archaeological Survey report that addresses these sites and the site recorded by Pilling (Elsasser 1954a, b, c) (see Table 1). Elsasser also mentions the stone-lined canals that were noted during the course of the current study. An archaeological survey in 1977 resulted in the identification of five additional archaeological sites: CA-SON-1155, -1156, -1157, -1158, and -1159 (Chavez and Mulloy 1978e, 1978f, 1978g, 1978h, and 1978i). In 1990 Pete Rhode recorded one additional site, CA-SON-1903.

In 1962 and 1964, George Phebus conducted archaeological excavations in the valley, but the report detailing these excavations was not published until 1990 (Phebus 1990). Phebus identified nine prehistoric deposits in the Tolay Valley, four of which are assumed to be the sites

originally identified by Pilling and Elsasser. The sites were not formally recorded and thus had not been given trinomials. A concordance of the excavated sites and the existing trinomials could not be accomplished for this report.

In 1977 Miley Holman reviewed the location and condition of the archaeological sites reported by Elsasser (Holman 1977). Holman confirmed, and in some cases corrected, the plotted location of the sites, and he noted that little had affected the sites except for plowing.

CA-SON-371 (Tolay A only)

This site is on level land amidst cultivated fields at the northwestern end of Tolay Valley. Previous studies have not determined the extent of the site, nor was the current field study able to establish boundaries. With its numerous "charmstones," this is the best known site in Tolay Valley. Pilling described it in his 1952 site record as "an old lake bottom which produced charmstones when lake was drained (shell mound adjacent)." Current field study was hindered by standing crops, but portions of the site were examined, and phallic and plummet type charmstones were identified. No other artifact types or midden soil were noted during the survey.

CA-SON-381 (Tolay A and C)

This site is situated on a low mound in the middle of the valley floor. It is a prehistoric archaeological site of approximately 25,500 m^2 in area and is evidenced by midden soil with shell, heat-altered rock, ash, and artifacts. Artifacts identified during the current study include charmstones, mortars, pestles, possible netweights, obsidian bifaces (both Napa Valley and Annadel obsidian), and chert cores and tools. Shellfish debris includes mussel (*Mytilus edulis),* oyster (*Ostrea lurida*), and clam (*Tresus nuttalli*). Faunal bone is also present at the site. Human remains were identified on the surface of the site by D. Chavez and W. Mulloy in 1978. The current study also identified human remains at this location.

CA-SON-382 (Tolay C only)

This site is a prehistoric archaeological site represented by a large, relatively discrete, mound of midden soil covering approximately 1,400 m^2, with marine shell, bone, chert flakes, and heat-altered rock. A burial was reportedly found in this location by an R.M. Rulofson of Cordelia, California (Elsasser 1955). The site is at the base of a bedrock hillslope on the eastern side of Tolay Valley. At least two active springs are adjacent to the site's northeastern boundary. An artificial channel separates the footslope from the plowed field to the west.

CA-SON-383 (Tolay A and C)

This site is an extensive mounded midden approximately 25,400 m^2 in area located at the center of the valley floor, in a regularly cultivated field. This site consists of midden soil, shell, heat-altered rock, burned bone, ash, and artifacts. Artifacts include charmstones, mortars, pestles, obsidian side-notched projectile points (source undetermined), obsidian bifaces (source undetermined), and incised bone. Dietary debris includes oyster (*Ostrea lurida*) and mussel (*Mytilus edulis*) shell, as well as burned faunal bone. A human cranial fragment, a metatarsal,

and a proximal ulna fragment were identified lying on the ground surface during the current field survey. T-A-4, on the southeast bank of Tolay Creek, may be a part of this site.

CA-SON-1154

This prehistoric midden site is located on the northeastern edge of the valley, on a rise above the valley floor. It is outside the regularly plowed fields and thus exhibits little disturbance. The location of this site, as plotted on the site record, is within the proposed candidate reservoir boundary. The current field investigation relocated the site and found its location is outside the area of effect. This site will not be addressed further by this study.

CA-SON-1155 (Tolay A and C)

This prehistoric archaeological site is situated at the southern end of Tolay Valley, along Tolay Creek at the foot of a low knoll and is surrounded by buckeye trees. This site covers approximately 650 m^2 in area and is evidenced by a dark midden soil with shell, chert debitage, heat-altered rock, obsidian flaked tools (of undetermined source), clamshell disc beads, chert tools, and mortar fragments. There are cupule rocks (i.e., boulders with shallowly pecked cup-like depressions) within and adjacent to the midden. Human remains were reported in the site record by Chavez and Mulloy in 1978. This site is not at the location indicated on the original site record. The site was relocated during the field survey and replotted at its correct location.

CA-SON-1156 (Tolay A only)

CA-SON-1156 is a prehistoric archaeological site located in a regularly plowed field along the 230-foot contour in the northeast corner of the Tolay Valley. This site is approximately 21,200 m^2 in area and comprises a discontinuous scatter of artifacts. Artifacts include a sandstone plummet charmstone, a handstone, a bowl-mortar fragment, an obsidian projectile point (Excelsior) and obsidian drill of undetermined source, chert cores, and obsidian and chert flakes. No midden soils were noted during field survey. This site is not at the location indicated on the original site record. The site was relocated during the field survey and replotted in its correct location.

CA-SON-1157 (Tolay A only)

This site is a prehistoric archaeological site approximately 370 m^2 in area and is located northeast of a rock outcropping on a small terrace on the west side of Tolay Valley just above the former lakebed, northeast of the Cardoza Ranch complex. The site is represented by a dark grey midden mound, with extensive shellfish debris consisting of oyster (*Ostrea lurida*), mussel (*Mytilus edulis*), and clam shell (*Tresus nuttalli*); heat-altered rock; obsidian (Annadel) and chert debitage; a pestle fragment; and burned animal bone. A human radius with the epiphysial ends broken was also identified in the backdirt of a burrowing animal hole. Portions of this site have been removed and redeposited for use as topsoil in an adjacent garden (see T-A-5). This site is not at the location indicated on the original site record. The site was relocated during the field survey and replotted in its correct location.

CA-SON-1158 (Tolay A and C)

CA-SON-1158 is a prehistoric archaeological site located in the central portion of Tolay Valley at a confluence. This location is regularly plowed. This site was previously identified as containing extensive obsidian debitage and obsidian scraper-like tools, chert flakes, and burned animal bone. Current field study identified that the site is approximately 9,500 m^2 in area and has midden soil, numerous chert and obsidian flakes, possible spire-lopped olivella beads, a bowl-mortar fragment, an obsidian biface fragment, an Excelsior obsidian projectile point of undetermined source, and dietary bone and shell fragments. This site is not at the location indicated on the original site record. The site was relocated during the field survey and replotted in its correct location.

CA-SON-1159 (Tolay A and C)

This site is situated in the central portion of Tolay Valley. It is a prehistoric archaeological site represented by midden soil, with obsidian and chert debitage and a mortar fragment. Possible human remains had been identified by previous field study (Mulloy 1978). Current field study revealed that installation of a duck pond has severely altered the site. Only a few indicators of this site were found in the berm of the pond on the northern side. These materials do not appear to be in situ and there is the possibility that this site has been destroyed.

CA-SON-1903 (Tolay A and C)

CA-SON-1903 is a prehistoric archaeological site consisting of a long narrow midden mound approximately 70 centimeters above the Tolay Valley floor. The leached midden soil is approximately 5,100 m^2 in area and contains fragments of shell, ash, and bone. Artifacts include obsidian concave-base projectile points, obsidian bifaces, bowl-mortar fragments, shaped pestle fragments, obsidian and chert debitage, and charmstones. Concave-base projectile points are the only type identified to date, indicating a possible single-component site. Based on projectile-point type and the leached quality of the midden, this is potentially a Middle Archaic site. All obsidian artifacts are of an undetermined source.

T-A-1 (Tolay A only)

This archaeological site is approximately 6,900 m^2 in area with both prehistoric and historic components. The historic component may date to the late 1870s or earlier, as a house and orchard shown as belonging to E. Mallen are indicated in the general area on Thomas H. Thompson and Co.'s (1877) map. Remains include a cement-lined well, a cold house, historic-period cherry trees, and a scatter of bricks. More recent additions west of the well include two concrete slabs, laid parallel to each other and separated by a feeding trough. Remains of the associated residence were not located and may have been upslope, outside the study area. The prehistoric archaeological component is a bedrock outcrop in the center of the historic site. The outcrop has four cupules on the surface; no prehistoric artifacts were noted.

T-A-2 (Tolay A and C)

T-A-2 is a small lithic scatter comprising chert flakes, two chert cores, and a handstone fragment. These materials were found in the soil of the artificial berm of Tolay Creek near the

southern portion of the valley and are dispersed in an area of approximately 350 m^2. They probably represent a redeposited site, as Tolay Creek was dredged when channelized, and the spoils were used for the berm.

T-A-3 (Tolay A only)

This site is located along a dirt road, between a plowed field and a fenced area currently being used as a vineyard. T-A-3 is approximately 4,700 m^2 in area and consists of a concentration of flaked-stone and groundstone artifacts, including three obsidian projectile points of undetermined source (one concave base, one Excelsior type, and one unidentified fragment), two bowl-mortar fragments, one plummet-style charmstone, and chert flakes. A number of fractured rocks, that may be of introduced origin, also occur in the area.

T-A-4 (Tolay A and C)

This site is a prehistoric archaeological site located at the footslope of a slight rise on the western side of the valley, below a building used as a duck blind. The area is regularly plowed and is on the west bank of Tolay Creek. Cultural constituents appear in a 5,300 m^2 area and include spindle and plummet charmstones, an obsidian concave-base projectile point of undetermined source, bowl-mortar fragments, pestles, and a handstone. There is no discernible color difference between the site area and the surrounding soil. This site is bordered on the northwest by the Tolay Creek channel and may have been part of CA-SON-383 before the creek was channelized.

T-A-5 (Tolay A only)

T-A-5 has been redeposited from CA-SON-1157 for use as garden fill behind a house in the Cardoza complex. Marvin Cardoza stated that a front loader was used to scoop a portion of CA-SON-1157 from its original location and dump it over the fence for topsoil. The deposit is represented by a greasy black soil with shell fragments and heat-altered rock. Human remains have been identified at CA-SON-1157 and this redeposited material may also contain human remains, although none were identified during the current field survey.

T-B-1: Pump House at the Hale Dairy (Tolay A only)

T-B-1 is an early 20th-century, front-gabled, wood-frame pump house that is clad with vertical, milled 1” x 8” boards with wire nails. It has a corrugated metal roof and is resting on a wooden pier foundation.

T-B-3: The Cardoza Ranch (Tolay A and C)

The Cardoza Ranch encompasses about 1,700 acres and occupies most of Tolay Valley. The building complex occupies roughly 20 acres and is located in the northwestern section of the property. The complex overlooks a drained lake bed that has been planted with barley, grapes, and pumpkins. Cattle graze on the surrounding hillsides. The complex consists of historic buildings that include dwellings, barns, and outbuildings--some dating to the late 19th century. There are also numerous structures and objects, including fences, corrals, water troughs, and

roads. Notable is the presence of a water-control system consisting of retaining walls, culverts, dams, ditches, and canals, most of which is of stone construction.

SP-B-2: Sears Point to Lakeville Historic Road System (Tolay A, C, and Sears Point)

Portions of a historic road system, dating to at least 1877, are within candidates reservoirs Tolay A, Tolay C, and Sears Point. Much of the historic road route is currently in use, while other portions are not in use or have been obscured by agricultural activity. The road was originally about 6 miles long and originated near where Highway 121 crosses Tolay Creek. The road ran up the Tolay Creek drainage for about 1.5 miles, then went northerly into the hills above Tolay Creek and entered the south end of Tolay Valley. From there it followed the western edge of the valley floor to what is today the Cardoza Ranch complex. The road continued westerly along what is now Cannon Lane and terminated at Lakeville Highway. Another branch of the road system ran from the Cardoza Ranch complex southerly to Lakeville Highway, following portions of what is currently Cardoza Road.

By 1908, another road originated at Highway 121 just north of the 1877 road, ran northwest along the base of Wildcat Mountain, and continued north along Tolay Creek. It paralleled the earlier road and intersected with it at the Cardoza Ranch complex.

Features associated with these roads include cypress-tree stumps, wooden bridges, fencing, and gates. Particularly notable are stone water-control features, such as culverts, retaining walls, and bridge abutments.

Historic Landscape

For a discussion of the historic landscape within the Tolay A and C candidate reservoir boundaries, refer to section 3.3.3, South County Historic Landscape.

Isolates

Isolated artifacts identified at the Tolay A and Tolay C candidate reservoirs consist of one mortar fragment, three obsidian flakes, four charmstone fragments, three complete charmstones, one obsidian biface, and one obsidian biface fragment.

Adobe Road

Adobe Road candidate reservoir consists of 337 acres. Field study was conducted of 234 acres. An area of 103 acres was not field surveyed but was addressed by the sensitivity study. This candidate reservoir is located within the Petaluma land grant. There was one previous archaeological survey of portions of the Adobe Road candidate reservoir for another project (Chavez 1978a). There are no previously recorded cultural resources.

The Adobe Road candidate reservoir is in a small canyon northeast of the Petaluma River in south-central Sonoma County. The canyon, cut into a ridge that overlooks the Petaluma River valley, contains oak grasslands. Native riparian species are along the south-flowing intermittent

creek. The canyon has been used historically as a dairy, and currently functions as such. The valley's rural landscape includes a ranch complex and non-native grasses.

There is one prehistoric archaeological site within the reservoir boundary and two other sites are just outside the study area: a prehistoric midden site to the south; and a petroglyph site to the east. It is likely that there are more prehistoric resources in the unsurveyed portion of this candidate reservoir (see map 5.3 for surveyed and unsurveyed areas). It is also likely that there are historic resources in and around the candidate reservoir. The Lynches, a local prominent family historically, owned a great deal of land in the area, some of which is within the candidate reservoir boundaries and some of which borders the candidate reservoir on the west. Additionally, the whole area was part of M.G. Vallejo's Petaluma Rancho. Vallejo's home, the Petaluma Adobe, is located 1.5 miles to the southeast of the reservoir site.

AR-A-1

This site is located on a terrace above an unnamed tributary of the Petaluma River, approximately 0.25 mile northwest from the Ielmorini house (AR-B-1). AR-A-1 is a historic archaeological site with a dry-laid rock foundation and a concrete foundation. Associated farm equipment parts, with imprinted manufacturer numbers, are located in erosion channels surrounding the site. The site's earliest occupation may date to the 1860s, based on the depiction of a house in this general area on Bowers's (1867) historic map. It is also possible that it is an agricultural building associated with the Ielmorini complex. The site area is approximately 3,300 m^2.

AR-A-2

This site is located on a midslope terrace near a confluence of an unnamed tributary of the Petaluma River. AR-A-2 is a prehistoric archaeological site with heat-altered rock, shell, obsidian (Borax Lake) and basalt flakes, petrified wood, and possible midden soil dispersed over an area of approximately 120 m^2.

AR-B-1: Henelly / Ielmorini Ranch

This resource is a historic dairy-ranching complex currently in use, consisting of a late-19th-century Queen Anne farmhouse, a wood-frame equipment shed/garage, a small shed, a bunk house, a hay barn, a small barn with corrugated metal siding, an equipment shed, and a variety of landscape features. Post-1950s buildings include a free-stall barn, a two-story front-gable barn with corrugated metal siding, and a one-room garden house.

Historic Landscape

For a discussion of the historic landscape within the Adobe Road candidate reservoir boundary, refer to Section 3.3.3, South County Historic Landscape.

Lakeville Hillside

Lakeville Hillside candidate reservoir consists of 251 acres. Field survey was conducted of 239 acres, including 8 acres that were subsequently removed from the Project area. An area of 20 acres was not field surveyed but was addressed by the sensitivity study.

This candidate reservoir is located within the Petaluma land grant. Three previous archaeological surveys (Flynn 1986; Roop 1990, 1993) covered portions of the Lakeville Hillside candidate reservoir. There were no previously recorded cultural resources within this candidate reservoir.

The Lakeville Hillside candidate reservoir in southeastern Sonoma County is in a narrow canyon just west of the southern ridge of the Tolay Creek drainage. It contains an unnamed tributary of the Petaluma River. The canyon has very steep slopes and heavily eroded soils; native riparian species occur along the south-flowing, intermittent creek. The land has been used historically for agriculture, a function that continues to the present day. The landscape includes non-native grasses, eucalyptus trees, and vineyards.

Historic Landscape

For a discussion of the historic landscape within the Lakeville Hillside candidate reservoir boundary, refer to Section 3.3.3, South County Historic Landscape.

Sears Point

Sears Point candidate reservoir consists of 469 acres. Field survey was conducted of 397 acres, including 19 acres that were subsequently removed from the Project area. An area of 91 acres was not field surveyed but was addressed by the sensitivity study.

This candidate reservoir is located within the Petaluma land grant. One previously recorded archaeological site within the Sears Point candidate reservoir boundary, CA-SON-210, was reported by Nels Nelson (1909) in *University of California Publications in American Archaeology and Ethnology* 7(4). Despite several intensive field reviews during the current survey the site could not be relocated at the location indicated on the Northwest Information Center map. Subsequent to the field survey, this location was monitored while a backhoe removed soils for use as roadfill. Archaeological monitoring during this activity did not reveal any cultural materials. Additional background research suggests that this site may be in the next drainage to the northeast.

The Sears Point candidate reservoir is at the south end of the Tolay Creek drainage. The Tolay Creek drainage extends from just north of Stage Gulch Road southeast to San Pablo Bay near Sears Point, in southeastern Sonoma County. This northwest-trending valley is about 6 miles long and is drained by intermittent Tolay Creek, which empties into San Pablo Bay. The Sears Point candidate reservoir is situated between the marshlands at the edge of this bay and the open valley at the head of the Tolay Creek watershed, where Tolay Lake once was. The portion of the valley containing the Sears Point candidate reservoir serves as a natural corridor between the marshes and the former lake. A riparian corridor of oaks, willows, buckeyes, and bays borders the creek. Occasional stands of these trees are found scattered in the valley, which is

predominantly grassland. The valley's cultural landscape includes non-native grasses and eucalyptus and cypress trees.

Numerous isolated prehistoric materials were identified within Tolay Creek. These materials may have washed out of the many prehistoric archaeological sites recorded within the Tolay watershed, or they may have originated from unidentified sites located outside the candidate reservoir. During monitoring of the geotechnical drilling, a drill location was moved in order to avoid a stone fence. Most of the area of this candidate reservoir is part of the Roche Ranch. The Roche residential complex, which has been documented in the Historical Resources Inventory, is outside of the current candidate reservoir configuration.

SP-A-1

SP-A-1 is a prehistoric petroglyph site represented by a boulder covering an area of approximately 3 m^2 with seven cupules on the upper surface. The site is located on a gentle slope above Tolay Creek, at an elevation of about 80 feet above mean sea level. No other cultural materials were identified at this location. SP-A-1 is one of three petroglyph sites in the lower reaches of Tolay Creek, all of them along the southwestern side of the valley at approximately the same elevation.

SP-A-2

This site is a prehistoric petroglyph with several pecked curvilinear nucleated glyphs (PCNs) on a large boulder approximately 3 meters long. The boulder is situated adjacent to an intermittent tributary of Tolay Creek, at an elevation of approximately 80 feet above sea level. Vegetation includes annual grasses on the surrounding hills, valley and live oak along the creek, and a willow adjacent to the site. The site appears to consist only of the petroglyph rock.

SP-C-1

This site is in a draw to the west of Tolay Creek. It is surrounded by oak trees and is situated on a midslope terrace. SP-C-1 is a prehistoric archaeological site approximately 850 m^2 in area, evidenced by midden soil and five boulders with cupules. At least one boulder has cupules, PCNs, and mortar cups. The midden contains shell, as well as fragmented bird bone and heat-altered rock. The site is located at an elevation of 110 feet above mean sea level.

SP-B-1: "Hay Shack"

SP-B-1 is an isolated, small, one-story, wood-frame building that appears to have been constructed during the late 19th or early 20th century. It is currently being used to store hay.

SP-B-2: Sears Point to Lakeville Historic Road System

See discussion in section 3.3.3, Tolay A/C.

Historic Landscape

For a discussion of the historic landscape within the Sears Point candidate reservoir boundary, refer to Section 3.3.3, South County Historic Landscape.

Isolates

Isolated artifacts identified at the Sears Point candidate reservoir are three obsidian flakes, one obsidian biface, one bowl-mortar rim fragment, one bowl mortar, and one handstone.

3.3.4 ALTERNATIVE 3: WEST COUNTY

West County Historic Landscape

Originally the landscape of southwestern Sonoma County consisted of coastal prairie-scrub mosaic and mixed hardwood forest (Küchler 1977). As a result of historical use of the land, the environment was altered to its present condition. Features of this historic landscape include cypress and eucalyptus tree rows, clusters and windbreaks; heavily-grazed, grassy, rolling hills; and ranch complexes with associated small-scale elements such as fences, feed and water troughs, windmills, roads, orchards, and farm machinery. Candidate reservoirs Two Rock, Bloomfield, Carroll Road North, Valley Ford East, and Huntley are situated within this landscape.

Two Rock

Field survey was conducted of 455 acres at Two Rock candidate reservoir. Subsequent to field study, the reservoir configuration was altered to 372 acres. This area, however, includes a construction zone with 28 acres that were not field studied. These 28 acres were addressed by the sensitivity study.

This candidate reservoir is located within the Roblar de la Miseria land grant. One previous archaeological survey (Jordan 1990a) covered portions of the Two Rock candidate reservoir recording four archaeological sites: two prehistoric sites (CA-SON-1867, -1868) and two historic sites (CA-SON-1866H, -1877H).

The Two Rock candidate reservoir is located in a narrow, steep-sided east-west trending valley approximately 2.5 miles north of the town of Two Rock, in southwestern Sonoma County. Native riparian species occur along the west-flowing intermittent creek. Stands of buckeye, oak, and Douglas fir are also found in the candidate reservoir; Douglas fir may indicate a relict environment. The valley has been used historically for grazing dairy cattle--a function that continues to the present day. The valley's cultural landscape includes non-native grasses and eucalyptus trees, as well as small stock ponds.

The Two Rock reservoir had been studied previously by the Anthropological Studies Center (Jordan 1990a, 1990b). The field director of that project and one of the crew members accompanied the current crew to the Two Rock reservoir area for reconnaissance of the previously recorded sites.

There was a report of bowl mortars at the Two Rock reservoir in one of the side drainages, identified by a botanical study team during the previous season. Although not identified during the original field study, our study team returned to the Two Rock reservoir to search for the reported mortars. A bowl mortar was identified by the return study team; but it was found to be within the site boundary of a previously recorded archaeological site.

Jordan's obsidian hydration readings indicate that CA-SON-1867 was occupied during the "Upper Archaic Period (500 B.C. to A.D. 500) [and] extends through Phase II of the Emergent Period (A.D. 500 to A.D. 1800). CA-SON-1868 shows a respectable time depth, beginning in the Lower Archaic Period (6000 B.C. to 3000 B.C.) into Phase I of the Emergent Period (A.D. 500 to approximately 1500 A.D.)" (1990a:10). Thus, this candidate reservoir location appears to have been frequented by the prehistoric populations of West County. A microenvironment unlike the rest of the area appears to have been preserved in this valley. Study of Two Rock may provide insight into past environmental conditions in West County. Such study, coupled with buried archaeological landscape studies, could open new avenues of study of archaeology in West County.

CA-SON-1866H

This site is located at the mouth of a draw, near a confluence with an unnamed tributary of Stemple Creek. The creek is bordered by willow, oak, and bay trees. CA-SON-1866H is a historic archaeological site, with one standing building in disrepair, probably used as an animal or equipment shed. Archaeological features include a house pad, cellar, ornamental plants, and a scatter of bricks, glass and ceramics. This site is approximately 18,500 m^2 in area and probably represents a farm/ranch complex. It may date to the late 1870s, as a building in the same general area is indicated as belonging to an H. Hall on T. Thompson's (1877) map.

CA-SON-1867

This site is located on a terrace above a creek confluence. It is a prehistoric archaeological site with two loci separated by a creek channel. One locus, a midden deposit, contains obsidian flaking debris (Napa Valley source). The other is a lithic scatter containing obsidian flaking debris (Annadel source) and a chert biface. The site as a whole covers an area of approximately 22,300 m^2.

CA-SON-1868

This site is situated on a midslope terrace approximately 5 to 10 meters above an unnamed tributary of Stemple Creek. It is a prehistoric archaeological site approximately 3,100 m^2 in area and consists of a lithic scatter. The lithic scatter contains chert and obsidian flaking debris (Annadel and Napa Valley sources) and a chert biface fragment.

CA-SON-1877H

A historic archaeological site approximately 8,850 m^2 in area, with such features as a brick-lined well; a possible water-tank foundation; and a deteriorating building that may be the remains of a milk barn. Portions of this site may date back to the 1860s, as there is a house and orchard

indicated as belonging to S. McGrew on Bowers's (1867) historic map in the same general area. Nearby TR-A-1 may be associated with this site. There is also a concrete-block foundation of undetermined age.

TR-A-1

This site is located on a slight rise above a recently built stock pond. It is a historic archaeological site approximately 5,500 m^2 in area and may represent a farmhouse or an outbuilding associated with nearby CA-SON-1877H. Ceramic fragments, boards, window glass, and porcelain are present at this location. Fruit trees and a windbreak of cypress are present and may represent the orchard depicted on Bowers's (1867) historic map in the same general area.

TR-A-2

This site is located at a confluence of two drainages in the western portion of valley. Willow, bay, and oak trees surround the site. A cattle trail, maintained annually with a bulldozer, bisects the site. TR-A-2 is a prehistoric archaeological site approximately 1,650 m^2 in area and consists of obsidian flaking debris and a single obsidian biface end fragment (Annadel source). Two isolated artifacts found near this site, across the creek, may represent an associated locus. After the recording of this site, the Two Rock candidate reservoir boundary was reconfigured. This site is no longer within the boundary of the proposed reservoir.

TR-A-3

This site, located at the head of a valley, is surrounded by willow and blackberries. TR-A-3 is a buried prehistoric archaeological site exposed at a depth of approximately 1 meter by the current creek channel, an unnamed tributary of Stemple Creek. Site dimensions are undetermined at this time. The owner of the property reports finding artifacts at this location from time to time. Artifacts identified by the current investigation include a miniature mortar, a biconically drilled schist charmstone, and large obsidian (source unknown) and chert flakes.

TR-A-4

This site is located at the valley bottom, within the floodplain of an unnamed tributary of Stemple Creek. TR-A-4 is a buried prehistoric archaeological site, exposed in the current creek channel, that consists of a relatively large lithic scatter, primarily obsidian flakes. Dimensions of this site are undetermined at this time, as no subsurface testing was done. Site constituents are buried at least 1 meter below the current ground surface. Many artifacts are present in the stream channel on top of the gravel bars, including an obsidian biface (of unidentified source) and a biface end fragment (of Annadel source). It appears, however, that substantial deposits are intact in the banks of the stream.

TR-A-5

This site is located on a mild slope within a draw above the main creek drainage, an unnamed tributary of Stemple Creek. TR-A-5 is a prehistoric archaeological site consisting of an obsidian flake scatter mostly exposed in a cattle trail and covering an area of approximately 1,950 m^2. All

flaking debris noted at this site was from the Annadel obsidian source; no formed artifacts were noted. A stock pond adjacent to the site may have obscured or destroyed a portion of the site.

TR-A-6

This site is located on a midslope terrace approximately 5 meters above an unnamed tributary of Stemple Creek, approximately 10 to 15 meters west of CA-SON-1868. It is surrounded on three sides by oak woodland. The creekbank, approximately 3 meters from the northern edge of the site, supports a riparian community of willow and blackberries. The resource is a prehistoric archaeological site approximately 1570 m^2 in area, and consists of obsidian and chert flaking debris. This site is bisected by a dirt road, but substantial deposits remain north and south of the road.

Historic Landscape

For a discussion of the historic landscape within the Two Rock candidate reservoir boundary, see section 3.3.4, West County Historic Landscape.

Isolates

Isolated artifacts identified at the Two Rock candidate reservoir consists of one obsidian biface end fragment and one obsidian flake tool, both of undetermined source.

Bloomfield

Bloomfield candidate reservoir consists of 288 acres. Field survey was conducted of 222 acres. An area of 66 acres was not field surveyed but was addressed by the sensitivity study.

This candidate reservoir is located within the Canada de Pogolimi land grant. There had been no previous archaeological surveys within the Bloomfield candidate reservoir boundary, nor were there previously recorded cultural resources.

The Bloomfield candidate reservoir is located in a narrow, north-south trending valley and is the closest of the West County reservoirs to the town of Bloomfield. The valley is part of the drainage of Americano Creek, which empties into Bodega Bay about 7 miles to the west. Native riparian species are along a southerly flowing intermittent creek. The valley has been used historically as a dairy, and continues to be used as such. The valley's cultural landscape includes a ranch complex, introduced annual grasses, and eucalyptus trees.

Because the Bloomfield, Carroll Road North, and Valley Ford candidate reservoirs are in such close proximity and cover the same landscape, they can be discussed as a whole. All of these drainages have produced isolated prehistoric artifacts. Although no single surface location has had sufficient concentration to merit a site recording, the large number of isolated artifacts found in the upper reaches of these creeks suggests the presence of subsurface deposits. The report of bowl mortars being turned up during excavation of a small stock pond at the foot of the Bloomfield reservoir confirms that subsurface deposits exist.

The Bloomfield candidate reservoir location is north of an architectural complex recorded on the Historic Resources Inventory, and includes a large portion of the Briggs cattle ranch associated with that inventoried property. While no prehistoric sites are recorded at this reservoir locality, isolated prehistoric artifacts found in the creek bed are suggestive of a subsurface deposit in this area.

B-A-1

This site is located south of a stand of eucalyptus, at the northern end of a small valley west of the town of Bloomfield. It is a historic archaeological site, approximately 1,885 m^2 in area, consisting of a scatter of domestic debris. The scatter comprises numerous porcelain and other ceramic fragments, square nails, window glass, brick, iron pipe, copper pipe, harness equipment, and a small concrete pad. The current owners of the property report there used to be a house at this location, but, there was no evidence of a foundation for a residence. The square nails at this site suggest that the site may date prior to the turn of the 19th century.

Historic Landscape

For a discussion of the historic landscape within the Bloomfield candidate reservoir boundary, see section 3.3.4, West County Historic Landscape.

Isolates

Isolated artifacts identified at the Bloomfield candidate reservoir consist of three obsidian flakes and one obsidian biface margin, all of undetermined source.

Carroll Road North

Carroll Road North candidate reservoir consists of 336 acres. Field survey was conducted of 350 acres, including 20 acres that were subsequently removed from the Project area. An area of approximately 5 acres was not field surveyed but was addressed by the sensitivity study.

This candidate reservoir is located within the Canada de Pogolimi land grant. One previous archaeological survey covered portions of the Carroll Road North candidate reservoir (Jordan 1990a), but there were no previously recorded sites within this candidate reservoir.

The Carroll Road North candidate reservoir is in a narrow, north-south trending valley of the Americano Creek drainage, about half way between the towns of Bloomfield and Valley Ford. Native riparian species occur along a southerly flowing intermittent creek. The valley has been used historically as a dairy, and continues to be used as such. The valley's cultural landscape includes two ranch complexes, as well as non-native grasses and cypress and eucalyptus trees.

Over the ridge from Bloomfield, there were indications of subsurface deposits at Carroll Road North candidate reservoir location. Prehistoric material unearthed by rodents and materials excavated by drills during geotechnical testing strongly suggest more than one subsurface site. The occurrence of even two subsurface sites could conceivably alter what we know about West County prehistory.

CR-A-1

This site is approximately 9,900 m^2 in area, located on the slope of a hill above a southward-trending, unnamed tributary of Americano Creek. Surrounding vegetation includes annual grasses and apple trees near the creek, as well as riparian species along the creek channel. It is an archaeological site with both prehistoric and historical components. The prehistoric component consists of obsidian flaking debris that was identified in rodent backdirt within the boundary of the historical site. The historical component, which may be represented in T. Thompson's (1877) atlas, consists of a circular concrete pad, glass fragments, glass bottles, shellfish remains, metal fragments, and a standing building that may have been a milking barn.

CR-B-1: Carroll Ranch

CR-B-1 is a historical dairy-ranch complex currently in use, consisting of a late-19th-century, vernacular Greek Revival farmhouse (with aluminum siding), two large dairy barns, a milk house, an apple shed, chicken pens, and two water tanks. There is also a 1960s six-car garage on this property. The area around the house is extensively landscaped, with a large pond at the front of the house.

CR-B-2: "Cabin"

An isolated, small, rectangular, side-gabled, mid- to late-20th-century, wood-frame "cabin" resting on wood blocks on concrete pier foundation. Exterior wall cladding consists of vertical, flush, milled boards with wire nails. The building does not appear to be in use.

CR-SF-1

This subsurface find consists of an obsidian flake found in a thin layer of charcoal at approximately 2 meters (6.5 feet) below the surface during geotechnical drilling. There is insufficient information to determine whether this is an isolated item or a part of a larger archaeological deposit.

CR-SF-2

This subsurface find consists of an obsidian flake found within 30 centimeters (1 foot) of the surface during geotechnical trenching. There is insufficient information to determine whether this is an isolated item or a part of a larger archaeological deposit.

Historic Landscape

For a discussion of the historic landscape within the Carroll Road North candidate reservoir boundary, see section 3.3.4, West County Historic Landscape.

Isolates

One isolated obsidian flake was identified at the Carroll Road North candidate reservoir.

Valley Ford East

Valley Ford East candidate reservoir consists of 362 acres. Field survey was conducted of 325 acres. An area of 37 acres was not field surveyed but was addressed by the sensitivity study.

This candidate reservoir is within the Canada de Pogolimi land grant. Prior to the present study, no archaeological surveys had been conducted within the Valley Ford East candidate reservoir boundary, nor were there previously recorded cultural resources.

The Valley Ford candidate reservoir is in an open north-south trending valley of the Americano Creek drainage between the towns of Bloomfield and Valley Ford. Native riparian species occur along a southerly flowing intermittent creek. The valley has been used historically as a dairy, and continues to be used as such. The valley's cultural landscape includes a ranch complex, as well as non-native grasses and eucalyptus trees.

Noted but not recorded at this candidate reservoir location was a cow bone feature eroding out of the hillside. Given that this is a functioning dairy ranch, this feature may be recent; even if the feature is of some antiquity, its buried condition suggests a substantial amount of soil movement in historic times. Isolated prehistoric artifacts were identified in the creekbed of this stream as well, further supporting the presence of subsurface deposits in this area.

VF-B-1: A.P. Gaver Ranch

VF-B-1 is a historic complex, located within a modern dairy-ranching operation, that consists of a late-19th-century converted farmhouse, a bunkhouse, a barn, a cow shed, an equipment shed, and a small cottage. This ranch is associated with early Valley Ford settler Andrew Poe Gaver.

Historic Landscape

For a discussion of the historic landscape within the Valley Ford candidate reservoir boundary, see section 3.3.4, West County Historic Landscape.

Isolates

Isolated artifacts identified at the Valley Ford East candidate reservoir include one bowl-mortar rim fragment and one obsidian biface midsection (of undetermined source).

Huntley

Huntley candidate reservoir consists of 306 acres. Field survey was conducted of 280 acres, including 14 acres that were subsequently removed from the Project area. An area of 40 acres was not field surveyed but was addressed by the sensitivity study.

This candidate reservoir is within the Blucher land grant. One previous archaeological survey had covered portions of the Huntley candidate reservoir and reported the possibility of archaeological deposits in the area of the Zanolini Ranch (King 1973), but there were no previously recorded sites within this candidate reservoir.

This small, narrow valley, located approximately half way between the towns of Two Rock and Fallon, is south of Bloomfield and abuts the Sonoma/Marin county border on the southwest. The valley has been used historically as a dairy, and continues to be used as such. The valley's cultural landscape includes introduced annual grasses and eucalyptus trees.

The architectural resources identified by King in 1973 have been substantially altered since his survey, and no longer have the appearance of their original design. Historic isolates identified in the creek appear to have been dumped there for erosion control. This material is more than likely associated with the recorded historic sites, however; the dumping itself seems to have occurred relatively recently. After a context is developed for this area, determining the origin of these dumping episodes may be possible.

H-A-1: Zanolini Ranch

H-A-1 has two separate components, the first being a historic archaeological site approximately 1,750 m^2 in area, and consisting of a shell scatter, broken glass, porcelain and earthenware fragments, brick, and some rusty fence hardware located downslope, east of the currently occupied residence. There is also a report from the current landowner about wells located upslope from the Zanolini ranch house. There is a house shown at this location on T. Thompson's 1877 Historic Atlas Map of Sonoma County.

The second component is a historic architectural complex consisting of a substantially modified, one-and-one-half story farm house with a historic core dating back to the 1850s, a medium-sized barn, a horse shed and corral, a fenced-in orchard, a water trough, boxed spring, and a eucalyptus windbreak. The farmhouse is currently occupied. The current landowner states that there were reports of a grave marker with the initials "JZ" unearthed during construction of a gravel parking lot, suggesting the possibility of a historic grave associated with the complex.

H-A-2: Stone / Huntley Ranch

H-A-2 has two separate components, the first being a historic archaeological site with three loci. The northeast locus contains the standing remains of a milkhouse, as well as concrete foundation remains. The southeast locus contains the foundation remains of what appears to have been a residence, associated with historical fencing and historical vegetation, including a cypress windbreak. The western locus contains the foundation remains of an outbuilding, farm equipment, broken glass, and several cedar stumps. The site is adjacent to the currently occupied 1870s residence.

The second component is a historic architectural site consisting of a currently occupied ca. 1870s vernacular residence that has been substantially modernized. There is also a recently constructed pole barn and a building used as a garage and for storage. To the east, across the creek, are the extant remains of a milkhouse.

Historic Landscape

For a discussion of the historic landscape within the Huntley candidate reservoir boundary, see section 3.3.4, West County Historic Landscape.

Isolates

One isolated obsidian flake of undetermined source was identified at the Huntley candidate reservoir.

3.3.5 ALTERNATIVES 4 AND 5: THE GEYSERS AND RUSSIAN RIVER DISCHARGE

A sensitivity study was done of these alternatives, but no field survey was conducted. Refer to section 3.4, Sensitivity Study, for study results.

3.4 SENSITIVITY STUDY

3.4.1 INTRODUCTION

An archival and literature search was done for those portions of the Subregional System study area not subjected to field survey in order to identify recorded cultural resources and estimate the type and number of potential unrecorded resources. The areas not field surveyed in this study consist of the agricultural and urban irrigation areas; pipelines to and within irrigation areas and reservoirs; The Geysers and Russian River discharge pipelines; and portions of the reservoir construction zones that were not accessible during field visits. The construction zone sensitivity study is presented separately. There is sufficient information about the locations of prehistoric and historic archaeological sites to estimate the number of unrecorded sites in unsurveyed areas. The data base for historic architectural resources, however, is insufficient to make such predictions. Maps 4.1 through 4.25 depict the areas of the sensitivity study. The locations of cultural resources are depicted on Maps 6.1 through 6.25 in Volume II. Tables 3 and 4 present the total number of known and estimated cultural resources in the unsurveyed portions. Tables C-2 through C-11 list the inventoried cultural resources for each project component.

There is the possibility of the presence of traditional cultural properties and historic vernacular landscapes. The data base on such sites is almost nonexistent. Traditional cultural properties are not addressed in this sensitivity study, as their identification requires extensive archival, ethnographic, and oral-history research. Historic landscapes have been identified in the West and South county areas during the field studies. It is highly likely that other portions of the Subregional System contain historic landscapes, such as those comprised of the orchards and associated drying sheds in the Sebastopol area, and the vineyards and winery complexes in the area north of Santa Rosa.

3.4.2 UNRECORDED PREHISTORIC ARCHAEOLOGICAL SITES

A wide range of prehistoric archaeological sites are present throughout the Santa Rosa Subregional Long-term Wastewater Project study area. These sites include large and small villages, cemeteries, resource-procurement and processing sites, workshops, temporary campsites, quarries, and ceremonial sites represented by midden deposits, lithic scatters, petroglyphs, housepits, rockshelters, and bedrock milling stations. Evidence of these sites may be apparent on the ground surface, or conversely, they may occur under a few inches to several feet of culturally sterile soil.

Generally, recorded surface sites are on level or gently sloping terrain near sources of water. The sites are often at resource-procurement locations, such as the bayshore, and near vegetation ecotones and sources of firewood. R. Peron (1978) in *A Study of Environmental Characteristics of Archaeological Site Location in the Geysers Locality* indicates that the important factors in site location are proximity to water, on-site slope, and vegetation type. There are also specific local factors that influence the distribution of sites. Certain sites, such as petroglyph, bedrock

milling station, or quarry sites, for example, are directly related to rock outcrops. For petroglyph or quarry sites, availability of water and gentle slope need not be determining factors.

Prehistoric Site Distribution in the Subregional System Area

In The Geysers portion of the Subregional System study area, lithic scatters have been found in exceptionally rugged terrain, while the permanent habitation sites are on terraces adjacent to major creeks.

In the Project area's valleys, such as Alexander and Bennett valleys, and the Santa Rosa Plain, prehistoric sites are generally found along watercourses and at the base of hills where small drainages enter the valleys. Subsurface sites, such as CA-SON-2098, the Memorial Hospital site, have been encountered under deposits of alluvium. Numerous ethnographic villages and campsites were located in the valleys and on the Santa Rosa Plain (Barrett 1908: Kroeber 1925). Prehistoric archaeological sites are often found at the locations of the ethnographic sites.

Around the Laguna de Santa Rosa, on the Santa Rosa Plain, permanent habitation sites are at an elevation of about 80 to 90 feet above mean sea level along the drainages that enter the Laguna, or on small knolls along the edge of the flood plain. Since lower elevations become marshy or inundated during the rainy season, sites found below this elevation are likely to be "temporary single function gathering, hunting, or camping sites, or settlements occupied only in the dry season" (Praetzellis and Praetzellis 1977:45).

Among the hills and valleys west and southwest of Sebastopol, most sites are at elevations of 150 to 300 feet, near springs or along drainages that flow into perennial streams. Sites can also be found at the edge of valleys and along valley watercourses.

There are few recorded sites in the West County portion of the Subregional System, which is probably a function of the lack of development in the area and thus, a paucity of cultural resource studies. Archaeological sites representing habitation and resource-processing locations have been found near estuaries, intermittent and perennial streams (particularly at confluences), springs, and marshes. They are often found at or near the interface of two or more vegetation communities. Of interest in this area is the presence of subsurface sites, identified in the current study in rodent backdirt, the banks of creeks, and during geological drilling. Sites buried by soil movement (see section 3.2.1, Geology) may explain the paucity of surface sites in the area.

Specific types of sites often have limited distributions. The South County area, for example, contains bedrock milling stations, while few are found to the north, though there are suitable rock outcrops for use as bedrock mortars. The bedrock milling stations in the Project study area appear to be associated with the Miwok people of southern Sonoma County and Marin County; the Pomo, to the north, did not use bedrock mortars.

Petroglyphs (rock-art sites) are found in several places in Marin and Sonoma counties, as well as elsewhere in the Coast Ranges. Hotz-Steenhoven notes that pecked curvilinear nucleated (PCN) petroglyphs in Marin and southern Sonoma County are in areas where

> The characteristic terrain is serpentine grasslands and streamsides within these areas. Sites frequently have a commanding view of a valley, river, bay, . . . There are usually freshwater springs nearby and habitation sites somewhere in the area. Commonly seen in association with the sites are steep slopes that exhibit a raveled appearance characteristic of the downslope creep of soil and other surface materials. In the steepest areas this would contribute to the removal or obscuring of any related tool materials or manufacturing debris [1986:184-185].

Within the Subregional System study area, such environments occur in the Tolay Creek watershed, an area where PCNs were recorded during the current field study.

Each Project alternative has the potential to contain prehistoric archaeological sites. If the appropriate environmental factors are present, the possibility of prehistoric archaeological sites is equally high within the irrigation areas and along pipeline routes. Although the linear routes have a limited area of potential effect, pipeline trenching may encounter buried archaeological sites. Indications of buried deposits have been identified during the field study; there is not enough information at this time to determine locations of unrecorded buried prehistoric archaeological deposits.

In general, the potential for the presence of a variety of prehistoric archaeological sites is high throughout most of the Santa Rosa Subregional Long-Term Wastewater Project area.

3.4.3 Unrecorded Historic Archaeological / Architectural Sites

Based solely on archival review, it is not possible to ascertain if locations of historical activity are represented by buildings or by archaeological deposits. Since the two types of sites may co-occur, historic archaeological and architectural sites are discussed together.

The Map of Sonoma County (Bowers 1867) and the Sonoma County Historical Atlas (Thomas H. Thompson & Co. 1877) depict numerous possible historic archaeological or architectural sites within the general study area. Previous studies, such as the Western Sonoma County Historic Resources Survey (Peterson and Associates Inc., and the Western Sonoma County Historical Society 1981), indicate the potential for numerous architectural resources.

Historic archaeological sites in the Subregional System study area include the remains of residences; farms and ranches; community facilities such as schools, churches, and cemeteries; and commercial and industrial facilities. These kinds of sites may be represented by a single archaeological feature or by a complex including such features as building remains (deteriorated or collapsed buildings, foundations, cellars, building pads); privy pits; rock alignments; grave sites; artifact deposits (scatters of historic materials, trash pits, including backfilled wells and privies); small-scale elements (walkways, fences, and gates); agricultural remains (field equipment, corrals and loading chutes, windmills, hopkilns, barns, and outbuildings); water-conveyance/control systems and features (dams, ditches, pipebeds, reservoirs, cisterns); and transportation systems (roads, bridges, railroads). Sites may occur in single relatively discrete locations; others, such as mining sites, may occur in several loci over many acres, connected by a network of road and rail systems.

Historic architectural sites include extant buildings or structures associated with residences; farms and ranches; community facilities such as schools, churches, and cemeteries; and commercial and industrial facilities. They may, however, have associated archaeological remains, such as backfilled privy pits and wells, dilapidated houses and barns, and foundation remains.

Historic Site Distribution in the Subregional System Study Area

The Geysers Pipeline component on the Santa Rosa Plain and along Chalk Hill Road was historically an area of farms and orchards. In Alexander Valley, the proposed pipeline would pass through an area that historically supported large farms. In the 1870s, the area around Jimtown had a church, store, and several residences. In the uplands, the population was much sparser; the area was used for mining, ranching, and recreation, with a hotel/resort at The Geysers. The former mining community of Pine Flat had many residences in the 19th century, and there is currently a cemetery. Portions of Chalk Hill Road, State Highway 128, and Pine Flat Road date back to at least 1877. There are three historic cemeteries along The Geysers Pipeline route: the Shiloh Cemetery; one off of Chalk Hill Road; and another at the corner of Willowside and Guerneville roads.

The Russian River Discharge study area historically contained small and large farms on both sides of Eastside Road and along the Laguna de Santa Rosa. Hopkilns and fruit-drying sheds have also been identified in this area.

The historic settlement of the city of Santa Rosa began with the establishment of the *Cabeza de Santa Rosa* land grant in 1837. Areas to the west of Santa Rosa had houses and orchards, as well as a saloon, a school, and a brickyard by the 1870s. The Fountain Grove irrigation area includes a portion of an 1860s farm and part of the Thomas L. Harris winery and utopian community that dates to the mid-1870s. East of Santa Rosa, the Calvary Cemetery had been built by the late 1870s. To the south and in Bennett Valley were large landholdings with few buildings. Proposed pipelines in the Santa Rosa Urban Irrigation areas would pass through historic farm lands, along some roads that date to at least 1867.

The Sebastopol area historically contained farms and orchards, many located adjacent to main roads. There were also schools, churches, and cemeteries, and, by 1890, a railroad. The areas in and around the towns of Sebastopol and Graton contain historic sites, including apple dryers and hopkilns.

West County areas were not densely populated historically, containing farms ranging in size from 80 acres to 1,200 acres. Schools, churches, and cemeteries are found in the towns of Two Rock, Bloomfield, and Valley Ford. These communities, in existence prior to 1867, contain numerous historic sites.

South County irrigation areas historically contained farms, the Petaluma Adobe complex (a National Register site), schools, cemeteries, quarries, a roadhouse, and a blacksmith shop. Historic communities include the town of Penngrove and the areas around Stony Point and Liberty. The Bayflats and Lakeville irrigation areas, although occupied prior to 1867, were not

densely populated and contained small farms ranging in size from 20 acres to 380 acres. There were small communities at Lakeville and Donahue's Landing.

Historical sites can be expected both in irrigation areas and along pipeline routes. Where pipelines follow historical roads, however, the potential for encountering historic archaeological sites is reduced, as residences and ranch complexes are generally set back from roads, while such archaeological features as backfilled privies and wells are usually found behind residences. Small-scale elements--fences, gates, ornamental plants--are often placed adjacent to roads and could be affected. There is also the possibility that roads were built or rerouted over historical remains, thus increasing the likelihood that pipeline construction could encounter archaeological sites.

In general, the closer to a historic community, the higher the number of anticipated historical sites. Further from settlement, however, there is a greater potential for such large-scale sites as agricultural complexes or mercury mines. Overall, there is a high possibility that a variety of historic architectural and archaeological sites are present in the Subregional System study areas.

3.4.4 Sensitivity Study of the Candidate Reservoir Construction Zones

After the completion of the field surveys, changes were made to the areas to be affected by reservoir construction. These changes included establishing a 100-foot wide construction zone surrounding each proposed reservoir boundary and dam footprint. Within this construction zone, access roads, diversion ditches, detention ponds, tunnel portals, spillways, and areas of rip-rap are proposed. Since access to the candidate reservoir properties was no longer readily available, it was decided to conduct sensitivity studies, as substantial portions of these construction zones had already been field surveyed. The sensitivity study areas constitute minor portions of the overall areas of each of the candidate reservoirs. This sensitivity study was done to determine the potential to encounter archaeological sites and architectural resources in the construction zones and *is not* applicable to the reservoirs as a whole. Table 6 presents the results of the sensitivity study for the candidate reservoir construction zones. The unsurveyed areas, on which the sensitivity study was done, are depicted on Maps 5.1 through 5.4.

Virtually all portions of the study area have the potential to contain prehistoric archaeological sites. There are areas in which different types of prehistoric archaeological sites are anticipated. Depending on the location of specific environmental features, there is the possibility that sites anticipated in one area will occur in another. Such factors might include locations of springs, rock outcrops, or vegetation. Ceremonial and religious sites are not necessarily constrained to a specific area, and major and minor trail routes may be found in all zones. In addition, there is the likelihood that buildings over 45 years old will be historically or architecturally important and may have their settings affected by reservoir construction.

The construction zones were reviewed to make determinations of high, moderate, or low archaeological and historical sensitivity. The categories of high, moderate, or low refer to the number and diversity of cultural resources that can be anticipated at a location; these terms do not refer to the presence or absence of cultural resources. An area of high sensitivity would be anticipated to contain numerous cultural resources of several different types; an area of moderate sensitivity would have a few differing types of cultural resources; and an area of low sensitivity would contain only a small number of one or two types of cultural resource types. For example,

an area of high prehistoric archaeological sensitivity may contain major and minor habitation sites, as well as resource processing sites; while an area of low historic sensitivity may contain only such features as fences.

South County

Tolay A and C

These candidate reservoirs have exceptionally high archaeological sensitivity based on known prehistoric archaeological site distribution and frequency within the valley proper. In addition, the nature of prehistoric archaeological sites found within the valley is unique in Sonoma County. The northwest end of the valley has high sensitivity for prehistoric archaeological sites based on a local resident report of an unrecorded archaeological site. The southern edge of the reservoir appears to be of low sensitivity based on steep slope; although soil movement (see section 3.2.1, Geology) may have buried rock-art sites. The northeast portion of the construction zone is also of high archaeological sensitivity based on level terrain and on isolated artifacts found in the area during a previous survey (Maniery et al. 1988).

Historic archaeological site sensitivity on the valley floor is high based on documented activity in the area as early as 1870.

Historic architectural resources in the area may have their settings affected by construction of a reservoir, but other than the resources field studied (reported in section 3.3.3) that are to be affected, no historic architectural resources will be directly affected by construction. Historical settings that may be indirectly affected are listed in Table 5 and in Appendix C: Tables C-12, C-13, and C-14.

In summary, sensitivity of the construction zones for Tolay A and Tolay C are as follows

- Prehistoric archaeological sensitivity is moderate to high.
- Historic archaeological sensitivity is moderate to high.
- Historic architectural sensitivity is low.

Adobe Road

Previously recorded prehistoric archaeological site CA-SON-1241 is within the construction zone at the south end of the candidate reservoir boundary. The area of the woodland-grassland ecotone located at the northern end of the reservoir may contain petroglyph sites, based on the similar environment of nearby CA-SON-1242. Because of the existing stock pond at the northwestern section of the candidate reservoir, however, the sensitivity is affected by the pond's installation and, therefore, is low at that specific location. Documented historical resources in the area appear to be associated with a possible historic architectural complex adjacent to the western border of the candidate reservoir boundary. This complex is close enough to have associated archaeological deposits within the construction zone.

Historic architectural resources in the area may have their settings affected by construction of a reservoir, but other than the resources field studied (reported in section 3.3.3) that are to be affected, no historic architectural resources will be directly affected by construction. Historical settings that may be indirectly affected are listed in Table 5 and in Appendix C: Tables C-12, C-13, and C-14.

In summary, sensitivity of the Adobe Road construction zone is as follows:

- Prehistoric archaeological sensitivity is moderate to high.
- Historic archaeological sensitivity is moderate to high.
- Historic architectural sensitivity is low.

Lakeville Hillside

There may be a historic architectural resource just south of the candidate reservoir boundary. Sensitivity for historic archaeological sites is moderate to high. A high degree of erosion within this candidate reservoir location suggests that prehistoric resources that may have been located within the drainage have been eroded away.

Historic architectural resources in the area may have their settings affected by construction of a reservoir, but other than the resources field studied (reported in section 3.3.3) that are to be affected, no historic architectural resources will be directly affected by construction. Historical settings that may be indirectly affected are listed in Table 5 and in Appendix C: Tables C-12, C-13, and C-14.

In summary, sensitivity of the Lakeville Hillside construction zone is as follows:

- Prehistoric archaeological sensitivity is low to moderate.
- Historic archaeological sensitivity is moderate to high.
- Historic architectural sensitivity is low.

Sears Point

Based on steep slope, sensitivity along the southwestern edge of the candidate reservoir boundary is low for habitation sites. It is likely, however, that petroglyph sites will be found at this location based on similar sites found near this elevation in the same area. The access road has high sensitivity because of its proximity to the stream channel and the as-yet-unlocated "Nelson Site," CA-SON-210, reported to be somewhere in the area. There is also a probable historic archaeological site based on a standing structure no longer extant, that is indicated on the USGS topographic quadrangle. The steeper areas, however, are considered to have low to moderate sensitivity.

Historic architectural resources in the area may have their settings affected by construction of a reservoir, but other than the resources field studied (reported in section 3.3.3) that are to be

affected, no historic architectural resources will be directly affected by construction. Historical settings that may be indirectly affected are listed in Table 5 and in Appendix C: Tables C-12, C-13, and C-14.

In summary, sensitivity of the Sears Point construction zone is as follows:

- Prehistoric archaeological sensitivity is low to high.
- Historic archaeological sensitivity is low to high.
- Historic architectural sensitivity is low.

West County

Two Rock

The construction zone covering the hilltop at the northern portion of the candidate reservoir is of moderate to high sensitivity for bedrock mortar, petroglyph, and small lithic scatter sites. This sensitivity is based on elevation of the knoll, proximity to a saddle, and the good view of the valley from that location. The proposed tunnel portal locations are of low sensitivity based on steep slope and the results of the field survey done for the present study. Except for hilltop and tunnel portal locations, all other areas have been surveyed.

Historic architectural resources in the area may have their settings affected by construction of a reservoir, but other than the resources field studied (reported in section 3.3.4) that are to be affected, no historic architectural resources will be directly affected by construction. Historical settings that may be indirectly affected are listed in Table 5 and in Appendix C: Tables C-12, C-13, and C-14.

In summary, sensitivity of the Two Rock construction zone is as follows:

- Prehistoric archaeological sensitivity is moderate to high.
- Historic archaeological sensitivity is moderate to high.
- Historic architectural sensitivity is low.

Bloomfield

The construction zone at the northern end of the canyon is of high sensitivity based on isolated prehistoric artifacts found within the creek bed. There is also a report by a local resident that bowl mortars were found just south of the present candidate reservoir location during construction of a small stock pond. Based on this, sensitivity of the construction zone at the southern end of the candidate reservoir boundary is also high. The eastern portion of construction zone is most likely of low sensitivity based on the steep slope.

Historic architectural resources in the area may have their settings affected by construction of a reservoir, but other than the resources field studied (reported in section 3.3.4) that are to be

affected, no historic architectural resources will be directly affected by construction. Historical settings that may be indirectly affected are listed in Table 5 and in Appendix C: Tables C-12, C-13, and C-14.

In summary, sensitivity of the Bloomfield construction zone is as follows:

- Prehistoric archaeological sensitivity is moderate to high.
- Historic archaeological sensitivity is moderate to high.
- Historic architectural sensitivity is low.

Carroll Road North

Subsurface finds identified during archaeological monitoring for geotechnical drilling and trenching indicate high sensitivity for prehistoric archaeological sites, especially at the foot of the candidate reservoir in the center of the valley. The eastern and western portions of the construction zone are of low sensitivity based on steep slope.

Historic architectural resources in the area may have their settings affected by construction of a reservoir, but other than the resources field studied (reported in section 3.3.4) that are to be affected, no historic architectural resources will be directly affected by construction. Historical settings that may be indirectly affected are listed in Table 5 and in Appendix C: Tables C-12, C-13, and C-14.

In summary, sensitivity of the Carroll Road North construction zone is as follows:

- Prehistoric archaeological sensitivity is high.
- Historic archaeological sensitivity is moderate.
- Historic architectural sensitivity is low.

Valley Ford East

Sensitivity is high at the northeastern portion of the construction zone of this candidate reservoir, based on the number of isolated prehistoric artifacts identified on the eastern hillside and within the stream channel. The construction zone at the foot of the reservoir in the center of the valley is of high sensitivity, based on a report by a local resident of mortar bowls being uncovered during construction of a small stock pond nearby. From this report, coupled with isolated artifacts found in the stream channel and along the hillside upstream, it appears likely that at least one subsurface resource is eroding from upstream at this candidate reservoir. The central location of the architectural complex in the valley suggests that there may be historic archaeological deposits within the construction zone associated with small-scale elements.

Historic architectural resources in the area may have their settings affected by construction of a reservoir, but other than the resources field studied (reported in section 3.3.4) that are to be affected, no historic architectural resources will be directly affected by construction. Historical

settings that may be indirectly affected are listed in Table 5 and in Appendix C: Tables C-12, C-13, and C-14.

In summary, sensitivity of the Valley Ford East construction zone is as follows:

- Prehistoric archaeological sensitivity is high.
- Historic archaeological sensitivity is high.
- Historic architectural sensitivity is low.

Huntley

The sensitivity at this candidate reservoir location construction zone is low based on the field survey conducted for current study, the steep slope of hillsides, and preliminary historic research conducted for this location.

Historic architectural resources in the area may have their settings affected by construction of a reservoir, but other than the resources field studied (reported in section 3.3.4) that are to be affected, no historic architectural resources will be directly affected by construction. Historical settings that may be indirectly affected are listed in Table 5 and in Appendix C: Tables C-12, C-13, and C-14.

In summary, the sensitivity of the Huntley construction zone is as follows:

- Prehistoric archaeological sensitivity is low.
- Historic archaeological sensitivity is low.
- Historic architectural sensitivity is low.

Table 3

Inventoried Cultural Resources Per Alternative

Total of All Inventoried Cultural Resources: 282

Alternative 2: South County							
	PA	**HA**	**AH**	**PA/HA**	**HA/AH**	**All**	***Total**
Reservoirs							
Tolay A	13	0	3	1	0	0	17
Adobe Rd	1	1	1	0	0	0	3
Lakeville Hillside	0	0	0	0	0	0	0
Tolay C	9	0	2	0	0	0	11
Sears Point	3	0	2	0	0	0	5
*Total	18	1	5	1	0	0	25
Irrigation Areas							
North of Petaluma	4	2	2	0	0	0	8
Adobe Road	3	0	0	0	0	0	3
East of Rohnert Park	6	3	3	0	0	0	12
Lakeville	18	3	6	1	0	0	29
Bayflats	3	0	0	0	0	0	3
*Total	34	8	11	1	0	0	54
*Total Cultural Resources in Alternative 2: 62							
Alternative 3: West County							
	PA	**HA**	**AH**	**PA/HA**	**HA/AH**	**All**	***Total**
Reservoirs							
Two Rock	7	3	0	0	0	0	10
Bloomfield	0	1	0	0	0	0	1
Carroll Road North	0	0	2	1	0	0	3
Valley Ford	0	0	1	0	0	0	1
Huntley	0	0	0	0	2	0	2
*Total	7	4	3	1	2	0	17
Irrigation Areas							
Americano Creek	4	1	40	1	0	0	46
Stemple Creek	2	1	0	0	0	0	3
Miscellaneous	1	0	1	0	0	0	2
*Total	7	2	41	1	0	0	51
*Total Cultural Resources in Alternative 3: 65							

Alternative 4: The Geysers Discharge							
	PA	**HA**	**AH**	**PA/HA**	**HA/AH**	**All**	***Total**
	12	1	3	0	0	0	16
*Total	12	1	3	0	0	0	16
*Total Cultural Resources in Alternative 4: 16							
Alternative 5: Russian River Discharge							
	PA	**HA**	**AH**	**PA/HA**	**HA/AH**	**All**	***Total**
	1	1	0	0	0	0	2
*Total	1	1	0	0	0	0	2
*Total Cultural Resources in Alternative 5: 2							
Alternative Substitutions and Miscellaneous Components							
	PA	**HA**	**AH**	**PA/HA**	**HA/AH**	**All**	***Total**
Irrigation Areas							
Sebastopol	10	1	2	1	0	0	14
Urban	6	1	4	0	0	1	12
Total	16	2	6	1	0	1	26
Pipelines							
L-	3	0	10	0	1	0	14
S-	6	3	8	0	1	0	18
W-	5	1	14	0	1	0	21
Urban	3	2	59	0	0	1	65
*Total	17	6	91	0	3	1	118
Pump Stations	4	0	0	0	1	0	5
*Total	4	0	0	0	1	0	5

PA - Prehistoric Archaeological Site HA - Historic Archaeological Site

AH - Architectural Historical Site

*Reservoir, irrigation, discharge, and pump-station study areas overlap and can contain the same cultural resources. Due to this overlap, total number of inventoried cultural resources per alternative will not equal totals per study area, nor will the total number of inventoried cultural resources equal the totals in the alternatives.

This table does not include Affected Architectural Historical Settings.

Pipelines include cultural resources within 300 feet to each side of the route.

Table 4

Archaeological Sites Anticipated per Irrigation Area

Irrigation Area	% Surveyed	Recorded Historic Archaeological Sites	Recorded Prehistoric Archaeological Sites	Multiple Resource Sites	Archaeological Sites within 300-foot Buffer Zone	Additional Archaeological Sites Anticipated
Alternative 2: South County						
North Petaluma	45%	2	4	0	0	5 Prehistoric; 3 Historic
Adobe Road	14%	0	3	0	0	19 Prehistoric; Historic-Insufficient Information
East of Rohnert Park	27%	3	6	0	3 Prehistoric	17 Prehistoric; 9 Historic
Lakeville	39%	2	19	1 Prehistoric/ Historic	3 Prehistoric	30 Prehistoric; 3 Historic
Bay Flats	36%	0	3	0	1 Prehistoric	6 Prehistoric; Historic-Insufficient Information
Alternative 3: West County						
Americano Creek	12%	1	4	1 Prehistoric/ Historic	1 Prehistoric/ Historic	37 Prehistoric; 15 Historic
Stemple Creek	4%	1	2	0	0	48 Prehistoric; 24 Historic
Miscellaneous	0%	0	1	0	0	Insufficient Information

Archaeological Sites Anticipated per Irrigation Area (Continued)

Irrigation Area	% Surveyed	Recorded Historic Archaeological Sites	Recorded Prehistoric Archaeological Sites	Multiple Resource Sites	Archaeological Sites within 300-foot Buffer Zone	Additional Archaeological Sites Anticipated
Alternative Substitutions and Miscellaneous Components						
Sebastopol	26%	1	10	1 Prehistoric/ Historic	5 Prehistoric; 1 Historic/ Architectural	29 Prehistoric; Historic-Insufficient Information
Urban	49%	1	6	1 Prehistoric/ Historic/ Architectural	8 Prehistoric; 1 Historic 1 Prehistoric/ Historic	7 Prehistoric; 2 Historic

The resources listed in the buffer zone are provided for planning purposes, and were not taken into account in making estimates. Information Center "C-number" resources identified during the records search were not considered for estimation purposes due to the informal and limited information recorded.

Table 5

Architectural Historical Site Settings That May Be Affected per Alternative

Alternative 2: South County	
Reservoirs	
	Architectural Historical Site Settings
Tolay A	16
Adobe Road	17
Lakeville Hillside	8
Tolay C	9
Sears Point	12
*Total	50
Pump Stations within Reservoirs	
	Architectural Historical Site Settings
Adobe Road	1
Lakeville Hillside	1
Sears Point	1
Tolay	2
*Total	5
Pump Stations within Irrigation Areas	
	Architectural Historical Site Settings
East of Rohnert Park	25
Lakeville	4
*Total	29
Alternative 3: West County	
Reservoirs	
	Architectural Historical Site Settings
Two Rock	35
Bloomfield	14
Carroll Road North	9
Valley Ford	5
Huntley	8
*Total	71

Alternative 3: West County	
Pump Stations within Reservoirs	
	Architectural Historical Site Settings
Two Rock	0
Bloomfield	0
Carroll Road North	0
Valley Ford	0
Huntley	1
*Total	1
Pump Stations within Irrigation Areas	
	Architectural Historical Site Settings
Americano Creek	1
Stemple Creek	11
Miscellaneous	2
*Total	14
Alternative 4: The Geysers Discharge	
	Architectural Historical Site Settings
Pump Stations	12
*Total	12
Alternative 5: Russian River Discharge	
	Architectural Historical Site Settings
Pump Stations	3
*Total	3
Alternative Substitutions and Miscellaneous Components	
Pump Stations within Irrigation Areas	
	Architectural Historical Site Settings
Sebastopol	0
East Santa Rosa Bennett Valley	0
Fountain Grove	1
*Total	1

*Reservoir, irrigation, discharge, and pump station study areas overlap and can contain the same cultural resources. Due to this overlap, total number of cultural resources per individual study area will not equal totals per overall alternative study area.

Table 6

Candidate Reservoir Construction Zone Sensitivity

Reservoir	Sensitivity			Recorded Sites
	Low	Moderate	High	
South County				
Tolay A				
Archaeology		✓	✓	None
Architecture	✓			None
Adobe Road				
Archaeology		✓	✓	CA-SON-1241
Architecture	✓			None
Lakeville Hillside				
Archaeology	✓	✓	✓	None
Architecture	✓			None
Tolay C				
Archaeology	✓	✓	✓	None
Architecture	✓			None
Sears Point				
Archaeology	✓	✓	✓	None
Architecture	✓			None
West County				
Two Rock				
Archaeology		✓	✓	None
Architecture	✓			None
Bloomfield				
Archaeology		✓	✓	None
Architecture	✓			None
Carroll Road North				
Archaeology		✓	✓	None
Architecture	✓			None
Valley Ford				
Archaeology			✓	None
Architecture	✓			None
Huntley				
Archaeology	✓			None
Architecture	✓			None

3.5 CONTACTS

3.5.1 INTRODUCTION

The Native American community and historical organizations were contacted for information or concerns that they might have in regards to The Santa Rosa Long-Term Wastewater Project (see Appendix D for correspondence received). Information on archaeological collections from the Project area was requested from museums, and technical information about cultural resources and historic preservation was requested from several state and local agencies. During the course of the study, several informal contacts were made with local archaeologists and local residents.

3.5.2 NATIVE AMERICAN COMMUNITY / HISTORICAL ORGANIZATIONS

Individuals and/or organizations of the Native American community, and historical organizations were sent a letter, with Project area maps, requesting information. If no response was received within 45 days of the request, a follow-up phone call was made to assure that the letter had been received and to request comments. See Table 7 for a list of those contacted and responses.

3.5.3 MUSEUMS

Archaeological sites in Tolay Valley are the only ones to have been excavated in the candidate reservoir study areas. Our research indicated that the Smithsonian Institution; the Natural History Museum, California Academy of Sciences; the Treganza Anthropology Museum; and the Phoebe Hearst Museum of Anthropology possess information about and/or collections from these sites. Information was requested to clarify archaeological site locations, to identify the nature of archived archaeological materials, and to identify information sources that may be useful for future research. See Table 7 for a list of those contacted and responses.

3.5.4 STATE AND LOCAL GOVERNMENT AGENCIES

Technical information about cultural resources, historic preservation, and planning was obtained from various state and local agencies. We requested information on local cultural resources and historic preservation ordinances, Native American burials, local landmark programs, heritage trees, historic landscapes, the Section 106 process, historic districts, National Register of Historic Places procedures, cultural resources recording procedures, and locally significant cultural resources.

State of California Office of Historic Preservation
  Nicholas Del Cioppo, Associate Archaeologist
  Jan Wooley, State Historian II
  John Thomas, Data Manager

State of California Native American Heritage Commission
Larry Meyers, Executive Secretary

Historical Resources Information System, Northwest Information Center, Sonoma State University
Leigh Jordan, Coordinator

County of Sonoma Planning Department
Sigrid Swedenborg, Project Planner
Kathi Jacobs, Planner III, Landmarks Commission

Marin County Planning Department
J.T. Wick, Principal Planner

City of Santa Rosa, Cultural Heritage Board (Planning Department)
Roy Anderson, City Planner

City of Sebastopol, Deputy City Clerk
Holly Fiori

City of Petaluma, Planning Department
James C. McCann, Principal Planner

Town of Windsor, Planning Department
Rick Jones, Senior Planner

City of Healdsburg
Betsi Lewitter, Assistant Planner

City of Sonoma, Planning Department
Joel Tranter, Planner

City of Cotati
Kathy Brisbane

City of Rohnert Park
Lorraine Roberts, Administrative Secretary/Deputy City Clerk

City of Novato
Nancy McPherson, Planner

3.5.5 INFORMAL CONTACTS

During the course of the study, several local archaeologists and local residents shared information with the study team.

Local Archaeologists

The Project was discussed with archaeologists at the Anthropological Studies Center who were knowledgeable about the Project area: Sunshine Psota, M.A.; Leigh Jordan, M.A.; Nelson "Scotty" Thompson, B.A.; David A. Fredrickson, Ph.D.; Thomas Origer, M.A.; and Greg White, Ph.C.

Local Landowners and Residents

Conversations about cultural resources were held with the following local landowners and residents: Mr. Al Marcucci, Mr. Jim Jacobs, Mr. and Mrs. Joseph Tresch, Mr. John Mattos, Mr. and Mrs. Marvin Cardoza, Mr. Kevin Condon, Mr. Bob Whitehead, Mr. and Mrs. Earnest Briggs, and Mr. William Diaz-Romero.

Upon selection of a preferred alternative, more Project-specific information will be available. As appropriate, the people and organizations contacted during this phase of the Subregional System cultural resources study will be recontacted to solicit specific concerns and information.

Table 7

List of Contacts: Native American Community, Historical Organizations, and Musems

Agency/Group	Contact	Response
Native American Community		
State of California Native American Heritage Commission	Debbie Pilas-Treadway, Staff Services Analyst	The Native American Heritage Commission (NAHC) in a letter dated 2 November 1994 provided a list of Native Americans in Sonoma and Marin counties who have concerns regarding cultural resources.
	Gail McNulty, Associate Program Analyst	In a letter dated 27 September 1995, the NAHC records search of the sacred lands file failed to indicate the presence of Native American cultural resources within the candidate reservoirs. The Commission staff noted that this did not indicate an absence of cultural resources in the candidate reservoirs.

List Of Contacts: Native American Community, Historical Organizations, and Musems(Continued)

Agency/Group	Contact	Response
Native American Community		
Ya-Ka-Ama	Michael Murphy, Farm Manager	Mr. Murphy, during a telephone conversation on 10 August 1995, said that he had spoken with Mr. Grant Smith (see below) about this project. Mr. Murphy said that the Project area in general was highly sensitive. He and Mr. Smith felt that it was necessary to conduct studies to identify archaeological sites.
Lytton Indian Community of California	Charles Starr, Tribal Administrator	Mr. Starr, during a telephone conversation on 21 September 1995, stated that he was familiar with sensitive sites in western Sonoma County. Mr. Starr objects to inundating Native American archaeological sites or to any other type of site desecration as a result of direct or indirect Project activity.
Kashia Band of Pomo	Calvin H. Smith	None.
	Jim Brown III, Pomo	None.
Mishewal-Wappo Tribe of Alexander Valley	John Trippo	None.
Miwok Archaeological Preserve of Marin		None.
Cloverdale Rancheria	John Santana	Mr. Santana referred us to Mr. Bird on 22 September 1995.
	Dexter Bird	Mr. Bird, during a telephone conversation on 22 September 1995, stated that he had no concerns at the moment. At his request, we sent him maps and a Project description. There has been no response.
Dry Creek Rancheria of Pomo Indians	Amy Martin	None.
	Grant Smith, Coast Miwok and Pomo Elder	See entry for Ya-Ka-Ama above.
Marin Museum of the American Indian	Sandy Teller, Program Director	Ms. Teller, during a phone conversation on 29 June 1995, requested that we contact Mr. Gibb Olivarez and Mr. Lanny Pinola. Letters were sent to both (see below).

List Of Contacts: Native American Community, Historical Organizations, and Musems(Continued)

Agency/Group	Contact	Response
Native American Community		
Federated Coast Miwok	Gibb Olivarez, Chairman Brian Campbell, Council Member Gene Buvelot	Mr. Brian Campbell responded by telephone on 21 August 1995. Mr. Gibb Olivarez wrote a letter dated 27 August 1995. Neither person had specific concerns, but stated that it was necessary to treat cultural resources properly. Mr. Brian Campbell and Mr. Tim Campbell, Tribal Secretary, visited the Anthropological Studies Center on 8 September 1995, where they were given a brief presentation of the cultural resources study. There was no response from Mr. Buvelot.
	Kathleen Smith, Pomo and Coast Miwok	Ms. Smith, who responded by telephone on 9 September 1995, stated that all applicable cultural resources laws should be followed and that a Native American observer should be present during ground-disturbing activity.
Pt. Reyes National Seashore	Lanny Pinola, Ranger	Mr. Pinola, during a telephone conversation on 29 September 1995, stated that the Laguna de Santa Rosa is a very important area for archaeological sites. Mr. Pinola expressed concern that traditional gathering areas in western Sonoma and Marin counties not be polluted.
Historical Organizations		
State of California Office of Historic Preservation	Cherilyn E. Widell, State Historic Preservation Officer Nicholas Del Cioppo, Section 106 Archaeologist	The Office of Historic Preservation had no comment at the time of contact, 26 July 1995, but requested to be consulted as the Project progresses.
Sonoma County Historical Society	Harry Lapham, Vice-President John Howland, President	None
Petaluma Historical Museum and Library	Barbara Lynch, Museum Coordinator	No information to provide.
Windsor Historical Society	Steve Lehmann	No information to provide.

List Of Contacts: Native American Community, Historical Organizations, and Musems(Continued)

Agency/Group	Contact	Response
Historical Organizations		
Western Sonoma County Historical Society	Tom Harriman, President	None.
Sonoma League for Historic Preservation	Jan MacNaughton, President	None.
Novato Historical Guild	Karen Milliken, President	None.
Marin Heritage	Niki Simons, President	None.
Marin County Historical Society	Jan Bishop, Director	None.
Museums		
National Anthropological Archives, Smithsonian Institution	James Harwood, Reference Archivist	Correspondence received 26 July 1995 stated that the Institution possesses excavation field notes and photographs, and archaeological collections from Tolay Valley.
Department of Anthropology, Natural History Museum, California Academy of Sciences	Chuck Cecil, Senior Curatorial Assistant	In a fax dated 23 August 1995, Mr. Cecil provided a copy of a historic letter regarding the archaeology of Tolay Valley. The Museum possesses charmstones collected in the 1800s from lagunas and shallow lakes in the general area.
Treganza Anthropology Museum, San Francisco State University		None.
Phoebe Hearst Museum of Anthropology, University of California, Berkeley	M. Steven Shackley, Assistant Research Archaeologist	Mr. Shackley, during a phone conversation on 25 August 1995, stated that the Museum's collections include artifacts from CA-SON-371, -381, -382, and -383.

3.6 PRELIMINARY EVALUATIONS

3.6.1 INTRODUCTION

Prehistoric and historic archaeological sites, historic architectural sites, historic landscapes, traditional cultural properties, and heritage trees were taken into consideration for the Santa Rosa Subregional Long-Term Wastewater Project cultural resources study. Architectural sites, prehistoric and historic archaeological sites, and historic landscapes were identified as a result of the archival and field studies conducted for the Project's candidate reservoirs. No traditional cultural properties or heritage trees were identified.

The cultural resources evaluations presented below are only preliminary. For archaeological sites, in addition to context development and background research, a formal evaluation generally requires subsurface excavation to recover materials to determine the extent, depth, nature, and period of use of the site. For historic architectural sites and historic landscapes, evaluation requires full development of context, with research on the specific background of a property. With no firmly delineated preferred alternative, it would have been prohibitively time consuming and costly to do such formal evaluations of all the resources identified. Formal evaluations for compliance with the National Historic Preservation Act will be necessary upon determination of the preferred alternative.

The California Environmental Quality Act, Appendix K, states that cultural resources can be important for (1) their association with persons or events in California or American history of recognized significance, (2) their potential to provide scientific information, (3) their interest to the public, or (4) due to possessing particular qualities such as the oldest or best example of a specific type of resource (California Governor's Office of Planning and Research 1992).

The California Register of Historic Places (California Public Resources Code 5020 et seq.) establishes the criteria for cultural resources that are addressed by CEQA. These criteria are similar to those of the National Register of Historic Places, which are presented below.

According to the National Register of Historic Places criteria, cultural resources, either individually or as a part of a district, can be significant due to their association with an important event or person, the quality of their design/construction, or their information potential (see National Park Service 1991a).

Several isolated prehistoric artifacts were identified during the field studies. These are not significant finds according to the appropriate legal criteria and are not discussed further.

In addition, two locations were identified at which prehistoric items were found during subsurface geotechnical studies. There is currently insufficient information to determine whether these items are isolates or represent a larger archaeological deposit. Further study is necessary before these locations can be evaluated. Refer to Table 3 for a list of these items.

3.6.2 NATIONAL REGISTER OF HISTORIC PLACES (NRHP)

As stated in National Register Bulletin 15:

> Preserving historic properties as important reflections of our American heritage became a national policy through passage of the Antiquities Act of 1906, the Historic Sites Act of 1935, and the National Historic Preservation Act of 1966, as amended. . . .The National Historic Preservation Act of 1966 authorized the Secretary to expand . . . recognition to properties of local and State significance in American history, architecture, archaeology, engineering, and culture, and are worthy of preservation. The National Register of Historic Places is the official list of the recognized properties, and is maintained and expanded by the National Park Service on behalf of the Secretary of the Interior [National Park Service 1991a:i].

The California Office of Historic Preservation (OHP) recommends using the Secretary of the Interior's Criteria for Evaluation, established for the National Register of Historic Places. According to OHP's *Instructions for Recording Historical Resources*:

> The NRHP Criteria for Evaluation are recommended as a uniform standard for California because they provide a basis for assessing the significance of historical resources at the national, state, and local level. As such, they encompass and provide routine consideration of other applicable state and local criteria [1995c:9].

National Register Criteria

Specific criteria have been established for determining the eligibility of a cultural resource for listing in the National Register of Historic Places, authorized under the National Historic Preservation Act of 1966, Public Law 89-665.S-3035, as amended. The criteria defined at 36 CFR 60.4 are as follows:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and
>
> (a) are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) that are associated with the lives of persons significant in our past; or
>
> (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

> (d) a resource that has yielded, or may be likely to yield, information important in prehistory or history.

Historic architectural sites are usually evaluated under Criteria A, B, and C, though there are instances where D is applicable. Prehistoric and historic archaeological sites are generally assessed under Criterion D. Historic archaeological sites may also be evaluated under Criteria A, B, and C; prehistoric sites are generally not evaluated under these criteria, though there may be instances that they are applicable. Traditional cultural properties are generally evaluated under Criteria A and B. Historic landscapes can be evaluated under Criteria A, B, C, and D.

Addressing Criteria A, B, and C is done through a combination of field identification, archival research, and oral history. Criterion D is usually addressed by using the material remains of a site to answer research questions, though archival review and oral history can also provide information at times.

Local Significance

As stated in *California Historic Resources Inventory Survey Workbook*:

> Once evaluators complete their search for Register-eligible properties, they will need to make judgments about the rest of the inventory. A community is usually interested in the remaining properties for one of two reasons: the properties may be eligible for designation under a local ordinance, or they may be eligible to receive special but less formal consideration in local planning [OHP 1986:18].

The preliminary evaluations presented here only address the cultural resources' National Register eligibility. Local significance is not addressed further at this phase of the cultural resources study (see, however, Recommendations).

Research Domains and Historic Context

For a property to qualify for the National Register, it must meet one of the NRHP criteria for evaluation by "being associated with an important historic context *and* retaining historic integrity of those features necessary to convey its significance" (National Park Service 1991a:3).

> Historic contexts are those patterns, themes, or trends in history by which a specific occurrence, property, or site is understood and its meaning (and ultimately its significance) is made clear. . . . The concept of historic context is not a new one; . . . Its core premise is that resources, properties, or happenings in history do not occur in a vacuum but rather are part of larger trends or patterns [National Park Service 1991a:7].

The first step in evaluating cultural resources within their historic contexts is the construction of a narrative statement which includes a description of the general patterns of the area's prehistory and history, discussion of individuals or events that have shaped the history of the area, and a general chronology of prehistoric and historic development (National Park Service 1986:15). The prehistoric and historical overviews developed for the Santa Rosa Subregional Long-Term

Wastewater Project constitute the narrative statements for this study. From the narratives, various themes appropriate to the property types found in the study area can be identified. These themes are then organized by place and time into specific historic contexts, such as Agricultural Development in Big Valley, 1870s-1900.

Since the evaluations of properties that were identified by this early phase of the cultural resources study are explicitly preliminary, historic contexts were not fully developed. Instead, the resources are assessed as to their apparent potential to contribute information to an understanding of the relatively broad research domains outlined below. Fully developed contexts will need to be prepared when a preferred alternative has been selected (see Recommendations).

Integrity

To be eligible for the National Register of Historic Places, a property must be significant under one of the National Register criteria *and* it must have integrity, which is the ability of a property to convey its significance. In the case of properties whose significance derives from the important information that they contain (Criterion D), integrity means the ability of the site to yield information that can be used to address important research questions. The evaluation of integrity must be grounded in an understanding of a property's physical features and its environment, and how these relate to its significance. Integrity for archaeological sites also requires full assessment of site formation processes, especially post-depositional events. Evaluation of integrity requires assessment of a property's location, design, setting, materials, workmanship, feeling, and association. To retain historic integrity a property will possess several of these aspects (National Park Service 1991a:44).

Further research is necessary to assess fully the integrity of the cultural resources identified by this study. While the integrity of the resources has been taken into consideration in the preliminary evaluations below, further research for a full assessment of integrity--including site-formation processes, especially post-depositional events-- will be necessary before their National Register of Historic Places eligibility can be determined.

3.6.3 Prehistoric Archaeological Research Questions

Several documents were reviewed in order to develop a set of research questions applicable to the prehistoric archaeological sites in the West and South County study areas. Used in this review was a study of early California coastal hunter-gatherers (Erlandson 1994); an extensive cultural resources management plan for The Geysers geothermal study area (Fredrickson 1985); the chapter on North Coast Ranges archaeology in Michael Moratto's *California Archaeology* (Fredrickson 1984); an archaeological excavation report on the Three Bridges sites in central Sonoma County (Jackson and Fredrickson 1979); the preliminary evaluation of archaeological sites to be impacted by an earlier version of the Subregional System (Jordan 1990a); a buried-sites analysis researched specifically for the Subregional System cultural resources study (Meyer 1995); a Master's thesis on obsidian hydration analysis from sites on the Santa Rosa Plain (Origer 1987); an examination of research issues related to identification of buried archaeological sites (Stafford 1995); a Master's thesis on the archaeological chronology of the

Warm Springs locality in northcentral Sonoma County (Stewart 1993); and archaeological overviews of Sonoma and Marin counties written for the California State Office of Historic Preservation (Stewart 1982a, 1982b).

Archaeologically, the West and South County study areas are poorly understood, The Geysers area is beginning to be investigated, and much progress has been made in the Santa Rosa Plain. Jones and Hayes note in "Problems and Prospects in Sonoma County Archaeology":

> In the past two decades, Sonoma County has been transformed from essentially an archaeological unknown into an area where much of the basic chronological sequence has been documented, *and debate concerning the most fitting interpretation of local cultural changes is active* [1993:197; emphasis added].

Jones and Hayes also note that

> Assemblages associated with the earlier periods are still not well defined in some areas . . . Large artifact and faunal samples need to be obtained from *clear single-component sites* representing the earlier time periods from all of the various environmental settings found in Sonoma County [1993:213; emphasis added].

Because so little is known about West and South County prehistory, it is necessary to address such basic concerns as determining when people first entered the area, the nature of land use and environmental changes, identifying artifact assemblages that reflect local adaptations, and dating apparent shifts in these and other archaeologically visible aspects of prehistory. Only then can a preliminary cultural sequence be constructed that represents the timing and nature of internal developments and outside influences.

Several prehistoric archaeological research domains have been identified by Fredrickson (1984:527) for the North Coast Ranges. The following domains are applicable to the sites reviewed here:

- Geographic-Temporal Relationships
- Settlement and Subsistence Patterns
- Paleoclimatic Reconstructions/Past Environmental Conditions
- Interaction and Exchange Systems
- Technological-Demographic Relationships
- Socio-cultural Identity of Prehistoric Populations

In addition to the above listed research domains, three site types within the Project area invoke distinctive research questions: buried sites, and milling stations and petroglyph sites.

For a list of research questions that fall within these domains, refer to Appendix E.

3.6.4 HISTORIC ARCHAEOLOGICAL RESEARCH QUESTIONS

Documents reviewed in order to develop a set of research questions applicable to the historic archaeological sites in the West and South County study areas include a homesteading and agricultural development context for South Dakota (Brooks and Jacon 1994); a *Historical Archaeology* article entitled "Questions of Substance, Questions That Count" (Cleland 1988); an evaluation, request for determination of eligibility, and effect report for the extensive Los Vaqueros Reservoir Project in Contra Costa County and Alameda counties (Sonoma State University Academic Foundation [SSUAF] 1992); a homesteading context for Arizona (Stein 1990); and National Register Bulletin 36: *Guidelines for Evaluating and Registering Historical Archaeological Sites and Districts* (National Park Service 1993).

Other than excavations at the Mexican-era Petaluma Adobe, little historical archaeological research has been conducted in the West and South County areas, and none has been done for rural agricultural sites. In-depth documentary research has also been limited to a few studies outside the Project area. Thus, basic questions about the nature of the archaeological and documentary records for this area must be considered before more research-oriented concerns can be addressed.

Several historic archaeological research domains have been identified in the above-mentioned documents and are applicable to the sites reviewed here:

- Environmental Adaptations
- Settlement Patterns
- Sociocultural Relationships
- Economics
- Ethnicity and Gender

For a list of questions that are applicable under these research domains, refer to Appendix E.

Presented below are the preliminary significance evaluations of the cultural resources identified during the field surveys of the candidate reservoirs of the Santa Rosa Subregional Long-Term Wastewater Project.

3.6.5 ALTERNATIVE 2: SOUTH COUNTY

South County Historic Landscape

The South County candidate reservoirs--Tolay A/C, Adobe Road, Lakeville Hillside, and Sears Point--are situated in a landscape that includes cypress- and eucalyptus-tree rows, clusters, and windbreaks; heavily-grazed, grassy, rolling hills; and ranch complexes with associated small-scale elements such as fences, feed and water troughs, windmills, roads, stone-lined water control systems, vineyards, and farm machinery. Portions of this rural landscape are similar to that identified in *The Changing Landscape of Sonoma County Dairies* as "a cultural landscape created by dairy ranchers and their land" (Abbott 1986:2).

Significance Discussion

This historic vernacular landscape is an example of a rural landscape that "gradually took form when people moved into a place, did what they could to survive and prosper with the resources at hand" (Jackson 1980:114). This landscape represents an important trend in Sonoma County history. When the land was initially occupied, it was farmed to meet the individual needs of its settlers. As populations grew, technological advancements occurred, transportation methods improved, and specialized commercial farming gradually came to replace subsistence and general farming. The current landscape is the outcome of this more than 100-year-long process.

Integrity

This historic vernacular landscape conveys a strong sense of the area's agriculturally based history. For the most part, the agricultural activity of the late 19th century continues to the present. The cultural aspects of this landscape indicate how space was organized, boundaries drawn, land divided, and communal facilities developed (see Jackson 1980:114).

Preliminary Evaluation

This historic vernacular landscape appears to have significance due to its ability to reflect the historic transitions of the agriculture in the area. This landscape may be eligible for listing on the National Register of Historic Places under Criterion A.

Tolay A / C

Introduction

Candidate reservoirs A and C have a substantial amount of overlap and in many instances contain the same sites. Each site below will be identified as to being in both Tolay A and C or only in Tolay A or Tolay C.

Archaeological District (Tolay A and C)

The prehistoric archaeological sites within the Tolay A and C candidate reservoirs may be most appropriately treated as comprising part of a National Register archaeological district. From a research perspective, studying these prehistoric sites as a district--rather than as individual resources--permits a more comprehensive approach to realizing the data potential of these sites (see section 2.1, Archaeological District, for a definition of *district*).

A total of 20 prehistoric archaeological sites have been identified to date within the Tolay Creek watershed which includes proposed candidate reservoirs Tolay A, C, and Sears Point. The cultural resources within this watershed appear to represent a continuum from initial occupation of the North Bay to the historic period. This continuum and the watershed can serve as a unifying element to these sites. Of the 20 sites, 11 occur within the Tolay A candidate reservoir boundary, 9 (8 overlapping) occur within the Tolay C candidate reservoir boundary, and 3 occur within the Sears Point candidate reservoir boundary.

The cultural resources within this watershed appear to represent a continuum from initial occupation to the historical period, represent a potentially wide range of prehistoric activity, though not necessarily the entire spectrum of resources associated with the people who used this valley. These sites include substantial and minor midden deposits, lithic scatters, bedrock mortars, petroglyphs, and the unique "charmstone site." These sites represent a variety of major and short-term habitation, resource processing, and ceremonial sites. The charmstones lie in a former lake bed; one interpretation suggests that the "charmstones" were used as slinging or bola stones for use in hunting waterfowl. These sites may represent occupation or use from about 5,000 years before the present to the 1850s. Considering the possible long extent of use and the diversity of functions, these prehistoric sites provide a unique data potential. However, regular surface collecting over many years at these sites may have significantly affected site integrity. In addition, artifacts are collected during the course of the year while plowing. Historic items such as horseshoes and broken ceramic pipe are found in almost every plowed field. Since these artifacts can hinder the tractors, they are regularly removed from the field by landowners and ranch hands.

CA-SON-371 (Tolay A only)

Known locally and in the archaeological literature for its numerous charmstones, this is the most distinctive site in the Tolay Valley.

Significance Discussion

This unusual site has produced an enormous number of charmstones over the years and continues to do so today. The amount and variety of these charmstones is unequaled at any other site in the North Bay and serve to make this a unique resource. Types of charmstones include spindles, plummets, phallic, grooved, fishtail, and pendular. If substantial intact deposits are present as well, the sites would constitute a unique database for testing various hypotheses regarding hunting and ceremonial use or cultural patterning of the diverse charmstone types.

Integrity

CA-SON-371 is located in the north-central portion of Tolay Valley and has probably been cultivated since it was drained in the late 19th century. The annual plowing of the site turns up many charmstones that have been collected by the owners and by other interested parties. The soil at this site is up to 60 inches deep (Miller 1972:22). Because plowing has disturbed no more than the top 2 feet (Holman 1977:2), it is possible that archaeological deposits occur below the plow zone.

Preliminary Evaluation

CA-SON-371 has the potential to yield important and unique information for the interpretation of the prehistory of the area and appears to be individually eligible for listing in the National Register of Historic Places under Criterion D. As such, it would also be eligible as a contributing element of the proposed Tolay Creek multicomponent archaeological district.

CA-SON-381 (Tolay A and C)

This large prehistoric archaeological site consists of a midden with shell, faunal bone, heat-altered rock, ash, and a diversity of flaked-stone and grooved-stone artifacts. Human remains were identified on the surface in 1978.

Significance Discussion

This major habitation site has a diversity of artifact types and subsistence debris that can be used to determine the site's functions and dates of occupation. The shellfish remains can be radiocarbon-dated, while obsidian would yield sourcing and dating information. The presence of human remains indicates the potential for demographic and sociocultural information. At a minimum, CA-SON-381 can provide information regarding demographic/geographic relationships, settlement and subsistence patterns, and interaction and exchange systems.

Integrity

While the upper one to two feet of the CA-SON-381 midden has been consistently plowed over the years, the remainder of mounded site appears to be relatively undisturbed (Chavez and Mulloy 1978a). Despite a dirt road and channelized Tolay Creek along the western portion of the site and the regular plowing, a large amount of diverse cultural material appears to be present.

Preliminary Evaluation

CA-SON-381 appears to be individually eligible for listing in the National Register of Historic Places under Criterion D because it has a large amount of diverse cultural materials that have the potential to yield data important to the interpretation of the area's prehistory. As such it would also be eligible as a contributing element of the proposed Tolay Creek multicomponent archaeological district.

CA-SON-382 (Tolay C only)

This prehistoric archaeological site is a large midden mound containing shell, bone, chert flakes, heat-altered rock. Human remains have been identified at the site.

Significance Discussion

The absence of temporally or functionally diagnostic materials make it difficult to date or determine the function of the site, although midden soil and dietary remains indicate a habitation site. If the site was a seasonally used campsite, the information it contains would add another dimension to the suite of village sites and nonmidden temporary camps. At a minimum, CA-SON-382 can yield information regarding settlement and subsistence patterns. The presence of a burial suggests the site may yield demographic and sociocultural information. The site is mounded and raised above the edge of the valley floor. Its location may indicate a different function than that of the sites on the valley floor, which are closer to the extinct lakebed. This

site may contain information not available at the rest of the sites in the valley, therefore offering a unique research potential.

Integrity

This site is outside the regularly plowed area and appears to have intact deposits.

Preliminary Evaluation

CA-SON-382 has the potential to yield information important to the interpretation of the area's prehistory and may be individually eligible for listing in the National Register of Historic Places under Criterion D. As such it would also be eligible as a contributing element of the Tolay Creek multicomponent archaeological district.

CA-SON-383 (Tolay A and C)

This prehistoric archaeological site, comprising an extensive mounded midden area, contains shell, heat-altered rock, burned bone, ash, and a variety of flaked-stone, groundstone and bone artifacts. Human remains were identified during the current field survey.

Significance Discussion

This appears to be a habitation site that contains dietary debris and materials that can be radiocarbon-dated and an array of artifacts that can be used to make temporal and functional inferences. At a minimum, CA-SON-383 should be able to provide information regarding geographic-temporal relationships, settlement and subsistence patterns, and interaction and exchange systems.

Integrity

Elsasser reported in 1954 that this site was largely destroyed; a subsequent review by Chavez and Mulloy (1978c) determined that CA-SON-383 is substantially larger than originally recorded, and that the site's integrity is not nearly as compromised as Elsasser had stated. Current field survey confirmed that this is a relatively large site. An artifact deposit discovered directly across the creek (T-A-4) may be a southwestern extension of CA-SON-383 separated from the main mound when the creek was channelized. A fence and road parallel the creek to the southwest while the remainder of the site is consistently plowed. Agricultural tilling only disturbs the top two to three feet. It appears the site has sufficient integrity to yield important information.

Preliminary Evaluation

CA-SON-383 appears to be individually eligible for listing in the National Register of Historic Places under Criterion D for its potential to yield information important to the interpretation of the area's prehistory. If the subsurface integrity is found to be compromised, the site may nonetheless be eligible as a contributing element of the proposed Tolay Creek multicomponent archaeological district.

CA-SON-1154

This site was recorded by Chavez and Mulloy (1978d). Current field investigation relocated this site and found it to be outside both candidate reservoir boundaries.

CA-SON-1155 (Tolay A and C)

This prehistoric archaeological site consists of a dark midden with shell, heat-altered rock, flaked-stone and groundstone artifacts, and shell beads. There are cupule rocks within and adjacent to the midden. Human remains have also been identified at this site.

Significance Discussion

The deposits at CA-SON-1155 suggest a small village site. The nature of the artifacts indicates seasonal occupation during the Emergent period. If this is the case, the deposits associated with CA-SON-1155 would be very important to the interpretation of the prehistory of Tolay Valley.

Integrity

Chavez and Mulloy (1978e) noted that CA-SON-1155 is "fairly undisturbed." There appears to be very little disturbance to the site proper, as it is entirely outside the area regularly plowed, while the adjacent historic road does not appear to have affected the site. Some erosion has occurred along Tolay Creek at the northeastern boundary of the site. In consideration of the large amount and diversity of materials present, and the minimal impacts to the deposit, it is highly likely that this site maintains sufficient integrity necessary to convey its significance.

Preliminary Evaluation

CA-SON-1155 appears to be individually eligible for listing in the National Register of Historic Places under Criterion D for its potential to yield information important to the interpretation of the area's prehistory. As such, it would also be eligible as a contributing element to the proposed Tolay Creek multicomponent archaeological district.

CA-SON-1156 (Tolay A only)

This site is a discontinuous scatter of prehistoric artifacts, flaking debris, and possible manuports. Artifacts include flaked-stone and groundstone items and may represent some antiquity.

Significance Discussion

As one of the few nonmidden sites in the Tolay Creek drainage, this site may be able to yield important information regarding settlement and subsistence practices and lithic technology. The possibility that CA-SON-1156 is a single-component site could be tested by obsidian hydration analysis; if affirmed, information from the site could be valuable in interpreting multicomponent sites in Tolay Valley.

Integrity

The surface of the site has been affected by plowing (Chavez and Mulloy 1978f). During the current study's field survey it was observed that the site has been consistently plowed, and materials have become quite dispersed (site dimensions are 180 meters by 150 meters). This site does not appear to have the potential of intact deposits, and unless this is a single-component site (i.e., representing a single time period or function), it does not appear to retain the ability to address research questions. Evaluation studies or formal evaluation, which may include test excavation, as well as controlled surface collection for horizontal integrity is necessary to make this assessment.

Preliminary Evaluation

It does not appear that CA-SON-1156 is individually eligible for listing in the National Register of Historic Places due to lack of integrity. The site, however, may be eligible as a contributing element to the proposed Tolay Creek multicomponent archaeological district.

CA-SON-1157 (Tolay A only)

This prehistoric archaeological site consists of a dark grey midden mound with extensive shell and burned bone debris, heat-altered rock, debitage, and a pestle fragment. Human remains were identified at the site.

Significance Discussion

This habitation site contains diverse and extensive dietary debris that has the potential to provide information regarding subsistence practices and paleo-climatic conditions. Radiocarbon-dating of the site using shellfish remains and animal bone might be possible as well as obsidian hydration studies. The debitage may provide information on prehistoric technologies. The presence of human remains indicates the potential for demographic and sociocultural information.

Integrity

This site is outside of the regularly plowed area. Midden soil, however, has been borrowed from the site for use elsewhere, resulting in a pit about 5 meters (16 feet) square in the eastern portion of the mound. Although the site is located within a horse corral, it appears to have substantial intact deposits, with only minor surface disturbance from the horses. There may be subsurface disturbance caused by rodent activity, evidenced by the human bone identified in a backdirt pile near a rodent hole.

Preliminary Evaluation

CA-SON-1157 appears to be individually eligible for listing in the National Register of Historic Places under Criterion D for its potential to yield information important to the interpretation of the area's prehistory. As such it would also be eligible as a contributing element of the proposed Tolay Creek multicomponent archaeological district.

CA-SON-1158 (Tolay A and C)

This prehistoric archaeological site contains midden soil, extensive obsidian debitage and flaked tools, chert flakes, burned animal bone, and shell fragments, as well as olivella shells and a bowl-mortar fragment.

Significance Discussion

Based on the cultural constituents, this site may date back to the Upper Archaic period; surface evidence suggests it may have had no subsequent Emergent period use. Therefore, the site may yield information on geographic-temporal relationships. The burned animal bone assemblage may to yield information on subsistence practices, while the obsidian tools and debitage offer the potential to answer questions regarding lithic technology, as well as provide dating for the site.

Integrity

This site still has a mounded area, even though it has been consistently plowed. This area is reportedly the first location within the lakebed to become dry when the annual lake recedes. Given the topography of the site and the location within the valley bottom, there is potential for substantial deposits remaining at this site.

Preliminary Evaluation

CA-SON-1158 appears to be eligible for listing in the National Register of Historic Places under Criterion D for its potential to yield information important to the interpretation of the area's prehistory. As such it would also be eligible as a contributing element of the proposed Tolay Creek multicomponent archaeological district.

CA-SON-1159 (Tolay A and C)

This prehistoric archaeological site consists of a midden, with obsidian and chert debitage and a mortar fragment. Possible human remains were also identified by previous field study.

Significance Discussion

The presence of obsidian can provide temporal information, while the debitage may provide information regarding lithic technology. Shellfish debris could provide information on settlement, subsistence, and paleoclimatic conditions. The possible presence of human remains suggests the potential for demographic and sociocultural information.

Integrity

This site has been severely damaged by the installation of a duck pond. Site indicators are found around the northern and western perimeter of the pond and about 5 to 10 meters (approximately 15 to 30 feet) into the plowed field. The site's integrity appears to have been compromised, and it does not appear to retain the ability to address research questions. Formal evaluation, which may include test excavation, is necessary to make this assessment.

Preliminary Evaluation

CA-SON-1159 may not be individually eligible for listing in the National Register of Historic Places due to lack of integrity, although additional research is essential to determine its actual condition. The site may, however, be eligible as a contributing element to the proposed Tolay Creek multicomponent archaeological district.

CA-SON-1903 (Tolay A and C)

This prehistoric archaeological site consists of a long, narrow, leached midden mound, containing small amounts of shell, ash, and bone, and flaked-stone and groundstone artifacts. The presence of concave-base projectile points and the leached midden suggest that it is potentially a Middle Archaic site.

Significance Discussion

In consideration of the possible antiquity of this site, CA-SON-1903 may yield information about the early use of Tolay Valley and other aspects of geographic-temporal relationships. If it is a single-component site it can provide information useful for the study of mixed deposits at other sites in Tolay Valley. CA-SON-1903 may also provide information regarding settlement and subsistence patterns and paleoclimatic conditions.

Integrity

Cultivation at CA-SON-1903 appears to have "posed no discernible damage" (Rhode 1990). The site is elevated above the rest of the valley floor, indicating that possible subsurface deposits are still intact.

Preliminary Evaluation

CA-SON-1903 appears to be individually eligible for listing in the National Register of Historic Places under Criterion D for its potential to yield information important to the interpretation of the area's prehistory. As such it would also be eligible as a contributing element of the proposed Tolay Creek multicomponent archaeological district.

T-A-1 (Tolay A only)

This site consists of the remains of a 19th-century agricultural complex, within which is a prehistoric petroglyph feature. The prehistoric archaeological feature is a bedrock outcrop with cupules on the surface.

Significance Discussion

The historical component of this site contains a remnant orchard, a well, agricultural equipment, a possible house pad, and a cellar or cold house. These remains appear likely to yield information regarding settlement patterns and economics.

Information from the cupules on the bedrock outcrop and about the feature's environmental setting is important for the study of the distribution, nature, and function of this site type.

Integrity

T-A-1 appears to contain various intact surface features as well as the potential for subsurface deposits of high integrity. The cupules on the bedrock outcrop do not appear to have been altered subsequent to their creation.

Preliminary Evaluation

T-A-1 appears to be individually eligible for listing in the National Register of Historic Places under Criterion D for its potential to yield information important to the interpretation of the area's history and prehistory. As such it would also be eligible as a contributing element of the proposed Tolay Creek multicomponent archaeological district, one of whose unifying themes may be rock art.

T-A-2 (Tolay A and C)

T-A-2 is a scatter of chert flakes, two chert cores, and a handstone fragment that appear to have been redeposited when Tolay Creek was channelized.

Significance Discussion

The presence of chert flakes and cores in association with a handstone fragment suggests a potentially Middle Archaic period site. If present in an intact deposit, these materials would constitute an important deposit, capable of yielding information on prehistoric lithic technology and subsistence.

Integrity

As these materials have been redeposited and their original context is unknown, T-A-2 appears to lack physical integrity.

Preliminary Evaluation

T-A-2 does not appear to be eligible for listing on the National Register due to the lack of integrity although additional research is essential to determine eligibility for listing on the National Register of Historic Places. As the deposit appears to have no obsidian for dating distinctive technological attributes and no stylistically distinctive artifacts, it is possible that T-A-2 would be ineligible as a contributing element to the proposed Tolay Creek multicomponent archaeological district.

T-A-3 (Tolay A only)

This prehistoric site is a concentration of flaked-stone and groundstone artifacts, including projectile points (a concave-base point and an Excelsior), two bowl-mortar fragments, a charmstone, and chert flakes.

Significance Discussion

T-A-3 may represent a habitation or resource-processing site, possibly dating to the Middle or Upper Archaic. As one of the few nonmidden sites in Tolay Valley, this site may be capable of yielding important information regarding settlement and subsistence patterns, paleoclimatic conditions, and lithic technology.

Integrity

Annual plowing appears to have caused little damage to T-A-3. The site is situated on the Tolay Creek floodplain, and alluvial deposits may have obscured a portion of the site. If this is the case, then there is a potential for intact deposits remaining.

Preliminary Evaluation

T-A-3 appears to be individually eligible for listing on the National Register of Historic Places under Criterion D for its potential to yield information important to the interpretation of the area's prehistory. As such, it would also be eligible as a contributing element of the proposed Tolay Creek multicomponent archaeological district.

T-A-4 (Tolay A and C)

This prehistoric archaeological site consists of a scatter of groundstone artifacts including charmstones, bowl-mortar fragments, pestles, and a handstone; an obsidian concave-base projectile point was also noted. This site may represent the southeastern extension of CA-SON-383 before the creek was channelized, or it may represent the southern portion of CA-SON-1903.

Significance Discussion

T-A-4 may be associated with the above-mentioned sites, or it may represent a discrete archaeological deposit. The absence of midden soil and the nature of the artifacts suggest that the site may date to the Lower or Middle Archaic period. Artifacts appear to occur in sufficient numbers and diversity to allow inferences about temporal placement and site function. If more obsidian artifacts are present, it may be possible to date the deposit. At a minimum, the site appears to have the potential to provide information regarding settlement and subsistence patterns.

Integrity

This site has been consistently plowed, which may have increased the spatial distribution of artifacts associated with what was once the southern portion of CA-SON-1903, or the southwestern boundary of CA-SON-383 before Tolay Creek was channelized. The integrity of T-A-4 cannot be determined without subsurface investigations.

Preliminary Evaluations

T-A-4 may have been a portion of either CA-SON-1903 or CA-SON-383, both of which appear to be individually eligible for listing in the National Register of Historic Places under Criterion D. If this site is not associated with one of the above-mentioned sites, it may be individually eligible for listing in the National Register of Historic Places under Criterion D. As such, it would also be eligible as a contributing element of the proposed Tolay Creek multicomponent archaeological district.

T-A-5 (Tolay A only)

T-A-5 has been redeposited from CA-SON-1157, for use as garden soil. The deposit consists of a shell midden with heat-altered rock. Human remains have been identified at CA-SON-1157, so this redeposited material may also contain human remains.

Significance Discussion

As redeposited site material, the data potential of T-A-5 is limited. Stylistically distinctive artifacts may provide information on the temporal or cultural nature of CA-SON-1157, while obsidian items with distinctive technological attributes might yield important information on that site's lithic assemblage.

Integrity

The materials comprising this site are redeposited from CA-SON-1157. Thus T-A-5 lacks physical integrity, although exceptional diagnostic artifacts may provide valuable information.

Preliminary Evaluation

T-A-5 appears to be ineligible for listing on the National Register of Historic Places due to lack of integrity. Depending on the archaeological materials present, however, it may be eligible for its information potential in relationship to CA-SON-1157. It is also necessary to take the possible presence of human bone into account.

T-B-1: Pump House at the Hale Dairy (Tolay A only)

This historic architectural site consists of an early-20th-century wooden pump house.

Significance Discussion

Individually, this building does not appear to possess any distinctive characteristics, associations with historical persons or events, or information potential that would indicate significance. It may, however, derive significance as a small-scale element of the Hale Dairy (see below). At the moment there is insufficient information to determine the significance of this building.

Integrity

The pump house is in poor physical condition, as it is missing wall boards and pieces of its roof.

Preliminary Evaluation

This building appears to lack architectural distinctiveness, nor does it have historical significance, as it appears to lack association with an important event or individual; therefore, it may not be eligible for individual listing in the National Register of Historic Places. It may, however, be associated with the Hale Dairy complex, which is outside of the field-study area. The Hale complex consists of several historic buildings that may be significant. The Hale ranch complex has not been evaluated and further research is needed to determine if the pump house may be eligible as a contributing element to the Hale Ranch.

T-B-3: The Cardoza Ranch (Tolay A and C)

This historic architectural site, the Cardoza Ranch, occupies roughly 20 acres in the northwestern section of this 1,700-acre property. The complex consists of historic residential and agricultural buildings, numerous structures and objects, and a water-control system consisting of retaining walls, culverts, dams, ditches, and canals--mostly of stone construction.

Significance Discussion

The Cardoza Ranch represents local and statewide trends that include large-scale, commercial agricultural activities. The ranch is associated with individuals of local and statewide importance, including William Bihler, who drained Lake Tolay, and James G. Fair, a former United States Senator. Fair raised thoroughbred horses and cattle and had a vast vineyard that produced prize-winning wines and brandies during the late 19th century. Senator Fair is said to have operated the "first continuous brandy distillery on the Pacific Coast" (McKee 1955). The ranch is also associated with A.W. Foster, who operated a stock farm on the ranch between 1905 and 1922 and owned the San Francisco and North Pacific Railroad. These associations are represented by a stone winery building, a late-19th-century dwelling and outbuilding, historic roads, extensive water-control features, corrals, and an early-20th-century barn and equipment shed.

Today, the Cardoza Ranch reflects the social history of several generations of a family living in a rural setting, as well as the rich agricultural history of the area.

Integrity

The Cardoza Ranch appears to maintain a high degree of integrity of setting and location. The complex as a whole represents several generations of use and a diversity of agricultural activity. The architecture of the complex, however, appears to lack some integrity as an architectural resource due to the removal and alteration of buildings. The water-control system possesses individual distinction with a high degree of integrity of design, materials, and workmanship.

Preliminary Evaluation

The Cardoza Ranch may be eligible for listing in the National Register of Historic Places under Criterion B for its association with individuals of local and statewide significance. The ranch may also be eligible under Criterion D for its ability to provide information about social history

and past land use. In addition, the ranch may be eligible to the National Register under Criterion A as a rural historic landscape that represents this region's history.

The Cardoza Ranch water-control system, a unique distinguishable entity fundamental to the history and operation of the ranch, may be individually eligible under Criterion C for the distinctive characteristics of rock construction using local materials. The water-control system may also have the potential to yield information about historical vernacular construction and engineering methods and, thus, may be eligible under Criterion D.

The stone features that are part of the water-control and road-related structures are also found on neighboring ranches. These distinctive features represent a significant concentration of structures that are linked by the use of native stone and specific construction techniques. Consequently, they may be eligible for listing on the National Register of Historic Places as a rural historic district under Criteria C and D. This district is distinct in that it exhibits a particular type of stonework construction that emphasizes the use of local materials. Important information pertinent to understanding the history of the technical and functional aspects of this type of stone construction may be obtained from further examination of these structures.

SP-B-2: Sears Point to Lakeville Historic Road System (Tolay A, C and Sears Point)

Portions of a historic road system, dating to at least 1877, are within the proposed Tolay A reservoir. Much of the road system is currently in use. The road originally was about 6 miles long and began near where Highway 121 crosses Tolay Creek. The road ran up the Tolay Creek drainage for about 1.5 miles, then went northerly into the hills above Tolay Creek and entered the south end of Tolay Valley. It followed the western edge of the valley floor to what is today the Cardoza Ranch complex. The road continued westerly along what is now Cannon Lane and terminated at Lakeville Highway. Another branch of the road system ran from the Cardoza Ranch complex southerly to Lakeville Highway, following portions of what is currently Cardoza Road.

By 1908, another road originated at Highway 121 just north of the 1877 road, ran northwest along the base of Wildcat Mountain, and continued north along Tolay Creek, paralleling the earlier road and intersecting with it at the Cardoza Ranch complex.

Features associated with these roads include cypress-tree stumps, wooden bridges, fencing, and gates. Particularly notable are stone water-control features, such as culverts, retaining walls, and bridge abutments.

Significance Discussion

The historic road system between Sears Point and Lakeville is associated with the growth of agriculture in this area during the l9th and 20th centuries. These roads appear to have been major circulation networks during historic times, transporting agricultural products, goods, and people between local ranches and major shipping points at the towns of Lakeville, Petaluma, and Sonoma. The road system represents the history of the development of transportation routes in

the area and is important for its influence on land use. It was also the major route connecting what was to become the Cardoza Ranch complex with agricultural activities on Tubbs Island.

The Sears Point to Lakeville historic road system may be associated with William Bihler, a locally significant individual who was responsible for the draining of Lake Tolay and who, as early as 1865, owned much of the property that the road bisects. The road system may also be important for its association with the successful brandy distillery operated by former U.S. Senator, James G. Fair. The roads may also have been integral to the operation of A. W. Foster's farm in the early 20th century, connecting the main ranch to Tubbs Island and other agricultural fields.

This historic road system reflects the local history of agriculture, transportation and settlement. It continues to be used as part of the local ranches' circulation network.

Integrity

Having maintained its historical route, the Sears Point to Lakeville historic road system appears to possess integrity of setting and location. Much of the area through which the roads pass appears to retain its rural historic setting. The roads' continued use in agricultural operations today supports the road system's association with local agricultural history, giving it a high degree of associational integrity. The system of stone support structures and bridges found along the road exhibit a high degree of integrity of design, workmanship, and use of materials. The roads and their related features appear to be in good condition. While the road has undoubtedly been graded over the years, it is still almost entirely unpaved. The extant material culture associated with road construction, maintenance, and continued use is sufficiently visible to distinguish the road system as a historic linear feature.

Preliminary Evaluation

The Sears Point to Lakeville historic roads may be eligible for listing in the National Register of Historic Places under Criterion A, for its association with the growth of local agriculture and the development of early transportation systems. Under Criterion B, the road system may be eligible for its association with the Bihler, Fair, and Foster agricultural operations during the l9th and 20th centuries. Also contributing to the eligibility of the road system under Criterion C are its associated stone structures, which provide a good example of local historical vernacular construction and engineering techniques.

The stone features associated with the road are also found on neighboring ranches. These distinctive features represent a significant concentration of structures that are linked by the use of native stone and specific construction techniques. These features may be eligible for listing in the National Register of Historic Places as a rural historic district under Criteria C and D. This district is distinct in that it exhibits a particular type of stonework construction that emphasizes the use of local materials. Important information pertinent to understanding the history of the technical and functional aspects of this type of stone construction may be obtained from further examination of these structures.

Historic Landscape (Tolay A and C)

The historic vernacular landscape of Tolay A/C appears to have significance due to its ability to reflect the historical transitions of agriculture in the area and may be eligible for listing on the National Register of Historic Places under Criterion A.

Refer to section 3.6.5, South County Historic Landscape, for a discussion of the historic landscape of these candidate reservoirs

Adobe Road

AR-A-1

This historic archaeological site consists of rock and concrete foundations and associated farm equipment. The site may date to 1867 or earlier, as Bowers's historic map (1867) depicts a house in this general area.

Significance Discussion

These remains may be directly associated with AR-B-1, the Henelly/Ielmorini ranch complex or they may represent a tenant holding. In either case, study of AR-A-1 may provide information about the ethnicity, land use, and specific agricultural practices of the occupants of the complex. The site may also yield information on the effects of agricultural practices on the environment. If AR-A-1 represents a tenant holding, it could provide information regarding differing economic strategies between owners and tenants.

Integrity

The existing foundations and the readily identifiable farm equipment at this site appears to have a relatively high degree of integrity. The high visibility of the foundation remains will facilitate the identification of associated archaeological deposits, if present.

Preliminary Evaluation

This site appears to have the potential to provide information important to the interpretation of the history of the area and appears to be eligible for listing in the National Register of Historic Places under Criterion D.

AR-A-2

This prehistoric archaeological site consists of heat-altered rock, shell, obsidian and basalt flakes, petrified wood, and possible organically discolored soil.

Significance Discussion

As a small habitation site near the major ethnographic village at the Petaluma Adobe, AR-A-2 has the potential to yield important information on the area's settlement system. The site

contains obsidian, which can provide chronological information and can be sourced to obtain information about exchange and procurement networks. The obsidian and basalt flakes and petrified wood may be able to provide information about lithic technology. The site may also yield information concerning subsistence practices.

Integrity

Cattle grazing may be the only activity that has adversely affected the surface integrity of AR-A-2. Slope wash from upslope may have covered a portion of the site, which would have effectively capped and preserved some of the site surface. Overall integrity appears to be good.

Preliminary Evaluation

AR-A-2 appears to have the potential to yield important information on the area's prehistory. It therefore appears to be eligible for listing in the National Register of Historic Places under Criterion D.

AR-B-1: Henelly / Ielmorini Ranch

This historic dairy ranching complex consists of a Queen Anne farmhouse that may date to as early as 1877. Several outbuildings, a variety of landscape features, and post-1950s agricultural buildings are also present.

Significance Discussion

The farmhouse embodies the distinctive characteristics of the Queen Anne style of architecture, which was popular in the United States between 1880-1910. As yet undiscovered archaeological deposits associated with the farmhouse could yield important information to the significance of the complex.

Integrity

The Henelly/Ielmorini farmhouse is in its original location, with good workmanship evident in the soundness of construction, the use of materials, and the attention paid to details. The house, set in a rural canyon, strongly conveys a sense of the historic period during which it was constructed. The design and placement of the post-1950s buildings in the Henelly/Ielmorini complex are not incompatible with the house and do not detract from the setting or the historic feeling.

Preliminary Evaluation

At a minimum, the house at the Henelly/Ielmorini Ranch may be eligible for listing in the National Register of Historic Places under Criterion C. If intact associated archaeological deposits are present, they may be eligible under Criterion D.

Historic Landscape

The historic vernacular landscape of candidate reservoir Adobe Road appears to have significance due to its ability to reflect the historical transitions of agriculture in the area and may be eligible for listing on the National Register of Historic Places under Criterion A.

Refer to section 3.6.5, South County Historic Landscape, for a discussion of the historic landscape of this candidate reservoir.

Lakeville Hillside

Historic Landscape

The historic vernacular landscape of candidate reservoir Lakeville Hillside appears to have significance due to its association with the historical transitions of agriculture in the area. Due to a possible lack of integrity this landscape may not be eligible for listing in the National Register of Historic Places.

Refer to section 3.6.5, South County Historic Landscape, for a discussion of the historic landscape of this candidate reservoir.

Sears Point

Archaeological District

The prehistoric archaeological sites within the Sears Point candidate reservoir may be most appropriately treated as part of a National Register archaeological district proposed for the Tolay A, C and Sears Point candidate reservoirs. See section 3.6.5, Tolay A/C, Archaeological District, for a discussion of a Tolay Creek watershed archaeological district.

SP-A-1

This prehistoric petroglyph site consists of a boulder with seven cupules on the upper surface. It is one of three petroglyph sites in the lower reaches of Tolay Creek, all of them along the southwestern side of the drainage at approximately the same elevation.

Significance Discussion

SP-A-1 has the potential to provide information about the nature of petroglyph sites and their place in the settlement system. Also, if there is a buried deposit at this location, such a deposit may yield information important to understanding the manufacture and use of petroglyphs.

Integrity

Other than minor weathering, there appears to have been no alteration of the glyphs on this rock, and SP-A-1 appears to have good integrity. Due to considerable soil creep in the area and

ground movement caused by the Tolay Fault, it is possible that this rock outcropping has an associated archaeological deposit preserved by sedimentary deposits.

Preliminary Evaluation

SP-A-1 appears to be individually eligible for listing in the National Register of Historic Places under Criterion D for its potential to yield information important to the interpretation of the area's prehistory. As such it would also be a contributing element to the proposed Tolay Creek multicomponent archaeological district.

SP-A-2

This prehistoric petroglyph site consists of several pecked curvilinear nucleated glyphs (PCNs) on a large boulder.

Significance Discussion

Most of the petroglyph sites in the lower Tolay Creek drainage are at about the same elevation. SP-A-2 is the only site so far identified in the lower Tolay Creek drainage that possesses PCNs, and may provide information in the interpretation of these types of petroglyph sites in this region. It has the potential to yield information on prehistoric land use and settlement patterns in the area.

Integrity

Other than minor weathering, there appears to have been no alteration of the glyphs on this rock, and SP-A-2 appears to have good integrity. Due to considerable soil creep in the area and ground movement caused by the Tolay Fault, it is possible that this rock outcropping has an associated archaeological deposit preserved by sedimentary deposits.

Preliminary Evaluation

SP-A-2 has the potential to provide information important to the interpretation of the prehistory in the Tolay Creek drainage and appears to be individually eligible for listing in the National Register of Historic Places under Criterion D. As such it would also be considered a contributing element to the proposed Tolay Creek multicomponent archaeological district.

SP-C-1

This prehistoric archaeological site consists of a midden deposit, cupule rocks, PCNs and bedrock mortars. The midden contains shell, fragmented bird bone, and heat-altered rock.

Integrity

Other than rodent activity and some possible effects as a result of cattle grazing, SP-C-1 appears to possess good integrity. The petroglyphs and milling features retain good integrity. Soil movement from upslope may have covered and preserved other site constituents.

Significance Discussion

The presence of midden and dietary debris can provide settlement pattern and subsistence use information, while the apparent absence of lithic debris at this site suggests that it may have had a specific role in the area's settlement. Of particular interest at SP-C-1 is the presence of cupules (petroglyphs) and milling features on the same boulders. This site could yield important information regarding petroglyph sites.

Preliminary Evaluation

SP-C-1 has the potential to provide information important to the interpretation of the prehistory of the area and appears to be individually eligible for listing in the National Register of Historic Places under Criterion D. As such it would also be eligible as a contributing element of the proposed Tolay Creek multicomponent archaeological district.

SP-B-1: "Hay Shack"

This historic architectural site is a small, wood-frame building constructed during the late 19th or early 20th century that is currently being used to store hay.

Significance Discussion

This building does not appear to embody any distinctive characteristics of a type, period, or method of construction. Neither does it appear to represent the work of a master or possess high artistic values. It is unlikely that this building could yield information important in history. This building, however, is a component of the Mangels/Roche Ranch complex, which was previously determined potentially significant but requiring further study (De Petris and Sweet 1978; California Office of Historic Preservation 1995a:54).

Integrity

Although this building is in good physical condition, it appears to lack integrity. As an isolated building, the "hay shack" in itself does not convey any sense of a particular time period, nor do the design or materials indicate anything significant about the history of the area.

Preliminary Evaluation

This building appears to lack architectural and historic significance based on design and lack of association with an important event or individual. SP-B-1 therefore may not be eligible for separate listing in the National Register of Historic Places. This building, however, may be associated with the Mangels/Roche ranch complex, consisting of several historic buildings

outside the Project area. The Mangels/Roche ranch complex has been recorded and determined potentially eligible for listing in the National Register. Further research, however, would be needed to determine SP-B-1's relationship to the Mangels/Roche complex.

SP-B-2: Sears Point to Lakeville Historic Road System

The Sears Point to Lakeville historic road system may be eligible for listing in the National Register of Historic Places under Criterion A, B, C, and D. See section 3.6.6, Tolay A/C, SP-B-2, for a discussion of the Sears Point to Lakeville Historic Road System.

Historic Landscape

The historic vernacular landscape of candidate reservoir Sears Point appears to have significance due to its ability to reflect the historical transitions of agriculture in the area and may be eligible for listing on the National Register of Historic Places under Criterion A.

Refer to section 3.6.5, South County Historic Landscape, for a discussion of the historic landscape of this candidate reservoir.

3.6.6 ALTERNATIVE 3: WEST COUNTY

West County Historic Landscape

The West County candidate reservoirs--Two Rock, Bloomfield, Carroll Road North, Valley Ford East, and Huntley--are situated in a landscape that includes cypress- and eucalyptus-tree rows, clusters, and windbreaks; heavily-grazed, grassy, rolling hills; and ranch complexes with associated small-scale elements such as fences, feed and water troughs, windmills, roads, orchards, and farm machinery. This rural landscape has been identified in *The Changing Landscape of Sonoma County Dairies* as "a cultural landscape created by dairy ranchers and their land" (Abbott 1986:2).

Significance Discussion

This historic vernacular landscape is an example of a rural landscape that "gradually took form when people moved into a place, did what they could to survive and prosper with the resources at hand" (Jackson 1980:114). This landscape represents an important trend in Sonoma County history. When the land was initially occupied, it was farmed to meet the individual needs of its settlers. As populations grew, technological advancements occurred, transportation methods improved, and specialized commercial farming gradually came to replace subsistence and general farming. The current landscape is the outcome of this more than 100-year-long process.

Integrity

This historic vernacular landscape conveys a strong sense of the area's agriculturally based history. For the most part, the dairy ranching of the late 19th century continues to the present. The cultural aspects of this landscape indicate how space was organized, boundaries drawn, land divided, and communal facilities developed (see Jackson 1980:114).

Preliminary Evaluation

This historic vernacular landscape appears to have significance due to its ability to reflect the historical transitions of the agricultural use of the area. This landscape may be eligible for listing on the National Register of Historic Places under Criterion A.

Two Rock

Archaeological District

The prehistoric and historic archaeological sites within the Two Rock candidate reservoir may be most appropriately treated as comprising a National Register archaeological district. From a research perspective, studying archaeological sites as components of a district--rather than as individual resources--permits a more comprehensive approach to realizing the data potential of these sites (see section 2.1, Archaeological District, for a definition of *district*).

The Two Rock candidate reservoir is in a unique watershed, whose distinctive setting provides a unifying element for the cultural resources within it. This protected valley has its own water source and contains an abundance and diversity of vegetational resources, such as oaks, buckeyes, Douglas fir, and hazelnut trees, not found in other drainages in the general vicinity. This valley may be a relict environment representative of the general vicinity prior to the effects of logging, farming, and grazing activities (see Gause and Gerike 1996).

The cultural resources within this watershed may represent a single continuum from initial use through historical occupation, or there may be two distinct phases of occupation represented by the prehistoric and historical sites. The Two Rock watershed contains a potentially wide range of both prehistoric and historical activity, though not necessarily the entire spectrum of resources associated with the people who used this valley.

Although there is information about prehistoric populations on the Sonoma County coast to the west and information about the people who lived on the Santa Rosa Plain to the east, there is little known about prehistoric settlement and use of the West County area. The seven prehistoric sites appear to represent a long period of occupation, with interrelated functions. Considering the lack of data on this area, the Two Rock prehistoric sites represent substantial information potential.

At least two farm/ranch complexes, dating from the latter half of the 19th century to the mid-20th century, were established within the valley. Other 19th-century farms/ranches also used portions of the valley as part of their agricultural operations. The historical sites within the Two Rock candidate reservoir provide an excellent opportunity to research not only the individual sites but also the manner in which the occupants of these sites interacted with each other and the land they held.

CA-SON-1866H

This possibly late 19th-century rural historic archaeological site consists of residential and outbuilding remains, ornamental plantings, and an artifact scatter.

Significance Discussion

The archaeological deposits and associated features will likely yield information to address research questions about environmental adaptations, spatial distribution, sociocultural relationships, and economics. Archaeological and archival information from the site would also be of fundamental importance in understanding the history of the valley itself.

Integrity

The shed feature is in poor condition but still standing. Ornamental plantings of daffodils and "red-hot pokers" on the site suggest a garden or front yard area and, as such, may aid in locating other features associated with the probable house location, such as kitchen refuse and privy pits. The current land use is cattle grazing, which does not appear to have significantly affected the site, and the complex appears to possess a high degree of archaeological integrity.

Preliminary Evaluation

CA-SON-1866H has the potential to provide information important to the interpretation of local history and appears to be eligible to the National Register under Criterion D at the local level. As such, it would also be eligible as a contributing element to the proposed Two Rock multicomponent archaeological district.

CA-SON-1867

This prehistoric archaeological site consists of a midden deposit with obsidian flaking debris and a separate lithic scatter.

Significance Discussion

The obsidian remains at this site can provide information regarding trade or procurement networks and the time of occupation of the Two Rock area. It may also be possible to obtain information regarding the use of this site as a habitation or a resource-procurement location. The site has the potential to answer research questions about geographic-temporal relationships and settlement and subsistence patterns.

Integrity

A creek along the boundary of the site may have eroded some of the site deposits. There does not, however, appear to have been any additional damage to the site since it was originally recorded in 1990. The current land use of cattle grazing also appears to have done little or no damage to the site.

Preliminary Evaluation

CA-SON-1867 appears to be individually eligible for listing in the National Register of Historic Places under Criterion D on the basis of the important data it can provide on the prehistory of the area. As such, it would also be potentially eligible as a contributing element of the proposed Two Rock multicomponent archaeological district.

CA-SON-1868

This prehistoric archaeological site consists of a lithic scatter containing chert and obsidian flaking debris and chert tools.

Significance Discussion

CA-SON-1868 contains obsidian that could be used to date the occupations at Two Rock and obtain information about possible exchange or procurement networks in the area. This site has the potential to yield information that could answer questions about geographic-temporal relationships, interaction and exchange systems, and lithic technology.

Integrity

This site appears to contain intact deposits, although the road that bisects it may have caused some data loss. These intact deposits have obsidian debris that can be dated--thus the deposits retain their integrity for chronological purposes.

Preliminary Evaluation

This site appears to be eligible for listing in the National Register of Historic Places under Criterion D on the basis of the important data it can provide about the prehistory of the area. As such, it would also be eligible as a contributing element of the proposed Two Rock multi-component archaeological district.

CA-SON-1877H

This rural historic archaeological site contains both a house foundation and an extant milking barn, and may date as early as 1867. TR-A-1 may be associated with the site.

Significance Discussion

This site has the potential to yield information that addresses research questions about environmental adaptations, sociocultural relationships, economics, and construction methods. Archaeological, oral-history, and archival information on this site can also be of importance in understanding the historical development of the Two Rock area.

Integrity

This archaeological site appears to retain a high level of integrity. The remains of several activity areas appear to have high visibility. Ornamental plantings around the possible house foundation can facilitate the determination of lot layout and the location of other associated features, such as the kitchen area, privy pits, refuse pits, and wells. Local residents are familiar with this site and information may be attained through interviews.

Preliminary Evaluation

This site has the potential to yield information important to the interpretation of the history of the area and, thus, appears to be eligible for listing in the National Register of Historic Places under Criterion D. As such, it would also be eligible as a contributing element of the proposed Two Rock multicomponent archaeological district.

TR-A-1

This historic archaeological site consists of a small wooden spring box, a remnant orchard, and domestic refuse (glass and ceramic fragments, barbed wire, and various metal fragments), possibly representing a farm house or features associated with nearby CA-SON-1877H.

Significance Discussion

Archival and oral-history research is needed to identify TR-A-1's function and associations. The site's significance probably lies in its potential to yield information about the history of the area, sociocultural relationships, economics, and settlement patterns.

Integrity

The current land use is cattle grazing and the site appears to be little altered by this activity. This deposit appears to have been burned by a surface fire. If the site consists of sheet refuse with no subsurface deposits, there may be insufficient intact deposits to yield important information. The fire may have compromised the integrity of the deposit.

Preliminary Evaluation

TR-A-1 may not be eligible for listing in the National Register of Historic Places due to its apparent lack of integrity. It may, however, be directly associated with nearby CA-SON-1877H, which is potentially eligible. If so, TR-A-1 may be eligible as a contributing element to the proposed Two Rock multicomponent archaeological district.

TR-A-2

The current field survey recorded this prehistoric archaeological site. Due to a subsequent change of the Two Rock reservoir configuration, this site is no longer within the candidate reservoir boundary.

TR-A-3

This buried prehistoric archaeological site has been exposed by the current creek channel. Artifacts noted include a miniature mortar, a schist charmstone, and large obsidian and chert flakes.

Significance Discussion

The artifacts from TR-A-3 may help to place the site in a cultural chronology of the larger Santa Rosa Plain, as well as identify a local cultural sequence answering questions about geographic-temporal relationships, settlement and subsistence, interaction and exchange systems, and the sociocultural identity of prehistoric populations in the area. The nature of the artifacts indicate a possible grave and/or habitation site and further the importance of this site for the interpretation of the occupation(s) at Two Rock. Obsidian hydration analysis and artifact cross-dating can aid in temporal placement, while such a site may also contain datable organic materials from intact deposits. This site may also yield important information about ceremonial and mortuary practices of the prehistoric residents in the West County area. TR-A-3 can also aid in addressing questions regarding buried sites and past environmental conditions.

Integrity

The deposit is eroding out of the creek at a depth of at least 1 meter. The majority of the deposit is assumed to be buried, and has probably been protected by sedimentary deposits.

Preliminary Evaluation

TR-A-3 has the potential to yield significant information for the interpretation of the history of the area and appears to be eligible for listing in the National Register of Historic Places under Criterion D. As such, it would also be a contributing element of the proposed Two Rock multicomponent archaeological district.

TR-A-4

This buried prehistoric archaeological site has been exposed in the current creek channel. It is represented by a relatively large lithic scatter of mostly obsidian flakes.

Significance Discussion

This site contains a deposit of obsidian which may provide information on the temporal period of use/occupation at this site and answer research questions about temporal-geographic relationships. Since the cultural chronology of the West County area is poorly understood, this site has the potential to provide basic information about the cultural sequence. The obsidian can also be used to conduct a variety of lithic analyses relating to tool production and use, and can provide information about exchange and procurement networks. This site also has the potential to address research questions associated with buried sites and past environmental conditions.

Integrity

The site is likely to have a high degree of preservation since it is buried beneath a minimum of 1 meter of alluvium. Although the site is currently being exposed by a creek, there is a high likelihood that deposits remain.

Preliminary Evaluation

TR-A-4 has the potential to provide information important in the interpretation of the prehistory of the West County area and, thus, appears to be eligible for listing in the National Register of Historic Places under Criterion D. As such, it would also be a contributing element of the proposed Two Rock multicomponent archaeological district.

TR-A-5

This prehistoric archaeological site consists of an obsidian flake scatter exposed mostly in a cattle trail. All flaking debris noted at this site is from the Annadel obsidian source.

Significance Discussion

The flaking debris identified at this site is only from one source, which may indicate a relatively brief use/occupation of this site. If TR-A-5 proves to be a single-component site, the information it contains can aid in the development of the West County chronology and assist in the interpretation of local multicomponent prehistoric sites. This site may be a satellite locus of buried site TR-A-3, which is about 100 meters to the east. An examination of both sites may provide information about intrasite activity areas.

Integrity

While the site has been heavily grazed and there is a high likelihood that the location has been subject to soil movement, TR-A-5 appears to be in situ with a discrete surface distribution. The site has the potential for undisturbed deposits.

Preliminary Evaluation

TR-A-5 has the potential to provide information important in the interpretation of the prehistory of the West County area and appears to be eligible for listing in the National Register of Historic Places under Criterion D. As such, it would also be a contributing element of the proposed Two Rock multicomponent archaeological district.

TR-A-6

This prehistoric archaeological site consists predominantly of chert flaking debris.

Significance Discussion

This site is unusual in that, unlike the other lithic deposits in the proposed Two Rock archaeological district, this deposit contains mostly chert. Thus the site may represent a different time period, cultural group, or functional activity. TR-A-6 has the potential to answer questions about temporal-geographic relationships and exchange and interaction networks and to address questions about lithic technology.

Integrity

Although the area is used for cattle grazing, this activity does not appear to have significantly affected the site. A road bisecting the archaeological deposit may have caused data loss, but the site appears to still contain intact deposits.

Preliminary Evaluation

TR-A-6 has the potential to yield information important to the interpretation of the West County area and, thus, appears eligible for listing in the National Register of Historic Places under Criterion D. As such, it would also be eligible as a contributing element of the proposed Two Rock multicomponent archaeological district.

Historic Landscape

The historic vernacular landscape of candidate reservoir Two Rock appears to have significance due to its ability to reflect the historical transitions of agriculture in the area and may be eligible for listing on the National Register of Historic Places under Criterion A.

Refer to section 3.6.6, West County Historic Landscape, for a discussion of the historic landscape of this candidate reservoir.

Bloomfield

B-A-1

This rural historic archaeological site consists of a scatter of historical domestic debris (glass bottle and ceramic fragments, copper fixtures that may have been part of a still, and various metal fragments) and structural remains. There is, however, no evidence of a foundation for a residence.

Significance Discussion

Archival and oral-history research is necessary to identify the site's function and associations. The nature of the artifacts suggest that the site information could be used to address questions regarding sociocultural relationships and economics.

Integrity

The 1954 USGS 7.5 minute map of the area indicates that there was once a building on or near the site. The remaining visible deposits may be sheet refuse, possibly in part due to the activity of the cattle grazing. The dispersed distribution of the artifacts suggests the site's integrity may have been compromised.

Preliminary Evaluation

Due to an apparent lack of discrete deposits, B-A-1 may not be able to yield information important to the interpretation of the history of the area. Thus, the site does not appear to be eligible for listing in the National Register of Historic Places. A historic context statement will need to be fully developed before eligibility can be determined.

Historic Landscape

The historic vernacular landscape of candidate reservoir Bloomfield appears to have significance due to its ability to reflect the historical transitions of agriculture in the area and may be eligible for listing on the National Register of Historic Places under Criterion A.

Refer to section 3.6.6, West County Historic Landscape, for a discussion of the historic landscape of this candidate reservoir.

Carroll Road North

CR-A-1

This archaeological site has prehistoric and historical components. The prehistoric site consists of obsidian lithic material identified in rodent backdirt within the boundary of the historical site, which consists of 19th-century domestic debris (glass bottles and fragments, ceramic fragments, and various metal fragments), structural remains, and a standing agricultural building (a barn or shed).

Significance Discussion

The extent and nature of the prehistoric component are unknown. At a minimum, the obsidian from this deposit can be used to date prehistoric use of the West County area as well as to address questions on exchange and procurement networks in the area. The deposit may also be able to provide information about lithic technology.

The historical component of CR-A-1 could provide information about spatial arrangements of farmsteads, economics, and sociocultural relationships in the West County area.

Integrity

The prehistoric component of CR-A-1 is likely to have a high degree of integrity as it appears to have been preserved beneath sediments. The site is currently being exposed by rodents.

The historical component of CR-A-1 has one standing building and intact foundation remains. The overall design of the site appears to be present in the remains. It is likely that this deposit has sufficient integrity to yield information important to the interpretation of the history of the area.

Preliminary Evaluation

CR-A-1 appears to be eligible for listing in the National Register of Historic Places under Criterion D for its potential to yield information important to the interpretation of the prehistory and history of the area.

CR-B-1: Carroll Ranch

This historical dairy-ranch complex consists of a late-19th-century, vernacular Greek Revival farmhouse, two large dairy barns, other outbuildings and structures, and extensive landscaping. There is also a 1960s six-car garage on this property.

Significance Discussion

This historic dairy-ranch complex is associated with Patrick Carroll, a prominent West County farmer who owned more than 1,000 acres in the Bloomfield area during the late 19th and early 20th centuries. Mr. Carroll engaged in many successful agricultural pursuits, including growing potatoes, apples, pears, plums, and cherries; the harvesting of hay and grains; and the operation of an extensive dairy. The buildings within the complex, however, do not appear to embody distinctive characteristics of a type, period, or method of construction, nor do they represent the work of a master or possess high artistic value.

Integrity

The setting of this historic dairy ranch appears to have been greatly altered since its period of historic significance, with the construction of a pond and paved walkways, introduction of an expansive lawn and other landscaping, and removal of original outbuildings. The house, although in good physical condition, has been clad with modern aluminum siding, its front facade has been altered, and the original exterior porches removed. The outbuildings are in poor to fair condition and, in some instances, remodeling has resulted in a loss of historic integrity.

Because of alterations to this property's main buildings and its setting, it does not immediately convey a sense of its historic period.

Preliminary Evaluation

This historic dairy ranch may not be eligible for listing in the National Register of Historic Places under Criteria A, B, or C. Although the ranch is associated with a locally significant individual, it appears to lack integrity of setting and feeling. The large, two-story dairy barn located within this complex may be eligible for individual listing in the National Register under Criterion D. By studying the way in which this building was constructed and noting the adaptations that have occurred over time, important information may be obtained regarding local building techniques of the mid-19th century.

CR-B-2: "Cabin"

This historic architectural site consists of a small isolated, mid-to-late-20th-century, wood-frame "cabin."

Significance Discussion

This building does not appear to embody any distinctive characteristics of a type, period, or method of construction or represent the work of master or possess high artistic values. It is unlikely that this building could yield information important in the interpretation of the history of the area. The exact age of the building is unknown. It is possible that this building is less than 45 years old, in which case it would not be eligible for listing in the National Register of Historic Places.

Integrity

Although this building is in good physical condition, it appears to lack sufficient antiquity. The building does not appear to be associated with any of the ranching complexes in the nearby vicinity and may have been moved to its present location. Consequently this building does not convey any sense of a particular time period, nor do the materials or design provide any indication of its original use.

Preliminary Evaluation

This building appears to lack architectural and historical significance and may be ineligible for listing in the National Register of Historic Places. A historic context statement will need to be fully developed before eligibility can be determined.

Historic Landscape

The historic vernacular landscape of candidate reservoir Carroll Road North appears to have significance due to its ability to reflect the historical transitions of agriculture in the area and may be eligible for listing on the National Register of Historic Places under Criterion A.

Refer to section 3.6.6, West County Historic Landscape, for a discussion of the historic landscape of this candidate reservoir.

Isolates

During geotechnical exploration of the Project area at Carroll Road North, a cultural resources monitor noted that a concentration of charcoal and a single obsidian flake were present at a depth of approximately 7 feet (more than 2 meters). These materials represent, in all likelihood, a subsurface archaeological deposit. There is currently not enough information to record this location as a site.

Valley Ford East

The Valley Ford candidate reservoir is in a north-south trending valley and the southern end is located about half-way between the towns of Bloomfield and Valley Ford on the Valley Ford Road. The valley has been used historically as a dairy ranch--a function that continues into the present day. The valley's cultural landscape includes a ranch complex, introduced annual grasses, and eucalyptus trees. Native riparian species are along a southerly-flowing intermittent creek.

VF-B-1: A.P. Gaver Ranch

This historic complex, located within a modern dairy-ranching operation, consists of a late-19th-century converted farmhouse; a bunkhouse; a small cottage; and various outbuildings.

Significance Discussion

This historic complex may be associated with the period of dairy expansion in West County in the late 19th and early 20th centuries, an important trend in Sonoma County history. In addition, it appears to be associated with a locally significant individual, A.P. Gaver. Gaver was a prominent businessman and rancher with two dairies. He also owned the Valley Ford flour mills, served as trustee to the American Valley School District for many years, and was a founder of the Dairyman's Bank of Valley Ford, which was established in 1893. The buildings within the complex embody distinctive characteristics of the vernacular building process, which is particularly demonstrated in the converted farmhouse.

Integrity

Although the historic complex appears to be in its original location, the physical condition of the buildings is only fair, and the overall setting of the complex has been disrupted by the construction of several post-1950s buildings nearby. Consequently the complex does not convey a sense of its period of historic significance.

Preliminary Evaluation

Although this complex appears to have historic significance because of its association with an important historic process, and prominent businessman A.P. Gaver, it appears to lack integrity of setting and feeling and may be ineligible for listing in the National Register of Historic Places. A historic context statement will need to be fully developed in order to determine eligibility.

Historic Landscape

The historic vernacular landscape of candidate reservoir Valley Ford East appears to have significance due to its ability to reflect the historical transitions of agriculture in the area and may be eligible for listing on the National Register of Historic Places under Criterion A.

Refer to section 3.6.6, West County Historic Landscape, for a discussion of the historic landscape of this candidate reservoir.

Huntley

H-A-1 (Archaeological / Architectural Site)

Archaeological Component

This historic archaeological site consists of a shell scatter and domestic refuse, and may date to at least 1877. These remains may be associated with the Zanolini Ranch house and outbuildings discussed below.

Significance Discussion

H-A-1 may provide information regarding the settlement of the area, environmental adaptation, sociocultural relationships, economics, and ethnicity.

Integrity

Portions of the archaeological site have been redeposited on a modern building pad. Artifacts in the creek appear to have been placed there for the purposes of erosion control. There is, however, a report of an old house and backfilled wells at this location. There is a report of encountering a grave marker while preparing a gravel parking lot of the ranch complex. This indicates the possibility of human remains associated with the complex. Thus H-A-1 may have sufficient intact deposits to answer research questions.

Preliminary Evaluation

H-A-1 appears to be eligible for listing in the National Register of Historic Places under Criterion D for its potential to yield information important to the interpretation of the history of the area.

Architectural Component: Zanolini Ranch

The historic architectural component consists of a historic complex with a substantially modified farmhouse. The historic core dates back to the 1850s, and includes animal pens, spring boxes, and landscape features.

Significance Discussion

Preliminary research indicates that this complex does not appear to be associated with any significant historic event or individual, nor does it appear to embody any distinctive characteristics of a type, period, or method of construction or represent the work of a master or possess high artistic values. If the exterior modifications to the house were removed, the historic core of the building could yield information about building techniques of the mid-19th century.

Integrity

The buildings within this complex are in good physical condition, but the farmhouse has been moved, original outbuildings have been removed, and new buildings have been constructed. Consequently the complex does not convey a sense of a particular time period, nor do the materials or design clearly indicate original use.

Preliminary Evaluation

This complex appears to lack architectural integrity as a result of substantial modifications to the main house and removal of original outbuildings. The complex also appears to lack association with an important event or individual. The buildings may therefore be ineligible for listing in the National Register of Historic Places. A historic context statement will need to be fully developed in order to determine eligibility.

H-A-2 (Archaeological / Architectural Site)

Archaeological Component

This historic archaeological site consists of three loci containing the standing remains of a milk house, foundation remains representing outbuildings and a residence, and various landscape features. It is adjacent to the currently occupied 1870s residence discussed below.

Significance Discussion

There are sufficient landscape features and foundation remains to reconstruct the layout of the various residential and agricultural activity areas of this 19th-century complex. H-A-2 has the potential to provide information about the historical development of the Bloomfield area, spatial arrangements of farmsteads, sociocultural relationships, and economics.

Integrity

Although the standing built environment has been significantly altered, the associated archaeological deposits appear to be intact and likely have the potential to yield information important to the interpretation of the history of the area.

Preliminary Evaluation

H-A-2 appears to be eligible for listing in the National Register of Historic Places under Criterion D for its potential to yield information important to the interpretation of the history of the area. It may also represent an archaeological district as there are numerous features directly related with each other that may represent the evolution of agriculture in the area.

Architectural Component: Stone / Huntley Ranch

This historical building complex consists of a currently occupied ca. 1870s residence, which has been substantially remodeled. Also present is a recently constructed barn, a garage, and the standing remains of a milk house.

Significance Discussion

The house does not appear to be associated with any significant historic event or individual, nor does it embody any distinctive characteristics of a type, period, or method of construction. Neither does it appear to represent the work of a master or possess high artistic values. It is unlikely that this building could yield information important to history.

Integrity

The house has been significantly altered to modernize it, while the complex of which the milk house was a part no longer exists. These buildings do not appear to possess the integrity to convey historical significance.

Preliminary Evaluation

Due to an apparent lack of integrity, these buildings appear to be ineligible for listing in the National Register of Historic Places. A historic context statement will need to be fully developed before eligibility can be determined.

Historic Landscape

The historic vernacular landscape of candidate reservoir Huntley appears to have significance due to its ability to reflect the historical transitions of agriculture in the area and may be eligible for listing on the National Register of Historic Places under Criterion A.

Refer to section 3.6.6, West County Historic Landscape, for a discussion of the historic landscape of this candidate reservoir.

4. CONCLUSIONS

4.1 ASSESSMENT OF EFFECTS

4.1.1 INTRODUCTION

Assessment of effects requires determining how the undertaking will affect those characteristics of a cultural resource that makes it eligible for listing in the National Register of Historic Places or locally significant. When an action affects a cultural resource, there may be a loss of integrity and, therefore, an adverse effect on that cultural resource. When a cultural resource is eligible as a contributing element to a district, the effects on the resource, as well as the district, must be assessed. The loss of the values of a contributing element may have adverse effects on the district as a whole.

4.1.2 EFFECTS

One of three possible findings of effect can be made: no effect, no adverse effect, or adverse effect. Advisory Council on Historic Preservation regulations define an undertaking such as the Subregional System as having an effect on a cultural resource when the undertaking may alter the characteristics of the property that may qualify the property for inclusion in the National Register of Historic Places, including alteration of the property's location, setting, or use. An undertaking may have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:

(1) Physical destruction, damage, or alteration of all or part of the property;

(2) Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;

(3) Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;

(4) Neglect of a property resulting in its deterioration or destruction; and

(5) Transfer, lease, or sale of the property [36 CFR 800.9b].

Effects of an undertaking that would otherwise be found to be adverse may be considered as being not adverse for the purpose of these regulations:

(1) When the historic property is of value only for its potential contribution to archeological, historical, or architectural research, and when such value can be substantially preserved through the conduct of appropriate research, and such research is conducted in accordance with applicable professional standards and guidelines;

(2) When the undertaking is limited to the rehabilitation of buildings and structures and is conducted in a manner that preserves the historical and architectural value of affected historic property through conformance with the Secretary of the Interior's *Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*; or

(3) When the undertaking is limited to the transfer, lease, or sale of a historic property, and adequate restrictions or conditions are included to ensure preservation of the property's significant historic features [36 CFR 800.9a, b, and c].

4.1.3 PROJECT EFFECTS

The Santa Rosa Subregional Long-Term Wastewater Project can affect prehistoric and historic archaeological sites, historical/architectural sites, and historic landscapes. There is also a possibility of an effect on traditional cultural properties. Activities during construction and subsequent operation of the Subregional System can alter the existing condition of cultural resources by direct damage or destruction or by altering a cultural resource's setting.

Construction of the Subregional System

The proposed Project would result in the construction of one or more of the following: dams; reservoirs; access roads; agricultural irrigation systems; transmission pipelines; pump stations; Russian River discharge facilities; and The Geysers recharge facilities. During the construction of these elements, depending on the facility, there would be construction zones, borrow pits, construction access roads, soil-deposition areas, and storage and staging areas. The development of these elements can result in impacts to cultural resources.

Effects to Cultural Resources

Impacts can result from the physical disturbance of cultural resources during construction or construction-related activities, including, but not limited to, damaging or destroying archaeological sites as a result of ground disturbance; increased access to cultural resources by personnel who may collect artifacts; and the demolition, removal, or alteration of historically or architecturally significant buildings and structures. Reservoir site preparation, use of staging areas, borrow pits, access-road construction, pipeline installation, and other activities involved in the development of facilities have the potential to impact cultural resources.

Cultural resources inundated by reservoirs can be damaged by physical and chemical alterations. Prehistoric sites, for example, can be physically damaged by wave action, particularly during filling or drawdown of reservoirs. Also, the physical or chemical nature of faunal, botanical, and lithic remains at prehistoric sites can be altered. Faunal and botanical remains at historical sites can also be affected.

Preparation of land for new crop types, or installation of irrigation pipelines, can result in the damage or destruction of cultural resources. Cycles of wetting and drying by irrigation may cause physical or chemical alteration of elements of archaeological or historical sites.

Historic landscapes can be adversely affected by the removal of such character-defining features as windbreaks, fencelines, and other small-scale ranch-related elements. The introduction of irrigation into an area can result in new crops that differ from historic-era crops (e.g., row crops replacing an orchard), thus affecting the historic landscape.

Effects to the Setting of Cultural Resources

Implementation of the Subregional System can introduce visual, audible, or atmospheric elements that alter the setting, integrity of location, or feeling associated with cultural resources.

The introduction of such features as dams and reservoirs can affect the integrity of architectural sites by altering the setting in which such cultural resources are situated, and by altering historic landscapes themselves. For example, large dams and bodies of water that dominate the landscape would be at a scale not in keeping with the elements of the architectural sites or historic landscapes. Pump stations could affect the setting of nearby historical/architectural sites.

Traditional cultural properties can be affected by the intrusion of elements inappropriate to the function of the property. For example, the use of a traditional cultural property for religious purposes may be significantly disrupted by the intrusion of visual or audible elements.

Operation of the Subregional System

Operation, general maintenance, repair, and updating of the Subregional System can all affect cultural resources. Such activities as ground disturbance, access to cultural resources by personnel, heavy-equipment activity, filling and drawdown of reservoirs, repairs to pipelines, and installation of new facilities can all result in damage to, or destruction of, cultural resources. Cultural resources can also be damaged as a result of unplanned events (e.g., pipeline ruptures).

Land-management practices may also change, allowing more access to lands by the public. Such lands may currently not be accessible, as they are regularly under the surveillance of the landowners. Change of ownership may increase access, which could result in vandalism of historic buildings or "pothunting" of archaeological sites.

4.1.4 Summary List of Impacts to Cultural Resources

1. All ground disturbance associated with site preparation and construction/installation of the facilities, including, but not limited to, dams, reservoirs, access roads, construction zones, borrow pits, pump stations, detention ponds, diversion ditches, pipelines, tunnels, storage tanks, utility lines, transmission towers, excess soils deposition locations, and staging areas.

2. Movement and storage of heavy equipment.

3. Artifact collecting by personnel.

4. Inundation by reservoirs resulting in physical and chemical alteration of the constituents of cultural resources.

5. Fluctuating water levels in reservoirs resulting in shore erosion and deterioration of cultural resources as a result of a wet/dry cycle.

6. Dams affecting site setting.

7. Dams altering historic landscape.

8. Reservoirs affecting site setting.

9. Reservoirs altering historic landscape.

1. Pump stations affecting site setting.

2. Pump stations altering historic landscape.

3. Irrigation accelerating the deterioration of resources as a result of a wet/dry cycle.

4. Increase or alteration of flow in watercourses resulting in erosion affecting cultural resources.

5. System operations, maintenance, repair, upgrading, and/or unplanned events affecting sites or landscapes.

4.1.5 IMPACTS BY ALTERNATIVE

1. No Project: No impact to cultural resources.

2. South County: Full range of impacts.

3. West County: Full range of impacts.

4. The Geysers Recharge: Limited range--Impacts 1, 2, 3, 10, 11, and 14.

1A. Russian River Discharge A: Limited range--Impacts 1, 2, 3, 10, 11, and 14.

5B. Russian River Discharge B: Limited range--Impacts 1, 2, 3, 10, 11, and 14.

4.2 RECOMMENDATIONS

4.2.1 INTRODUCTION

Upon selection of a preferred alternative, treatment of cultural resources to be affected by the Subregional System will be addressed under Section 106 of the National Historic Preservation Act. The Section 106 review process entails several simultaneous and sequential steps, including identifying and evaluating cultural resources, assessing effects of an undertaking on significant resources, and consultation about ways to avoid, reduce, minimize, or otherwise address any possible adverse effects. Consultation to address potential adverse effects will involve, at a minimum, the City of Santa Rosa and the U.S. Army Corps of Engineers (lead agencies) and the State Historic Preservation Officer (SHPO). A Memorandum of Agreement (MOA) between these parties, and other parties as appropriate, will set out specific steps for avoiding or reducing harm to cultural resources determined eligible to the National Register of Historic Places or considered locally significant.

To address the requirements of this process, which are detailed at 36 CFR 800, the following procedures will be necessary once the Area of Potential Effects (APE) for the preferred alternative has been refined:

- Identification: Conduct research and field studies to identify and record any previously unrecorded prehistoric and historic archaeological sites, historical/architectectural sites, traditional cultural properties, historic landscapes, and possible subsurface archaeological site locations;

- Evaluation: Evaluate the cultural resources for their National Register of Historic Places significance, and their local significance;

- Assessment of Effects: Determine whether construction or operation of the Subregional System could change in any way the characteristics that qualify a cultural resource for inclusion in the National Register or that qualify it as locally significant; and

- Avoidance or Mitigation of Adverse Effects: In accordance with the MOA, establish and implement specific management procedures for the avoidance or mitigation of adverse effects on those cultural resources determined eligible to the National Register or locally significant, and on those potentially eligible cultural resources that may be encountered during construction.

Cultural resources not eligible for listing in the National Register, or not locally significant, require no protection or mitigation measures.

4.2.2 CULTURAL RESOURCES IDENTIFICATION

Much of the Project remains subject to final design. Only those portions of the Subregional System that have been firmly delineated (i.e., candidate reservoirs) have been field-studied.

Upon selection of a preferred alternative and identification of its area of potential effects, it will be necessary to:

1. Conduct studies of any area that has not been field-surveyed for cultural resources in order to identify and record prehistoric and historic archaeological sites, historic architectural sites, traditional cultural properties, and historic landscapes. Such studies should include background research; archival and literature searches; field studies; interviews; and contact with interested or concerned parties.

2. Conduct a geoarchaeological study to evaluate the potential for subsurface archaeological sites. Such a study should include field studies, including exploratory subsurface investigations. Both prehistoric and historical sites should be taken into account in such a study.

4.2.3 EVALUATION OF CULTURAL RESOURCES

Any cultural resource that may be affected (i.e., whose integrity of location, setting, use, design, materials, workmanship, feeling, or association may be altered) shall be evaluated for its significance. Evaluation for National Register eligibility will be based on Criteria A, B, C, and D as contained in *National Register Bulletin 15 (*National Park Service 1991a*)*; evaluation for local significance will use the criteria of local cultural resources legislation and the responses of local residents (see California Office of Historic Preservation 1986:18-19).

Field and archival research will be undertaken to determine the historic context in which each resource is to be evaluated and to identify potentially significant elements or associations of the resource. The evaluation process shall also determine if a cultural resource is a contributing element to a historic district. Whenever possible the boundaries of both sites and districts shall be established, as this aspect of evaluation is fundamental to planning site avoidance and/or assessing the magnitude of effects on a site.

Evaluation procedures appropriate to the various anticipated cultural-resource types are described below.

Evaluate Prehistoric Archaeological Sites

Prehistoric archaeological sites are generally evaluated under National Register Criterion D, the site’s potential to yield important information. The evaluation of a such a site is therefore accomplished by conducting a test excavation in order to assess the extent and nature of the deposit and its informational potential. Such excavations take into account the time period of the site's use, the type of site, applicable research questions, and the ability of the site to address those questions.

Excavation of prehistoric archaeological sites shall be done in coordination with representatives of the local Native American community. A Native American monitor, if the community so desires, shall be retained to be present during excavations.

Evaluate Historic Archaeological Sites

Historic archaeological sites are also usually evaluated under Criterion D. The evaluation of a historical archaeological site is done through a combination of archival research, oral history (if possible), and field study. A thorough recording and surface examination of the site in relationship to archival research is necessary prior to conducting a subsurface examination. Subsurface testing should take into account the time period of the site's use, the type of site, applicable research questions, and the ability of the site to address those questions.

If possible, excavation of historical sites shall be done in coordination with descendants of those who occupied the sites. Such descendants, if they so desire, shall be retained to be present during excavations.

Evaluate Historic Architectural Sites

Evaluation of historic architectural sites, which may be appropriately evaluated under any of the National Register Criteria, is generally done through field inspection and recording, archival research, context research, and interviews with individuals who may have knowledge of the site. It is also necessary to conduct a general field review of the area to assess whether a site is unique or has exceptional integrity. The possibility of archaeological deposits at these sites should be taken into account.

Evaluate Traditional Cultural Properties

Identification and evaluation of traditional cultural properties requires archival and literature research to develop a context for determining the nature and presence of such properties. It is necessary to interview individuals who may be knowledgeable of the existence of traditional cultural properties. Such interviews generally include a visit to the Project area to assist in the identification of traditional cultural properties that may be present; these visits should include a review of the recorded cultural resources. Local Native Americans, descendants of those who used the historic-period properties, and local residents should be contacted. Those with exceptional knowledge and interest should be interviewed.

National Register Criteria A, B, C, and D are applicable in the evaluation of traditional cultural properties. In evaluating it is necessary to use National Register Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties* (National Park Service 1992).

Produce Cultural Landscape Report

Preservation Briefs 36, *Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes,* states*:*

> A Cultural Landscape Report (CLR) is the primary report that documents the history, significance and treatment of a cultural landscape. A CLR evaluates the history and integrity of the landscape including any changes to its geographical context, features, materials, and use. . . . a CLR can be a useful tool to protect the landscape's character-defining features from undue wear, alteration, or loss. A

> CLR can provide managers, curators and others with information needed to make management decisions [Birnbaum 1994:3].

The CLR should also take Heritage Trees into account.

Historic District Assessment

A historic district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development (California Office of Historic Preservation 1995c:3). A cultural resource may possess significance in and of itself, and /or it may possess significance by being a contributing element to a historic district. Preliminary evaluation of recorded cultural resources in the Two Rock, Tolay A and C, and Sears Point candidate reservoirs indicates that these resources may represent historic districts (see sections 3.3.3 and 3.3.4 for discussion of South County and West County archaeological districts). Evaluations of the cultural resources in these candidate reservoirs shall take this possibility into account. Cultural resources in other portions of the Project may also be considered as contributing elements to historic districts.

Local Significance

Depending upon which preferred alternative is chosen, there may be county or city ordinances that provide for an assessment and protection of cultural resources at the local level. Cultural resources should also be evaluated in accordance with any such local ordinances that may be applicable.

4.2.4 Determination of Eligibility and Effect

Under the Section 106 process, the evaluations are submitted to the lead agency in a document that includes a request for determination of eligibility and effect. Using this document, the agency consults with the SHPO and takes into account the views of any interested persons (36 CFR Part 800.5a), in order to identify whether historic properties (i.e., significant cultural resources eligible to the National Register) may be affected by the Project; it is recommended that the agency also assess Project effects on locally significant properties. As noted above, an MOA will be entered into that sets out the specific steps for avoiding or reducing harm to historic properties.

4.2.5 Management Plan

A management plan will be developed in accordance with the MOA, for all historic properties and locally significant cultural resources. Such a plan shall address both the construction of the Subregional System and its subsequent operation. The management plan shall identify procedures for the avoidance of adverse effects or the mitigation of such effects. A specific Historic Property Treatment Plan will be developed for each cultural resource, or groups of cultural resources, determined significant.

Avoidance of Adverse Effects

Whenever feasible, adverse effects on significant cultural resources shall be avoided through Project planning/redesign, protection measures, or data recovery. Implementing these measures would result in no effect or no adverse effect depending upon the nature of the resource in question.

Project Planning / Redesign

To avoid adverse effects on cultural resources, Project planning/redesign shall be done whenever feasible. Various elements of the Project, such as access roads and pipelines, can often be readily designed to avoid effects on cultural resources.

Protection Measures

To assure that significant cultural resources are not inadvertently affected during construction or operation of the Subregional System, such resources shall be placed in exclusion zones for which protection measures shall be implemented.

During construction, cultural resources shall be fenced with a distinctive material, such as orange safety netting, to prevent inadvertent intrusion. Construction personnel shall be instructed to avoid such fenced areas. It may be necessary to develop other protection measures that take into account unique cultural resources or specific construction situations.

During operation of the Subregional System, measures for the protection of cultural resources shall be implemented (e.g., permanently fencing an archaeological site, or capping the site with a light layer of fill that is minimally landscaped). Specific protection measures shall be developed in relation to the cultural resource and the level of protection necessary.

Construction and operations supervisory personnel shall be briefed as to the required protection of cultural resources.

Data Recovery

In those cases where a cultural resource is determined to be eligible to the National Register for its data potential (Criterion D), a data-recovery program can be implemented to recover the values that make the property eligible. Since cultural resources are nonrenewable, data recovery of those values that make the site significant should be undertaken only in those instances where project planning/redesign and protection measures cannot be implemented. Often data recovery will be undertaken only for the directly affected portion of a site, with the remainder of the site protected. For the purposes of Section 106, data recovery will normally result in a determination of no adverse effect. Where human remains are present, however, such a determination will normally not be obtained from the Advisory Council of Historic Preservation.

Excavation of prehistoric archaeological sites shall be coordinated with representatives of the local Native American community, and excavation of historic archaeological sites shall be coordinated with descendants (if present) of those people who occupied the site. In-field monitoring by Native Americans or historical descendants is appropriate.

Mitigation of Adverse Effects

There will be instances where avoidance of adverse effect by Project planning/redesign or protection measures is not a feasible alternative due to requirements of implementing the Subregional System (e.g., an architectural property situated within the area to be inundated by a reservoir). In such cases, effort shall be made to mitigate the effect on those values that make the property eligible for listing on the National Register or locally significant.

Adverse effects on those values that make a cultural resource significant can be mitigated in a variety of ways including, but not limited to, archival and oral research, field studies, public interpretation programs, technical and popular reporting of findings, relocation of the historic property, and/or recording through mapping, photographing, and other documentation. The specific approach to mitigation is dependent upon the nature of the cultural resource and the adverse effect. Mitigation procedures will need to be developed specifically for each cultural resource that is to be adversely affected.

Cultural resources to be treated must be adequately protected until mitigation measures can be carried out.

Human Remains

Locations containing human remains shall be avoided by any impacts whenever feasible; this shall include archaeological soils redeposited from sites known to contain human remains. In those cases where impacts to human remains cannot be avoided, it is appropriate to relocate the remains to a location that will not be disturbed in the future. Any excavation where human remains are likely should be done in coordination with those who are most likely descendants, whether the sites are prehistoric or historical.

A burial agreement, addressing known burial locations and unidentified burials, should be developed prior to any archaeological excavation or ground-disturbing construction. Parties to such an agreement can include the City of Santa Rosa, the Army Corps of Engineers, the County Coroner's Office, the Native American Heritage Commission, and most likely descendants or their representatives.

Late Discoveries

There is the possibility that surface or subsurface cultural resources not identified during this study or subsequent studies will be encountered during construction or operation of the Subregional System, or that unexpected effects on known cultural resources will occur. The management plan will need to address such situations. Treating late discoveries as significant cultural resources will prevent construction and operation delays in evaluating and developing treatment plans for the resource in question. A programmatic approach to the treatment of specific property types should be developed to be used in this eventuality.

A qualified archaeologist for in-field monitoring during construction activities (see below) will greatly facilitate the identification, assessment, and treatment of unexpected discoveries.

Construction personnel should be made aware of indicators of cultural resources and should report any encounters to the in-field monitor.

In the event of late discoveries, work at the location of the late discovery shall cease until the cultural resources monitor has evaluated the situation and provided recommendations for further procedures.

Construction Monitoring

It is recommended that a cultural resources monitor be on site on a regular basis during construction activities. Such in-field monitoring is necessary to assure that adverse effects on significant cultural resources are avoided.

The duties of an in-field cultural resources monitor include the following:

1. Provide assistance for addressing cultural resources when construction plans change;

2. Monitor activities adjacent to cultural resources to assure that such resources, or unidentified portions of such resources, are not affected;

3. Facilitate assessing and implementing the appropriate approach if encroachment on a protected area is required;

4. Assure the proper treatment of any human remains that may be encountered; and

5. Monitor locations that the geoarchaeological study has identified as having the potential to contain subsurface cultural resources.

The in-field monitor shall be empowered to halt work whenever necessary to assess finds and collect information.

While every effort should be made to expedite construction activities, delays for archaeological excavation to recover human remains, important archaeological features, or intact deposits may occur. Contingency plans for proceeding with construction activities at such times should be developed.

Operation of the Subregional System

The management plan should address the procedures for identifying and protecting cultural resources during operation, maintenance, modification, or expansion of the Subregional System.

1. Expansions or modifications of the Subregional System could result in effects on cultural resources. The management plan should address the identification and treatment of cultural resources for any planned expansions or new activities.

2. Cultural resources may also be encountered during the operation or maintenance of existing Subregional System facilities. The management plan should address the identification and treatment of such cultural resources.

3. Unplanned events, such as pipeline ruptures, may occur during operation of the Subregional System. The management plan should establish a process for the identification and treatment of cultural resources affected by such occurrences.

4.2.6 MITIGATION MONITORING

Mitigation monitoring is required by Public Resources Code Section 21081.6 to ensure mitigation compliance (Cervantes and Rivasplata 1989). The mitigation monitor shall periodically review Project activities as necessary to assure that mitigation measures have been implemented.

The mitigation monitor will periodically prepare a report for the agencies responsible for mitigation compliance during construction and subsequent operation of the Subregional System. Prior to Project implementation, a time-and-milestone schedule will be established for conducting reviews of, and reporting on, the implementation of mitigation measures. The report will document Project visits, the mitigation measure to be addressed, the manner in which the mitigation measure was implemented, and the need for follow-up reviews.

The in-field monitor shall prepare mitigation monitoring reports during construction. This person will be most familiar with treatment of cultural resources as the Project progresses. Subsequent mitigation monitoring may be conducted by a qualified cultural resources manager.

4.2.7 PUBLIC INTERPRETATION AND OUTREACH

In accordance with the Secretary of the Interior’s Archeology and Historic Preservation Standards and Guidelines (48 CFR 44734), the results of the cultural resources investigations for the Subregional System shall be made available to the public. As much of the value of a cultural resource is informational in nature, presenting this information to the general public can be educationally beneficial. Publication of a popular pamphlet, available for sale at local and county museums and provided to local and county libraries, is recommended. An interpretative trail or display at one of the Subregional System facilities, or salvaging material for development of a museum display, are other means of implementing an outreach program.

Unless well protected, the specific locations of cultural resources in such outreach programs shall not be divulged.

4.2.8 REPORTING

All findings from identification, evaluation, and treatment of cultural resources shall be documented in formats that are responsive to contemporary professional standards, as stated in *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines* (Advisory Council on Historic Preservation and the GSA Interagency Training Center 1993:III 53-121) and the California Office of Historic Preservation's *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* (California Office of Historic Preservation 1989b).

In order to make such information available to those who have a need to know, such reports shall be put on file with the California Historical Resources Information System, Northwest Information Center, Sonoma State University. To achieve a wider distribution of the technical information, copies shall be placed on file at other information repositories where confidentiality of information would not be an issue (e.g., Archaeological Research Facility at the University of California, Berkeley).

4.2.9 CURATION

All cultural materials resulting from the implementation of evaluation and mitigation programs shall be appropriately curated in accordance with the Secretary of the Interior's Standards and Guidelines (36 CFR Part 79).

4.2.10 SCHEDULE OF MITIGATION

Cultural resources consist of nonrenewable physical remains at specific locations, or of specific locations at which traditional practices occur. As such, all mitigation measures that involve treatment of the physical remains, or the specific location, must be done prior to any effect on them. Other aspects of mitigation, such as museum displays, public interpretation programs, and technical reports, can be completed subsequent to impacts to the resource.

4.2.11 PERSONNEL QUALIFICATIONS

Identification, evaluation, and treatment of cultural resources shall be carried out or directly supervised by appropriately trained personnel who meet the Guidelines for Historic Preservation Projects, Professional Qualification Standards, as stated in *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines* (Advisory Council on Historic Preservation and the GSA Interagency Training Center 1993:III 53-121).

4.2.12 CONFIDENTIALITY OF INFORMATION

Distribution of this report, and subsequent reports that contain confidential cultural resource location information, shall be restricted to those with a need to know. Cultural resources are nonrenewable, and their scientific, cultural and aesthetic values can be significantly impaired by disturbance. To deter vandalism, artifact hunting, and other activities that can damage cultural resources, the locations of cultural resources shall be kept confidential.

The legal authority to restrict cultural resource location information is in the National Historic Preservation Act of 1966, Section 304, and the California Government Code 6254.1.

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6. APPENDICES

APPENDIX A

PROJECT AREA AND FIELD STUDIES MAPS

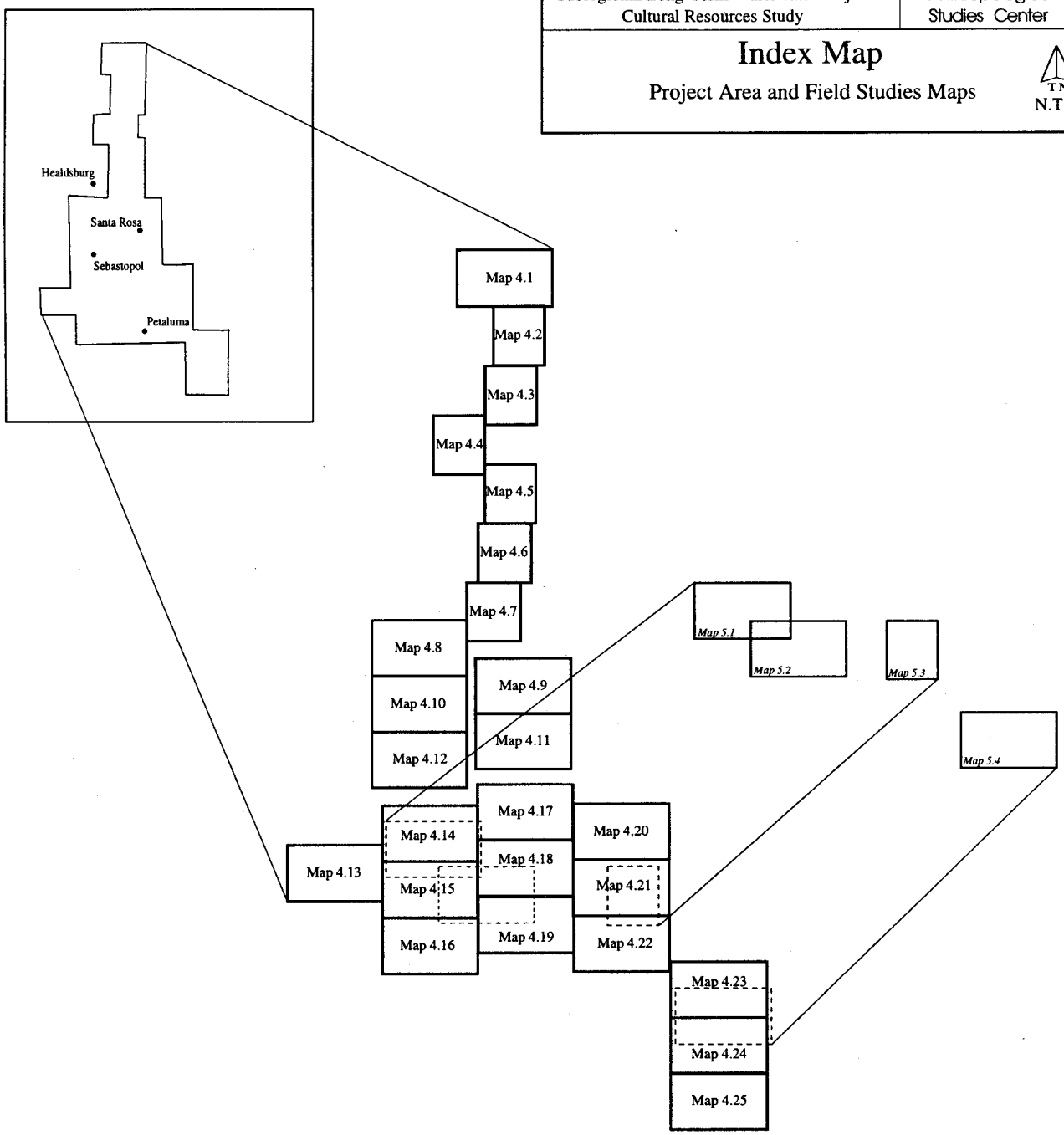
Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study

SSU
Anthropological
Studies Center

Index Map

Project Area and Field Studies Maps

TN
N.T.S.



Legend

4.1-4.25: Project Area Maps

5.1-5.4: Field Studies Maps

Pipeline

Pumpstation

Geologic And Well Monitoring Location

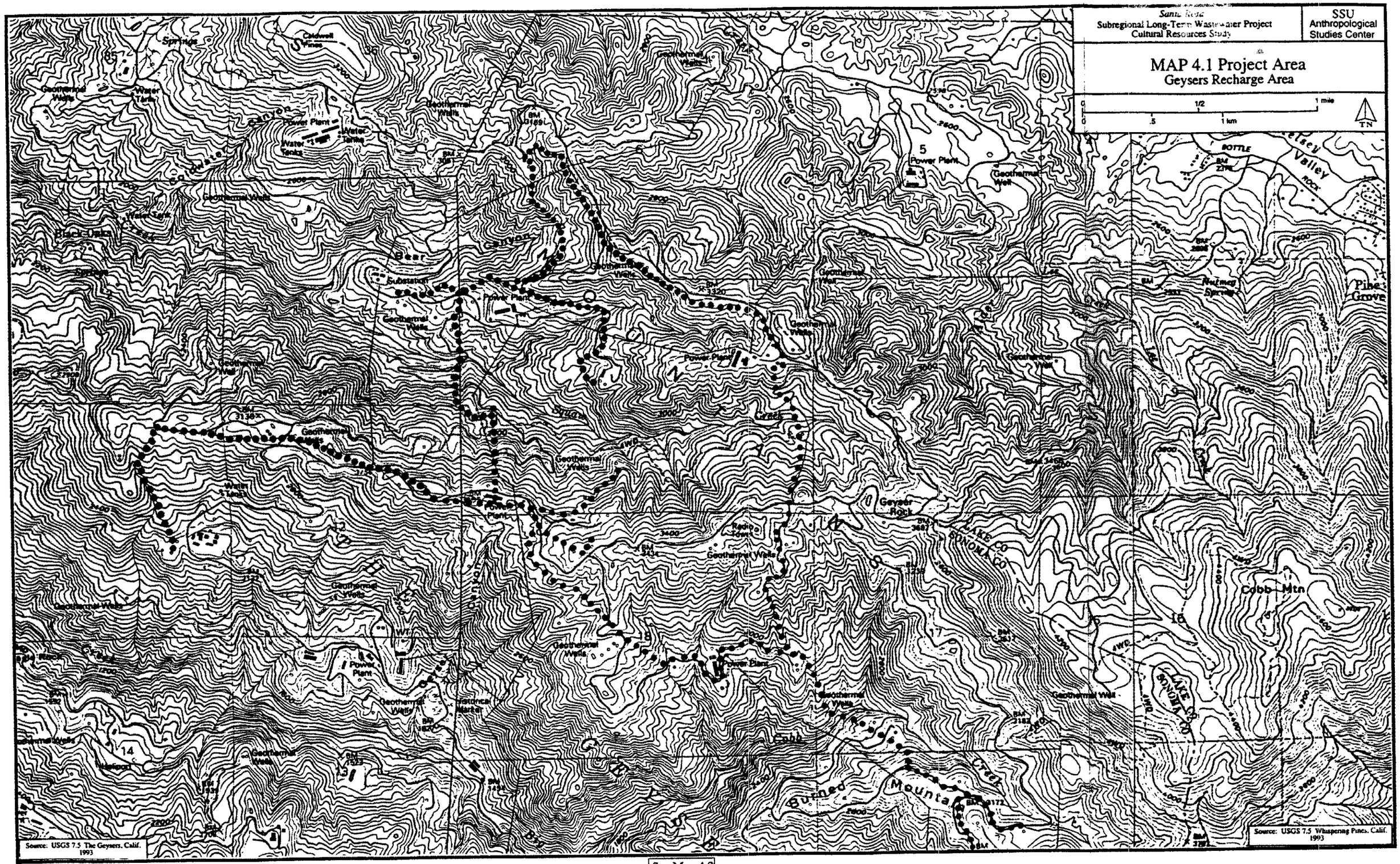
Irrigation Area

Area Surveyed

Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study

SSU
Anthropological
Studies Center

MAP 4.1 Project Area
Geysers Recharge Area

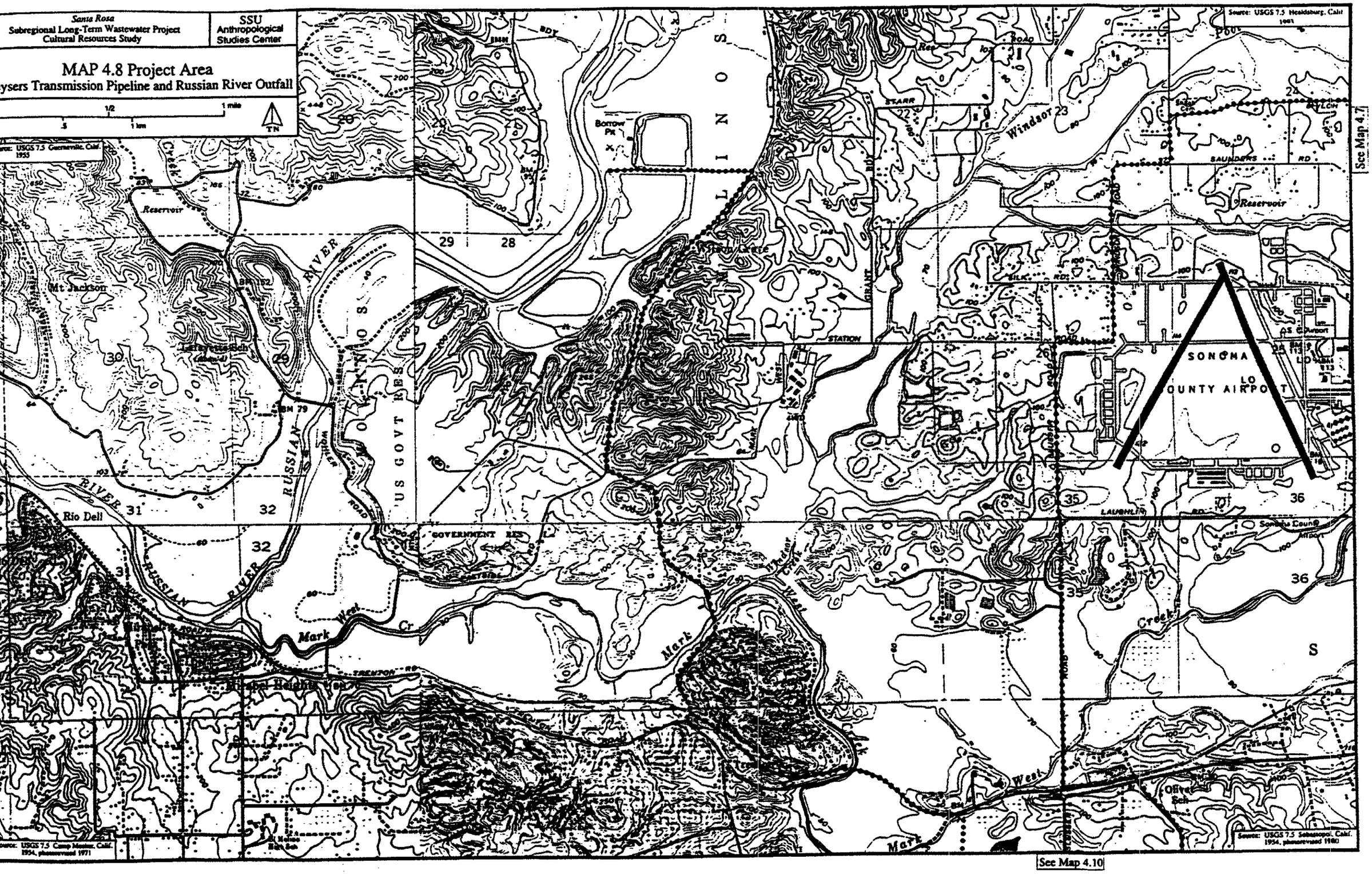


See Map 4.2

Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study

SSU
Anthropological
Studies Center

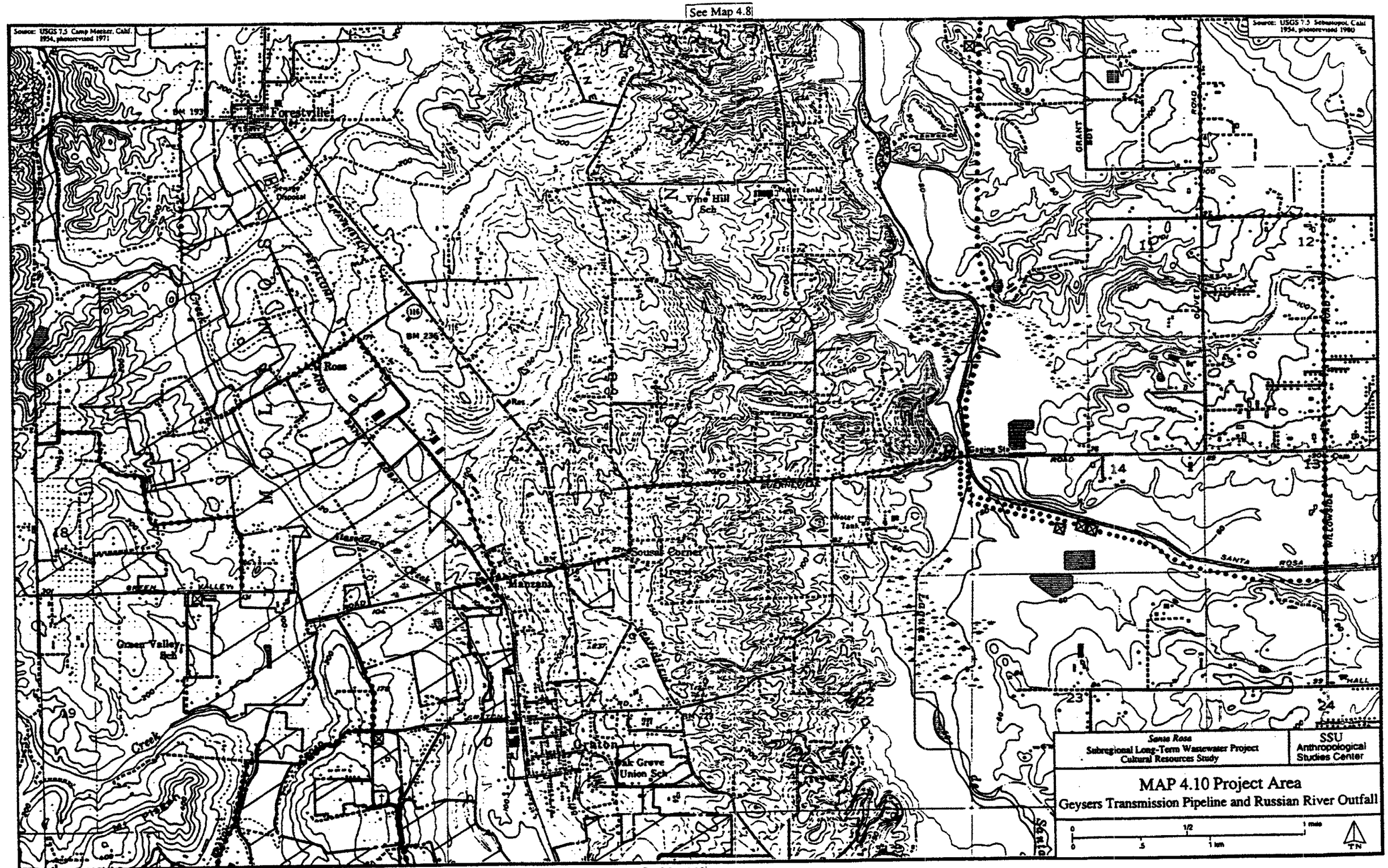
MAP 4.8 Project Area
ysers Transmission Pipeline and Russian River Outfall




Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.9 Project Area
Fountaingrove Urban Irrigation Areas
0
1/2
1 mile
0
.5
1 km
TN
Reservoir
Winery
Rincon
Dutch
Creek
Rincon Valley
Sch
Santa
Rosa
Drive
Lake Ralphine
Hilkner
Detention Home
County
Hospital
Santa Rosa
Memorial
Park
Franklin
Park
Steele Lane
Sch
Jr College
High School
Pacific Avenue
Water Tank
Nat'l
Guard
Armory
Shopping Center
Monroe
Mattie
Wye
(Siding)
St. Eugene
Herbert
SANTA ROSA
MIGUEL
BM 164
BM 136
BM 161
BM 570
Source: USGS 7.5 Sebastopol, Calif.
1954, photorevised 1980
Source: USGS 7.5 Santa Rosa, Calif.
1954, photorevised 1980

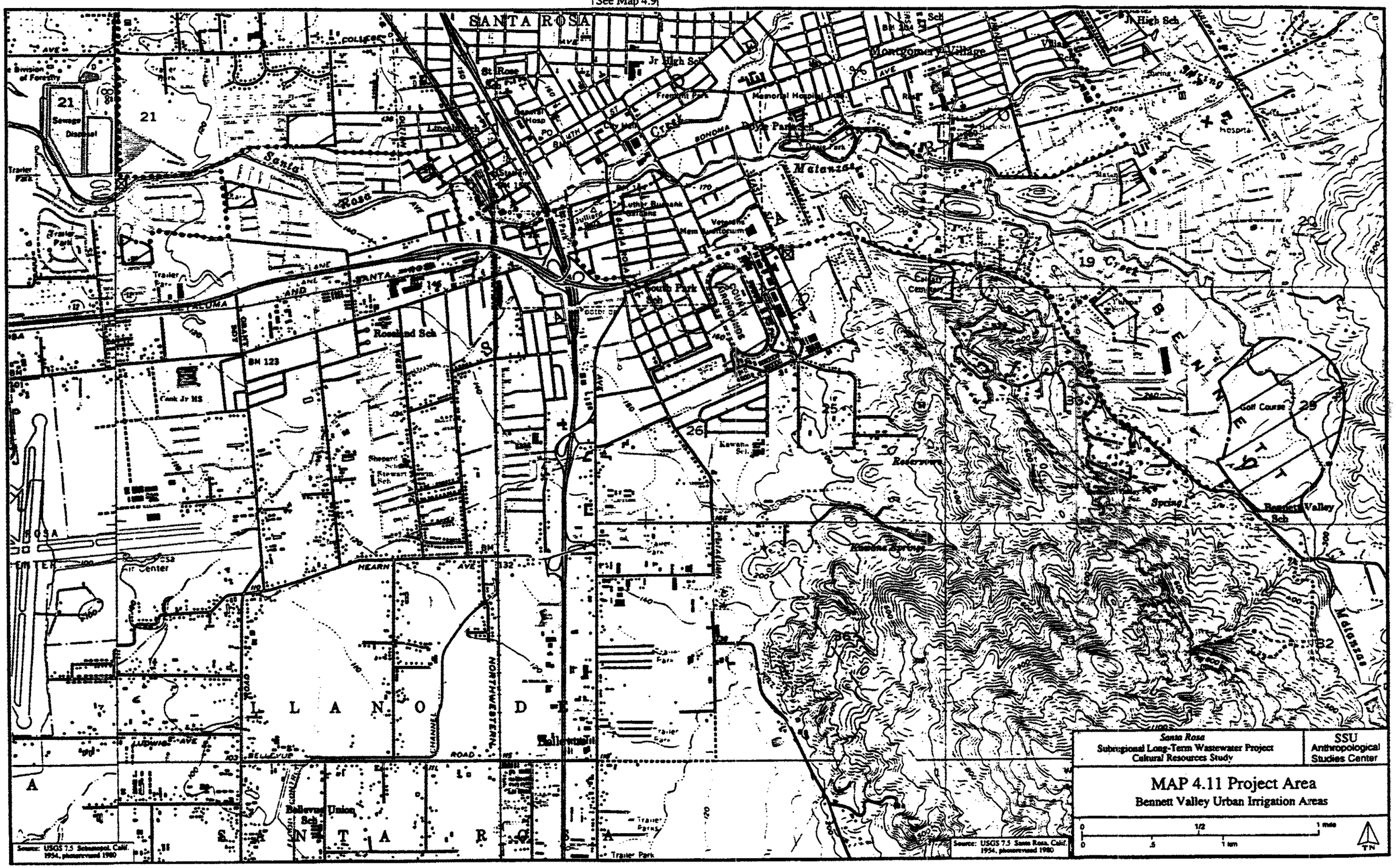
See Map 4.11

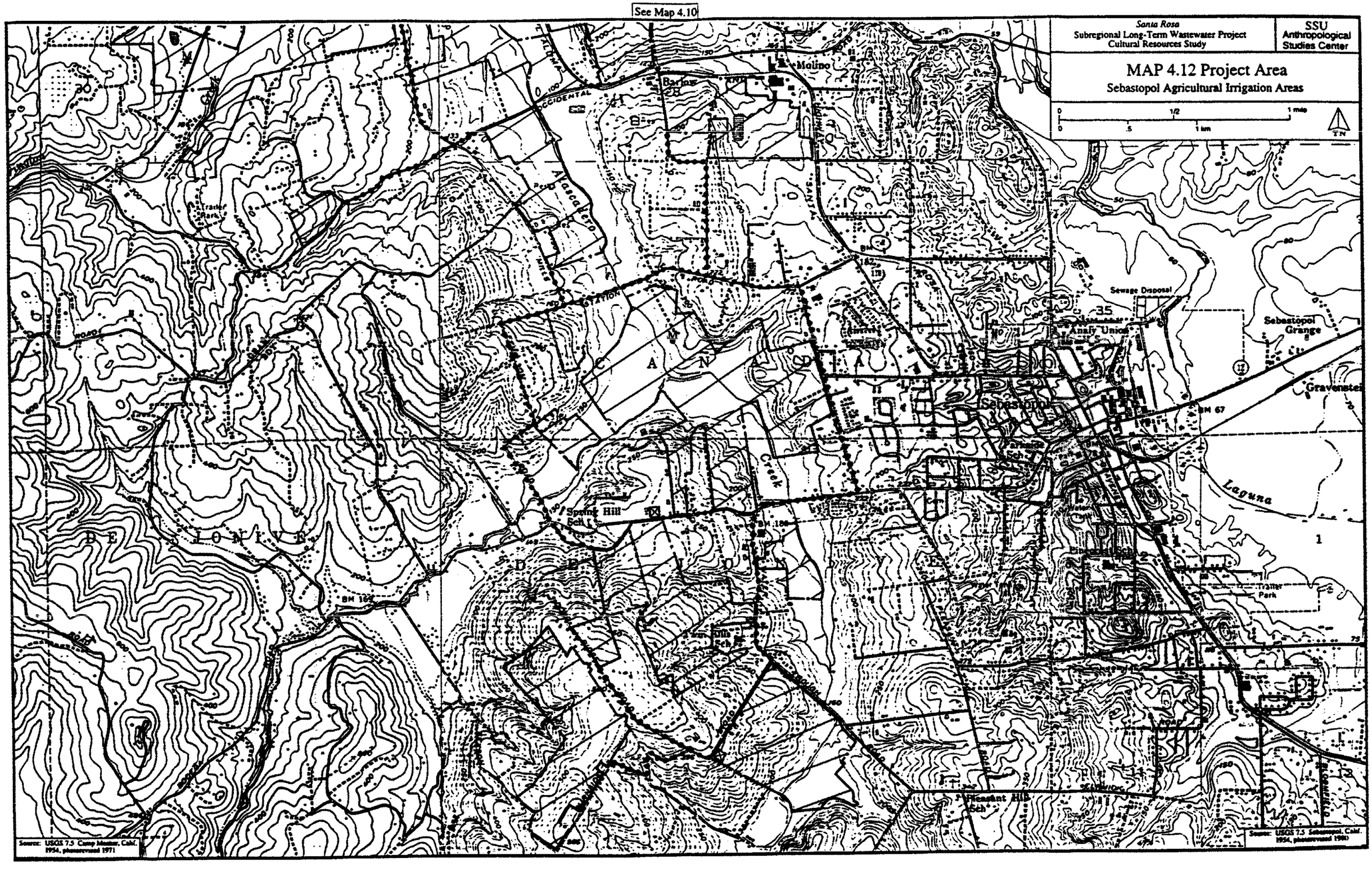
See Map 4.8

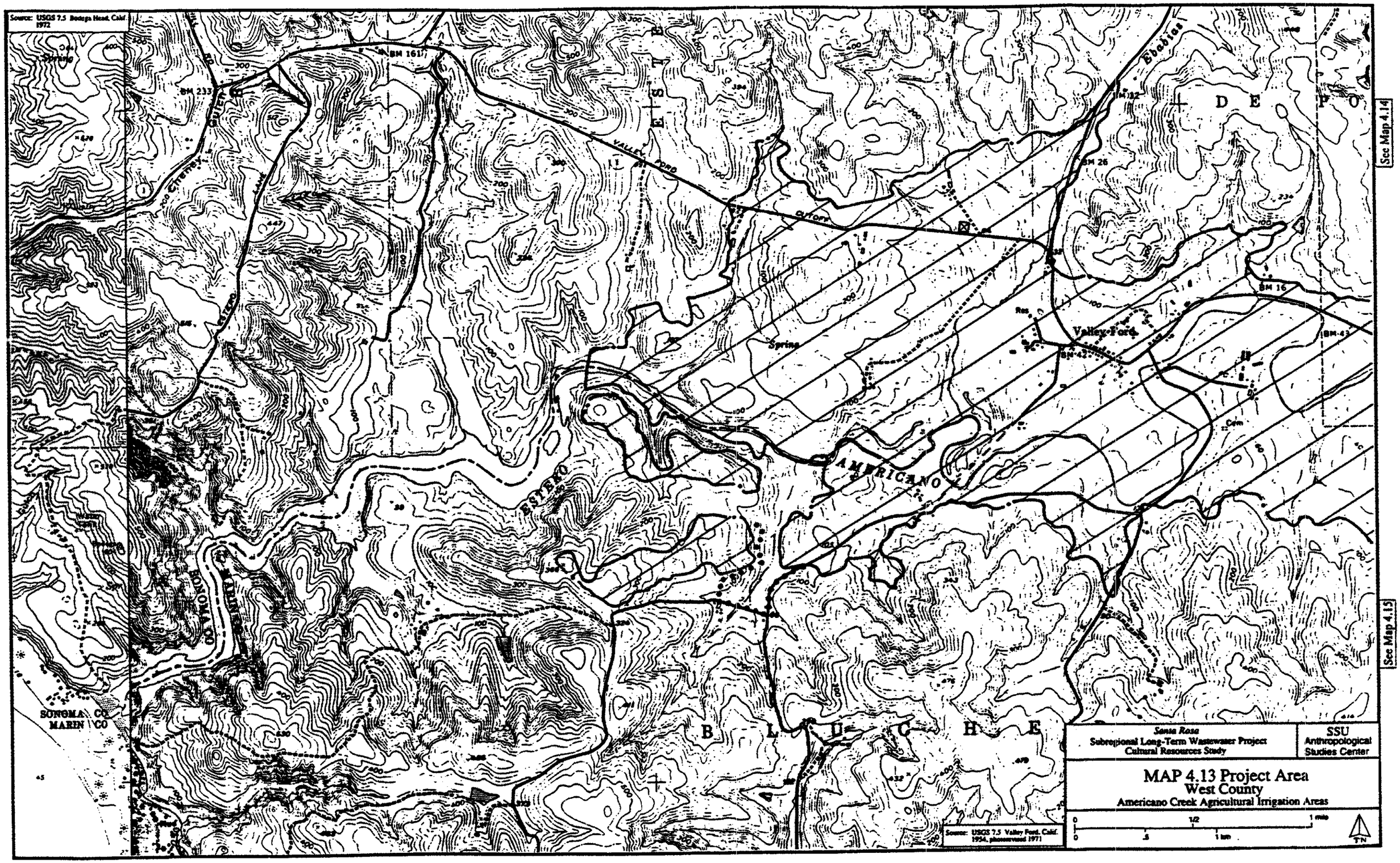


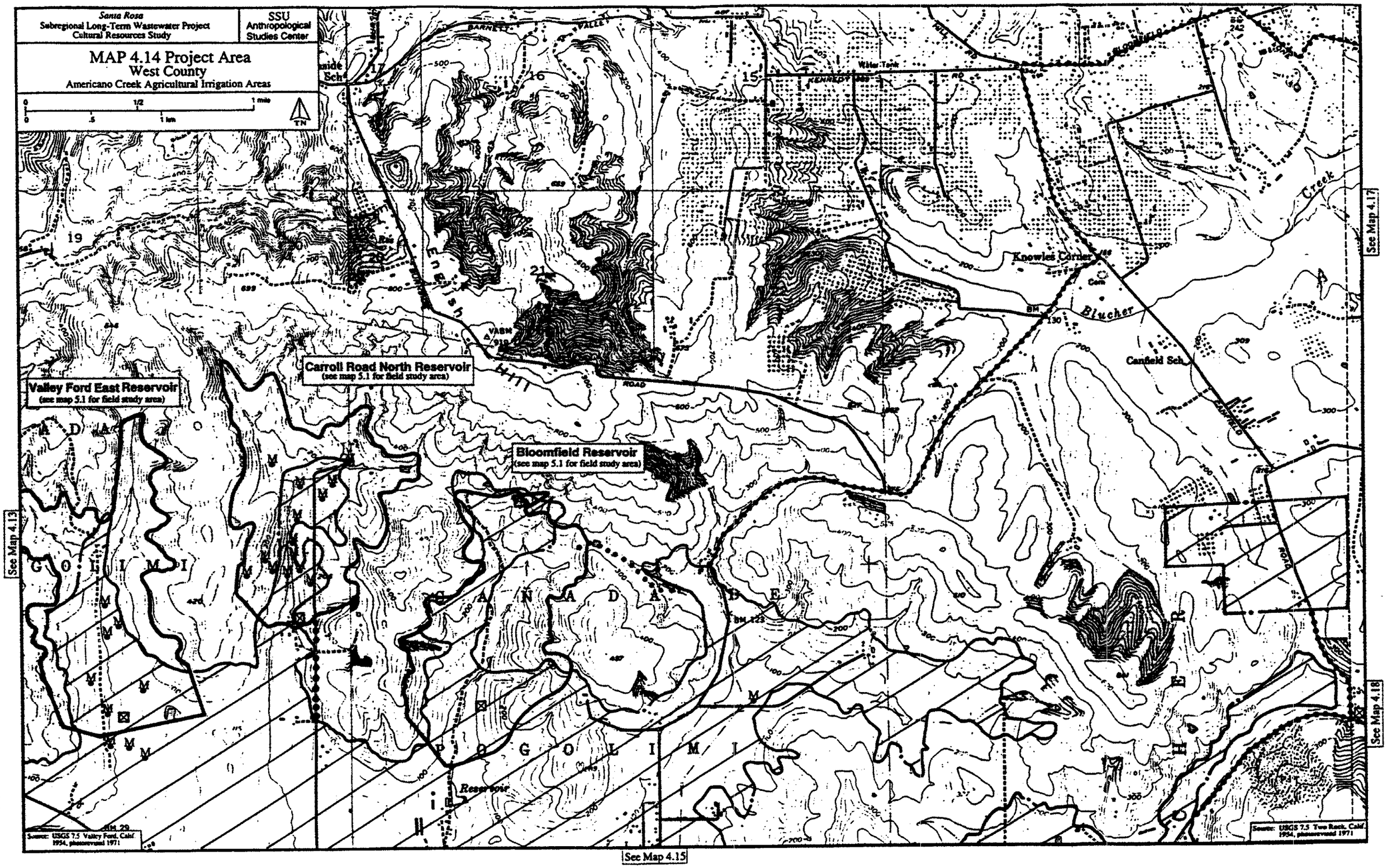
See Map 4.12

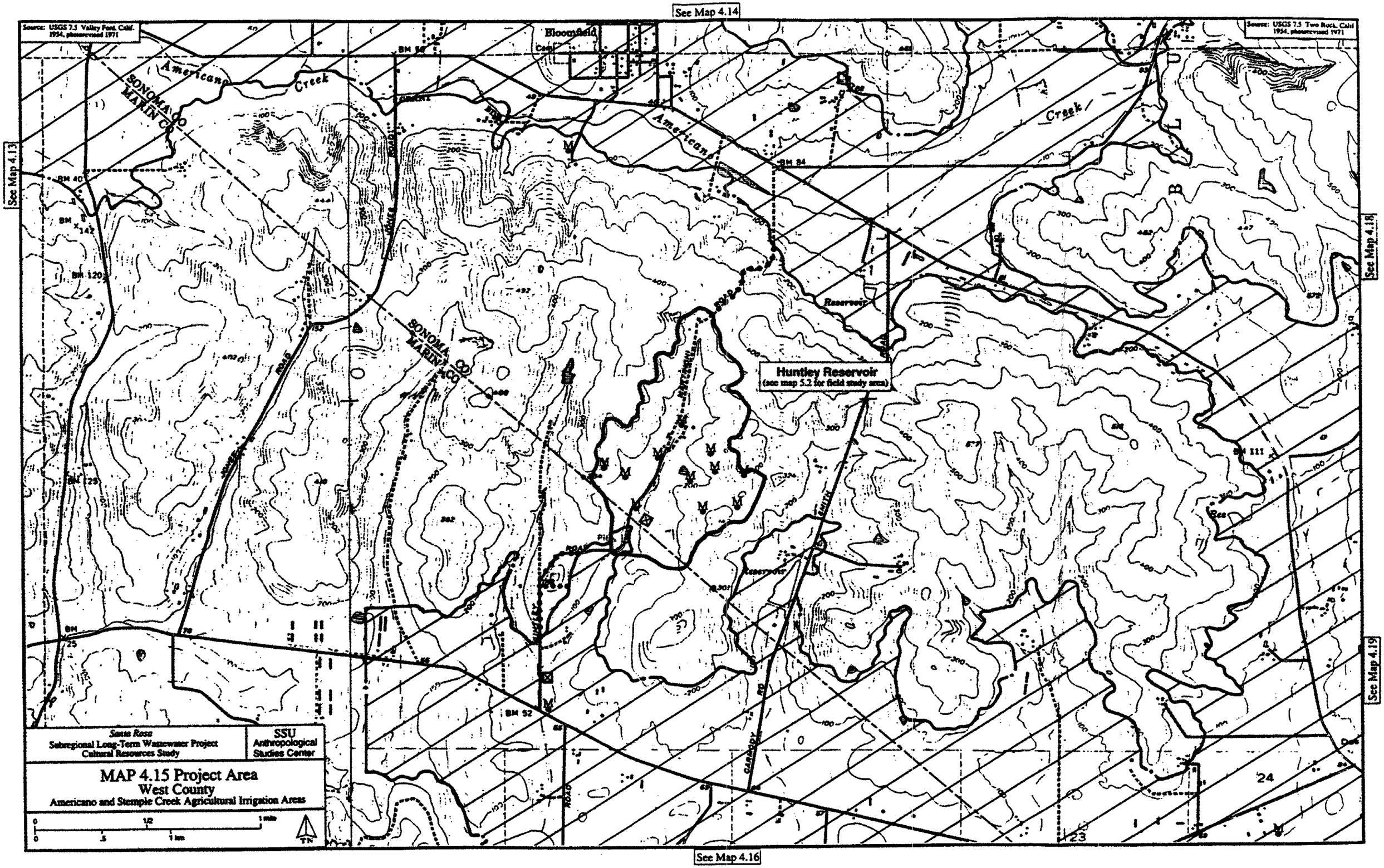
See Map 4.9

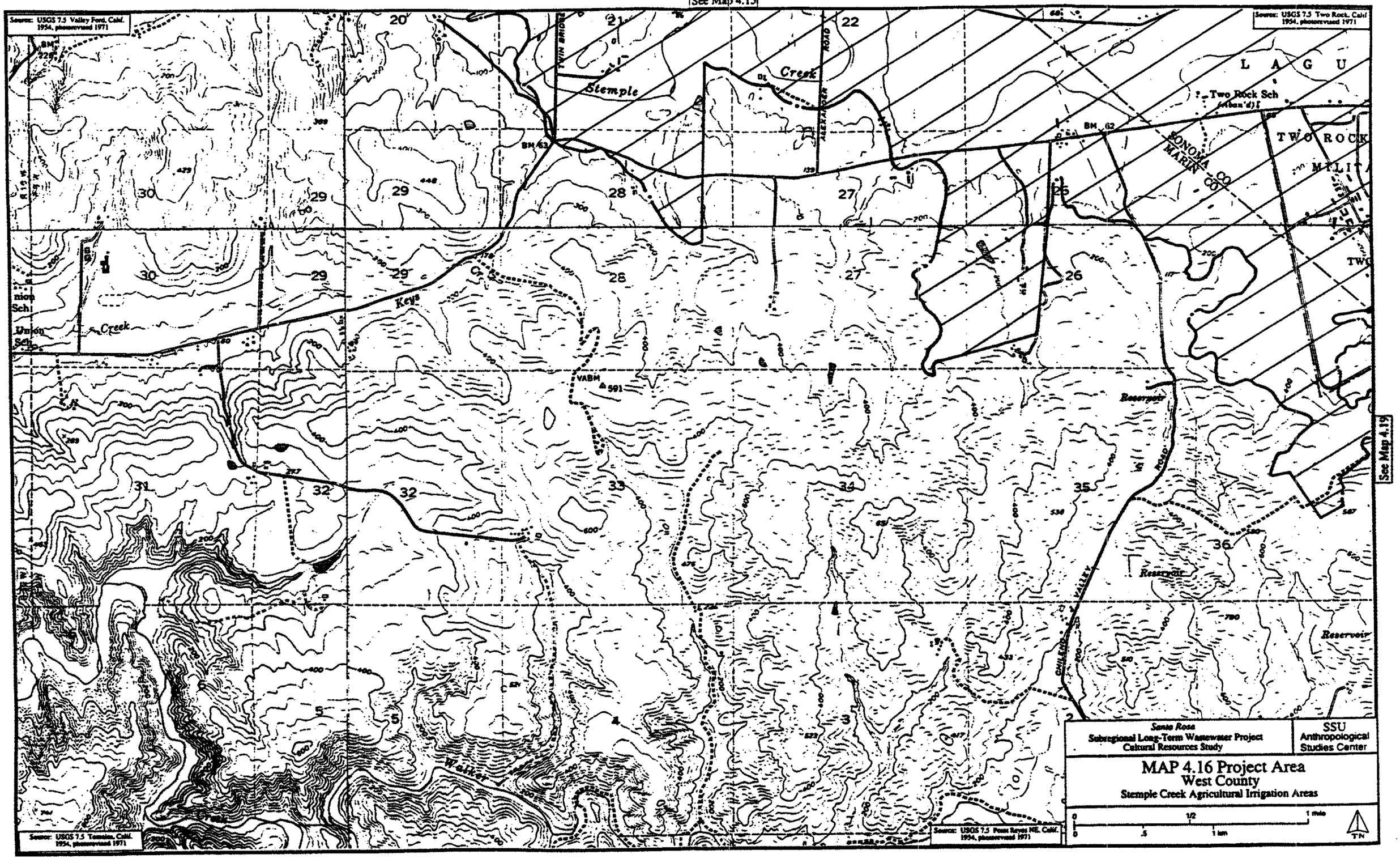

SANTA ROSA
Santa Rosa Creek
Matanzas Creek
Bennett Valley
Rosenblum Spring
Reservoir
Spring
Golf Course
Rosland Sch
Bennett Valley Sch
Bellevue Union Sch
Jr High Sch
Montgomery Village
Memorial Hospital
Fremont Park
Doyle Park
Luther Burbank Gardens
Veterans Mem Auditorium
Pioneer Cemetery
Trailer Park
Sewage Disposal
Fire Center
Sheppard Sch
Stewart Sch
Kawana Sch
Lincoln Sch
St Rose Sch
Hearn Ave
Ludwig Ave
Bellevue Ave
Northwestern Ave
Channel Ave
Fulton Road
Sonoma Ave
Mendocino Ave
Farmer Lane
Santa Rosa Ave
Colgan Ave
Mission Blvd
Petaluma Hill Rd
Bennett Valley Rd
Melanzana
Source: USGS 7.5 Sebastopol, Calif. 1954, photorevised 1980
Source: USGS 7.5 Santa Rosa, Calif. 1954, photorevised 1980
Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.11 Project Area
Bennett Valley Urban Irrigation Areas
0 1/2 1 mile
0 .5 1 km
TN

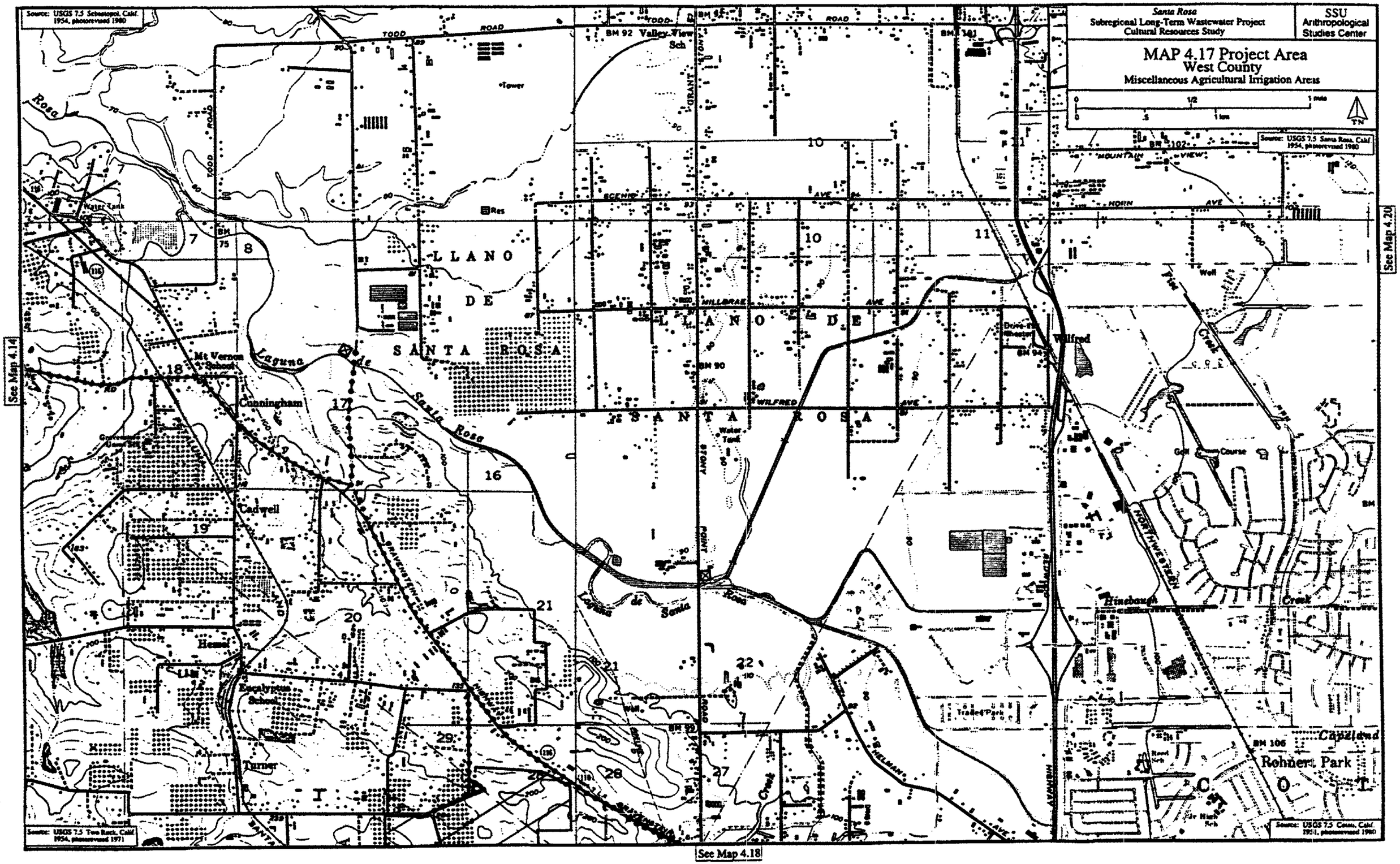

See Map 4.10
Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.12 Project Area
Sebastopol Agricultural Irrigation Areas
0
1/2
1 mile
0
.5
1 km
TN
Molino
Barlow
Alameda
Sewage Disposal
Sebastopol
Grange
Gravenstein
Laguna
Sebastopol
Spring Hill
Sch
Creek
Trailer
Park
Pleasant Hill
Sch
Source: USGS 7.5 Camp Meeter, Calif.
1954, photorevised 1971
Source: USGS 7.5 Sebastopol, Calif.
1954, photorevised 1980

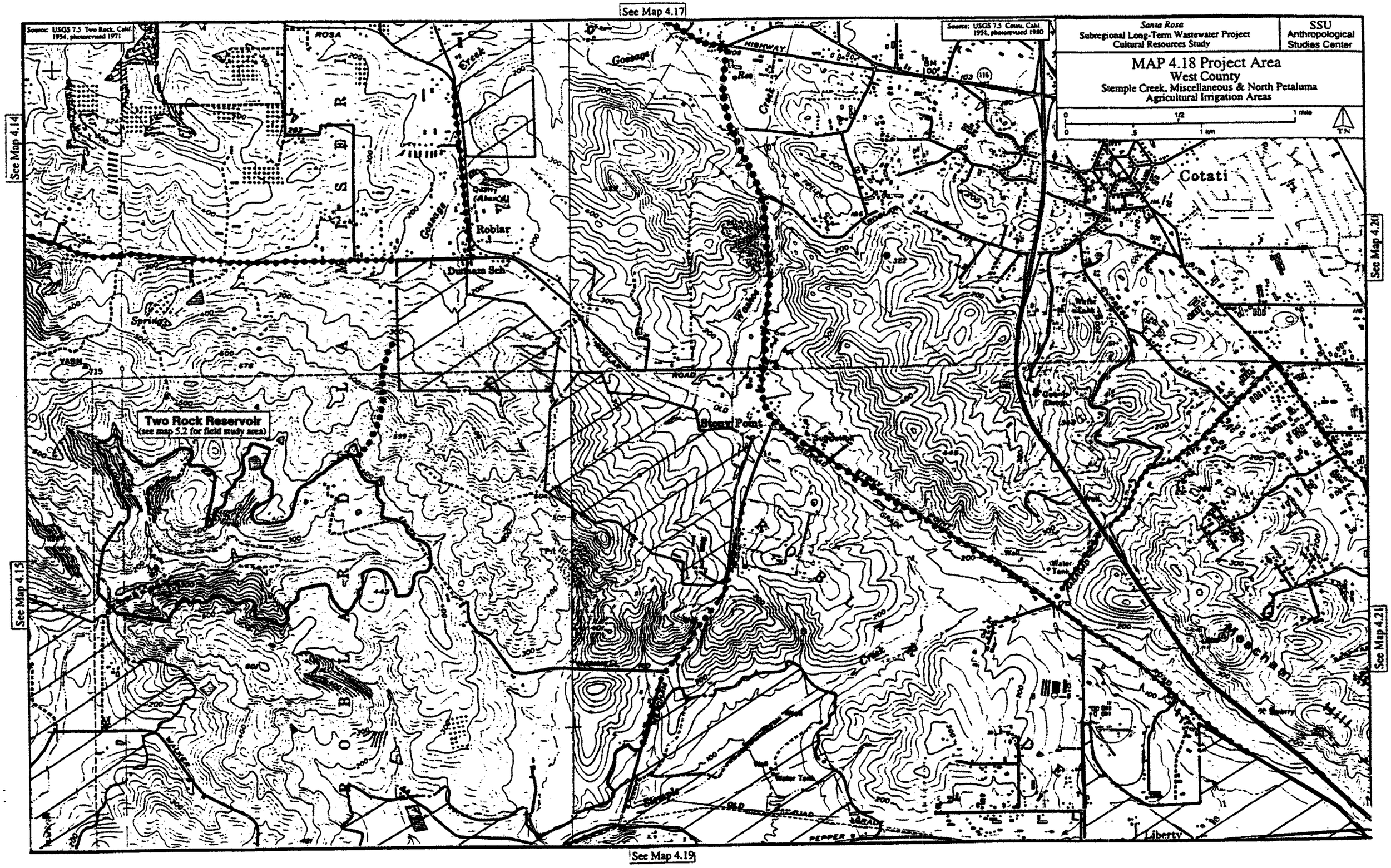

Source: USGS 7.5 Bodega Head, Calif. 1972
Source: USGS 7.5 Valley Ford, Calif. 1954, photorevised 1971
See Map 4.14
See Map 4.15
Valley Ford
Americano
Esteros
Spring
Res.
Cem.
BM 161
BM 233
BM 26
BM 16
BM 42
BM 43
BM 32
Ebabias
Cherry
Lake
Estero
Bodega
Valley Ford
Cotoni
Americano
Estero
Bodega
Sonoma Co
Marin Co
Sonoma Co
Marin Co
Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.13 Project Area
West County
Americano Creek Agricultural Irrigation Areas
0
1/2
1 mile
0
.5
1 km
TN

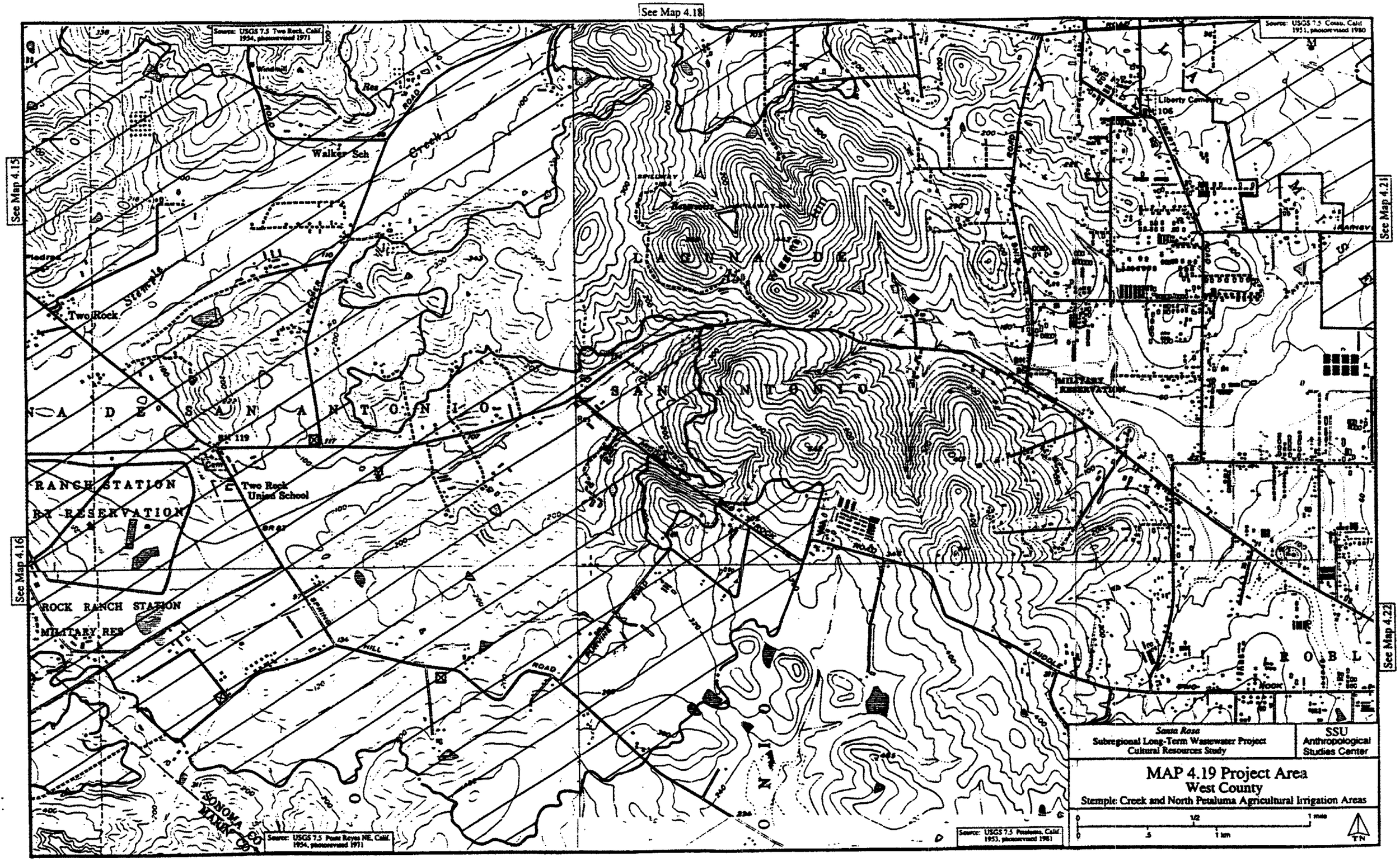

Sonoma
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.14 Project Area
West County
Americano Creek Agricultural Irrigation Areas
0
1/2
1 mile
.5
1 km
TN
Carroll Road North Reservoir
(see map 5.1 for field study area)
Valley Ford East Reservoir
(see map 5.1 for field study area)
Bloomfield Reservoir
(see map 5.1 for field study area)
Knowles Corner
Canfield Sch
Bluchet
Creek
Water Tank
KENNEDY
RD
BARNETT
VALLE
HILL
ROAD
English
Hill
Reservoir
G O L I M I
C A N A D A
P O G O L I M I
See Map 4.13
See Map 4.15
See Map 4.17
See Map 4.18
Source: USGS 7.5 Valley Ford, Calif
1954, photorevised 1971
Source: USGS 7.5 Two Rock, Calif
1954, photorevised 1971

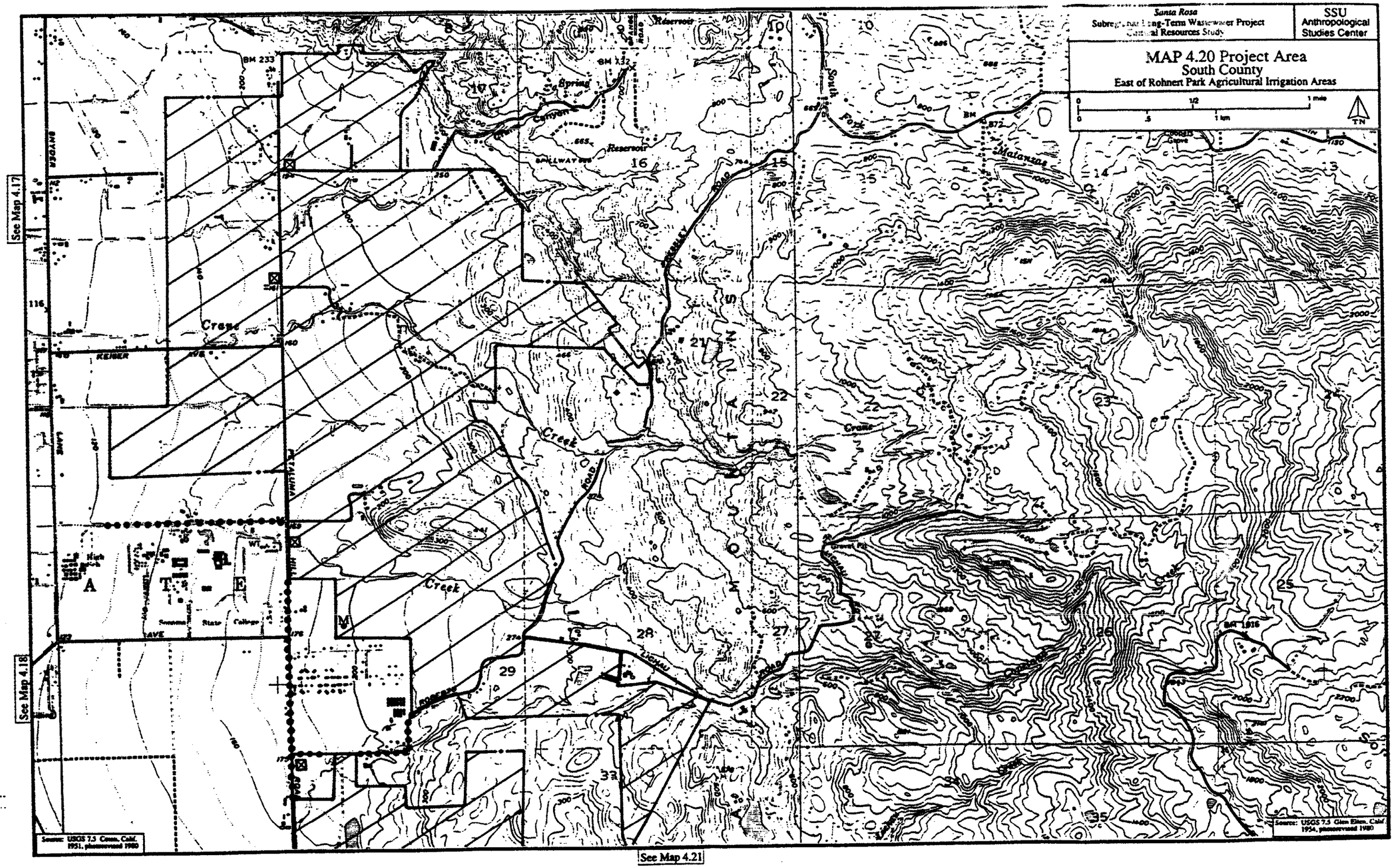

See Map 4.14
See Map 4.13
See Map 4.18
See Map 4.19
See Map 4.16
Source: USGS 7.5 Valley Ford, Calif. 1954, photorevised 1971
Source: USGS 7.5 Two Rock, Calif 1956, photorevised 1971
Bloomfield
Camp
Americano Creek
SONOMA CO
MARIN CO
Huntley Reservoir
(see map 5.2 for field study area)
Reservoir
BM 40
BM 120
BM 125
BM 84
BM 52
BM 111
23
24
Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.15 Project Area
West County
Americano and Stemple Creek Agricultural Irrigation Areas
0
1/2
1 mile
0
.5
1 km
TN

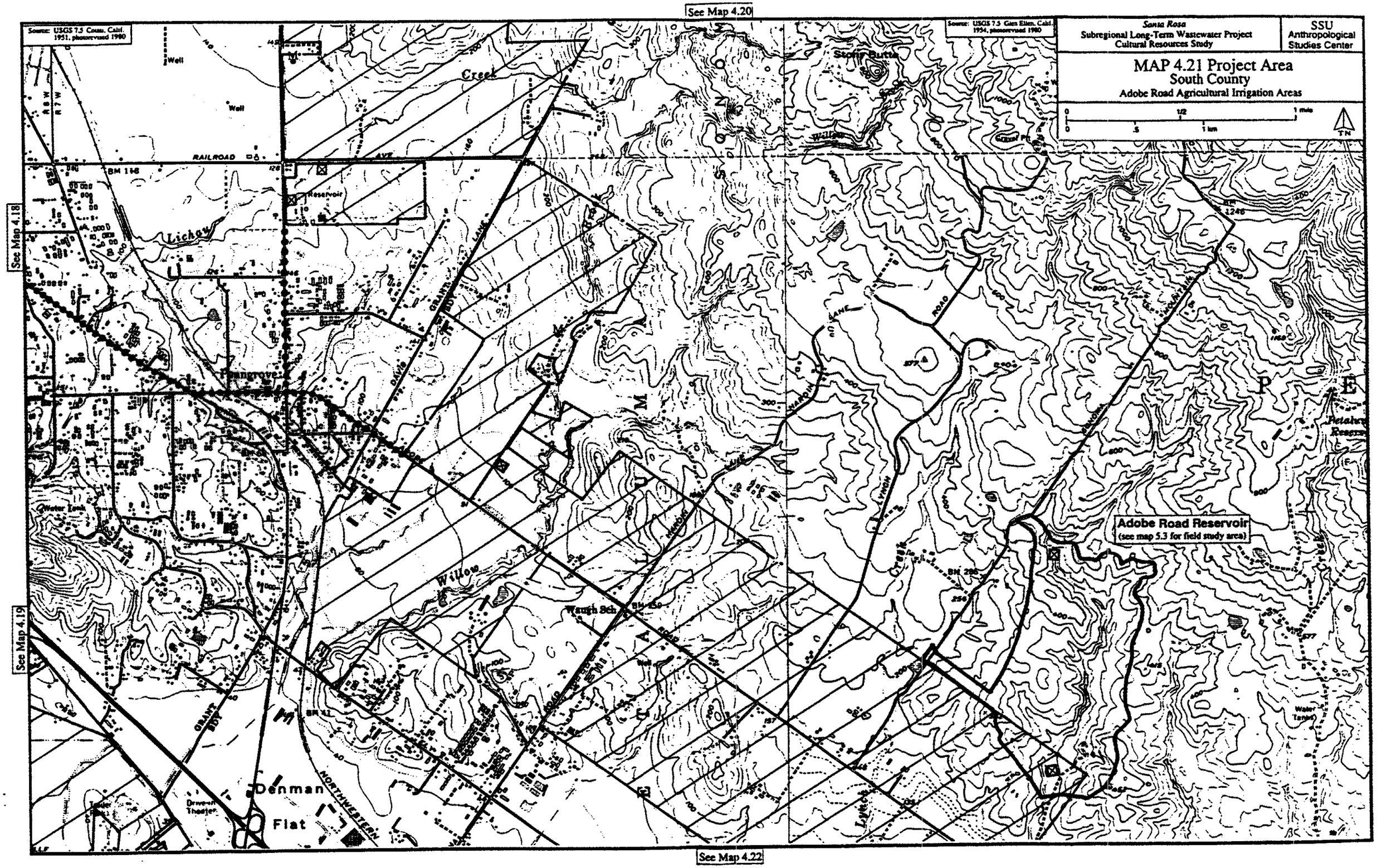

See Map 4.15
See Map 4.19
Source: USGS 7.5 Valley Ford, Calif. 1954, photorevised 1971
Source: USGS 7.5 Two Rock, Calif 1954, photorevised 1971
Source: USGS 7.5 Tomales, Calif. 1954, photorevised 1971
Source: USGS 7.5 Point Reyes NE, Calif. 1954, photorevised 1971
Stemple
Creek
Keys
Creek
Walker
Creek
TWIN BRIDGE ROAD
ALEXANDER ROAD
CHILEAN VALLEY ROAD
Two Rock Sch
(abandoned)
Union Sch
Reservoir
Reservoir
Reservoir
SONOMA CO
MARIN CO
TWO ROCK
MILIT
LAGU
VABM 591
BM 62
BM 229
Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.16 Project Area
West County
Stemple Creek Agricultural Irrigation Areas
0
1/2
1 mile
0
.5
1 km
TN

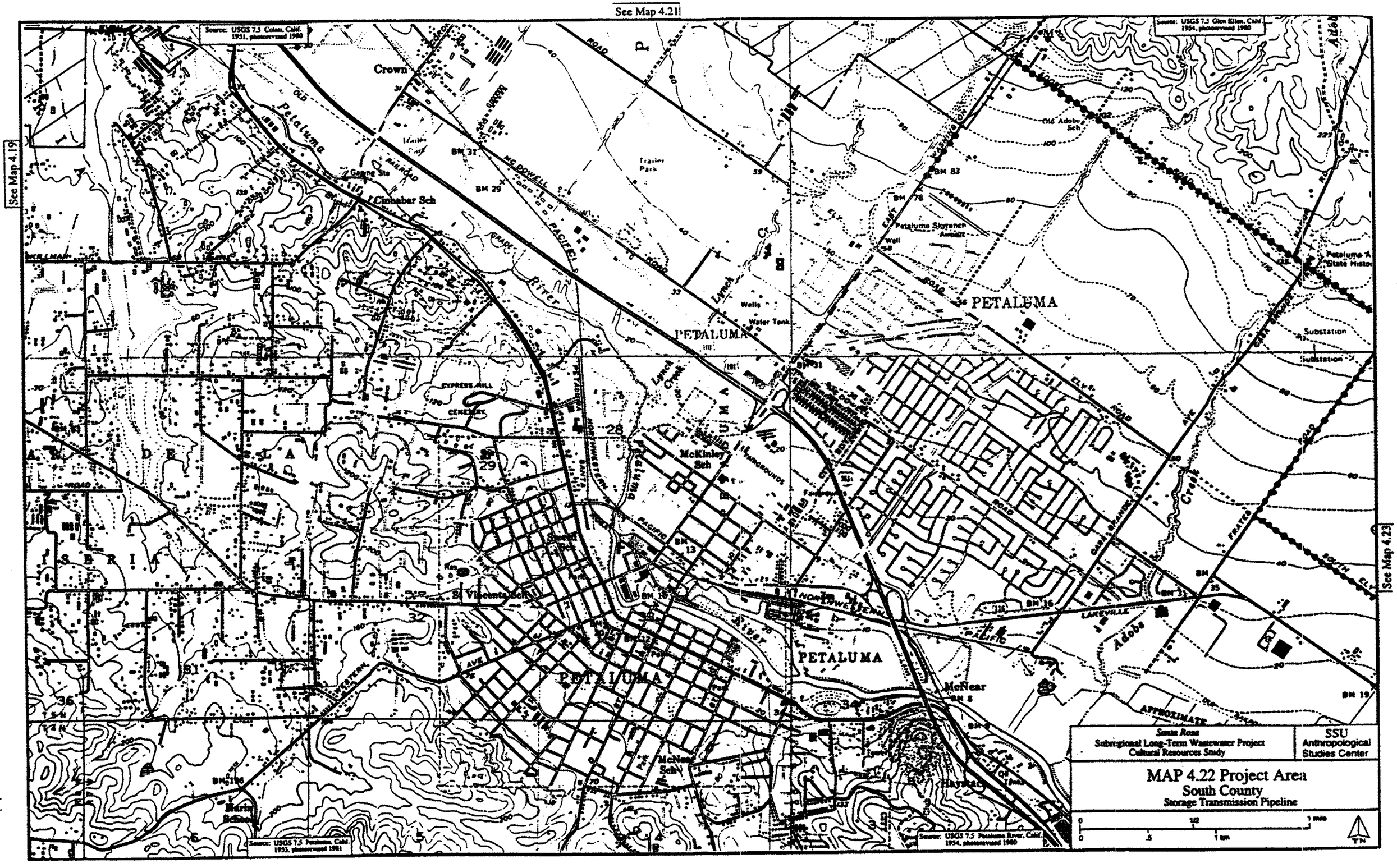

Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.17 Project Area
West County
Miscellaneous Agricultural Irrigation Areas
Source: USGS 7.5 Sebastopol, Calif. 1954, photorevised 1980
Source: USGS 7.5 Santa Rosa, Calif. 1954, photorevised 1980
Source: USGS 7.5 Two Rock, Calif. 1954, photorevised 1971
Source: USGS 7.5 Cotati, Calif. 1951, photorevised 1980
See Map 4.14
See Map 4.20
See Map 4.18
LLANO DE SANTA ROSA
Laguna de Santa Rosa
Mt Vernon School
Cunningham
Cadwell
Hessel
Eucalyptus School
Turner
Valley View Sch
Wilfred
Hinebaugh
Rohnert Park
Cotati
Golf Course
Trailer Park
TODD ROAD
GRANT
SCENIC AVE
MILLBRAE AVE
WILFRED AVE
STONY POINT
LAKEVILLE
MOUNTAIN VIEW
NORTH AVE
NORTHWESTERN
SHELLMAN AVE
AVENUE
Water Tank
Tower
Res
Well
Creek
BM 92
BM 90
BM 94
BM 102
BM 106
BM 75
BM 101
TN


Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.18 Project Area
West County
Stemple Creek, Miscellaneous & North Petaluma
Agricultural Irrigation Areas
Source: USGS 7.5 Two Rock, Calif. 1954, photorevised 1971
Source: USGS 7.5 Cotati, Calif. 1951, photorevised 1980
See Map 4.17
See Map 4.14
See Map 4.20
See Map 4.15
See Map 4.21
See Map 4.19
Two Rock Reservoir
(see map 5.2 for field study area)
Roblar
Dunham Sch
Stony Point
Cotati
Liberty
Springs
Gossage
Creek
HIGHWAY
ROAD
OLD
PEPPER
WALKER


See Map 4.18
See Map 4.15
See Map 4.21
See Map 4.16
See Map 4.22
Source: USGS 7.5 Two Rock, Calif. 1954, photorevised 1971
Source: USGS 7.5 Cotati, Calif. 1951, photorevised 1980
Source: USGS 7.5 Point Reyes NE, Calif. 1954, photorevised 1971
Source: USGS 7.5 Petaluma, Calif. 1953, photorevised 1981
Windmill
Res
ROAD
Walker Sch
Creek
Stemple
Two Rock
Liberty Cemetery
106
LAGUNA DE
SANTA ROSA
MILITARY RESERVATION
RANCH STATION
BY RESERVATION
Two Rock Union School
ROCK RANCH STATION
MILITARY RES
SPRING
HILL
ROAD
MIDDLE
ROCK
ROBL
SONOMA CO
MARIN CO
Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.19 Project Area
West County
Stemple Creek and North Petaluma Agricultural Irrigation Areas
0
1/2
1 mile
.5
1 km
TN


Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.20 Project Area
South County
East of Rohnert Park Agricultural Irrigation Areas
0
1/2
1 mile
0
.5
1 km
TN
See Map 4.17
See Map 4.18
See Map 4.21
Reservoir
Spring
Canyon
Reservoir
SPILLWAY
South
Fork
Matanzas
Creek
Creek
Creek
Creek
KEISER
AVE
LAKE
WHITAKER
AVE
Sonoma
State
College
ROBERTS
LICHAU
ROAD
BM 233
BM 132
BM 872
BM 1016
Source: USGS 7.5 Cotati, Calif.
1951, photorevised 1980
Source: USGS 7.5 Glen Ellen, Calif.
1954, photorevised 1980

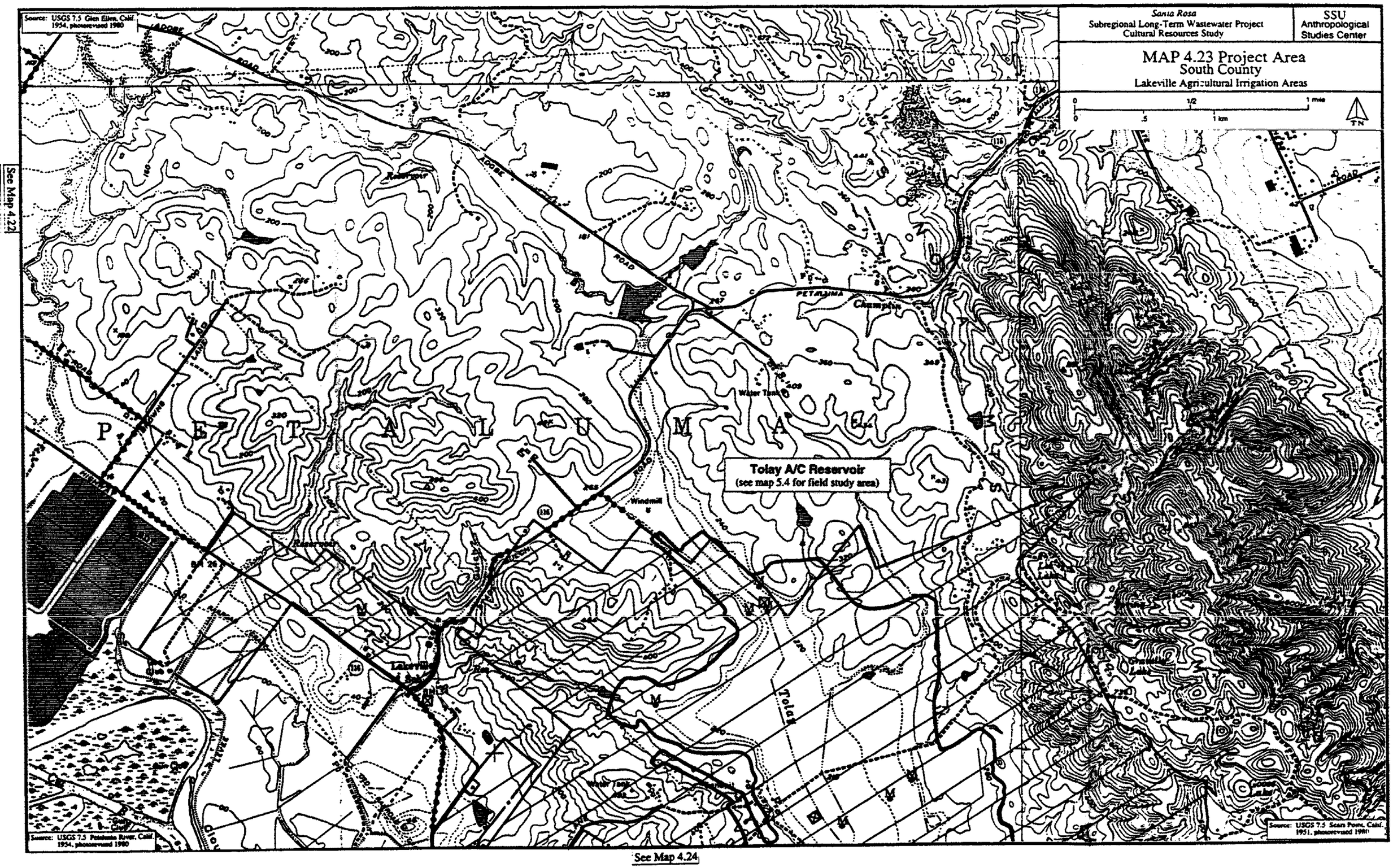

See Map 4.20
See Map 4.18
See Map 4.19
See Map 4.22
Source: USGS 7.5 Cotati, Calif. 1951, photorevised 1980
Source: USGS 7.5 Glen Ellen, Calif. 1954, photorevised 1980
Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.21 Project Area
South County
Adobe Road Agricultural Irrigation Areas
0 1/2 1 mile
0 .5 1 km
TN
Adobe Road Reservoir
(see map 5.3 for field study area)
Petaluma Reservoir
Penngrove
Denman Flat
Lichau Creek
Willow Creek
Stony Butte
Reservoir
Well
RAILROAD
AVE
GRANT DIV
DAVIS
LANE
ROAD
HARDIN
PANORAMA
MOUNTAIN
LYNDON
NORTHWESTERN
Waugh Sch
Water Tank
Drive-in Theater
BM 118
BM 206
BM 1246
R 8 W
R 7 W


See Map 4.21
See Map 4.19
See Map 4.23
Source: USGS 7.5 Cotati, Calif. 1951, photorevised 1980
Source: USGS 7.5 Glen Ellen, Calif. 1954, photorevised 1980
Source: USGS 7.5 Petaluma, Calif. 1953, photorevised 1981
Source: USGS 7.5 Petaluma River, Calif. 1954, photorevised 1980
Crown
Old Petaluma
Cinnabar Sch
McDOWELL
PACIFIC
Trailer Park
Lynch Creek
PETALUMA
McKinley Sch
Fairgrounds
CYPRESS HILL CEMETERY
St Vincents Sch
NORTHWESTERN
PETALUMA
McNear
McNear Sch
Haystack
Old Adobe Sch
Petaluma Skyranch Airport
Petaluma A State Histor
Substation
LAKEVILLE
Adobe
Marin School
APPROXIMATE
Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.22 Project Area
South County
Storage Transmission Pipeline
0 1/2 1 mile
0 .5 1 km
TN

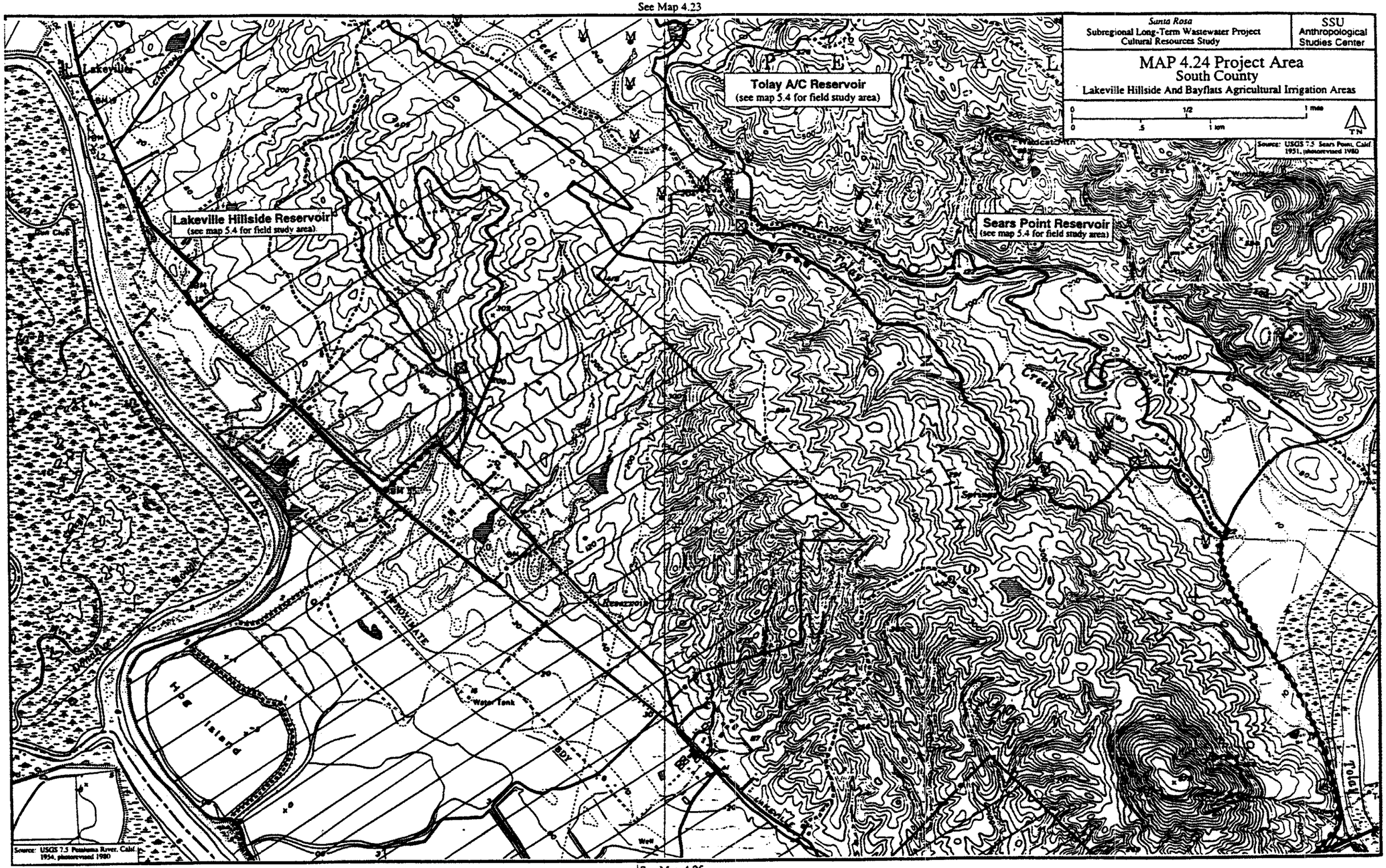
Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study

SSU
Anthropological
Studies Center

MAP 4.23 Project Area
South County
Lakeville Agricultural Irrigation Areas

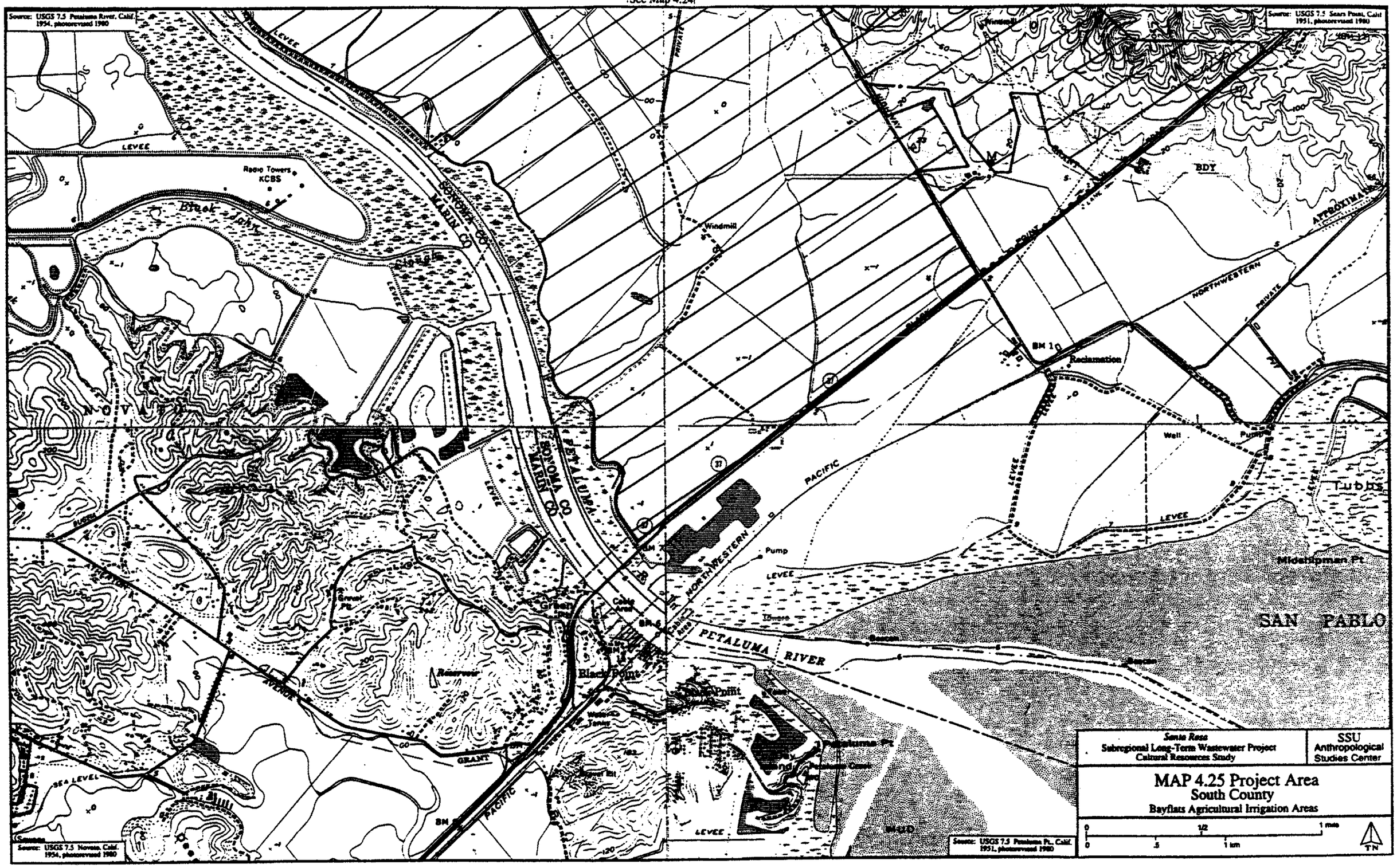


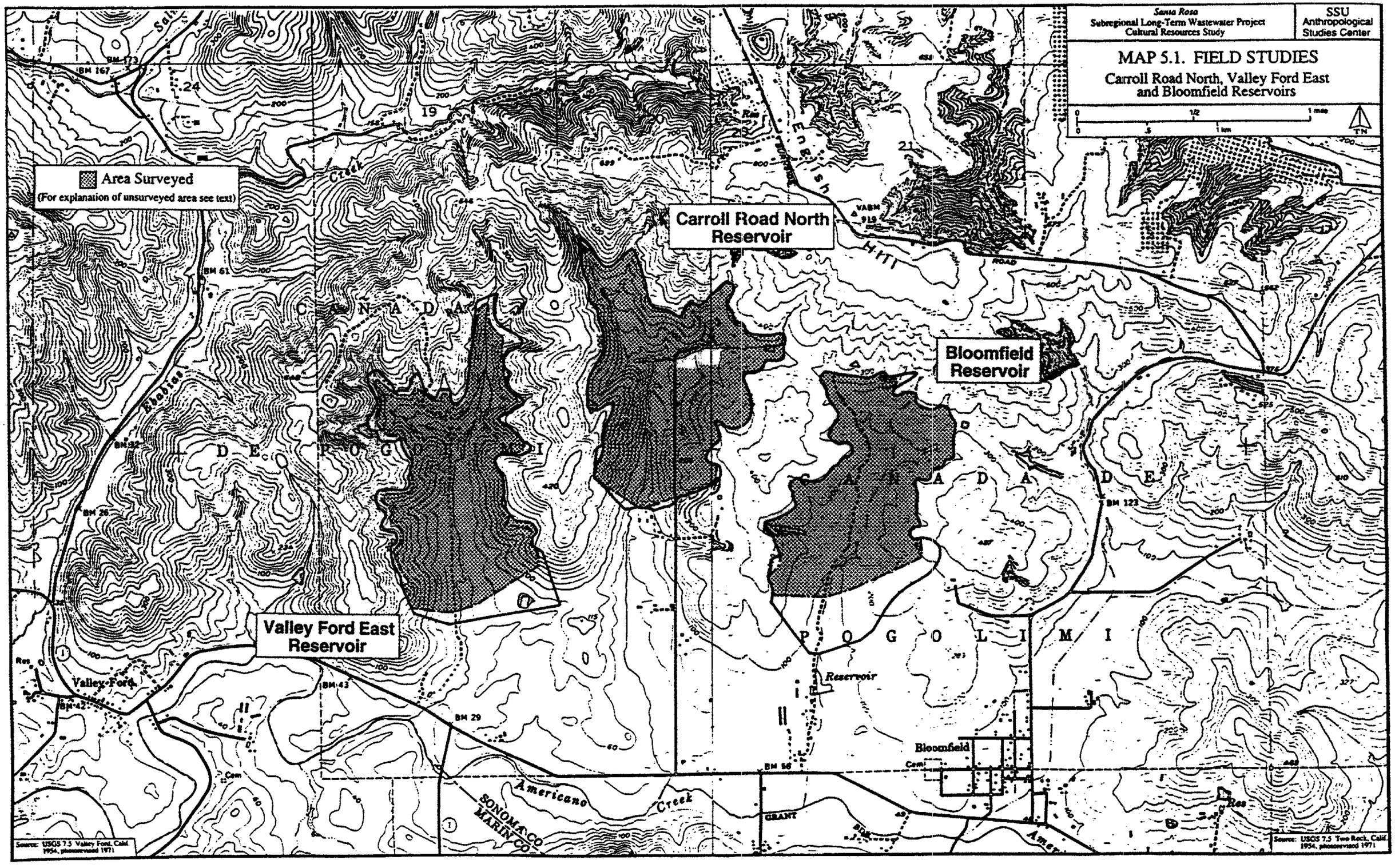
See Map 4.23

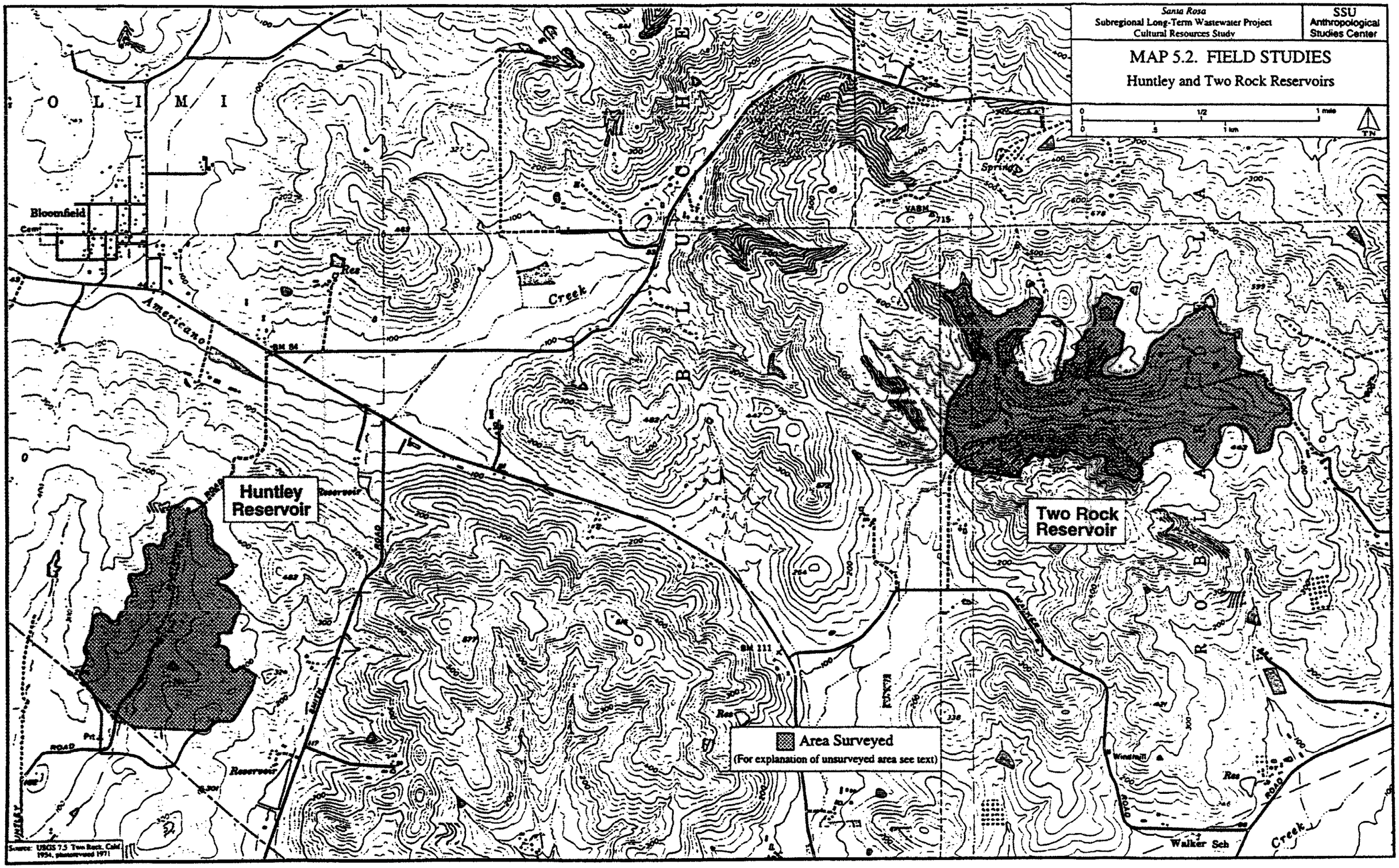


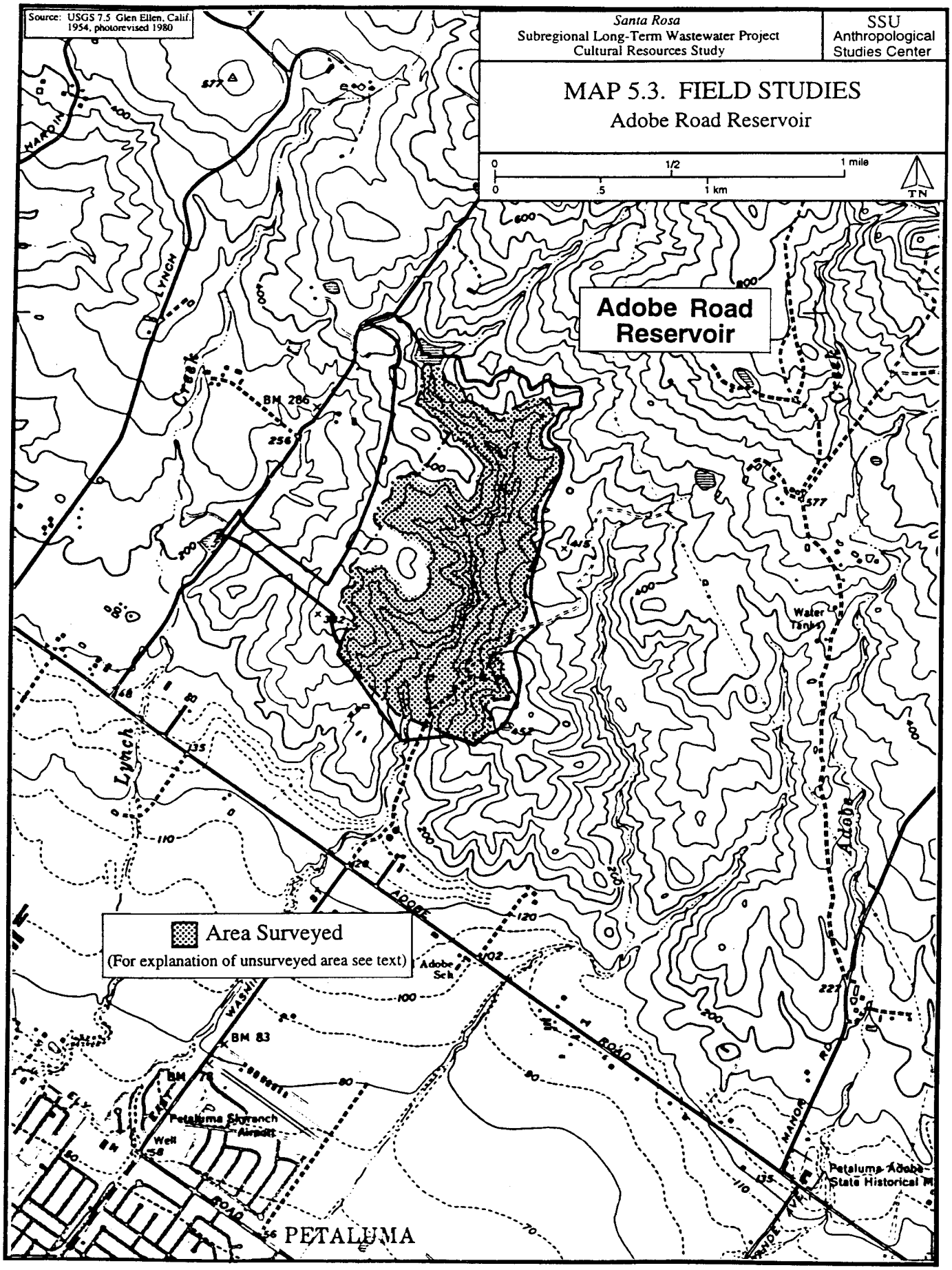
See Map 4.25

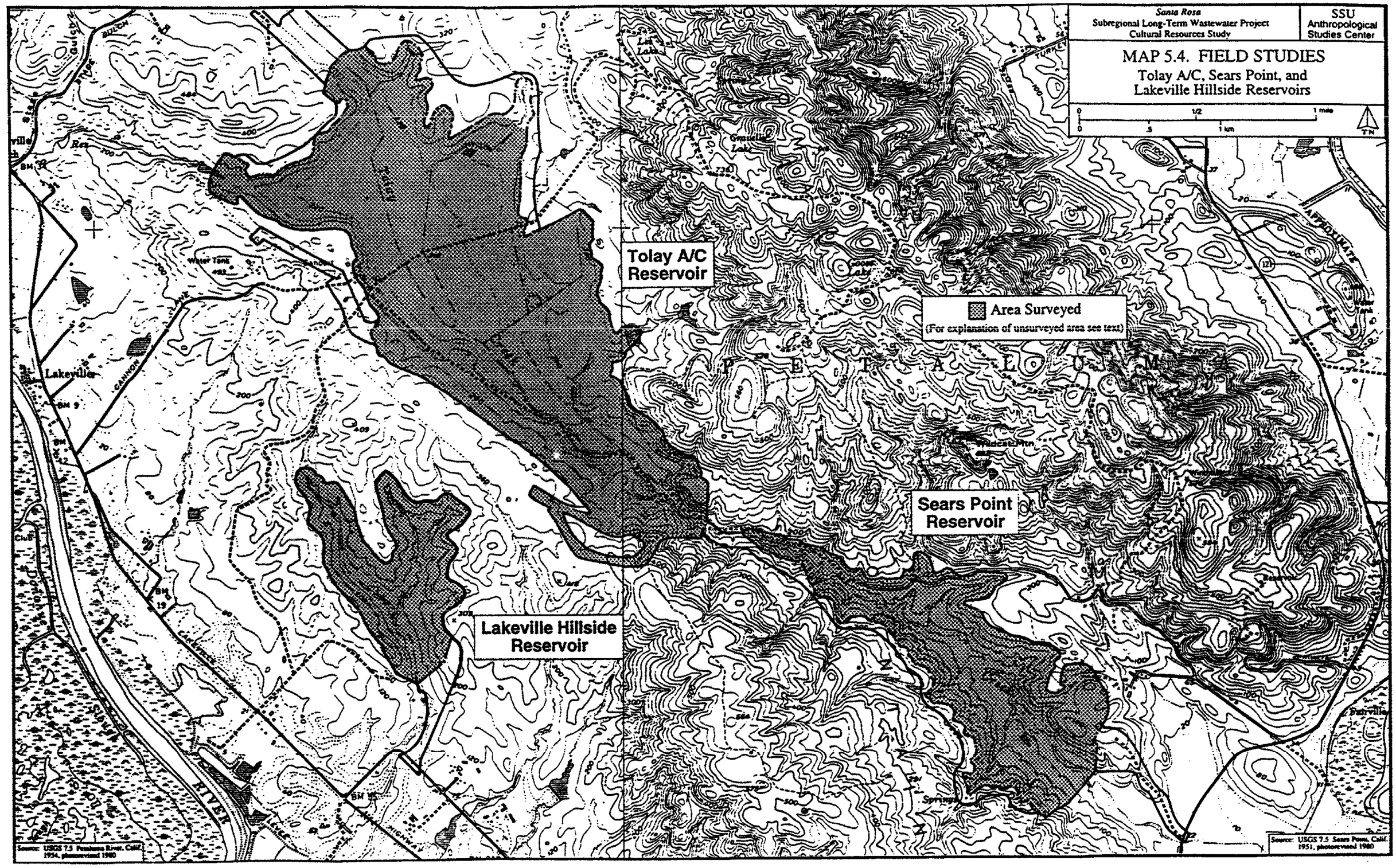
See Map 4.24


Source: USGS 7.5 Petaluma River, Calif. 1954, photorevised 1980
Source: USGS 7.5 Sears Point, Calif. 1951, photorevised 1980
Source: USGS 7.5 Novato, Calif. 1954, photorevised 1980
Source: USGS 7.5 Petaluma Pt., Calif. 1951, photorevised 1980
LEVEE
Radio Towers KCBS
Black John
Slough
SONOMA CO
MARIN CO
PETALUMA
PRIVATE
Windmill
BDY
APPROXIMATE
NORTHWESTERN
PACIFIC
BM 1
Reclamation
Well
Pump
Tubbs
Midshipman Pt
SAN PABLO
PETALUMA RIVER
Black Point
Reservoir
Grant Pt
Cattle Area
BM 6
Petaluma Pt
Petaluma Creek
MUD
NOVATO
BUSH
AVENUE
GRANT
SEA LEVEL
BM 7
Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 4.25 Project Area
South County
Bayflats Agricultural Irrigation Areas
0
1/2
1 mile
0
.5
1 km
TN


Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 5.1. FIELD STUDIES
Carroll Road North, Valley Ford East
and Bloomfield Reservoirs
Area Surveyed
(For explanation of unsurveyed area see text)
Carroll Road North
Reservoir
Bloomfield
Reservoir
Valley Ford East
Reservoir
Valley Ford
Bloomfield
Reservoir
Americano Creek
SONOMA CO
MARIN CO
GRANT
English Hill Road
Source: USGS 7.5 Valley Ford, Calif. 1954, photorevised 1971
Source: USGS 7.5 Two Rock, Calif. 1954, photorevised 1971


Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 5.2. FIELD STUDIES
Huntley and Two Rock Reservoirs
0
1/2
1 mile
0
.5
1 km
TN
Bloomfield
Americano
Creek
Huntley
Reservoir
Two Rock
Reservoir
Area Surveyed
(For explanation of unsurveyed area see text)
Walker Sch
Source: USGS 7.5 Two Rock, Calif.
1954, photorevised 1971


Source: USGS 7.5 Glen Ellen, Calif. 1954, photorevised 1980
Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 5.3. FIELD STUDIES
Adobe Road Reservoir
0
1/2
1 mile
0
.5
1 km
TN
Adobe Road Reservoir
Area Surveyed
(For explanation of unsurveyed area see text)
Lynch Creek
BM 286
Water Tanks
Adobe Sch
BM 83
BM 78
Petaluma Skyranch Airport
Well
Petaluma Adobe State Historical M
PETALUMA


Santa Rosa
Subregional Long-Term Wastewater Project
Cultural Resources Study
SSU
Anthropological
Studies Center
MAP 5.4. FIELD STUDIES
Tolay A/C, Sears Point, and
Lakeville Hillside Reservoirs
0
1/2
1 mile
0
.5
1 km
TN
Tolay A/C
Reservoir
Area Surveyed
(For explanation of unsurveyed area see text)
Sears Point
Reservoir
Lakeville Hillside
Reservoir
Lakeville
Petaluma
Source: USGS 7.5 Penngrove, Calif.
1954, photorevised 1980
Source: USGS 7.5 Sears Point, Calif.
1951, photorevised 1980

APPENDIX B

PERSONNEL QUALIFICATIONS

APPENDIX B: PERSONNEL QUALIFICATIONS

Adrian Praetzellis, Ph.D., Anthropology, Member, Society of Professional Archaeologists
Project Director
20 years experience in California prehistoric and historical archaeology, and history

Christian Gerike, B.A., Anthropology, graduate student, Cultural Resources Management
Project Manager, Field Supervisor, Field Monitor, Report Author/Editor
17 years experience in California archaeology, history, and ethnography

Seana L. S. Gause (Searle), B.A., Anthropology, M.A. candidate, Cultural Resources Management
Project Archaeologist, Field Supervisor, Field Monitor, Report Author/Editor
5 years experience in California archaeology

Suzanne Stewart, M.A., Cultural Resources Management, Member, Society of Professional Archaeologists
Editor, Report Author, Quality Control
17 years experience in California archaeology, history, and ethnography

Katherine Johnson, M.A., History
Architectural Historian, Field Technician, Researcher, Report Author/Editor
3 years experience in California history

Jennifer Boruck, B.A., Anthropology
Administrative Assistant
1.5 years experience in California museum and archival research

Lynn Compas, B.S., Anthropology, M.A. candidate, Cultural Resources Management
Field Technician
7 years experience in California and Southwest archaeology

Bright Eastman, B.A., Anthropology, M.A. candidate, Cultural Resources Management
Architectural Historian
3 years experience in California architectural history

Jennifer Ferneau, B.A., Anthropology, graduate student, Cultural Resources Management
Field Supervisor, Field Technician, Field Monitor
8 years experience in California archaeology

Mary Frye, undergraduate student, Anthropology
Field Technician
3 years experience in California and Southwest archaeology

Susan Hanson, B.A., Anthropology
Field Technician
6 years experience in California archaeology

Holly Hoods, B.A., Linguistics, Certificate in Archaeological Technology, graduate student, Cultural Resources Management
Researcher
2 years experience in California archaeology and history

Julia Huddleson, B.A., Anthropology, M.A., Education, graduate student, Cultural Resources Management
Bibliography Coordinator
10 years experience in California archaeology

Michael Jablonowski, B.A., Anthropology, M.A. candidate, Cultural Resources Management
Field Director, Field Monitor, Coordinator for Native American Involvement
16 years experience in California archaeology

Todd Jaffke, B.A., Anthropology, M.A. candidate, Cultural Resources Management
Field Technician
7 years experience in California archaeology

Linda Jameson, B.A., Anthropology
Field Technician
1 year experience in California archaeology

Leigh Jordan, B.A., Anthropology, M.A., Cultural Resources Management
Field Director
11 years experience in California archaeology and history

Tiffany LaGant, undergraduate, Anthropology
Administrative Assistant
Less than 1 year administrative experience

Michael Love, Ph.D., Anthropology
Computer Cartography, Field Technician
17 years experience in California and Mesoamerican archaeology

Cris Lowgren, B.A., Anthropology, M.A. candidate, Cultural Resources Management
Field Technician
3 years experience in California archaeology

Trent Mears, M.A., Cultural Resources Management
Field Technician, Field Monitor, Computer Manager
5 years experience in California archaeology/computers

Jack Meyer, B.S., Sociology/Anthropology, M.A. candidate, Cultural Resources Management
Geoarchaeologist, Field Technician
4 years experience in Midwestern and California archaeology

Steve Moore, B.A., Anthropology, graduate student, Cultural Resources Management
Field Technician, Field Monitor
3 years experience in California archaeology

Barbara Polansky, B.A., Anthropology
Field Technician
1 year experience in California archaeology

Karen Prescott, undergraduate student, Geography
Cartographic Technician, Field Technician
1 year experience in California archaeology

Maria Ribeiro, B.A., Anthropology
Field Technician, Researcher, Word Processor
3 years experience in California and Southwest archaeology

Jeffrey Rosenthal, B.A., Anthropology, M.A. candidate, Cultural Resources Management
Field Technician
7 years experience in California archaeology and architectural history

John Whatford, M.A., Cultural Resources Management
Field Technician
7 years experience in California archaeology

Rosemary White, B.A., Psychology, minor Anthropology
Computer Graphics Specialist
5 years experience in California archaeology

Jeannie Yang, B.A., Anthropology, graduate student, Cultural Resources Management
Word Processing Technician
1 year experience in California archaeology

Kathleen Zahniser, B.A., Geography
Field Technician
4 years experience in California archaeology

CONSULTANT
Kendall Schinke, A.A., Topographic/Civil Engineering Drafting, and B.A., Anthropology
Cartographer
13 years experience in drafting and cartography, 4 years experience in California archaeology.

APPENDIX C

TABLES C-1 TO C-14

Table C-1

South and West County Alternatives: Prehistoric Isolates per Reservoir

Alternative with Reservoir	Isolated Artifacts +/-	Temporary #	Artifact Type	Material
Alternative 2: South County				
Tolay A	+	TAa, b, f	Flakes	Obsidian (Various)
	+	TAc	Charmstone Fragment	Unknown
	+	TAd	Charmstone (Plummet)	Andesite
	+	TAe	Biface End Fragment	Obsidian (U)
	+	TAg	Mortar Fragment	Unknown
	+	TAh	Biface	Obsidian (U)
	+	TAi	Charmstone (Incised/Drilled)	Unknown
	+	TAj	Charmstone	Unknown
	+	TAk	Charmstone Fragment	Unknown
	+	TAl	Charmstone Fragment	Unknown
Adobe Road	-			
Lakeville Hillside	-			
Tolay C	+	TAg	Mortar Fragment	Unknown
	+	TAh	Biface	Obsidian (U)
	+	TAi	Charmstone (Incised/Drilled)	Unknown
	+	TAj	Charmstone	Unknown
	+	TAk	Charmstone Fragment	Unknown
	+	TAl	Charmstone Fragment	Unknown

Alternative with Reservoir	Isolated Artifacts +/-	Temporary #	Artifact Type	Material
Alternative 2: South County				
Sears Point	+	SPAa, f, h	Flakes	Obsidian (U)
	+	SPAb	Biface	Obsidian (U)
	+	SPAc, d	Mortar Rim Fragment	Basalt
	+	SPAe	Bowl Mortar	Vesicular Basalt
	+	SPAg	Handstone	Sandstone
ASR				
Alternative 3: West County				
Two Rock	+	TRAa	Biface End Fragment	Obsidian (A)
	+	TRAb	Flake Tool	Obsidian (A)
Bloomfield	+	BAa, b, c,	Flakes	Obsidian (A)
	+	BAd	Biface Margin	Obsidian (N)
Carroll Road North	+	CRAa	Flake	Obsidian(U)
Valley Ford East	+	VFAa	Mortar Rim Fragment	Vesicular Basalt
	+	VFAb	Biface Midsection	Obsidian (A)
Huntley	+	HAa	Flake	Obsidian (A)
ASR				

Obsidian Source: A=Annadel; N=Napa; U=Unknown

This table presents prehistoric isolated artifacts only, as historic isolated artifacts were treated as features of the farm complexes on which they were located, or they were found downstream from recorded historical sites. Because there was so much historical dumping in the drainages for the purposes of erosion control, and because this activity is still practiced today, it was difficult to establish context. If in fact any one of these candidate reservoir areas is picked for completion it will be necessary to further evaluate the historical resources on the properties; as evaluation done for this project was solely preliminary.

Table C-2

Summary of Inventoried Cultural Resources per Irrigation Area

Irrigation Area	Historic Archaeological Sites		Prehistoric Archaeological Sites		Architectural Historical Resources		Multiple Resource Sites	
	Inside	Buffer Zone	Inside	Buffer Zone	Inside	Buffer Zone	Inside	Buffer Zon
Alternative 2: South County								
North Petaluma	2	0	4	0	2	9	0	0
Adobe Rd	0	0	3	0	0	0	0	0
East of Rohnert Park	3	0	6	3	3	0	0	0
Lakeville	2	0	19	3	6	0	1 PA/HA	0
Bayflats	0	0	3	1	0	0	0	0
Alternative 3: West County								
Americano Creek	1	0	4	0	40	1	1 PA/HA	1 PA/HA
Stemple Creek	1	0	2	0	0	0	0	0
Miscellaneous	0	0	1	0	1	0	0	0
Alternative Substitutions and Miscellaneous Components								
Sebastopol	1	0	10	5	2	4	1 PA/HA	1 HA/ AH
Urban	1	1	6	8	4	24	1 PA/HA/AH	1 PA/HA
Totals	11	1	58	20	58	38	4	3

PA - Prehistoric Archaeological Site HA - Historic Archaeological Site AH - Architectural Historical Site

Inventoried Cultural Resources per Irrigation Area

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative 2: South County						
North Petaluma	CA-SON-446	Ash Midden	None	068058 Project Review FHWA871022A	Building	None
	CA-SON-1148	Lithic Scatter, and Shell	None	067789 Project Review HUD900411A	Building	Edwin Merritt Farm
	CA-SON-1266H	Farm Complex	068056 & 068062 Project Review FHWA871022A Sonoma County Landmark	067790 Project Review FHWA871022A	Building	Edwin Merritt Farm
	CA-SON-1781H(c)	Railroad Crossing	Determined Ineligible for Listing on National Register	067791 Project Review FHWA871022A	Building	Edwin Merritt Farm
	CA-SON-1783H	Historic Scatter	None	067792 Project Review FHWA871022A	Building	Edwin Merritt Farm
	CA-SON-1796	Lithic Scatter	Buried Site	067793 Project Review FHWA871022A	Building	Edwin Merritt Farm
	CA-SON-1842	Lithic Scatter	None	067794 Project Review FHWA871022A	Building	Edwin Merritt Farm

Inventoried Cultural Resources per Irrigation Area (Continued)

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative 2: South County						
North Petaluma (continued)	067600 Project Review FHWA871022A	Building	John T. Merritt Residence	068060 Project Review FHWA871022A	Building	None
				068057 Project Review FHWA871022A	Buildings	None
Adobe Road	CA-SON-1241	Midden	None	None	None	None
	CA-SON-1445	Lithic Scatter	None			
	CA-SON-1803	Midden	None			
East of Rohnert Park	CA-SON-155	Unknown	Recorded by Peter and Loud	CA-SON-1078	Lithic Scatter, Possible Midden and Cupules	None
	CA-SON-156	Midden	Recorded by Peter and Loud	CA-SON-1567	Small Midden	None
	CA-SON-668	Midden	None	CA-SON-1061	Lithic Scatter	None
	CA-SON-669	Shell Midden	None	None	None	None
	CA-SON-1077	Petroglyph, Lithic Scatter	Possible House Pits Present			
	CA-SON-1079H	Basalt Stone Quarry	None			
	CA-SON-1197H	Basalt Stone Quarry	None			
	CA-SON-1198H	Stone Fence	None			
	CA-SON-1506	Small Midden	None			
	C-727	Farm Complex	None			
	C-744	Farm Complex	None			
	C-745	Farm Complex	None			

Inventoried Cultural Resources per Irrigation Area (Continued)

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative 2: South County						
Lakeville	CA-SON-201	Shellheap	Recorded by Nelson	CA-SON-200	Shellmound	Recorded by Nelson
	CA-SON-204	Shellmound	Recorded by Nelson	CA-SON-202	Shellmound	Recorded by Nelson
	CA-SON-205	Shellheap	Recorded by Nelson	CA-SON-1155	Midden with Petroglyph	None
	CA-SON-371	"Charmstone Site"	Recorded by Pilling			
	CA-SON-381	Midden Mound	Recorded by Elsasser			
	CA-SON-382	Midden	Recorded by Elsasser			
	CA-SON-383	Midden Mound	Recorded by Elsasser			
	CA-SON-1075	Petroglyphs--PCN	None			
	CA-SON-1154	Small Midden	None			
	CA-SON-1156	Lithic Scatter	None			
	CA-SON-1157	Midden	None			
	CA-SON-1158	Possible Midden,	None			
	CA-SON-1159	Midden	None			
	CA-SON-1160	Petroglyphs	None			
	CA-SON-1747H	Farm Complex	None			
	CA-SON-1903	Midden Mound	None			
	HRI# 4952-0282-0000	Bridge	Bridge# 20-133			
	HRI# 4952-0283-0000	Bridge	Bridge# 20-239			

Inventoried Cultural Resources per Irrigation Area (Continued)

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative 2: South County						
Lakeville (continued)	C-705	Historic Town	Donahue's Landing	None	None	None
	C-909	Farm/Ranch Complex	Bordessa Dairy			
	T-A-1	Farm/Ranch; Petroglyph	Historic/ Prehistoric Site			
	T-A-2	Lithic Scatter	None			
	T-A-3	Lithic Scatter	None			
	T-A-4	Habitation Site	None			
	T-A-5	Midden	Probable Redeposit from CA-SON-1157			
	T-B-1	Pump House	None			
	T-B-3	Ranch Complex	None			
	SP-B-2	Historic Road	None			
Bayflats	CA-SON-202	Shellmound	Recorded by Nelson	CA-SON-204	Shellmound	Recorded by Nelson
	CA-SON-203	Midden	Recorded by Nelson			
	CA-SON-206	Shellground	Recorded by Nelson			

Inventoried Cultural Resources per Irrigation Area (Continued)

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative 3: West County						
Americano Creek	CA-SON-1869	Lithic Scatter	None	VF-B-1	Farm/Ranch Complex	None
	CA-SON-1870/H	Lithic Scatter and Historic Sheet Scatter	Probable Buried Site	CR-A-1	Farm/Ranch, Buried Lithic Scatter	None
	CA-SON-1871	Lithic Scatter	Probable Buried Site			
	CA-SON-1872	Lithic Scatter	Possible Buried Site			
	CA-SON-1873	Lithic Scatter	None			
	C-1243	Dairy/Creamery	Sonoma County Landmark			
	CR-B-1	Farm/Ranch Complex	None			
	CR-B-2	Cabin	None			
	B-A-1	Farm/Ranch	None			
	HRI# 4952-0287-0000	Building	None			
	HRI# 4952-0288-0000	Building	None			
	HRI# 4952-0289-0000	Building	None			
	HRI# 4952-0290-0000	Building	None			
	HRI# 4952-0291-0000	Building	None			
	HRI# 4952-0292-0000	Ranch	None			
	HRI# 4952-0293-0000	Building	None			
	HRI# 4952-0294-0000	Building	None			
	HRI# 4952-0295-0000	Building	None			

Inventoried Cultural Resources per Irrigation Area (Continued)

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative 3: West County						
Americano Creek (continued)	HRI# 4952-0296-0000	Building	None	None	None	None
	HRI# 4952-0297-0000	Building	None			
	HRI# 4952-0298-0000	Building	None			
	HRI# 4952-0301-0000	Building	None			
	HRI# 4952-0302-0000	Cemetery	None			
	HRI# 4952-0303-0000	Building	None			
	HRI# 4952-0304-0000	Ranch	None			
	HRI# 4972-0001-0000	Building	Sonoma County Landmark			
	HRI# 4972-0002-0000	Bridge	Sonoma County Landmark			
	HRI# 4972-0003-0000	School	Sonoma County Landmark			
	HRI# 4972-0004-0000	Building	None			
	HRI# 4972-0005-0000	Building	None			
	HRI# 4972-0006-0000	Fence Pole	None			
	HRI# 4972-0007-0000	Bridge	None			
	HRI# 4972-0008-0000	Building	None			
	HRI# 4972-0009-0000	Building	None			
	HRI# 4972-0010-0000	Building	None			
	HRI# 4972-0011-0000	Building	None			
	HRI# 4972-0012-0000	Building	None			
	HRI# 4972-0013-0000	Building	None			

Inventoried Cultural Resources per Irrigation Area (Continued)

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative 3: West County						
Americano Creek (continued)	HRI# 4972-0014-0000	Building	None	None	None	None
	HRI# 4972-0015-0000	Building	None			
	HRI# 4972-0017-0001	Building	None			
	HRI# 4972-0017-0002	Building	Sonoma County Landmark			
	HRI# 4972-0017-0003	Building	None			
	HRI# 4972-0017-0004	Building	None			
	HRI# 4972-0017-9999	District	None			
	14459 Valley Ford Road	Building	Sonoma County Landmark			
Stemple Creek	CA-SON-1027	Lithic Scatter	None	None	None	None
	CA-SON-1028	Lithic Scatter	None			
	CA-SON-1031H	Farm/Ranch or Residence	None			
Miscellaneous	CA-SON-448	Ash Midden	None	None	None	None
	HRI# 5472-0204-9999	Farm/Ranch Complex	C-914			
Alternative Substitutions and Miscellaneous Components						
Sebastopol	CA-SON-274	Lithic Scatter	Recorded by Chenoweth, Meighan, and Pilling	CA-SON-275	Midden	Recorded by Chenoweth, Meighan, and Pilling
	CA-SON-370	Bedrock Mortars	None	CA-SON-712	Lithic Scatter and Midden	None
	CA-SON-700	Lithic Scatter	None	CA-SON-1137	Lithic Scatter	None

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative Substitutions and Miscellaneous Components						
Sebastopol (continued)	CA-SON-1101/H	Lithic Scatter, Homestead	1849 Ragle Homestead	CA-SON-1534	Lithic Scatter	None
	CA-SON-1102	Buried Site	Lithic Scatter	CA-SON-1780	Midden	Located withi C-482
	CA-SON-1377	Midden	Leached?	HRI# 5472-0204-9999	Farm/Ranch Complex	C-914
	CA-SON-1964	Midden Mound	None	HRI# 5444-0012-0005	Building	None
	CA-SON-2086	Lithic Scatter, or Leached Midden	None	HRI# 5444-0012-0001	Building	None
	CA-SON-2104	Lithic Scatter	None	HRI# 5472-0196-0000	Building	None
	CA-SON-2105	Lithic Scatter	Possible Midden	C-482	Isaac Sullivan Homestead	One House is S Standing
	HRI# 5444-0012-0003	Building	None			
	HRI# 5472-0198-0000	Building	None			
	C-483	Mitchell Gillian Property	None			
	C-802	Sandstone Pestle	Possible Buried Site			
Fountain Grove and East Santa Rosa/Bennett Valley	CA-SON-154	No Site Record	Recorded by Peter and Loud. IA: Bennett Valley Golf Course and Galvin Park	CA-SON-9/H	Lithic Scatter/ Homestead	IA: Howarth P

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative Substitutions and Miscellaneous Components						
Fountain Grove and East Santa Rosa/Bennett Valley (continued)	CA-SON-394	Lithic Scatter	IA: Doyle Park and School	CA-SON-11	Lithic Scatter	Possibly Destroyed. IA: Julliard Park and Luther Burbank Gardens
	CA-SON-515	Habitation Site	Artifacts; Possible Midden. IA: Cloverleaf Ranch	CA-SON-14	Unknown	IA: Montgomery High School
	CA-SON-882	Midden	IA: Bennett Valley Golf Course and Galvin Park	CA-SON-337	Shell Scatter	IA: Doyle Park and School
	CA-SON-1042	Lithic Scatter	Possible Midden. IA: Bennett Valley Golf Course and Galvin Park	CA-SON-729	Lithic Scatter	IA: Yulupa School and Mesquite Park
	CA-SON-1220H	Late 19th-century Utopian Colony	within IA: Fountain Grove Business Park within Buffer Zone for IA: Clover Leaf Ranch	CA-SON-857	Midden	IA: Doyle Park and School
	CA-SON-1222	Lithic Scatter	IA: Fountain Grove Country Club	CA-SON-1221	Lithic Scatter	Possible Midden IA: Cloverleaf Ranch.

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative Substitutions and Miscellaneous Components						
Fountain Grove and East Santa Rosa/Bennett Valley (continued)	CA-SON-394	Lithic Scatter	IA: Doyle Park and School	CA-SON-11	Lithic Scatter	Possibly Destroyed. IA: Julliard Park and Luther Burbank Gardens
	CA-SON-515	Habitation Site	Artifacts; Possible Midden. IA: Cloverleaf Ranch	CA-SON-14	Unknown	IA: Montgomery High School
	CA-SON-882	Midden	IA: Bennett Valley Golf Course and Galvin Park	CA-SON-337	Shell Scatter	IA: Doyle Park and School
	CA-SON-1042	Lithic Scatter	Possible Midden. IA: Bennett Valley Golf Course and Galvin Park	CA-SON-729	Lithic Scatter	IA: Yulupa School and Mesquite Park
	CA-SON-1220H	Late 19th-century Utopian Colony	within IA: Fountain Grove Business Park within Buffer Zone for IA: Clover Leaf Ranch	CA-SON-857	Midden	IA: Doyle Park and School
	CA-SON-1222	Lithic Scatter	IA: Fountain Grove Country Club	CA-SON-1221	Lithic Scatter	Possible Midden IA: Cloverleaf Ranch.

Inventoried Cultural Resources per Irrigation Area (Continued)

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative Substitutions and Miscellaneous Components						
Fountain Grove and East Santa Rosa/Bennett Valley (continued)	HRI# 5402-0212-0000	House, Outbuildings, and Garden	National Register No. 66000241 State Historic Landmark No. 234 California Inventory of Historic Resources Sonoma County Landmark No. 502 City of Santa Rosa Landmark No. 7 IA: Julliard Park and Luther Burbank Gardens	CA-SON-1223	Lithic Scatter	IA: Fountain Grove Country Club
	HRI# 5402-0254-0020	Park	Part of Local Historic "Olive Park District" City of Santa Rosa Landmark Resolution No. chb0057; cc22328 IA: Olive Park	CA-SON-1276H	Brewery Site	IA: Olive Park
	HRI# 5402-0257-0059	Park	IA: De Meo Park	CA-SON-1298	Lithic Scatter	IA: Montgomery High School
				HRI# 5402-0257-0036	Building	IA: De Meo Park
				HRI# 5402-0257-0037	Building	IA: De Meo Park

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative Substitutions and Miscellaneous Components						
Fountain Grove and East Santa Rosa/Bennett Valley (continued)	2930 Bennett Valley Road	Cemetery	Sonoma County Landmark IA: Calvary Cemetery	HRI# 5402-0242-0000	Building	National Register No. 79000560 Sonoma County Landmark IA: Julliard Park and Luther Burbank Gardens
	C-965	Basalt Quarry; Waterworks; Bedrock Mortar	Bedrock Mortar was Redeposited. IA: Howarth Park	HRI# 5402-0254-0005	Building	Part of Local Historic "Olive Park District" IA: Olive Park
				HRI# 5402-0254-0006	Building	Part of Local Historic "Olive Park District" IA: Olive Park
				HRI# 5402-0254-0009	Building	Part of Local Historic "Olive Park District" IA: Olive Park
				HRI# 5402-0254-0021	Building	Part of Local Historic "Olive Park District" IA: Olive Park
				HRI# 5402-0254-0023	Building	Part of Local Historic "Olive Park District" IA: Olive Park
				HRI# 5402-0257-0038	Building	IA: De Meo Park
				HRI# 5402-0257-0039	Building	IA: De Meo Park

Inventoried Cultural Resources per Irrigation Area (Continued)

Irrigation Area	Cultural Resources within Irrigation Areas			Cultural Resources within 300-foot Buffer Zone		
	Designation	Resource Type	Comments	Designation	Resource Type	Comments
Alternative Substitutions and Miscellaneous Components						
Fountain Grove and East Santa Rosa/Bennett Valley (continued)				HRI# 5402-0257-0040	Building	IA: De Meo Park
				HRI# 5402-0257-0041	Building	IA: De Meo Park
				HRI# 5402-0257-0054	Building	IA: De Meo Park
				HRI# 5402-0257-0055	Building	IA: De Meo Park
				HRI# 5402-0257-0056	Building	IA: De Meo Park
				HRI# 5402-0257-0114	Building	IA: De Meo Park
				HRI# 5402-0257-0116	Building	IA: De Meo Park
				HRI# 5402-0257-0117	Building	IA: De Meo Park
				HRI# 5402-0257-0118	Building	IA: De Meo Park
				HRI# 5402-0257-0121	Building	IA: De Meo Park
				HRI# 5402-0257-0122	Building	IA: De Meo Park
				HRI# 5402-0257-0123	Building	IA: De Meo Park
				HRI# 5402-0257-0124	Building	IA: De Meo Park
				HRI# 5402-0257-0125	Building	IA: De Meo Park
				4760 Bennett Valley Road	Building	Sonoma County Landmark A: Bennett Valley Golf Course and Galvin Park

IA - Irrigation Area

Table C-4

Summary of Inventoried Cultural Resources Along Pipeline Routes and Within 300-foot Buffer Zone

Pipelines	Historic Archaeological Sites	Prehistoric Archaeological Sites	Architectural Historical Resources	Multiple Resource Sites
Alternative 4: The Geysers Discharge				
The Geysers Discharge	1	12	3	0
Alternative 5: Russian River Discharge				
Russian River Discharge	1	1	0	0
Alternative Substitutions and Miscellaneous Components				
Urban	2	3	59	1 AH/HA/PA
L -	0	3	10	1 AH/HA
S -	3	6	8	1 AH/HA
W -	1	5	14	1 AH/HA
Totals	8	30	94	4

PA - Prehistoric Archaeological Site HA - Historic Archaeological Site

AH - Architectural Historical Site

Table C-5

The Geysers Pipeline Route, Inventoried Cultural Resources

Inventoried Cultural Resources along Pipeline Routes and within 300-foot Buffer Zone		
Designation	**Resource Type**	**Comments**
Geysers Discharge Pipeline		
CA-SON-532	Lithic Scatter	None
CA-SON-533	Lithic Scatter	None
CA-SON-534	Lithic Scatter	None
CA-SON-535	Lithic Scatter	None
CA-SON-1321H	Mine	None
CA-SON-1993	Lithic Scatter	None
HRI# 5441-0029-0000	Building	Pipeline Location Uncertain
HRI# 5448-0244-0000	Building	Pipeline Location Uncertain
Geysers Geothermal Steamfield Recharge		
CA-SON-758	Lithic Scatter	None
CA-SON-764	Lithic Scatter	None
CA-SON-769	Possible Habitation Site	Possible House Pit
CA-SON-781	Lithic Scatter	None
CA-SON-782	Lithic Scatter	None
CA-SON-795	Lithic Scatter	None
CA-SON-1256	Midden	None
CA-SON-1321H	Mine	None
Geysers Geothermal Power Development	Power Plants/Steam Fields	Civil Engineering Historic Landmark

Table C-6

Russian River Discharge Pipeline Route, Inventoried Cultural Resources

Inventoried Cultural Resources along Pipeline Route and within 300-foot Buffer Zone			
Designation	**Pipeline**	**Resource Type**	**Comments**
CA-SON-1315	D-1	Lithic Scatter	None
CA-SON-1405H	D-3	Hop Kiln Complex	None

Table C-7

Urban Irrigation Pipeline Routes, Inventoried Cultural Resources
Fountain Grove and East Santa Rosa/Bennett Valley

Inventoried Cultural Resources along Pipeline Route and within 300-foot Buffer Zone		
Designation	**Resource Type**	**Comments**
CA-SON-922	Lithic Scatter	None
CA-SON-948	Lithic Scatter	Possible Midden
CA-SON-1092	Lithic Scatter	None
CA-SON-1276H	Brewery	None
CA-SON-1805H	Refuse Pit and Drainage Trench	None
C-965	Quarry, Waterworks, and Bedrock Milling Station	BRM is Redeposited
HRI# 5402-0240-0000	Bennett Valley Road	Limits Uncertain
National Register No. 79000561(A)	Building	In Railroad Square District
National Register No. 79000561(B) HRI# 5402-0246-0015	Building	In Railroad Square District
National Register No. 79000561(C)	Building	In Railroad Square District
HRI# 5402-0254-0020	Park	In Olive Park District
HRI# 5402-0254-0021	Building	In Olive Park District
HRI# 5402-0256-0023	Building	In West 3rd Street District
HRI# 5402-0256-0024	Building	In West 3rd Street District
HRI# 5402-0256-0025	Building	In West 3rd Street District
HRI# 5402-0256-0026	Building	In West 3rd Street District
HRI# 5402-0256-0027	Building	In West 3rd Street District
HRI# 5402-0256-0028	Building	In West 3rd Street District
HRI# 5402-0256-0029	Building	In West 3rd Street District
HRI# 5402-0256-0030	Building	In West 3rd Street District
HRI# 5402-0256-0031	Building	In West 3rd Street District
HRI# 5402-0256-0032	Building	In West 3rd Street District
HRI# 5402-0256-0033	Building	In West 3rd Street District
HRI# 5402-0256-0035	Building	In West 3rd Street District

Inventoried Cultural Resources along Pipeline Route and within 300-foot Buffer Zone		
Designation	**Resource Type**	**Comments**
HRI# 5402-0256-0036	Building	In West 3rd Street District
HRI# 5402-0256-0037	Building	In West 3rd Street District
HRI# 5402-0256-0038	Building	In West 3rd Street District
HRI# 5402-0257-0051	Building	In Westside District
HRI# 5402-0257-0052	Building	In Westside District
HRI# 5402-0257-0053	Building	In Westside District
HRI# 5402-0257-0054	Building	In Westside District
HRI# 5402-0257-0055	Building	In Westside District
HRI# 5402-0257-0056	Building	In Westside District
HRI# 5402-0257-0057	Building	In Westside District
HRI# 5402-0257-0058	Building	In Westside District
HRI# 5402-0257-0059	Park	In Westside District
HRI# 5402-0257-0082	Building	In Westside District
HRI# 5402-0257-0083	Building	In Westside District
HRI# 5402-0257-0084	Building	In Westside District
HRI# 5402-0257-0085	Building	In Westside District
HRI# 5402-0257-0086	Building	In Westside District
HRI# 5402-0257-0087	Building	In Westside District
HRI# 5402-0257-0088	Building	In Westside District
HRI# 5402-0257-0090	Building	In Westside District
HRI# 5402-0257-0091	Building	In Westside District
HRI# 5402-0257-0092	Building	In Westside District
HRI# 5402-0257-0093	Building	In Westside District
HRI# 5402-0257-0094	Building	In Westside District
HRI# 5402-0257-0095	Building	In Westside District
HRI# 5402-0257-0096	Building	In Westside District
HRI# 5402-0257-0097	Building	In Westside District
HRI# 5402-0257-0098	Building	In Westside District
HRI# 5402-0257-0099	Building	In Westside District
HRI# 5402-0257-0100	Building	In Westside District
HRI# 5402-0257-0101	Building	In Westside District
HRI# 5402-0257-0114	Building	In Westside District
HRI# 5402-0257-0116	Building	In Westside District
HRI# 5402-0257-0117	Building	In Westside District

Inventoried Cultural Resources along Pipeline Route and within 300-foot Buffer Zone		
Designation	**Resource Type**	**Comments**
HRI# 5402-0257-0118	Building	In Westside District
HRI# 5402-0257-0126	Building	In Westside District
HRI# 5402-0257-0128	Building	In Westside District
HRI# 5402-0257-0131	Building	In Westside District
HRI# 5402-0257-0133	Building	In Westside District
073132 Project Review HUD91013J	Building	In Westside District
2705 Bennett Valley Road	Building	Sonoma County Landmark;

Table C-8

L - Storage Transmission and Irrigation Distribution Pipeline Route, Inventoried Cultural Resources

Inventoried Cultural Resources along Pipeline Route and within 300-foot Buffer Zone			
Designation	**Pipeline**	**Resource Type**	**Comments**
CA-SON-1317	L-138	Lithic Scatter	Possible Midden
CA-SON-1378	unnamed pipeline	Lithic Scatter	None
CA-SON-1780	L-85	Midden	Located Within C-482
HRI# 5444-0012-0002	L-85	Building	None
HRI# 5444-0012-0005	L-88	Building	None
HRI# 5472-0151-0000	L-127	Building	None
HRI# 5472-0152-0000	L-108	Building	None
HRI# 5472-0157-0000	L-127	Building	None
HRI# 5472-0195-0000	L-128	Building	None
HRI# 5472-0204-9999	L-107	District	C-914
HRI# 5472-0210-0000	L-110	Building	None
HRI# 5472-0212-0000	L-132	Building	None
HRI# 5472-0213-0000	L-132	Building	None
C-482	L-87	Isaac Sullivan Homestead	One House Still Standing

Table C-9

S - Storage Transmission and Irrigation Distribution Pipeline Route, Inventoried Cultural Resources

Inventoried Cultural Resources along Pipeline Route and within 300-foot Buffer Zone			
Designation	**Pipeline**	**Resource Type**	**Comments**
CA-SON-206	S-121	Shellground	Recorded by Nelson
CA-SON-208	S-123	Shellheap	Recorded by Nelson
CA-SON-227	S-123	Shellheap	Recorded by Nelson
CA-SON-363H	S-146	Petaluma Adobe	National Register No. 70000151; California Inventory of Historic Resources; California Historic Landmark No. 18
CA-SON-859	S-18	Midden	None
CA-SON-1311	S-146	Lithic Scatter	Probable Midden
CA-SON-1781H (c)	S-38	Railroad Crossing	None
CA-SON-1783H	S-38	Trash Scatter	None
CA-SON-1796	S-151	Lithic Scatter	Buried Site
CA-SON-1913H	S-19	Trash Scatter	None
067789 Project Review FHWA871022	S-38	Building	None
067790 Project Review FHWA871022	S-38	Building	None
067791 Project Review FHWA871022	S-38	Building	None
067792 Project Review FHWA871022	S-38	Building	None
067793 Project Review FHWA871022	S-38	Building	None
067794 Project Review FHWA871022	S-38	Building	None
068060 Project Review FHWA871022A	S-38	Building	None
068058 Project Review FHWA871022A	S-151	Farmstead	None

Table C-10

W - Storage Transmission and Irrigation Distribution Pipeline Route, Inventoried Cultural Resources

Inventoried Cultural Resources along Pipeline Route and within 300-foot Buffer Zone			
Designation	**Pipeline**	**Resource Type**	**Comments**
CA-SON-159	W-200 A/S	Midden with Shell	None
CA-SON-432	W-202 A/S	Midden	None
CA-SON-730	W-202 A/S	Midden	None
CA-SON-1781 (b)	W-200 A/S	Railroad Crossing	None
H-A-1	W-209 A/S	Farm/Ranch Complex	None
TR-A-2	W-206 A/S	Lithic Scatter	None
TR-A-6	W-206 A/S	Lithic Scatter	None
068046 Project Review FHWA871022A	W-200 A/S	Building	None
068047 Project Review FHWA871022A	W-200 A/S	Building	None
068048 Project Review FHWA871022A	W-200 A/S	Building	None
068049 Project Review FHWA871022A	W-200 A/S	Building	None
068050 Project Review FHWA871022A	W-200 A/S	Building	None
068052 Project Review FHWA871022A	W-200 A/S	Building	None
068053 Project Review FHWA871022A	W-200 A/S	Building	None
068054 Project Review FHWA871022A	W-200 A/S	Building	None
HRI# 4952-0285-0000	W-142 A/S	Building	None
HRI# 4952-0286-0000	W-200 A/S	Building	Sonoma County Landmark
HRI# 4952-0292-0000	W-111 A/S	Ranch	None
HRI# 5472-0174-0000	W-200 A/S	Building	National Register No. 78000804 Sonoma County Landmark

Inventoried Cultural Resources along Pipeline Route and within 300-foot Buffer Zone			
Designation	**Pipeline**	**Resource Type**	**Comments**
HRI# 5472-0179-0000	W-201 A/S	Building	None
HRI# 5472-0183-0000	W-200 A/S	Building	None

Table C-11

Cultural Resources That May Be Affected by Pump Stations

Inventoried Archaeological Sites at Pump Stations and within 300-foot Buffer Zone			
Designation	**Pump Station**	**Resource Type**	**Comments**
CA-SON-532	PS-G4	Lithic Scatter	None
CA-SON-712	LBPS-1	Lithic Scatter and Midden	None
CA-SON-980	S-PS	Shell Midden	None
TR-A-6	PS-TR	Lithic Scatter	None
C-482	LBPS-2	Isaac Sullivan Homestead	One House is Still Standing

Table C-12

Pump Stations That May Affect the Setting of Architectural Historical Sites

Study Area	Pump Station	Pipeline	Possible Architectural Historical Site(s)
Alternative 2: South County			
South County Reservoirs			
Adobe Road	PS-AR	S-153	1
Lakeville Hillside	PS-L	S-66	1
Sears Point	PS-SP	S-124	1
Tolay	PS-TCSW	No Pipeline	1
	PS-T	Unnamed	1
South County Irrigation			
East of Rohnert Park	SBPS-2	S-3	6
	SBPS-3	S-1	5
	SBPS-7	S-16	5
	SBPS-8	S-20	5
	SBPS-9	S-159	6
	SBPS-10	S-23	6
	SBPS-11	S-28	1
Lakeville	SBPS-12	S-44	4
Alternative 3: West County			
West County Reservoirs			
Bloomfield	None		
Carroll Road North	None		
Huntley	PS-H	W-32	1
Two Rock	None		
Valley Ford	None		
West County Irrigation			
Americano Creek	WBPS-6	W-126	1
Stemple Creek	WBPS-1	W-30A/S	1
	WBPS-3	W-55S	3
	WBPS-4	W-585	3
	WBPS-5	W-615	4
Miscellaneous	WBPS-7	W-140A	2

Pump Stations That May Affect the Setting of Architectural Historical Sites
(Continued)

Study Area	Pump Station	Pipeline	Possible Architectural Historical Site(s)
Alternative 4: The Geysers Discharge			
The Geysers Discharge	PS-G2	D-1	11
	PS-G3	D-1	1
Alternative 5: Russian River Discharge			
Russian River Discharge	PS-DR	D-2	3
Alternative Substitutions and Miscellaneous Components			
Sebastopol Irrigation			
Sebastopol	None		
Laguna Irrigation			
Existing Laguna	LBPS-1	L-76	6
	LBPS-2	L-87	8
	LBPS-3	L-151	4
	LBPS-4	L-150	4
Urban Irrigation			
Fountain Grove and East Santa Rosa Bennett Valley	PS-FGB	Unnamed	1

Reservoir, irrigation, discharge, and pump station study areas overlap and can contain the same cultural resources. Due to this overlap, total number of cultural resources per individual study area will not equal totals per overall alternative study area.

Table C-13

The Geysers Alternative, Watertanks That May Affect the Setting of Cultural Resources

Designation	Resource Type
Recorded Archaeological Sites	
CA-SON-1123H	Mine
CA-SON-1321H	Mine
Possible Cultural Resources	
Contact Mine	Mine
Crystal Mine	Mine
WT-1: Approximately eight tenths of a mile east of Socrates Mine on Dillingham Road	Building
WT-2: Approximately one-half mile west of Socrates Mine	Building
WT-3: Approximately one mile south of Socrates Mine, just east of intersection of Pine Flat Road and unnamed dirt road	Building
WT-4: Approximately one mile west of Socrates Mine	Building

Table C-14

South and West County Alternatives: Architectural Historical Site Settings That May Be Affected

Alternative with Reservoir	Architectural Historic Site	Associated Landscape Features & Small-Scale Elements Directly Impacted (i.e., within reservoir)	Archival Evidence	Field Review
Alternative 2: South County				
Tolay A	AHS-1	Yes	Yes 1877	Early 20th Century
	AHS-2	Yes	Yes 1877	No Field Review
	AHS-11	No	No Evidence	No Field Review
	AHS-12	Yes	Yes 1877	No Field Review
	AHS-13	Yes	Yes 1877	No Field Review
	AHS-14	Yes	Yes 1877	No Field Review
	AHS-16	No	No Evidence	No Field Review
	AHS-47	Yes	Yes 1877	Possible 19th Century
	AHS-48	No	No Evidence	No Field Review
	AHS-57	No	No Evidence	Late 19th Century
	AHS-59	No	No Evidence	No Field Review
	AHS-69	No	No Evidence	No Field Review
	AHS-70	Yes	Yes 1877	No Field Review
	AHS-71	No	No Evidence	No Field Review
	AHS-109	No	No Evidence	No Field Review
	AHS-120	No	No Evidence	Early To Mid-20th Century

South and West County Alternatives: Architectural Historical Site Settings That May Be Affected (Continued)

Alternative with Reservoir	Architectural Historic Site	Associated Landscape Features & Small-Scale Elements Directly Impacted (i.e., within reservoir)	Archival Evidence	Field Review
Alternative 2: South County				
Adobe Road	AHS-21	No	No Evidence	Early 20th Century
	AHS-22	No	No Evidence	Early 20th Century
	AHS-23	Yes	Yes 1877	Late 19th Century
	AHS-24	Yes	Yes 1867	Early 20th Century
	AHS-25	No	No Evidence	No Field Review
	AHS-26	No	No Evidence	No Field Review
	AHS-27	Yes	No Evidence	No Field Review
	AHS-28	Yes	Yes 1877	Mid 20th Century
	AHS-29	Yes	Yes 1867	Mid 20th Century
	AHS-55	Yes	Yes 1877	Early 20th Century
	AHS-64	No	Yes 1877	No Field Review
	AHS-112	No	Yes 1877	No Field Review
	AHS-113	No	No Evidence	No Field Review
	AHS-114	No	No Evidence	No Field Review
	AHS-115	No	Yes 1877	No Field Review
	AHS-116	No	Yes 1877	No Field Review
	AHS-117	No	No Evidence	No Field Review
Lakeville Hillside	AHS-1	No	Yes 1877	Early 20th Century
	AHS-2	No	Yes 1877	No Field Review
	AHS-3	No	No Evidence	No Field Review
	AHS-4	Yes	Yes 1877	Late 19th Century
	AHS-65	No	Yes 1877	Late 19th Century

South and West County Alternatives: Architectural Historical Site Settings That May Be Affected (Continued)

Alternative with Reservoir	Architectural Historic Site	Associated Landscape Features & Small-Scale Elements Directly Impacted (i.e., within reservoir)	Archival Evidence	Field Review
Alternative 2: South County				
Lakeville Hillside (continued)	AHS-66	No	Yes 1867	No Field Review
	AHS-67	No	Yes 1867	No Field Review
	AHS-68	No	Yes 1877	No Field Review
Tolay C	AHS-1	Yes	Yes 1877	Early 20th Century
	AHS-2	Yes	Yes 1877	No Field Review
	AHS-12	Yes	Yes 1877	No Field Review
	AHS-13	No	Yes 1877	No Field Review
	AHS-14	No	Yes 1877	No Field Review
	AHS-59	No	No Evidence	No Field Review
	AHS-71	No	No Evidence	No Field Review
	AHS-74	No	No Evidence	No Field Review
	AHS-120	No	No Evidence	Early To Mid-20th Century
Sears Point	AHS-7	Yes	HRI# 5476-0335-0000	Late 19th Century
	AHS-8	No	No Evidence	No Field Review
	AHS-9	No	No Evidence	No Field Review
	AHS-10	No	No Evidence	No Field Review
	AHS-11	Yes	No Evidence	No Field Review
	AHS-72	No	No Evidence	No Field Review
	AHS-73	No	No Evidence	No Field Review
	AHS-74	No	No Evidence	No Field Review
	AHS-110	No	No Evidence	No Field Review

South and West County Alternatives: Architectural Historical Site Settings That May Be Affected (Continued)

Alternative with Reservoir	Architectural Historic Site	Associated Landscape Features & Small-Scale Elements Directly Impacted (i.e., within reservoir)	Archival Evidence	Field Review
Alternative 2: South County				
Sears Point (continued)	AHS-111	No	No Evidence	No Field Review
	AHS-119	No	No Evidence	No Field Review
	AHS-120	No	No Evidence	Early To Mid-20th Century
Alternative 3: West County				
Two Rock	AHS-30	No	Yes 1877	Late 19th Century
	AHS-31	No	Yes 1867	Late 19th Century
	AHS-32	Yes	Yes 1877	Early 20th Century
	AHS-33	Yes	Yes 1877	Early 20th Century
	AHS-34	Yes	Yes 1877	Late 19th Century
	AHS-60	No	Yes 1867	No Field Review
	AHS-75	No	Yes 1867	No Field Review
	AHS-76	No	No Evidence	No Field Review
	AHS-77	No	Sonoma County Landmark 3995 Roblar Road	No Field Review
	AHS-78	No	No Evidence	No Field Review
	AHS-79	No	No Evidence	No Field Review
	AHS-80	No	Yes 1877	No Field Review
	AHS-81	No	HRI# 4952-0284-0000	No Field Review
	AHS-82	No	No Evidence	No Field Review
	AHS-83	No	No Evidence	No Field Review
	AHS-84	No	No Evidence	No Field Review
	AHS-85	No	No Evidence	No Field Review

Alternative with Reservoir	Architectural Historic Site	Associated Landscape Features & Small-Scale Elements Directly Impacted (i.e., within reservoir)	Archival Evidence	Field Review
Alternative 3: West County				
Two Rock (continued)	AHS-86	No	No Evidence	No Field Review
	AHS-87	No	Yes 1877	No Field Review
	AHS-88	No	No Evidence	No Field Review
	AHS-89	No	No Evidence	No Field Review
	AHS-90	No	No Evidence	No Field Review
	AHS-91	No	No Evidence	No Field Review
	AHS-92	No	No Evidence	No Field Review
	AHS-93	No	No Evidence	No Field Review
	AHS-94	No	No Evidence	No Field Review
	AHS-95	No	No Evidence	No Field Review
	AHS-96	No	No Evidence	No Field Review
	AHS-97	No	No Evidence	No Field Review
	AHS-98	No	HRI# 4952-0285-0000	No Field Review
	AHS-99	No	Yes 1877	No Field Review
	AHS-100	No	No Evidence	No Field Review
	AHS-101	No	No Evidence	No Field Review
	AHS-102	No	No Evidence	No Field Review
	AHS-103	No	No Evidence	No Field Review
Bloomfield	AHS-35	No	HRI# 4952-0302-0000	A Mid-19th Century Cemetery
	AHS-36	No	Yes 1877	Late 19th Century
	AHS-37	Yes	Yes 1877	No Field Review

Alternative with Reservoir	Architectural Historic Site	Associated Landscape Features & Small-Scale Elements Directly Impacted (i.e., within reservoir)	Archival Evidence	Field Review
Alternative 3: West County				
Bloomfield (continued)	AHS-38	No	Includes: HRI# 4952-0287-0000 HRI# 4952-0288-0000 HRI# 4952-0289-0000 HRI# 4952-0290-0000 HRI# 4952-0291-0000 HRI# 4952-0293-0000 HRI# 4952-0294-0000 HRI# 4952-0295-0000 HRI# 4952-0296-0000 HRI# 4952-0297-0000 HRI# 4952-0298-0000 HRI# 4952-0301-0000 HRI# 4952-0302-0000 HRI# 4952-0303-0000	No Field Review
	AHS-39	No	Yes 1877	No Field Review
	AHS-42	No	No Evidence	Mid-20th Century
	AHS-43	Yes	HRI# 4952-0304-0000	Mid-19th Century
	AHS-44	Yes	No Evidence	Late 19th Century
	AHS-63	No	Yes 1867	No Field Review
	AHS-104	No	No Evidence	No Field Review
	AHS-105	No	Yes 1867	No Field Review
	AHS-106	No	Yes 1877	No Field Review
	AHS-107	No	Yes 1877	No Field Review
	AHS-108	No	Yes 1867	No Field Review
Carroll Road	AHS-39	Yes	Yes 1877	No Field Review
	AHS-40	No	HRI# 4952-0292-0000	Mid-19th Century

Alternative with Reservoir	Architectural Historic Site	Associated Landscape Features & Small-Scale Elements Directly Impacted (i.e., within reservoir)	Archival Evidence	Field Review
Alternative 3: West County				
Carroll Road (continued)	AHS-41	No	No Evidence	Late 19th Century
	AHS-42	No	No Evidence	Mid-20th Century
	AHS-43	Yes	HRI# 4952-0304-0000	Mid-19th Century
	AHS-44	Yes	No Evidence	Late 19th Century
	AHS-45	Yes	Yes 1877	Mid-20th Century
	AHS-46	No	Yes 1877	Early 20th Century
	AHS-63	Yes	Yes 1867	No Field Review
Valley Ford	AHS-40	No	Yes 1877	No Field Review
	AHS-41	No	No Evidence	Late 19th Century
	AHS-45	Yes	Yes 1877	Mid-to-Late 20th Century
	AHS-46	Yes	Yes 1877	Early 20th Century
	AHS-118	No	No Evidence	No Field Review
Huntley	AHS-17	No	Yes 1877	Late 19th Century
	AHS-18	No	Yes 1877	Early 20th Century
	AHS-19	No	Yes 1877	Early 20th Century
	AHS-20	No	Yes 1877	Late 19th Century
	AHS-49	No	Yes 1877	Early 20th Century
	AHS-50	No	Yes 1877	Early 20th Century
	AHS-61	Yes	Yes 1877	No Field Review
	AHS-62	Yes	Yes 1877	No Field Review

APPENDIX D

CORRESPONDENCE

STATE OF CALIFORNIA PETE WILSON, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082

November 2, 1994

RECEIVED 11-10-94

Seana Searle
Sonoma State University Academmmic Foundation, Inc.
Anthropological Studies Center
Cultural Resources Facility
Foundation Center, Bldg. 300
1801 East Cotati Ave.
Rohnert Park, California 94928-3609

RE: Long Term Sub Regional Waste Water Management Plan for the City of Santa Rosa

Dear Ms. Searle:

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. It is with the understanding that the list is to be used only to determine possible areas of cultural sensitivity.

The Commission makes no recommendation or preference of a single individual, or group over another. One suggestion would be to contact all of those indicated, if they cannot supply information, they might recommend other with specific knowledge.

This list should provide a starting place in locating areas of potential adverse impact within the proposed project area.

If you have any questions or need additional information, please contact me.

Sincerely,

Debbie Pilas-Treadway
Staff Services Analyst

Native American Contacts
SonomaCounty

November 2, 1994

Gene Buvelot Coast Miwok
1025 Susan Way
Novato , CA 94947
(415) 241-3942 Work
(415) 883-9215 Home

Cloverdale Rancheria of Pomo Indians
Jeffery Allen Wilson, Sr., Representitive Pomo
2013 Long Leaf Court
Santa Rosa , CA 95492
(707) 523-1852

Dry Creek Rancheria of Pomo Indians
Amy Martin, Chairperson Pomo
P.O. Box 607
Geyserville , CA 95441
(707) 857-3842
(707) 857-4011

Grant Smith Coast Miwok, Pomo
4309 Chico Ave
Santa Rosa , CA 95401
(707) 528 -2584

Lytton Indian Community of California
Eleanor Lopez, Chairperson Pomo
P.O. Box 7882/ 4525 Montgomery Dr. , #12
Santa Rosa , CA 95407
(707) 537-1655
Fax: (707) 537-1705

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Cod and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting Native Americans regarding the The Long term sub regional waste water management plan for the city of Santa Rosa.

Native American Contacts
SonomaCounty

November 2, 1994

Kashia Band of Pomo
Calvin H. Smith, Sr., Vice-Chairperson Pomo
2167 Whitewood Drive
Santa Rosa , CA 95407
(707) 573-1876

Jim Brown III Pomo
P.O. Box 618
Clearlake Oaks , CA 95423
(707) 998-1666

Kathleen Smith Pomo, Coast Miwok
1728 Sunnyvale Avenue
Walnut Creek , CA 94596
(510) 938-6323

Ya-Ka-Ama
Mrs. Quitiquit Pomo, Miwok, Wappo
6215 Eastside Road
Forestville , CA 95436
(707) 887-1541

Mishewal-Wappo Tribe of Alexander Valley
John Trippo, Chairperson Wappo
P.O. Box 7342
Santa Rosa , CA 95407

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This list is only applicable for contacting Native Americans regarding the The Long term sub regional waste water management plan for the city of Santa Rosa.

Native American Contacts
Marin County

November 2, 1994

Grant Smith — Coast Miwok, Pomo
4309 Chico Ave
Santa Rosa , CA 95401
(707) 528 -2584

Kathleen Smith — Pomo, Coast Miwok
1728 Sunnyvale Avenue
Walnut Creek , CA 94596
(510) 938-6323

Federated Coast Miwok
Gene Buvelot — Coast Miwok
P.O. Box 481
Novato , CA 94948

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This list is only applicable for contacting Native Americans regarding the The Long term sub regional waste water management plan for the city of Santa Rosa.

24 August 1995

Mr. Christian Gerike
Project Manager
Sonoma State University Academic Foundation, Inc.
1801 East Cotati Avenue
Rhonert Park, CA 94928-3609

Dear Mr. Gerike:

Santa Rosa Subregional Long-Term Wastewater Project

Thank you for your letter of 5 July 1995 regarding an ongoing cultural resources study for the Santa Rosa Subregional Long-Term Wastewater Project Environmental Report. The Federated Coast Miwok would like to be consulted on any matters potentially affecting cultural resources in Marin and southern Sonoma Counties.

With regard to the project discussed in your letter we are particularly interested in the reservoir sites near Valley Ford and Two Rock and any type of site in the vicinity of Sebastopol and the Laguna where many unmarked Coast Miwok and Pomo burials are located. We would appreciate receiving notification of any field activities in these areas and afforded an opportunity to accompany field personnel.

Coast Miwok Cultural Preservation - As we progress with our efforts for federal acknowledgment we anticipate compiling detailed historical and archaeological information. Would it be appropriate to contact the Foundation for information and possibly assistance with this effort? We are currently seeking grant funding to support this effort. A related effort we hope to undertake at a future date is compiling an inventory of human remains and cultural items located in various museums and depositories.

Please feel free to write to me at either the letterhead address of my residence at 970 San Clemente Drive, Santa Rosa, CA 95404. Tribal Council Member Brian Campbell is an alternate contact for these matters and can be reached at 564 Central Avenue #108, Alameda, CA 94501, (510) 523-0680 [H], (510) 287-0680 [W]. Thank you again for your efforts.

Sincerely,

Gibb Olivarez pc

Gibb Olivarez
Chairman, Tribal Council
Federated Coast Miwok

c: Tribal Council

STATE OF CALIFORNIA

PETE WILSON, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082

RECEIVED 9/27/95

September 27, 1995

Christian Gerike
Project Manager
Sonoma State University Academic Foundation, Inc.
Foundation Center, Bldg. 300
1801 East Cotati Avenue
Rohnert Park, CA 94928-3609

RE: Santa Rosa Subregional Long-Term Wastewater Project

Attention: Michael Jabionowski

A record search of the sacred lands file has failed to indicate the presence of Native American cultural resources in the immediate project area indicated on the maps you provided. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is the list of Native American contacts individuals/organizations who may have knowledge of cultural resources in the project area. It is with the understanding that this list is to be used only to determine possible areas of cultural sensitivity.

The Commission makes no recommendation or preference of a single individual, or group over another. One suggestion would be to contact all of those indicated, if they cannot supply information, they may be able to recommend others with specific knowledge

If you have any questions or need any additional information, please call me at (916) 653-4040.

Sincerely,

Gail McNulty

Gail McNulty
Associate Program Analyst

NATIVE AMERICAN CONTACTS
Marin County

September 26, 1995

Grant Smith Coast Miwok, Pomo
4309 Chico Ave
Santa Rosa , CA 95401
(707) 528 -2584

Kathleen Smith Pomo, Coast Miwok
1728 Sunnyvale Avenue
Walnut Creek , CA 94598
(510) 938-6323

Ya-Ka-Ama
6215 Eastside Road Pomo, Miwok, Wappo
Forestville , CA 95436
(707) 887-1541

Federated Coast Miwok
Gene Buvelot Coast Miwok
P.O. Box 481
Novato , CA 94948

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This list is only applicable for the cultural resource assessment of the Santa Rosa Subregional Long-Term Wastewater Project.

NATIVE AMERICAN CONTACTS
Sonoma County

September 26, 1995

Gene Buvelot Coast Miwok
1025 Susan Way
Novato , CA 94947
(415) 241-3942 Work
(415) 883-9215 Home

Grant Smith Coast Miwok, Pomo
4309 Chico Ave
Santa Rosa , CA 95401
(707) 528 -2584

Kathleen Smith Pomo, Coast Miwok
1728 Sunnyvale Avenue
Walnut Creek , CA 94596
(510) 938-6323

Ya-Ka-Ama
6215 Eastside Road Pomo, Miwok, Wappo
Forestville , CA 95436
(707) 887-1541

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This list is only applicable for the cultural resource assessment of the Santa Rosa Subregional Long-Term Wastewater Project.

APPENDIX E

RESEARCH DOMAINS AND APPLICABLE RESEARCH QUESTIONS

APPENDIX E: RESEARCH DOMAINS AND APPLICABLE RESEARCH QUESTIONS

Listed below are prehistoric and historical research questions found in the archaeological literature that are applicable to the South and West County study areas. Refer to sections 3.6.3 and 3.6.4 for information regarding the sources of these research domains and questions. In addition some new questions have been developed to address specific research concerns in the study area.

Prehistoric Research Domains

Geographic - Temporal Relationships

What local chronological sequence refinement can be made using radiocarbon, hydration, and/or sourcing information?

What was the time period of the earliest human utilization of the area and the nature of that utilization?

Are there single-component sites in the area that can aid in identifying temporally-diagnostic artifact assemblages?

What is the cultural sequence in each smaller locality and its relationship to the sequences in adjacent portions of the North Coast Ranges and the San Francisco Bay Area?

Settlement and Subsistence Patterns

When does the introduction of the bow and arrow occur in the area? What is the relation to its introduction in surrounding areas? How does this development affect resource-procurement? What can faunal element analysis tell us about the increase or decrease of resource types exploited?

Is there evidence of discrete periods of occupation of the area? Does the pattern of settlement suggest periodic site abandonment to allow replenishment of local resources?

What is the relationship of individual sites to their biophysical contexts, their functions, and their statuses in the overall settlement system of which they are a part?

Can shifts in the Sonoma/Marin District prehistoric boundary be documented from study of site distributions and artifact assemblages?

What caused the documented sudden shift in the dominant shellfishes that were exploited in the Bay Area? Is there evidence of overexploitation at this time? Is this evidence for a sudden subsidence and silting on the bay?

What was the degree of seasonality/sedentism in the area? Did this pattern change through time? Does the degree of sedentism inferred correlate with certain environmental factors?

Is there evidence in the artifact assemblages or faunal remains at Tolay Valley sites to support the hypothesis that "charmstones" were used for capturing waterfowl?

Did the nature or importance of waterfowling change over time?

Do charmstones at occupations sites differ from those in the former lakebed?

Do charmstones types cluster within the drainage?

What activities took place at the site, and where did these activities take place on the site?

Paleoclimatic Reconstructions/Past Environmental Conditions

Is there indication of botanical and faunal remains altering through time that may suggest environmental change?

Are there buried sites that can provide paleolandscape information?

Are there appropriate locations in the area for obtaining pollen data?

Interaction and Exchange Systems

Is there information regarding trade and/or social relationships among the Bodega Coast Miwok and the Southern Coast Miwok through time?

Were the coastal resources utilized by the area's occupants traded for, or did the inhabitants make periodic trips to the coast to collect shellfish? Was the activity a seasonal one?

What obsidian sources were used in the area, and did the dominant source change over time?

Do obsidian sources correlate with specific artifacts, artifact styles, and/or lithic reduction stages?

What caused the development of the clam disc bead horizon? Is there evidence of greater use of clam disc beads in marginal areas? What factors led to the acceptance of these beads as the dominant currency throughout northcentral California?

What was the impetus for the increasing complexity in the development of tribelet systems?

Technological - Demographic Relationships

How were the bow and arrow introduced?

How does the nature of stone-tool production in this area compare with flaked-stone technologies in the Bay Area and the North Coast Ranges?

Are local toolstones preferred for certain tool types or during certain time periods?

Do any of the tools at bayshore and lakeside settings represent a special technology developed for the exploitation of marsh resources?

Is there evidence for the development of an acorn economy in the ratios of kinds of milling tools, their wear patterns, changes in the macrobotanical remains, and artifact assemblages associated with bedrock milling stations?

Are there differences between the formal tools as regards material type or wear patterns?

Is there evidence for charmstone manufacture at Tolay Valley sites? Are charmstones made of locally occurring material? Does material type differ by charmstone style?

Sociocultural Change

Can information from sites in the area help to further define the ethnographic boundaries of the Coast Miwok, Pomo, and Wappo peoples?

Can a transition from burial to cremation be documented? Can it be linked to other events, such as environmental change, entry of new populations, or introductions of new technology?

What is the evidence for the rise of sociocultural complexity and the development of specialization?

Was tribelet structure at the base of the prevailing settlement pattern in the Bay Area?

How can variables in settlement pattern be controlled to identify sociopolitical structure?

Can the evolution of the tribelet be traced in the archaeological record?

Sociocultural Identity of Prehistoric and Ethnographic Populations

When did the Utians (Miwok-Costanoans) first arrive on the bay? When did they move into the Marin District, the Sonoma District?

Can the ethnographic boundary be defined between the Coast Miwok and Patwin peoples in South County?

Is there information adequate to allow correlations between the sites at Two Rock and the ethnographically reported sites of *Ewa-pai I*, *Uli'yome*, and *Payine'tca*?

Does archaeological evidence affirm or deny the presence of the ethnographic Patwin peoples in the Tolay drainage?

What does the archaeological record indicate concerning the social structure of the group(s)? Will the analysis of ornaments and wealth items, if any, indicate social ranking?

Do obsidian trade and exchange networks correlate with ethnographic boundaries and/or archaeological districts?

Buried Sites

Can buried sites in the area provide information for the reconstruction of the paleolandscape?

Can reconstruction of the paleolandscape based on geographical evidence be used to identify buried archaeological sites?

Do buried sites provide information distinct from surface sites or sites that have been reoccupied?

Can buried sites in the area provide cultural, spatial or temporal information that is not represented elsewhere in the archaeological record?

Can buried sites provide information about the nature and timing of past environmental events?

Milling Station Sites and Petroglyph Sites

> Note: While petroglyph and milling station sites serve different functions, the question of the relationship between manufacture, use, and associated deposits are similar.

Were the petroglyph/milling stations produced during a single episode, over a relatively brief time, or added to or renewed over a long period of time?

Are there cultural deposits in direct association with the petroglyph/milling station boulders, and what is the relationship between such deposits and the boulders?

Do such deposits contain tools that may have been used to manufacture the petroglyph/milling stations, as evidenced by wear patterns, distinctive distributions, or petrographic analysis (e.g., mortar sandstone embedded in basalt hammerstone)?

Are there sufficient temporally diagnostic tools or datable materials to propose the time of manufacture/use of these sites?

Is there evidence to suggest differing contemporaneous activities at these sites (e.g., faunal remains at milling sites; flaking debris at petroglyph sites).

Were the petroglyphs painted? Does the site contain evidence of pigments, and if so, are they near the petroglyph panels, do they occur randomly throughout the deposit, and can they be temporally associated with a specific assemblage? Is there evidence of pigment processing in cupules or at milling stations?

What is the relationship between cupules, mortars, and PCNs on the same outcropping (e.g., at SP-C-1)?

What was the function of the milling stations (e.g., processing acorns, seeds, berries, medicines or pigments)? Can flotation analysis of adjacent soils indicate what was processed?

What is the relationship of the petroglyph/milling station sites to other sites in the area? Are they linked in a way so as to suggest kin group or tribelet territory?

What is the relationship of these sites to topographic, hydrological, and biotic features?

Are any of these petroglyph/milling station sites traditional cultural properties?

Historical Research Domains

Environmental Adaptations

How were the local adaptations related to agricultural water requirements, in terms of crop choice, field size, barn and corral placement, size and location of reservoirs?

How did the droughts of the 1860s, 1890s and 1930s affect the local adaptations? Can shifts in the above-mentioned features be dated to these events?

What was the effect of the ranchers' ecosystem management on the environment?

To what extent were published resources used to develop and manage farms?

Settlement Patterns

How were physical and social boundaries given material form?

Was there a relationship between the layout of farms and the township and range system, or with land-grant boundaries?

What is the geographic distribution of the various construction techniques used?

What is the geographic distribution of differing farm/ranch layouts?

Does the farm/ranch layout represent any specific environmental adaptations?

Sociocultural Relationships

How was material culture used to symbolize and affirm social categories?

To what extent were patterns of land use, development, and tenure associated with family developmental cycles?

How were the social relations managed within and between ranching units?

What evidence exists for competition of resources in the study area?

Was there legislation that affected these agricultural communities, and can we see the physical manifestation of that legislation?

Economics

What is the relationship between agricultural practices and site form?

What was the relationship between control of production and social differentiation?

What was the relationship between the size of domiciles, the composition of families, and labor requirements?

How did the development of transportation networks alter the function and complexity of sites?

To what degree did subsistence agriculture increase during periods of economic decline for ranchers?

How did the economic strategies of owners differ from those of tenants? Which of the two groups fared better?

How does the shift from generalized to specialized farming appear in the archaeological record?

Ethnicity and Gender

Did the consumer behavior of men and women differ? Are certain types of artifacts more reflective of women in the study area than men ?

Do female artifact assemblages in rural areas differ from those from urban contexts?

What is the relationship between ethnicity and commercially manufactured agricultural equipment versus farm-manufactured equipment?

What unique features did an ethnic group bring with them that allowed them to function in this agricultural setting (e.g., ranch layout, artifact types, methods of ranching)?

Does the arrangement of the farm/ranch yard indicate ethnicity?

Are certain types of artifacts more reflective of particular ethnic group than others?

What is the relationship between ethnicity, site and material use, and environmental adaptation?