Historic Property Treatment Plan for the Feather River Levee Repair Project, Segment 2—Levee Setback

Yuba County, California

PREPARED FOR:

Three Rivers Levee Improvement Authority
Marysville, California

PREPARED BY:

EDAW, Inc.
Sacramento, California

November 2008

EDAW | AECOM

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ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
AEP	annual exceedance probability
B.P.	before present
CCTS	Central California Taxonomic System
cfs	cubic feet per second
cm	centimeters
CRHR	California Register of Historic Resources
Enterprise	Enterprise Rancheria
EPA	Environmental Protection Agency
HPTP	Historic Property Treatment Plan
km	kilometer
m	meters
MLD	most likely descendant
MOA	memorandum of agreement
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
plan	historic property treatment plan
RD	Reclamation District
Section 106	Section 106 of the National Historic Preservation Act
SHPO	California State Historic Preservation Officer
TRLIA	Three Rivers Levee Improvement Authority
UC Berkeley	University of California, Berkeley
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

HISTORIC PROPERTY TREATMENT PLAN FOR CA-YUB-5

INTRODUCTION AND STATEMENT OF AUTHORITY

The Three Rivers Levee Improvement Authority (TRLIA) is realigning Segment 2 of the Feather River East Levee, south of the City of Marysville, California. This project is an undertaking under Section 106 of the National Historic Preservation Act (Section 106) because it requires permissions and authorizations from the U.S. Army Corps of Engineers (USACE) under the Section 404 of the Clean Water Act and Section 408 of the Rivers and Harbors Act. This undertaking will realign the position of the Feather River East Levee, and as a result, will place the prehistoric site CA-YUB-5 within the expanded floodplain. This site is eligible for listing on the National Register of Historic Places (NRHP) under Criterion D, because the site has a scientifically valuable assemblage with sufficient integrity to yield important information for prehistoric research. As such, the site is an historic property under the Section 106 regulations (36 CFR Section 800.16[l][1]). The identified assemblage at the site may include organic constituents that record prehistoric dietary, subsistence, and settlement patterns. While the site will only be inundated during relatively high river flows, it will be inundated more frequently than the present interval of flooding, as fully described below under *Anticipated Hydrologic and Hydraulic Conditions*. The increased inundation relative to existing conditions has the potential to damage the data-bearing organic constituents of the assemblage by expediting decay. The increased inundation frequency also has limited potential to result in embankment sloughing or erosion at the site which could remove other portions of the cultural deposit that contain data such as lithic, faunal, and skeletal constituents. These impacts would be an adverse effect under Section 106, because they would diminish the characteristics that make the site eligible for inclusion in the NRHP (36 CFR Section 800.5[a][1]).

To resolve the potential adverse effects, USACE, after consultation with TRLIA, the California State Historic Preservation Officer (SHPO), and Enterprise Rancheria (Enterprise) executed a memorandum of agreement (MOA) on July 22, 2008, per the Section 106 regulations (36 CFR Part 800.6). The contents of the MOA are referred to in this plan as "stipulations." The MOA stipulates that TRLIA will prepare this historic property treatment plan (plan) to resolve identified adverse effects (Stipulation II [B]). This plan thus provides the legal standards for identifying and resolving adverse effects. This plan also offers a program of investigation to further characterize the nature of the adverse effect as it relates to the remaining assemblage, and to capture data that contributes to the site's eligibility.

The proposed methods to achieve these goals include analysis of existing collections from CA-YUB-5, curated at the University of California, Berkeley (UC Berkeley), geomorphological studies, limited site sampling through augering, and a literature review on the effects of inundation on archaeological materials. The program of augering will attempt to retrieve a sample of the perishable portion of the assemblage, including faunal remains and botanical material from sediments by flotation analysis. The analysis of existing collections will retrieve data from the UC Berkeley collection, originally retrieved in 1953, and provide a proxy measure for characterizing the remaining assemblage without ground-disturbing data recovery. The geomorphological analysis and literature review will provide a baseline to determine what impact post-project inundation may have on the perishable materials in the assemblage. This work may also clarify how historic and prehistoric seasonal inundation has played a role in degradation of data potential prior to levee construction. Collectively, these actions should characterize the nature of the assemblage at the site, allow the consulting parties to determine the severity of the potential effects of increased inundation frequency, and synthesize and capture data that may be lost by expedited decay caused by inundation. This plan also provides protocols for monitoring construction and inadvertent discoveries included as Appendix A, as required under Stipulation III(F).

REGULATORY FRAMEWORK AND STANDARD FOR IDENTIFYING AND RESOLVING ADVERSE EFFECTS

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of their undertakings on historic resources (those cultural resources presently listed or determined to be eligible for listing on the NRHP) and allow the Advisory Council on Historic Preservation (ACHP) reasonable opportunity to comment on their actions (16 U.S. Code Section 470[f]). However, only adverse effects require resolution through Section 106 (36 CFR Section 800.6). These regulations indicate that an adverse effect is one that would:

> "… alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative."

The criteria of adverse effects refer to the characteristics that make a property eligible for inclusion in the NRHP. Criterion D applies to site CA-YUB-5 (36 CFR Section 60.4):

> "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 … [have] yielded, or may be likely to yield, information important in prehistory or history [Criterion D]."

As described above, the present undertaking has the potential to expedite decay of organic material that contains information about dietary, subsistence, and settlement patterns, as well as potentially cause soil sloughing or erosion of potential data-bearing portions of the assemblage. Because these assemblages contain the data that make CA-YUB-5 eligible for NRHP listing under Criterion D, these impacts are adverse and must be resolved through consultation and planning.

Resolution of adverse effects is a process that does not dictate substantive outcomes. Federal courts have held that "Section 106 is characterized aptly as a requirement that agency decision makers "stop, look, and listen," but not that they reach particular outcomes" (*Narragansett Indian Tribe v. Warwick Sewer Authority*, 334 F.3d 161, 166 [2003]). The critical concern is that the federal agency identify ways to "minimize, or mitigate any adverse effects on historic properties" in consultation with the SHPO, Indian Tribes, and other consulting parties (36 CFR Part 800.1[a] et seq.), not that agencies completely mitigate the full extent of impacts.

Accordingly, this plan provides a range of mitigation measures and treatment, including further investigation of CA-YUB-5 to retrieve a sample assemblage of data that contributes to the site's eligibility. This plan thus provides a vehicle for the discussion and selection of appropriate treatment and mitigation. In its final form, upon review and incorporation of comments by consulting parties, the plan will be implemented to complete USACE's responsibilities under Section 106 for CA-YUB-5. The following section documents the expressed wishes of the consulting parties, to date, for treatment of CA-YUB-5. The Monitoring and Inadvertent Discovery Plan provided in Appendix A also includes actions related to the protection of site CA-YUB-5 during project construction and is considered part of this Historic Property Treatment Plan (HPTP).

RESULTS OF CONSULTATION TO DATE REGARDING THE TREATMENT OF CA-YUB-5

SHPO, USACE, and TRLIA are signatory parties under the MOA. TRLIA's role is significant as the local agency that assumes responsibility for completing a cultural resource inventory, HPTP, and Monitoring and Inadvertent Discovery Plan under the MOA. USACE has identified Enterprise Rancheria (Enterprise) as a Native American tribe that attaches cultural significance to CA-YUB-5, and has standing to consult regarding treatment of the site as a consulting party.

ENTERPRISE RANCHERIA

In a meeting on December 9, 2007 between USACE, TRLIA, TRLIA's consultant EDAW, and Enterprise, Enterprise indicated their desire to completely avoid data collection methods that would require disturbing the soil at the site. Enterprise also expressed a preference that the undertaking provides some method of stabilizing the site to protect it from potential soil sloughing, erosion, and human disturbance. Subsequently, USACE forwarded their concerns to SHPO.

Ren Reynolds, EPA Planner with Enterprise, indicated in a phone conversation that Enterprise would like to have the CA-YUB-5 site materials held by UC Berkeley collections repatriated. While this action is beyond the scope of this project, USACE archaeologist Dan Bell indicated that USACE would assist Enterprise with their request. In addition, a copy of the analysis performed by EDAW including a catalog of the collection will be forward to Enterprise. A record of the correspondence between EDAW and Enterprise regarding this HPTP is provided in Appendix E.

USACE AND SHPO

During consultation to develop the MOA, USACE expressed a strong interest in data recovery if it is determined that the undertaking will expedite the decay of organic constituents likely present at CA-YUB-5. USACE would also like to see TRLIA place appropriate protective measures on the site such as riprap or vegetative plantings to minimize the potential for soil sloughing or erosion of the site.

SHPO has heard the expressed concerns of Enterprise and USACE. SHPO indicated that at a minimum, testing efforts should provide a spatial index of the horizontal and vertical extent of the site, as well as characterize the remaining cultural assemblage.

TRLIA

The primary responsibility of TRLIA, a joint powers agency, is to provide 200-year flood protection to the Reclamation District (RD) 784 area in southern Yuba County. TRLIA pursues this mission while simultaneously seeking to satisfy and comply with all applicable state and federal laws and regulations.

SUMMARY OF MANAGEMENT GOALS RESULTING FROM CONSULTATION

To accommodate the combined goals of minimizing disturbance while refining the nature of the possible adverse effects and retrieving a sample of archaeological data that may be lost by these effects, EDAW, in consultation with USACE, is proposing a five-stage approach, consisting of:

- collection of soil profiles and other geomorphological data from visible and existing stratigraphic exposures at the edge of the site;

- comparison of the geomorphological data with information garnered in a literature search regarding the effects of inundation on archaeological assemblages;

- limited subsurface auger testing at CA-YUB-5 to characterize the assemblage and to the extent possible capture important archaeological data from the site;

- analysis of UC Berkeley collections to increase the utility of these collections for research, and to further characterize the assemblage at CA-YUB-5 by nonintrusive means; and

- data analysis, synthesis, and preparation of a technical report documenting the results and presenting their significance relative to pertinent research domains.

Though unlikely due to soil conditions, the western edge of the terrace that CA-YUB-5 occupies may slough during cycles of inundation and drying after removal of the existing levee. TRLIA is working with land restoration specialists to place appropriate vegetative plantings on the slope, where appropriate, to increase the density of vegetation, thus minimizing the potential for soil sloughing. Both the side of the terrace and the surface of the CA-YUB-5 mound are unlikely to suffer from erosion during inundation events due to the slow water velocities indicated by hydraulic modeling (i.e., 1-2 cubic feet per second [cfs]) and the presence of soil types that are not highly susceptible to erosion. Never-the-less, the surface of the CA-YUB-5 mound will be planted with dense vegetation to both ensure stability of site soils and to discourage human access to the site. TRLIA will identify an appropriate and feasible planting plan and consult with the other signatories and consulting parties. Vegetative plantings will be sufficient to achieve two success criteria:

- provide root structures that would stabilize the landform so that it does not slough or erode as a result of inundation events, and,

- provide a deterrent to human interference through the use of plantings of blackberries and/or poison oak.

One or more feet of additional soil will also be placed on the surface of the CA-YUB-5 site prior to planting to further protect the site from erosion potential and human disturbance.

TRLIA or the California Department of Water Resources (anticipated ultimate owner of land in the setback area) will perform ongoing monitoring of the site to ensure that these success criteria are achieved. Implementation of these tasks will meet recommendations outlined in Mitigation Measure 3.8-a1 of the draft Environmental Impact Statement and Stipulation II(B) of the MOA regarding adverse effect and treatment of the identified historic property, CA-YUB-5.

STRATIGRAPHIC EXPOSURES OF THE SOIL PROFILE AT CA-YUB-5

EDAW proposes to expose existing stratigraphic profiles that are available in the bank along the western boundary of the site. These exposures would remove vegetation, with minimal surface disturbance. These exposures will be inspected, drawn, and characterized by an EDAW archaeologist and geomorphologist. No more than three profiles will be placed along the site boundary.

Sediment profiles and the associated geomorphological data would be used to reconstruct the general depositional history of the site and the role of inundation frequency in the site formation process. This data will then be compared against a review of available literature on the effects of inundation on archaeological sites to form a baseline against which to compare the impact of increased inundation frequency caused by the undertaking.

SUBSURFACE AUGERING

EDAW proposes excavation of up to, but no more than, 20 auger probes 4 inches (10 centimeters [cm]) in diameter across the site. These augers will be excavated into sterile deposits, and will be placed throughout the site area in order to characterize horizontal and vertical differentiation within the archaeological assemblage and to retrieve data. The exact number of auger probes will be determined through further discussion with consulting parties and Enterprise.

Auger probes will be excavated in 10 cm levels, and the recovered matrix will be submitted to a lab where flotation analysis will be used to extract all cultural material including flaked and ground stone tools and tool fragments, bone tools, carbonized seeds, non-human skeletal remains, shell, food remains, shell beads, etc. If human skeletal remains are encountered, they will be treated according to state law, as described in the Monitoring and Inadvertent Discovery Plan in Appendix A, as required under California Health and Safety Code Section 7050.5 and California Public Resources Code Section 5097.98. Because the auger could only disturb and expose small portions of human skeletal remains, a more comprehensive burial treatment plan is not required. Auger probes will be backfilled with sterile deposits from an off-site location. A Native American monitor will be present during all excavation at CA-YUB-5 under this plan. If human remains are discovered that are of prehistoric Native American origin, after the California Native American Heritage Commission designates a most likely descendant (MLD), the MLD will be provided access to the site and the opportunity to reinter of the remains with appropriate dignity.

ANALYSIS OF UC BERKELEY COLLECTIONS

EDAW archaeologists will conduct a detailed analysis and description of the cultural and human remains recovered from UC Berkeley excavations conducted in 1953. A preliminary assessment of the CA-YUB-5 materials curated in the Berkeley collections indicates that the matter consists of shell beads, flaked and ground stone artifacts, bone tools, charcoal samples, faunal remains, and the skeletal remains of approximately nine individuals. Skeletal remains will be analyzed by EDAW's on-staff osteologist, and artifacts will be analyzed by the project archaeologist, experienced in the analysis of flaked and ground stone tools, bone tools, and shell bead typologies. The level of effort expended in this analysis will consist of a qualitative and quantitative description of the artifacts, and complete pathological examination of the skeletal remains to the greatest degree possible given that some of the remains may be fragmentary. Analysis of the faunal remains from the collection will be conducted by an outside consultant.

Specifically, the osteological analysis of the human remains interred at CA-YUB-5 will include a thorough inventory of the skeletal and dental elements present, as well as further inspection to confirm any characteristics that might be indicative of age, sex, stature, pathology, trauma, ancestry, behavior, and lifestyle. This information will be synthesized to complete a biological profile for each individual interred and the population as a whole. Data collection will follow the methodology outlined in Buikstra and Ubelaker (1994) and Scott and Turner (1997). Both metric and morphological analyses will be undertaken.

Due to the fragmentary nature of the remains, it is expected that the information to be gleaned from the skeletal elements will be limited in scope. The skeleton is the most productive indicator of age, sex, and pathology. An assessment of these features within a population provides a foundation for addressing demographic inquiries, such as those regarding life and death. Nonspecific indicators of stress will be considered to appraise the overall health of the population. By studying patterns of pathology, it is also possible to determine behavioral or occupational patterns. Pending the condition of the remains, each individual will be assessed to determine the information useful to answering research questions such as:

- What is the demographic profile of the population?
- Are patterns present that reflect age, sex, or status in the burial practices?
- What is the generalized health of the population?

- What, if any, are the prevalent pathological conditions present?
- Do the pathological conditions present indicate any particular behaviors or lifestyle?

If the skeletal remains are fragmentary, dentition typically can contribute enough data to supplement that which is lost to taphonomic processes. This is most evident in studies of generalized health and diet using a biocultural approach (Larsen 1997). Oral health is indicative of an individual's general health, especially in prehistoric populations. Diet will also be assessed using patterns of dental attrition, as their relationship to diet is well documented in the literature. A study of the dental morphology will provide information regarding the human variation present within the burial site. The dental remains will be analyzed to provide insight into the following research questions:

- What is the trend in oral and general health in the population? Can any generalizations of the population be made?

- Is there any indication of diet at the macroscopic level? Larsen (1995) discusses the patterns of dental attrition as they relate to different diets. Additionally, the degree and location of carious lesions have been used to discern dietary components (Larsen et al. 1991).

- What are the most common discrete traits present in the dentition, and how does this characterize the population?

- Is there any indication of childhood stress or other pathological conditions present?

This analysis of the existing collection from the site will thus yield important data about the nature of the assemblage the site contained, including information regarding diet, overall population health, and subsistence patterns.

DATA SYNTHESIS AND PREPARATION OF TECHNICAL REPORT

Following the gathering of data through field investigations and analysis of the collections archived at UC Berkeley, EDAW will prepare a technical report. Analyses of the collected cultural materials will include, but will not necessarily be limited to, flaked and ground stone technological analysis, basalt and obsidian X-ray fluorescence, faunal bone analysis, C-14 analysis, and archaeo-botanical analysis of carbonized seed remains.

This data will offer an important proxy for work that would require greater ground disturbance that Enterprise wishes to avoid. This information will then be compared with the results of the augering, geomorphological work, and literature review to provide a more complete data set relative to hydrological and hydraulic information provided in Appendix B, the prehistoric context presented in Appendix C, and the research topics and questions provided in Appendix D and described above. The results of this study will be synthesized in a final report that will describe what the data contained at CA-YUB-5 reveals relative to the research questions and topics. This approach will hopefully maximize retrieval of information that contributes to the site's NRHP eligibility while simultaneously minimizing disturbances that would be contrary to the expressed wishes of Enterprise.

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APPENDIX A

Cultural Resources Monitoring and Inadvertent Discovery Plan

APPENDIX A
CULTURAL RESOURCES CONSTRUCTION MONITORING AND INADVERTENT-DISCOVERY PLAN

This cultural resources monitoring and inadvertent-discovery plan describes the monitoring methods and protocols and the locations along Segment 2 of the Feather River Levee Repair Project (FRLRP) that are subject to cultural resources–related construction monitoring. This plan is necessary to implement the monitoring requirements of the California Environmental Quality Act (CEQA) and National Environmental Protection Act (NEPA) documents prepared for the project and the memorandum of agreement (MOA) prepared to satisfy Section 106 of the National Historic Preservation Act (NHPA). References in this plan to "stipulations" or a "Stipulation" refer to stipulations of the MOA.

This body of this document describes the location subject to monitoring as well as the protocols for handling monitoring and inadvertent discoveries. The attachments review the mitigation measures that are incorporated from other environmental documents prepared for the undertaking (i.e., CEQA environmental impact report, cultural resources assessment, MOA, NEPA environmental impact statement). Attachment A1 provides a table listing the relevant mitigation measures and recommendations that apply generally to construction work associated with the undertaking. The measures in Attachment A1 as well as the specific practices defined in Attachment A2 apply to work in the vicinity of the archeological site identified as CA-YUB-5.

I. LOCATION OF MONITORING

Older alluvial surfaces characterized by the Riverbank and Modesto Formations are present within the area of potential effects (APE). These deposits occur at CA-YUB-5 as depicted in Exhibit A1. Due to the location and characteristics of these landforms and the evidence of occupation at CA-YUB-5, the Riverbank and Modesto Formations in the vicinity of site CA-YUB-5 are considered sensitive for buried archaeological resources. Where these formations are exposed in cut banks, they are shown to be overlain by up to 3 feet of sand and silt sediments deposited during seasonal flooding of the Feather River before construction of the existing levee. This recent layer of alluvium may obscure archaeological deposits that could be unearthed during ground-disturbing construction. The following monitoring protocols apply to ground-disturbing work within this region of the APE (i.e., the setback levee alignment at and within one-quarter mile of the CA-YUB-5 site). The inadvertent-discovery protocol governs finds made anywhere in the APE. The precise locations subject to monitoring are indicated in Exhibit A1.

II. MONITORING OF CONSTRUCTION

This section describes the activities within the sensitive portions of the APE that require cultural resources monitoring during construction. Cultural monitors will observe tree removal and stripping of topsoil, and excavation of the inspection trench. Periodic spot checks will be conducted during later excavations for the installation of a bentonite slurry barrier.

III. PROFESSIONAL QUALIFICATION STANDARDS

Consistent with the MOA, EDAW will supply field technicians to perform construction monitoring. All monitors will be supervised by an individual who meets the *Secretary of Interior's Professional Qualifications Standards* (48 *Federal Register* 44738–44739), consistent with Stipulation III(A). Native American monitors will also be present as appropriate.

IV. INADVERTENT-DISCOVERY PLAN

The following protocols for the discovery of cultural materials will apply to all construction activities conducted by Three Rivers Levee Improvement Authority (TRLIA) and its representatives. Cultural materials here mean prehistoric or historic archaeological deposits. Such deposits may contain flaked stone, bone, human skeletal remains, shell beads, or historic debris such as bricks or glass. Other indicators include darkened midden soil or other anomalous stratigraphy.

A. CONDITIONS TRIGGERING THIS PLAN

If three or more items of prehistoric or historic archaeological debris are discovered in one location during construction, ground-disturbing activities shall immediately stop where the discovery was made. Project team members shall be notified per Section C1, "Notice" described below. The initial identification may be made by construction personnel, an archaeological monitor, or a Native American monitor. In the event of an initial disagreement about whether the find is archaeological material requiring further treatment, the ultimate determination in the field shall be made either by consensus between the archaeological monitor and the Native American monitor, if any, or between two supervising professional archaeologists, by communication over the phone, or in person at the location of the discovery.

B. WHEN WORK MAY RESUME

The determination of when work may resume depends on the nature of the find and the potential effects of the undertaking on that resource:

- Where the U.S. Army Corps of Engineers (Corps), TRLIA, and TRLIA's contractor EDAW determine that the resource lacks eligibility for listing on the National Register of Historic Places (NRHP) as described under Section C(3) below, the Corps may issue the order to resume work. This order will be communicated to TRLIA and TRLIA's contractors either through EDAW, or by the Corps directly.

- Where a new historic property has been identified, the Corps may issue an order to resume work only after consulting with the State Historic Preservation Officer (SHPO) on the significance of the find, the presence or absence of adverse effects, and the sufficiency of measures developed to avoid the resource during construction or otherwise treat adverse effects. Section C(3) below describes the consultation process in detail. The order to resume work will be communicated to TRLIA and TRLIA's contractors either through EDAW or by the Corps directly.

C. ACTIONS SUBSEQUENT TO DISCOVERY

1. NOTICE

If a discovery is made by construction personnel, the contractor shall place telephone calls first to EDAW and immediately thereafter to TRLIA's representative(s). If direct contact is not made with the first individual called, a voice mail message shall be left and the next person on the list shall be called, and so on. If the discovery is made by the archaeological or Native American monitor, EDAW will contact TRLIA's construction personnel to advise them of the protective measures required and the status of the investigation. EDAW will then contact TRLIA.

EDAW, Inc.	TRLIA Contractors Contacts
Richard Deis, Archaeologist Office: 916\414-5878 Cell phone: 916\761-5358	John Dahl, GEI Consultants Office: 916\631-4586 Cell phone: 916\717-0162
Sean Bechta, Project Manager Office: 916\414-5876 Cell phone: 916\479-5442	Don Kurosaka, GEI Consultants Office: 916\990-6028 Cell phone: 916\631-4541
John Downs, Field Monitoring Coordinator Office: 916\414-5859 Cell phone: 916\290-2362	Doug Handen, Consultant Office: 916\635-5200 Cell Phone: 916\425-4662
Brian Ludwig: Archaeologist Office: 916\414-5886 Cell phone: 916\799-1384	
Steve Heipel: Archaeologist Office: 916\414-5837 Cell phone: 916\761-5289	
EDAW receptionist (ask for an archaeologist) Office: 916\414-5800	

2. INITIAL ASSESSMENT

This section describes how new discoveries will be recorded in the field. If the discovery is made while an archaeologist is present at the APE, the archaeologist will follow this section. If no archaeologist is present, TRLIA's contractors shall contact EDAW and EDAW shall send a qualified archaeologist to the project site within 2 hours following notification. The archaeologist shall document and assess the nature and significance of the find. This assessment will include at a minimum documentation on California State Parks (DPR) forms, including a description of the resource, photographs, dimensions, and geographic coordinates. The initial field assessment may include limited excavation to provide sufficient data to determine whether the resource requires further investigation. If the resource appears significant, it shall be considered an historic property subject to management pursuant to the MOA and this plan, until investigation and evaluation disproves this assessment. The determination of significance will be made per Section 3, below.

3. CONSULTATION REGARDING THE FIND

Pursuant to Stipulation III(E) of the MOA, "Discoveries," TRLIA, TRLIA's consultant EDAW, and the Corps shall consult to evaluate a discovered resource per the criteria for listing on the NRHP provided at 36 Code of Federal Regulations (CFR) Part 63. If TRLIA, EDAW, and the Corps concur that the resource in question is not a historic property, no further action is required. The Corps shall communicate this finding to the SHPO per 36 CFR Section 800.4(d)(1). The Corps may issue an order to resume work as described in Section IV(B) above, without concurrence from the SHPO.

If TRLIA, EDAW, and the Corps determine that the resource in question may be eligible for listing on the NRHP, then they shall apply the criterion of adverse effect per 36 CFR Part 800.5(a). Based upon this assessment, the

parties consulting under this section shall make a finding of effect (FOE), per Stipulation III(E). If a finding of *no historic properties affected* is made because the undertaking will not cause adverse effects, the Corps will forward the finding and all relevant documentation to the SHPO. The SHPO shall have 48 hours to respond. Upon SHPO concurrence or the expiration of the 48-hour clock, the Corps may issue an order for work to proceed.

If an adverse effect is found, the Corps shall forward all relevant documentation and recommendations for mitigation to the SHPO (MOA Stipulation III[E]), and the SHPO shall respond within 15 calendar days. If the SHPO, the Corps, and TRLIA agree on treatment of identified historic properties, TRLIA, in consultation with the Corps, shall ensure execution of the specified measures, and incorporate these measures into the Historic Properties Treatment Plan (HPTP) prepared for the MOA.

Disagreements regarding the presence of historic properties, adverse effects, or the sufficiency of treatment under this section shall be resolved per Stipulation VIII(C) of the MOA.

4. TREATMENT OF HUMAN SKELETAL REMAINS, CREMATIONS, OR OTHER INTERMENTS

If suspected human remains such as skeletal elements or cremation burials are found, work in the vicinity shall cease immediately. If the discovery is made by construction personnel, they shall immediately notify EDAW. An EDAW archaeologist shall make a site visit to determine the nature of the find within 2 hours following notification. If the EDAW archaeologist identifies human remains or potential human remains, he or she will immediately contact the Yuba County Coroner. If the coroner determines that a criminal investigation is required, directions from the coroner and law enforcement personnel shall be followed. If the coroner determines that no criminal investigation is required and the remains are not a prehistoric Native American burial, the remains shall be treated as a "find" per Section C(3) above. If the coroner determines that the remains are a prehistoric Native American burial, the coroner will contact the Native American Heritage Commission (NAHC) by phone within 24 hours of making that determination (California Health and Safety Code Section 7050.5[c]).

The NAHC will immediately notify the person it believes is the most likely descendant (MLD) of the Native American remains. With permission of the legal landowner(s), the MLD may visit the site and make recommendations regarding the treatment and disposition of the human remains and any associated grave goods. This visit should be conducted within 48 hours of their notification by the NAHC (California Public Resources Code Section 5097.98[a]). If an agreement for treatment of the remains cannot be resolved satisfactorily, any of the parties may request mediation by the NAHC (PRC Section 5097.94[k]). Should mediation fail, the landowner or the landowner's representative must reinter the remains and associated items with appropriate dignity on the property in a location not subject to further subsurface disturbance (California Public Resources Code Section 5097.98[e]).

ATTACHMENT A1

Mitigation Measures and Management Recommendations
Applicable to the Undertaking

ATTACHMENT A1
MITIGATION MEASURES AND MANAGEMENT RCOMMENDATIONS APPLICABLE TO THE UNDERTAKING

Mitigation Measures and Management Recommendations Applicable to the Undertaking	
Mitigation Measure ASB-5.8-d (TRLIA 2006, p. 5.8-d)	Stop Work and Implement Measures to Protect Archaeological Resources If Discovered during Ground-Disturbing Activities
Mitigation Measure ASB-5.8-e (TRLIA 2006, p. 5.8-d)	If Human Remains are Discovered during Ground-Disturbing Activities, Stop Work and Comply with State Laws Pertaining to the Discovery of Human Remains
Mitigation Measure 3.10-a1 (Corps 2008, p. 3.10-8)	Prepare a Memorandum of Agreement (MOA) between the Corps, TRLIA, and the SHPO, and Implement Measures in the Attached Historic Property Treatment Plan (HPTP) to Protect Site CA-Yub-5 during Project Construction
Mitigation Measure 3.10-a3 (Corps 2008, p. 3.10-10)	Provide Construction Monitoring
Mitigation Measure 3.10-b2 (Corps 2008, p. 3.10-11)	Provide Training to Construction Personnel in Identification of Cultural Deposits and Human Remains
Construction Training (TRLIA 2007, p. 40)	Provide Training to Construction Personnel in Identification of Cultural Deposits and Human Remains
Construction Monitoring (TRLIA 2007, p. 40)	Monitor locations containing older alluvial surfaces of the Modesto and Riverbank formations
Unanticipated Finds (TRLIA 2007, p. 40)	Stop work if archaeological resources are found, assess the significance of the find. If human remains are found comply with California Health and Safety Code Section 7050.5(b) and California Public Resources Code Section 5097.9

ATTACHMENT A2

Mitigation Measures for Site CA-YUB-5 and Work in the Vicinity

ATTACHMENT A2
MITIGATION MEASURES FOR SITE CA-YUB-5 AND WORK IN THE VICINITY

Mitigation Measures For Site CA-YUB-5 and Work In the Vicinity	
Exhibit A2-1 provides a graphic representation and narrative description of the stipulated mitigation and monitoring provided in this appendix.	
Mitigation Measure 5.8-a (TRLIA 2006, p 5.8-26)	Use engineered features and/or strategic plantings to protect the site. Collect site data as necessary to mitigate the loss of research potential associated with increased rates of decay for organic constituents of the assemblage.
Leave trees in place to the extent practical on the mound of CA-YUB-5 and in the vicinity (TRLIA 2007, p. 38).	Trees should be left in place and understory vegetation be allowed to grow to the extent practical on the CA-YUB-5 mound itself and within the area extending 500 feet north of the northernmost point of the mound, 200 feet east of the easternmost point of the mound, 100 feet south of the southernmost point of the mound, and west to the edge of the elevated terrace.
Monitoring of tree removal where necessary, within the portion of the levee footprint 500 feet north, 200 feet east, and 100 feet south of the mound boundaries (TRLIA 2007 p. 38).	In the portion of the setback levee construction footprint that is within these boundaries, where trees and root systems must be removed, mechanical tree removal should be completed in the most practicable manner that offers the greatest opportunity for preserving any isolated cultural resource materials that may be encountered during this process. A backhoe should be used for focused, controlled excavation around each tree stump prior to removal to afford a view of the root ball. This process should be closely monitored by an archaeologist and a Native American monitor.
Recommended tree removal methods outside of the levee footprint, but within the area 500 feet north, 200 feet east, and 100 feet south of the CA-YUB-5 mound boundaries (TRLIA 2007, p. 38).	Trees that would be removed from within these boundaries but outside of the setback levee construction footprint should be cut and the stumps ground. In these areas, the root systems should be left in place to the extent practicable to minimize the extent of ground disturbance. This activity should also be monitored by an archaeologist and a Native American monitor.
Grading methods to be used 500 feet north, 200 feet east, and 100 feet south of the CA-YUB-5 mound boundaries (TRLIA 2007 p. 39).	A tracked excavator with a flat blade on the bucket should be used to gradually grade the levee footprint within the area extending 500 feet north of the northernmost point of the CA-YUB-5 mound, 200 feet east of the easternmost point of the mound, and 100 feet south of the southernmost point of the mound. This activity should be monitored by an archaeologist and a Native American monitor. The grading should continue to the depth that will be needed to construct the levee footprint. If a belly scraper has to be used instead of an excavator, the scraper should remove soils in a maximum lift of 3 inches. Grading within this area should be performed as early as possible within the construction schedule to maximize the time available for investigation and appropriate treatment of discoveries.
Protection of the landform along the waterside access easement (TRLIA 2007, p. 39)	The waterside levee access easement parallel to the mapped extent of CA-YUB-5 should be built up with imported soils to a depth of at least 1 foot to protect any near-surface artifacts or features that could be affected by construction or maintenance machinery.

REFERENCES CITED

Corps. *See* U.S. Army Corps of Engineers.

TRLIA. *See* Three Rivers Levee Improvement Authority.

Three Rivers Levee Improvement Authority. 2006 (August). *Draft Environmental Impact Report for the Feather River Levee Repair Project, an Element of the Yuba-Feather Supplemental Flood Control Project.* State Clearinghouse #2006062071. Marysville, CA. Prepared by EDAW and Flood Control Study Team.

———. 2007 (August). *Cultural Resources Assessment for the Feather River Levee Repair Project, Segment 2—Levee Setback, Yuba County*. Marysville, CA. Prepared by EDAW, Sacramento, CA.

U.S. Army Corps of Engineers. 2008 (June). *Draft Environmental Impact Statement, 408 and 404 Permit to the Three Rivers Levee Improvement Authority for the Feather River Levee Repair Project, California, Segment 2.* Sacramento, CA.

APPENDIX B

Anticipated Hydrologic and Hydraulic Conditions

APPENDIX B
ANTICIPATED HYDROLOGIC AND HYDRAULIC CONDITIONS

The planned setback levee will work within the capacities of the current flood control system. The existing system design flow for the Feather River between the Yuba and Bear Rivers is 300,000 cubic feet per second (cfs). The upstream reservoirs (such as Oroville Reservoir and Bullard's Bar Reservoir) operate to maintain flows in the Feather River at or below this design flow, insofar as possible. With the setback levee in place along the Feather River, the reservoirs could continue to operate in the same manner as under current conditions. The levee setback will result in flood control benefits because it will lower water levels in the river during flood events and because the setback levee will be constructed in a more secure location than the existing levee, using modern engineering and construction methods. For the 1-in-100 annual exceedance probability (AEP) flood (i.e., the "100-year flood"), it was determined that the levee setback will lower the water level at the confluence of the Feather and Yuba rivers by approximately 1.3 feet. For the 1-in-200 AEP flood, the maximum water depth in the setback area is expected to fall approximately 1.6 feet in this location.

MBK Engineers (Three Rivers Levee Improvement Authority 2006) performed hydraulic modeling of the proposed levee setback. The modeling showed that flows will enter the upstream end of the levee setback area (i.e., the new floodway) when the river stage rises above the ground elevation at the current levee alignment, which is approximately 50 feet mean sea level. The analysis indicated that flows passing downstream would enter the levee setback area approximately once every 3 years on average, when the rate of flow is approximately 50,000 cfs. This is similar to the frequency of flooding now experienced in areas that are within the currently leveed channel of the Feather River, but are outside the low-flow channel. Approximately 70 to 100 acres of the setback area will also experience inundation from backwater flowing up the Plumas Lake Canal, approximately two out of every three years. However, site CA-YUB-5 will only be inundated during larger, relatively infrequent high water events.

The proposed levee setback would increase the capacity of the Feather River floodway to convey flood flows. Increasing the conveyance area by increasing the floodplain width would decrease the depth and velocity of flood flows in this portion of the Feather River floodway (along project Segment 2). This decrease in velocity would result in a decrease in shear stresses along this part of the Feather River. Shear stress is an expression of the lateral force of water against the adjacent shoreline. Higher shear stresses typically indicate greater erosion potential. Therefore, the presence of the setback levee would be expected to lessen the potential for channel bed, bank, and levee erosion on the Feather River along project Segment 2.

Water entering the setback levee area would result in the inundation of site CA-YUB-5 when sufficient flows are in the Feather River. This inundation could possibly cause soil sloughing from the existing bank on the western edge of the site, and erosion. The existing levee currently protects CA-YUB-5 from these effects, except during flood events resulting from a levee breach. The erosion potential at CA-YUB-5 after the setback levee is complete is very minor due to low water velocities and soil at the site not being highly susceptible to erosive forces. Any erosion or soil sloughing along the western bank will be addressed through protection and stabilization of the site using vegetation planted to minimize erosion and further stabilize the soil. The effects of inundation and soil saturation on the archaeological deposit at CA-YUB-5 are poorly understood at this time. Previous excavations conducted by University of California, Berkeley (UC Berkeley) were poorly documented, focused on the removal of human remains in only one portion of the deposit, and did not result in an assessment of archaeological data and its research potential. Therefore, in order to develop an accurate assessment of the archaeological values and to determine the extent to which inundation may impact those values, this Historic Property Treatment Plan (HPTP) was drafted.

REFERENCES CITED

Three Rivers Levee Improvement Authority
2006 Hydraulic and Hydrologic Analysis of the Three Rivers Levee Improvement Authority's Phase IV Project, Feather River Project. Marysville, CA. MBK Engineers, Sacramento, CA.

APPENDIX C

Project Context

APPENDIX C
PROJECT CONTEXT

ENVIRONMENTAL CONTEXT

The project site is situated on the east side of the Sacramento Valley in southwestern Yuba County, approximately 6 miles north of the town of Nicolaus, south of the towns of Yuba City and Marysville, southwest of Olivehurst, east of the Feather River, and south of the Yuba River. The area is depicted on the Olivehurst 7.5-minute U.S. Geological Survey (USGS) Quadrangle in Sections 1, 11–14, 23, 24, 26, and 36 of T14N, R3E, and Section 1 of T13N, R3E (Exhibits C1 and C2).

Currently, the project area contains primarily walnut and plum orchards with a smaller percentage of unplanted open land. The landscape and its dependent plant and animal species have been significantly modified over the last 150 years or so, making it difficult to reconstruct environmental conditions that might have been present during prehistory. Generally, it is considered that areas surrounding river corridors were covered with a riparian woodland as defined by Thompson (1961, 1980).

Riparian woodlands would have been dominated by California valley oak, Fremont cottonwood, and California sycamore, with an intermediate overstory of Oregon ash, walnut, cottonwood, big leaf maple, California box elder, white alder, California bay, and willow. The understory would have included elderberry, mugwort, mulefat, wild rose, and button-willow. Vines and climbers may have consisted of Dutchman's pipe vine, poison oak, wild grape, greenbrier, and wild clematis.

A broad assortment of faunal species would have been present prior to the arrival of European groups in the 19th century. Larger fauna of the riparian woodland would have consisted of transhumant tule elk and pronghorn, black-tailed deer, coyote, gray fox, badger, spotted skunk, striped skunk, bobcat, puma, black bear, and grizzly bear. Smaller species were gray squirrel, ground squirrel, cottontail rabbit, brush rabbit, California quail, ringtail, various small perching birds, rodents, reptiles, amphibian, and bats (Thompson 1961, 1980).

Generally, sediments within the project area consist of alluvium deposited by the Feather, Yuba and Bear rivers. These deposits are mapped as Holocene alluvium and the alluvium of the Modesto and Riverbank Formations (Helley and Harwood 1985). Deposits situated above the Holocene alluvium are composed of un-weathered gravel, sand, and silt deposited by more recent high water events. These deposits form a series of natural levees along the Feather River; the height of which varies from as little as a few centimeters (cm) to up to 10 meters (m). The stream terrace deposits of the Modesto Formation are composed of Pleistocene alluvial gravel, sand, and silt and range in thickness from 0 to 120 m (Helley and Harwood 1985). This unit forms the lowest deposits lying topographically above the Holocene levee and channel deposits (see Exhibit C1).

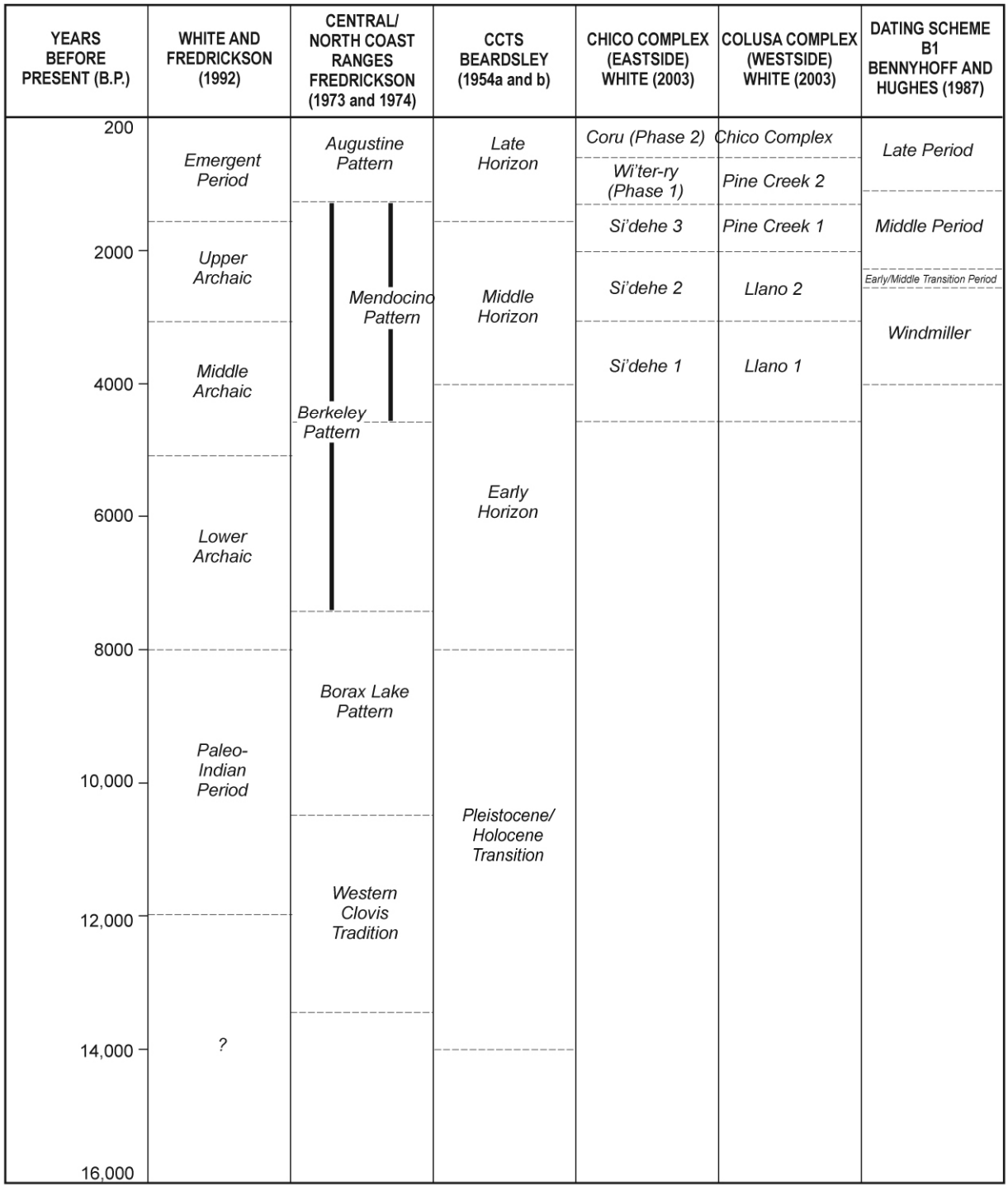
ARCHAEOLOGICAL CONTEXT

The archaeological record of the Sacramento Valley has been approached in two fundamentally different ways by 20th century researchers. The first approach is chronological and was initially developed from relative artifact sequences and types associated with stratified occupation horizons and burials. Based on these sequences, a three-stage chronology was proposed in the late 1930s (Lillard et al. 1939), and was simply referred to as the Early, Middle, and Late Horizons. These chronologies were defined by varying patterns in material culture assemblages and mortuary contexts. Although interpretations varied, explanations for change were usually linked to the movements of people, although environmental and social influences were also considered. This chronological framework was later refined and eventually became the Central California Taxonomic System (CCTS) (Beardsley 1954a, 1954b) (see Exhibit C2), which emphasized the linear, uniform sequence of cultural succession over time.

A second approach was derived from the archaeological patterns defined in the CCTS. As absolute dates (radiocarbon and obsidian hydration in particular) became available, it was often noted that archaeological sites with differing artifact assemblages were sometimes contemporaneous. This was particularly true with sites from the Early and Middle Horizons. This discovery, along with the archaeological paradigm shift to the processual orientation in the 1960s and 1970s, led to a reevaluation of the CCTS. A new scheme used the same archaeological manifestations to differentiate sites as the old CCTS, but it ordered sites into functional and temporal categories, rather than simply interpreting archaeological data as a simple linear temporal progression.

Using this new approach and based upon previous research presented in Fredrickson (1973, 1974), Fredrickson (1994) defined a sequence of cultural patterns that he believed were applicable to California as a whole (see Exhibit C2). He proposed and utilized the concept of the cultural pattern as an adaptive mode shared in general by a number of analytically separable cultures. These different cultural modes could be characterized by similar technological skills and devices; similar economic modes, including participation in trade networks and practices surrounding wealth, with similar mortuary and ceremonial practices. Fredrickson argued that the dating and definition of particular patterns should be kept separate from temporal periods, given the coexistence of more than one cultural pattern operating at any particular time. Thus, his framework of prehistoric periods is based on general technological and cultural horizons in operation throughout California over appreciable lengths of time, and is based upon the approach taken by Willig and Phillips (1958).

Recently, another approach has focused on refinements of the sequences proposed by Fredrickson for the North Coast Range and others for the Sierra Nevada region. This tentative cultural sequence proposed by White (2003) is based upon excavations along the east and west sides of the Sacramento River, and consists of separate chronologies of what White believes represent an interrelationship between the east and west sides of the Sacramento Valley that reflect foothill traditions of the Sierra and Coast Ranges which merge at the Sacramento



Source: EDAW 2008

Culture Chronology for the Feather River-Segment 2 Project Area and Adjoining Regions Exhibit C2

River. White further indicates that the "Mid-Valley" is poorly sampled and lacks a well-developed understanding of cultural history to enable cross-valley comparisons to be made. Recognizing sub-regional variations, White has proposed an Eastside and Westside district, which he defines as the Chico chronology (east side) and the Colusa chronology (west side), representing 4,500 years of occupation before present (B.P.) (see Exhibit C2). Evidence of occupation prior to 4,500 years B.P. has yet to be developed for this region.

The following discussion first presents an overview of the specific regional manifestations as outlined by White (2003). Then a chronological sequencing is provided, starting at 12,000 B.P. and extending to 200 B.P. Within the chronological sequencing the applicable periods, patterns, and horizons are described following the sequencing of White and Fredirickson (1992), Fredirickson (1973 and 1974), CCTS Beardsley (1954a and 1954b), and Bennyhoff and Hughes (1987) (see Exhibit C2).

The discussion provides a summary of the broad temporal periods with descriptions of the associated cultural patterns that have been identified for the adjoining regions within each of these broad temporal patterns.

COLUSA COMPLEX (WESTSIDE) AND CHICO COMPLEX (EASTSIDE) (WHITE 2003)

As described above, White (2003) has proposed Eastside and Westside districts for the Sacramento Valley, which he defines as the Colusa Complex (Westside) and the Chico Complex (Eastside). These complexes, which are described below, represent a period of occupation extending to 4,500 years B.P.

COLUSA COMPLEX (WESTSIDE)

As shown in Exhibit C2, the Colusa Complex is divided into the ***Llano 1***, ***Llano 2***, ***Pine Creek 1***, ***Pine Creek 2,*** and ***Chico Complex*** phases. The ***Chico Complex*** phase under the Colusa Complex (Westside) District is separate from the Chico Complex (Eastside) District. Originally, White had lumped the Llano phases together, as one single phase spanning approximately 3,100 years, but he has subsequently separated these into the ***Llano 1*** and ***Llano 2*** phases.

Llano 1 is represented at only one site (CA-BUT-233), which dates from ca. 4,300 B.P. to 2,500 B.P. and is marked by the presence of manos and metates, L series *Olivella* beads, drilled stone plummets, and large notched and leave-shaped projectile points.

Llano 2 is marked by the data gathered from three archaeological sites dating between approximately 2,500 B.P. and 2,000 B.P. During this time frame, the archaeological assemblages consist of large stemmed projectile points, bowl mortars, and *Olivella* A1a and C series beads and *Macoma* clam shell disk beads. However, it should be noted that elsewhere the spire-lopped A1a shell beads occur in all time periods and may not provide an adequate chronological marker for this time frame.

Pine Creek 1 extends from 2,000 B.P. to 1,300 B.P. and is marked by the use of wooden mortars and wooden mortar stone pestles, stemmed, notched and concave-based projectile points, and *Olivella* G and F series bead types. Artifact types for this phase and the preceding Llano 1 and 2 phases suggest that peoples operated within the Central California interaction sphere, but also maintained close-ties with groups in the foothill and Sierra regions.

The ***Pine Creek 2*** phase along with the later ***Chico Complex*** phase appears to be a variant of the Augustine Pattern (described later in this section). The period spans 1,200 B.P. to 500 B.P., and is marked by the presence of small corner-notched projectile points which grade into expanding stemmed types, which reflect introduction of bow and arrow technology. Willow-leaf *Haliotis* pendants and *Olivella* A1a, A1b and M series beads are also present (see Deal 1987).

The ***Chico Complex*** phase spans the period between 500 B.P. and 200 B.P. White (2003) cites the work of Chartkoff and Chartkoff (1983), who based their information on excavations at one site, believed to be specific to the Sacramento Valley region between the foothills and the Sacramento River. Because of limited data, additional information would be required to further define this cultural manifestation. Artifact types indicative of this phase are bowl and hopper mortars, manos and metates, clam shell disk beads, which dominate the shell bead types, along with smaller percentages of spire-lopped *Olivella* beads (type A), incised bird bone beads, and a variety of plummet types. Desert side-notched, triangular, and small corner-notched projectile points are primarily made from chert. Stone pendants and cylinders are present. There is a heavy reliance on deer and shellfish, with various species of fish and waterfowl supplementing the diet.

CHICO COMPLEX (EASTSIDE)

As shown in Exhibit C2, the Chico Complex is divided into the ***Si'dehe 1***, ***Si'dehe 2***, ***Si'dehe 3***, ***Wi'ter-ry***, and ***Coru*** phases.

The ***Si'dehe 1*** phase was defined by Stratum 3 at CA-Col-247, which yielded ^{14}C dates ranging from 4,385–3,460 B.P. While consisting of typical archaic technology, stylized types consisted of the Mendocino concave-based point form, an antler splitting wedge, a *haliotis* square bead, and non-perforated plummets. Obsidian associated with this phase was dominated by material which originated from sources in Napa Valley and Cow Creek. A single human internment was found in a semi-extended posture. Because of similarities in the burial method and artifact assemblage White (2003) concluded that it was consistent with the early Mendocino Aspect of the Mendocino Pattern (described later in this section), found in the southern North Coast Ranges dating between 3,500–4,750 B.P.

The ***Si'dehe 2*** phase is associated with Stratum 2 at CA-Col-247 with ^{14}C dates ranging from 3,222-2,750 B.P. The functional and stylistic artifact types included small blade contracting-stemmed points, wedge-shaped handstones, thin millingslabs, large disk-shaped *Haliotis* pendants, an *Olivella* L2 thick rectangle bead, and ocher pebbles. Also associated with this phase and the following ***Si'dehe 3*** phase are metasedimentary core tools, perforated plummets, *Macoma* disk beads, bone and antler daggers, clay acorn cases, and ceramic egg-shapes. Unlike the preceding ***Si'dehe 1*** phase, obsidian is dominated by material originating from Borax Lake, with lesser percentages coming from Napa Valley, Mt. Konocti, Cow Creek, and a Bodie Hills. Burials are both extended and flexed. White (2003) concluded that this phase exhibits modes of burial and artifacts similar to the Windmiller traits of central California (described later in this section) and those of the Houx phase of the Clear Lake basin.

The ***Si'dehe 3*** phase is based upon the associated artifacts assemblage recovered from Stratum 1 at CA-Col-247, which yielded ^{14}C dates ranging from 2,750–1,550 B.P. Artifact types include large contracting-stemmed points, wooden mortar pestles, Haliotis disk beads and eccentric pendants, Olivella G series saucer and ring beads, Olivella C series beads, and flat hair pins. Sources of obsidian are similar to those of the preceding ***Si'dehe 2*** phase with the exception that materials from the Bodie Hills source are missing and an undermined source is represented in the assemblage. Burial positions are similar to those of the ***Si'dehe 2*** phase.

The ***Wi'terry*** phase is represented by components at two sites that appear to date to the Emergent Period (described later in this section), with associated ^{14}C date ranges between 1,180–740 B.P. The assemblages consists of wide and narrow-stemmed small contracting stemmed projectile points, Rattlesnake corner-notched points, *Olivella* type F or M series beads, bipointed gorge hooks, and a J-shaped bone fishhook. Additional artifacts that are also present in the later ***Coru*** phase (see below) are *Olivella* M series sequin beads, triangular arrow point preforms, and arrow point fragments. Obsidian associated with the ***Wi'terry*** phase is dominated by material originating from the Borax Lake source with smaller percentages of Napa Valley, Tuscan, and Grasshopper Flat/Lost Iron Well/Red Switchback obsidian also present. One burial recovered indicates that the preferred burial position was tightly flexed.

The ***Coru*** Phase is based upon excavations at one site; however, no radiocarbon association was present. The site location does correspond with that visited during the contact period by Arguello and Ordaz in 1821. Artifacts consist of *Olivella* M series beads, triangular arrow point preforms, as mentioned above, in addition to Rattlesnake side-notched points of Napa Valley obsidian, clamshell disk beads, decorated European ceramics, and glass trade beads. While Napa Valley obsidian dominates the assemblage, Borax Lake material comprises the remainder of the assemblage.

PALEO-INDIAN PERIOD (12,000 B.P. TO 8,000 B.P.)

The Paleo-Indian Period, as shown in Exhibit C2, is part of the White and Fredirickson (1992) chronology and extends from 12,000 B.P. to 8,000 B.P. This period saw the first demonstrated entry and spread of humans into California with most known sites being situated along lakeshores. A developed milling tool technology may be present at this time although evidence regarding this technology is scarce (see Fagan 2003). The social units were not heavily dependent upon the exchange of resources with trading activities occurring on an ad hoc, individual basis.

Archaeological evidence for human use of the Sacramento Valley during the late Pleistocene and early Holocene is lacking. At the end of the Pleistocene era parts of the Sierra Nevada adjacent to the Sacramento Valley were covered with glaciers. However, the valley was open and likely provided a major transit route for animals and people. Early Native inhabitants may have frequently utilized this corridor, but archaeological evidence for their presence is sparse at best. The paucity of evidence from this time period is likely a product of the archaeological record and taphonomic characteristics of the valley. Most Pleistocene-Holocene sites are likely buried deep in the alluvial deposits that have accumulated in the Sacramento Valley since the retreat of the glaciers. Although rare and sometimes controversial, archaeological traces from this earliest period may have been identified in the Central Valley (Johnson 1967, Peak & Associates 1981, Treganza and Heizer 1953) and by quarrying activity at Borax Lake near Clear Lake, where activities have been tentatively dated to 16,000 years B.P. (White et al. 2002:448–449).

Johnson (1967) presents evidence for some late Pleistocene use of the Camanche Reservoir area along the Mokelumne River based upon a number of lithic cores and a flake found at three different locations. All lithic specimens were associated with Pleistocene-aged gravels. These archaeological remains have been grouped into what has been called the Farmington Complex, characterized by core tools and large, reworked percussion flakes (Treganza and Heizer 1953). Farther north, at Rancho Murieta, lithic artifacts spanning the reduction sequence, as well as un-worked raw material, were recovered from gravel deposits attributed to the late Pleistocene (Peak & Associates 1981). Unfortunately, the context of these finds in gravel deposits suggests that the sites may represent redeposited assemblages or that their associated artifacts could be "ecofacts" (naturally flaked or broken stones bearing superficial resemblance to purposefully manufactured tools and debitage).

Traditionally, subsistence patterns adopted by Native populations during this time were thought to have been geared almost entirely towards the procurement of large megafauna such as mammoth, bison, and other now-extinct or extirpated species. However, while there is clear evidence for consistent utilization of such species throughout North America, there is little archaeological evidence to support the contention that Paleo-Indian lifeways, land-use practices, and subsistence patterns were so intimately tied to the dramatic "Man the Hunter" hypothesis espoused in the 19th and early 20th centuries. In general, Paleo-Indian sites frequently show evidence for a much broader use of floral and faunal species and while clear evidence for the acquisition and use of megafauna species exists, many of these instances were probably fortuitous happenings and well-documented cases of hunting such species are rare in North America and unknown in California.

WESTERN CLOVIS TRADITION AND BORAX LAKE PATTERN (13,350 B.P. TO 8,000 B.P.)

The Western Clovis Tradition and Borax Lake Pattern, as shown in Exhibit C2, are part of the Fredirickson (1973 and 1974) chronology and together extend from 13,350 B.P. to 8,000 B.P. Fredrickson initially indicated that the earliest occupation within the north coast ranges occurred ca. 12,000 to 8000 B.P., and at the time he assigned the provisional Post Pattern (not shown in Figure C2). This manifestation appears contemporaneous with the Western Clovis Tradition, and subsequent investigations indicated that the date range may extend from ca. 13,350 to 10,000 B.P. (Fredrickson and White 1988). The Post Pattern and Western Clovis Tradition represent the earliest known occupation of the North Coast Ranges. This period is documented only at the Borax Lake site, and perhaps at the Mostin site (Moratto, 1984:497). Characteristic artifacts noted in the lithic assemblages include fluted projectile points and flaked crescents that occur during the Paleo-Indian Period. The Post Pattern is somewhat roughly contemporaneous with the former Borax Lake Pattern.

LOWER ARCHAIC PERIOD (8,000 B.P. TO 5,000 B.P.)

The beginning of this period coincides with that of the middle Holocene climatic shift to more arid conditions that brought about the drying up of the pluvial lakes in Northern and Southern California and throughout the Great Basin. Subsistence appears to have been focused more on plant foods although hunting clearly still provided for important food and raw material sources. Settlement was semi-sedentary with little emphasis on material wealth. Most tools were manufactured of local materials, and exchange remained on an ad hoc basis. Distinctive artifact types are large projectile points and the milling slab and hand stone.

EARLY HORIZON (8,000 B.P. TO 4,000 B.P.)

As shown in Figure C2, the Early Horizon (8,000 to 4,000 B.P.) encompasses the entire Lower Archaic Period and is part of the CCTS Beardsley (1954a and 1954b) chronology. During this horizon changes in the variety and distribution of flora and fauna occurred throughout California. Such shifts no doubt had a significant impact on the nature of the technological patterns and subsistence of the Native inhabitants of the Central Valley. During the Early Horizon, small groups of people probably moved through the valley, the foothills, and the Sierra Nevada to take advantage of seasonally available resources and resources limited to particular ecozones.

The presence and use of an increased variety and quantity of plants and animals than were available in earlier times had major consequences relevant to the archaeological record. As seasonality became more pronounced during this time, different resources became available at various times of the year in geographically wide areas. As a result, large areas of land were needed to ensure that enough resources were available for the needs of the population during all times of the year, resulting in nomadic lifestyles. In addition, a wide variety of specialized tools were required to procure and process the wide range of plants and animals that were being used.

Beginning at approximately 6,000 B.P., shifts in subsistence strategies began to take place that may have been partially the result of an increasing Central Valley population. Increasing populations are suggested by a dramatic increase in the number of sites across the landscape (Moratto 1978). Apparently, subsistence patterns became constrained in the Central Valley and populations may have had to make due with lower-quality foods or were being forced into conflict with neighboring groups competing for limited resources. Fredrickson (1973) saw this population increase and intensification of land-use patterns beginning with the Windmiller Pattern (Bennyhoff and Hughes [1987] dating scheme as shown in Exhibit C2) (initially defined according to the artifact assemblages recovered from the Windmiller site [CA-Sac-107]), which marks the terminal point of the Early Horizon ca. 4,000 B.P.).

BERKELEY PATTERN (7,500 B.P. TO 750 B.P.)

The *Berkeley Pattern* (7,500–750 B.P.) appears to have originated in the San Francisco Bay region during the Lower Archaic Period, and is based on the assemblage of CA-Ala-307 (Fredrickson 1973). However, the majority of identified components date to the Middle Archaic and continue into the Upper Archaic.

This pattern has been noted at numerous sites in the Central Valley and Bay and North Coast Ranges regions. Numerous similarities exist between these regions. Mortuary practices are characterized by tightly flexed burials with no apparent patterning in orientation and fewer artifact associations compared to the elaborate practices evidenced in Windmiller Pattern burials. Grave associations include numerous *olivella* saucer and saddle beads, and *haliotis* ornaments. The artifact assemblage is distinguished by a highly developed bone tool industry represented by bone needles; bird and mammal bone whistles; serrated scapula saws; bone hairpins and spatulae; mammal and bird bone tubes; and other types of flaked, ground, and polished bone artifacts. Mortars and pestles dominate the milling tool assemblage with only infrequent occurrences of milling slabs and hand stones. Non-stemmed obsidian projectile points and knives are abundant, and ribbon flaking technology makes its appearance. Midden deposits contain large accumulations of oyster, clam, and salt-water mussel shells in the Bay Area, while freshwater mussel predominates in Central Valley sites.

MIDDLE ARCHAIC PERIOD (5,000 B.P. TO 3,000 B.P.)

This period begins at the end of mid-Holocene climatic conditions when weather patterns became similar to present-day conditions. Discernable cultural change was likely brought about in response to these changes in climate and accompanying variation in available floral and faunal resources. Economic systems were more diversified and likely included the introduction of acorn processing technology. Hunting remained an important source of food and raw materials, although reliance on plant foods appears to have dominated the subsistence system. Sedentism appears to have been fully developed and there was an overall growth in population and a general expansion in land use. Little evidence is present for development of regularized exchange relations. Typologically and technologically important artifacts characteristic of this period include the bowl mortar and pestle and the continued use of large projectile points.

THE MENDOCINO PATTERN (4,500 B.P. TO 1,500 B.P.)

The *Mendocino Pattern* assemblages (4,500–1,500 B.P.) originate in the Middle Archaic Period and are known to persist through the Upper Archaic and possibly into the Emergent Period. The Hultman Aspect and Windmiller Pattern are two identified cultural divisions in the Mendocino Patter. The two share such basic material traits as basalt core tools, shaped unifaces, heavily worked bifaces, and thin, finely flaked obsidian knives. The Hultman Aspect is distinguished by the presence of ovate scrapers, numerous simple tools, incised or drilled steatite plummets (charmstones), and the use of local and non-local obsidian for the manufacture of projectile points.

WINDMILLER PATTERN (4,000 B.P. TO 2,500 B.P.)

The *Windmiller Pattern* (4,000–2,500 B.P.) is the earliest identified cultural pattern in the Central Valley and is part of the Bennyhoff and Hughes (1987) dating scheme (see Exhibit C2). It has been identified at several sites along the Cosumnes and Mokelumne rivers in the Delta region. Artifacts and faunal remains recovered from Windmiller manifestations indicate that a diverse range of resources was exploited, including seeds, a variety of small game, and fish. Material assemblages from Windmiller sites can include trident fish spears, at least two types of fishhooks; various “charm stone” forms, and distinctive baked clay items including net sinkers, fish line sinkers, and cooking balls. Ground stone implements found on these sites include mortars and pestles and a bone tool industry that includes awls, needles, and knapping tools. Windmiller peoples interred their dead in formal cemeteries, both within and separate from habitation areas. Burials typically exhibit extensive ritualistic elements and often included the use of red ochre and extensive grave offerings. Body positions in burials occur in ventral

extension with a predominantly western orientation (although other burial positions, such as dorsal extension and flexed, and cremations have also been documented [Moratto 1984]). The Windmiller Pattern sites in this period seem to occur with more frequency in or near the Delta, while Berkeley Pattern sites (see above) tend to be more prevalent farther north, suggesting that, at least to a certain degree, technological differences noted in the archeological record may be related to the availability of varying resources and materials.

MIDDLE HORIZON (4,000 B.P. TO 1,500 B.P.)

The *Middle Horizon* (4,000–1,500 B.P.) is encompassed by the Middle and Upper Archaic periods. It is during the Middle Horizon that resource specialization becomes readily visible in the archaeological record. Marshlands where the Sacramento and San Joaquin rivers meet were considerably larger in prehistoric times and the rich resource base became a major attraction for Native peoples. In addition, acorn became fully developed as a staple food source. The acorn had been used before this time, but it became a much more predominant resource with specialized procurement and processing technologies. Populations during the time were more sedentary than they had been in the past, and village sites are found throughout the valley along rivers and near other areas with permanent sources of water. An economic shift from a foraging to a collecting strategy probably occurred during this time.

UPPER ARCHAIC PERIOD (3,000 B.P. TO 1,500 B.P.)

A marked expansion of sociopolitical complexity marks the Upper Archaic Period with the development of status distinctions based upon material wealth being well documented. Group-oriented religions emerge and may be the origins of the Kuksu religious system that arises at the end of the period. There was a greater complexity of trade systems with evidence for regular, sustained exchanges between groups. Shell beads gained in significance as possible indicators of personal status and as important trade items. This period retained the large projectile points in different forms, but the milling slab and hand stone were replaced throughout most of California by the bowl mortar and pestle. During this period, the Mendocino Pattern is present in the central and northern portions of the North Coast Ranges and the Berkeley Pattern persisted in the Central Valley, Bay, and southern portion of the North Coast Ranges.

EMERGENT PERIOD (1,500 B.P. TO 200 B.P.)

This period corresponds with the Late Horizon (see below) and is distinguished by the advent of several technological and social changes. The bow and arrow were introduced, ultimately replacing the atlatl. Territorial boundaries between groups became well established and were well documented in early historic accounts. It became increasingly common for distinctions in an individual's social status to have been linked to acquired wealth. The exchange of goods between groups became more regularized with more raw materials, along with finished products, entering into the exchange networks. In the latter portion of this period (500 B.P.–200 B.P.), exchange relations became highly regularized and sophisticated. The clam disk bead became a monetary unit of exchange and increasing quantities of goods are transported over greater distances. Specialists arose to govern various aspects of production and exchange. Patterns in the activities, social relationships, belief systems, and material culture continued to develop during this period and took forms similar to those described by the first Europeans that entered the area.

LATE HORIZON (1,500 B.P. TO 200 B.P.)

During the Late Horizon period, the Augustine Pattern becomes the predominant economic/cultural manifestation in the Central Valley, Bay, and southern North Coast Ranges with numerous regional aspects having been identified in the archaeological record. Cultural traits that distinguish this pattern include pre-interment grave-pit burning, tightly flexed burials, and cremation. Artifact assemblages include clam and *olivella* shell disk beads, magnesite cylinders, and banjo type *haliotis* ornaments, as well as bird bone whistles and tubes and flanged

steatite pipes. The mortar and pestle are the predominant milling implements and small arrow points replaced the larger projectile point forms more commonly associated with atlatls. Also found in the tool assemblages were implements such as harpoons, bone fish hooks, and gorge hooks.

AUGUSTINE PATTERN (1,500 B.P. TO 200 B.P.)

The predominant pattern of material cultural noted archaeologically during this period is called the Augustine Pattern (Fredrickson 1973). Sites representing the Augustine Pattern show a high degree of technological specialization. Artifacts from this period include those composed of composite materials, and highly developed and specialized stone, shell, basketry and ceramic technologies emerge. Other notable elements of the material culture assemblage include flanged tubular smoking pipes, harpoons, ceramic figurines and vessels (Cosumnes Brownware), clam and Olivella shell disk beads, magnesite cylinders, banjo type Haliotis ornaments, bird bone whistles and tubes, and small projectile point types, such as the small contracting-stemmed series. Complex social and economic institutions are also represented by differential access to wealth, as indicated by variability in the quantity and diversity of mortuary goods found between burials, pre-internment grave-pit burning, lightly flexed burials and cremations, the implementation of a shell money system, and the maintenance of extensive exchange networks. It is during the latter part of this period that the effects of Euro-American populations on the traditional lifeways of the Native peoples begin to become apparent. Although such incursions were minimal at first and typically involved contact with a limited number of trappers, traders, and explorers, by the middle decades of the 19th century, the pressures were intense and Native populations decreased dramatically through disease and conflict.

ETHNOGRAPHIC CONTEXT

The project area is situated within the lands traditionally occupied by the Nisenan, or Southern Maidu. The language of the Nisenan, which includes several dialects, is classified within the Maiduan family of the Penutian linguistic stock (Kroeber 1925; Shipley 1978). The western boundary of Nisenan territory was the western bank of the Sacramento River. The eastern boundary was “the line in the Sierra Nevada mountains where the snow lay on the ground all winter” (Littlejohn 1928:13), and included the drainages of the Yuba, Bear, and American rivers and the lower drainages of the Feather River.

SETTLEMENT

Nisenan settlement locations depended primarily on elevation, exposure, and proximity to water and other resources. Within the valley, permanent villages were usually located on low rises along major watercourses. Wilson and Towne (1978) indicate that village size ranged from three houses to up to 40 or 50. During expeditions in 1833, Work indicated that villages along the Feather River were composed of up to 200 individuals (Maloney 1944). Houses were domed structures covered with earth and tule or grass and measured 10–15 feet in diameter. Brush shelters were used in the summer and at temporary camps during food-gathering rounds. Larger villages often had semi-subterranean dance houses that were covered in earth and tule or brush and had a central smoke hole at the top and an east-facing entrance. Another common village structure was a granary, which was used for storing acorns (Wilson and Towne 1978). Two Nisenan villages, *Holloh* and *Lelikian*, were located in the vicinity of two documented archaeological sites, CA-YUB-1312 and CA-YUB-1313 (Wilson and Towne 1978) located to the south of the current project, and a third, *Intanto*, appears to have been just to the east of these sites in the vicinity of the confluence of the Bear and Feather Rivers. The village of *Yupu* was located at the current location of Marysville. Four village sites *Mimal, Sisum, Hok, and Yukuylme* were located south of Marysville, along the west side of the Feather River, and one village *Tomchoh* is depicted as being situated south of Marysville on the east side of the river (see Wilson and Towne 1978: Figure 1). None of these locations appear to match the location of CA-YUB-5, suggesting that the CA-YUB-5 site had been abandoned sometime prior to the gathering of ethnographic information, or that the descendants of the occupants of CA-YUB-5 did not survive the various diseases and conflicts that decimated large groups of individuals in the 1800s.

John Work's California Expedition passed through this area in 1833 and his record from August 1, 1833 provides insight into the Native American populations in the area and most likely references the above villages:

> *Very warm weather. Raised camp and proceeded across the plain 18 miles N.N.W. to a small fork of feather* river [most likely the Bear River] – *This was a hard day both on men and horses, not a drop of water to be procured during the journey, and the heat excessive marching over the scorched plain, a great part of which has been recently overrun by fire which renders it still worse. Some of the hunters were out but without success. A party of 8 men visited the Indian village to seek the horses which were seen yesterday but the horses had been taken across the big river. The Indians did not take an arrow in their hands, and informed the men at once where the horses had been taken and offered to prepare a raft for them to cross and go in pursuit of them, but the men declined doing so as they would probably not have been able to follow their tracks or come up with them. A great many of the Indians are sick some of them with the fever. (Maloney 1944:131)*

SUBSISTENCE

The Nisenan occupied permanent settlements from which specific task groups set out to harvest the seasonal bounty of flora and fauna that the rich valley environment provided. The Valley Nisenan economy involved riparian resources, in contrast to the Hill Nisenan, whose resource base consisted primarily of acorn and game procurement. The only domestic plant was native tobacco (*Nicotiana* sp.), but many wild species were closely husbanded. The acorn crop from the blue oak (*Quercus douglasii*) and black oak (*Q. kelloggii*) was so carefully managed that its management served as the equivalent of agriculture. Acorns could be stored in anticipation of winter shortfalls in resource abundance. Deer, rabbit, and salmon were the chief sources of animal protein in the aboriginal diet, but many insect and other animal species were taken when available. Regarding species of fish, the Feather River supported a diversity of resident and anadromous fishes. The largest resident was the white sturgeon (*Acipenser transmontanus*), however, the most common fishes belong to the cyprinidae family, including hitch (*Lavinia exilcauda*), splittail (*Pogonichthys macrolepidotus*), and the western pike-minnow (*Ptychocheilus grandis*). Other common resident fish included the western sucker (*Catostomus occidentalis*), Sacramento perch (*Archoplites interruptus*), and tule perch (*Hysterocarpus transkii*), Each of these species was widely dispersed most of the year, but during the spring season could be found clustered in side streams, sloughs, or shallow water habitats for spawning. Anadromous fishes primarily spawned in the late fall/winter, but also had spring runs. These included the Pacific Lamprey (*Lampetra Lethophaga*), and several salmonids including the king salmon (*Onorhynchus tshawytscha*), Coho salmon (*Oncorhynchus kisutch*), and steelhead rainbow trout (*Salmo gairdneri gairdneri*) (White 2003:8–9).

LIFEWAYS AFTER CONTACT

In general, Nisenan lifeways remained stable for centuries until the early to middle decades of the 19th century. With the coming of Russian trappers and Spanish missionaries, cultural patterns began to be disrupted as social structures were stressed. Rampant disease, such as "the fever" noted by Work in 1833, quickly led to a dramatic decline in population. By the start of the Gold Rush period, many Native populations were already stressed and the incursion of thousands of Euro-Americans into traditional Indian lands only pushed cultures further toward the brink. Today, the Nisenan and neighboring tribes are reinvesting in their traditions and now constitute growing and thriving communities.

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APPENDIX D

Research Design

APPENDIX D
RESEARCH DESIGN

Although specific research issues have been addressed utilizing archaeological data recovered from various sites in the Sacramento Valley and Feather River region, for the most part the archaeology of the region remains poorly understood. Research designs produced under most cultural resource management projects tend to ask narrow questions of the archaeological data and reflect the efforts to determine National Register of Historic Places (NRHP) or California Register of Historic Resources (CRHR) significance. Although determining site significance is an important management tool, the same data set that supports significance determinations can also answer more detailed and broadly relevant research domains. The retrieval and application of such data for broad research questions in turn helps mitigate adverse effects where the effects to be managed is the loss of data potential. As such, the research questions presented below are geared to a broader perspective and while not all may be addressed by the available data from CA-YUB-5, their analysis most likely will contribute to the available data sets that could provide answers to interdisciplinary and broad research issues in California archaeology. Thus, application of these questions to the material retrieved from CA-YUB-5 will help reduce the impact of the potential loss of perishable data-bearing portions of the assemblage.

PREHISTORIC POPULATION DENSITY, LAND USE PATTERNS AND PALEOENVIRONMENTAL STUDIES

Paleoenvironmental studies are useful in reconstructing past environments and serve as an aid in understanding how prehistoric people may have responded to changes in the environment. Changes in subsistence practices, which may have resulted from environmental change, can be determined through analysis of charred wood, seeds, and floral and faunal remains. These remains could provide data on the types of plants that were collected from an area during periods when significant environmental shifts occurred (c.f. West 1993). In the lower Sacramento Valley, Schultz (1981) examined skeletal remains from Early, Middle, and Late Period contexts concluding that Early populations were under greater dietary stress than later groups, with critical annual periods occurring in the late winter or early spring. He attributed this disparity to paleoenvironmental data that depicted a period of less moisture resulting in smaller rivers and the movement of oak woodlands to higher elevations. However, Sheeders (1982) doubts that oak woodlands were completely absent from the delta and were merely reduced in quantity and density.

According to research conducted in the vicinity of the Feather River and in the Sacramento Valley in general, the valley floor and riparian areas seem to have been inhabited fairly late in the record of Native occupation of California. While human residence dates to approximately 13,500 BP and possibly earlier in foothill and mountain settings in Northern California (White 2003), it has been surmised that the Sacramento Valley region was only occupied on a large scale fairly late in time beginning around 4,500 BP and increasing dramatically after about 1,100 BP (Dreyer 1984; Deal 1987; White 2003). These population and settlement models essentially assume a direct correlation between existing archaeological sites and intensity of occupation in the valley. In addition, they assume, although this is not specifically stated, that for some reason the resources present in the valley were not highly desired for the initial 7,000–9,000 years of human occupation in California.

Recent investigations by White (2003) in the Sacramento River Conservation area in nearby Tehama, Butte, Glenn, and Colusa counties suggest that the density and distribution of archaeological sites in the region is less an indicator of population and more the result of taphonomic factors associated with the dynamic riparian setting of the Sacramento River. CA-YUB-5 is located in such a setting and all indications point towards post-4,500 year dates for habitation. However, can this relatively “late” occupation provide any data that might be relevant to searching for and investigating earlier sites in the Central Valley? Radiocarbon dates and an analysis of geomorphic conditions present at CA-YUB-5 would provide the kind of data necessary to approach such questions. The following data would be useful in addressing this research issue.

PALEOENVIRONMENTAL DATA REQUIREMENTS

- Floral and faunal remains in datable contexts.
- Intact stratigraphy.
- Evidence of soil formation, sediment deposition and erosion processes (geomorphology).

SITE FORMATION PROCESSES

The examination of site formation processes is concerned with understanding the forces that created and shaped the physical remains on archaeological sites. These studies detail the cultural and natural processes that contributed to the original depositional patterns and the post-depositional factors that influence the distribution of cultural materials on an archaeological site.

Particularly important is the identification of the natural processes that created a specific landform on which archaeological materials are located and the subsequent historic alterations to that terrain from seasonal flooding, agriculture, and other activities. As noted above, such an analysis could contribute not only to our understanding of the context and taphonomic history of CA-YUB-5, but possibly the environmental settings preferred by earlier inhabitants of the Sacramento Valley. In the case of CA-YUB-5, subsequent plowing has caused some vertical and horizontal displacement of artifacts. However, vertical artifact distributions, while clearly affected by direct human impacts, are also affected by natural forces. For example, the vertical displacement of artifacts within grassland environments is discussed by Bocek (1986; 1992) and Erlandson (1984). In this CA-YUB-5 investigation, the basic site formation process addresses issues not only related to the site, but how site occupation contributes to the mosaic of prehistoric occupation in the Sacramento Valley.

Can the presence of intensive occupation offer any indications as to where earlier occupation sites might have been situated and how CA-YUB-5 fits into the regional subsistence and land-use strategy of Native populations?

In order to investigate site formation processes and glean data that could be useful in interpreting the landform history of CA-YUB-5 and applying that data to considerations of earlier occupation in the Sacramento Valley, certain types of data will be necessary.

These include indications of cultural processes affecting site formation, including soil chemistry and structure, stratigraphy, artifact reuse and discard patterns, activity areas, and features. These data are important for interpreting CA-YUB-5 and can be used in interpreting broader issues of patterns of early Native American land use in the region.

SITE FORMATION PROCESSES DATA REQUIREMENTS

- Indications of natural (e.g., bioturbation, geoturbation) soil-disturbing processes.
- Indications of cultural processes affecting site formation, including soil chemistry and structure, stratigraphy, site and artifact reuse, discard patterns, activity areas, and the distribution of features (e.g., house-pits, hearths).
- Data on soil and sediment-depositing factors such as flood episodes, hydraulic trends over time, and other natural processes as determined through geomorphic studies.

RESOURCE EXPLOITATION PATTERNS

Basic resource gathering and processing and subsistence and land use patterns can be studied by examining archaeological materials recovered through subsurface and to a lesser extent, surface artifact assemblages.

Previously collected data from elsewhere in the region can be used to examine regional material acquisition patterns. However, as noted above, relying solely on the archaeological record to formulate models of prehistoric resource acquisition and land use in the region is hampered by the dynamic taphonomic character of the riparian setting. Clearly, data other than the simple presence or absence of archaeological sites on the landscape is necessary if resource exploitation and foraging patterns through time and changes in these patterns are to be approached.

White (2003:129–130) suggests that available plant resources reflected the dynamic changes in floodplain development associated with variations in climate patterns. He found that plants associated with clayey or alkaline older floodplains and natural levees appear in the archaeological record during 2,750–4,385 B.P., and those associated with sandy and silt sediments resulting from high water depositional episodes were present between 1,180–2,200 B.P.

Regarding the presence of fish taxa in Sacramento Valley rivers (with data primarily available for the Sacramento River), large fish taxa occur from the beginning of occupation (ca. 4,385 B.P.) and maintain the same distribution in the archaeological record with a dominance in small bodied species and a spike in *salmonidae* species occurring after 1,185 B.P.. White (2003:131–133) attributed this spike with the introduction of new technologies (e.g., dip nets and fishing weirs). Bird species, not surprisingly, appear to have been dominated by waterfowl, and with the exception of the period 2,200–2,750 B.P., with geese dominate the assemblages. During this 550 year period, ducks appear to have replaced geese in dominance (White 2003:133).

Analysis of dietary remains would provide information on the selection of resources, seasonality, and scheduling, and allow for a comparison with the subsistence and settlement strategies identified in the region. Although the inhabitants of CA-YUB-5 may have been primarily exploiting locally-available food resources, it is also possible that resources from outside the immediate area were being transported in to the sites. As previously noted, the archaeological record clearly demonstrates that the flora and fauna present in the Sacramento Valley riparian and grassland settings were highly desirable and their extensive acquisition and processing since at least 4,500 B.P. has been well demonstrated. Although this research topic will draw upon other data including those made available through investigations into site formation processes and population density, the best information will likely be derived from faunal and floral remains recovered from subsurface contexts.

RESOURCE EXPLOITATION DATA REQUIREMENTS

- Floral and faunal remains in quantities sufficient for assessments of the nature and availability of such resources.

- Intact stratigraphy and/or surface landforms for geomorphological studies.

EXCHANGE AND INTERACTION SYSTEMS

The sourcing of materials found on site, including basalt, obsidian, and possibly shell and other materials could provide information useful for understanding exchange and interaction systems of which CA-YUB-5 was a part and provide further data contributing to models of broader patterns in the Sacramento Valley. Lithic assemblages stored at University of California, Berkeley (UC Berkeley) indicate that the majority of lithic artifacts have been manufactured from obsidian, most of which can probably be sourced to locations in the Napa and eastern Sierra Nevada regions. Basalt, sources of which are located to the north and east, is relatively scarce. The presence of obsidian suggests, at least to some extent, more intensive interaction with groups to the east of the Sacramento Valley and to the west where multiple regional obsidian sources exist and were consistently utilized by early Native populations. The presence of exotic raw materials, particularly obsidian, may provide evidence to suggest interactions occurred between groups. The regional distribution of obsidian and its implications for external relationships between groups has been previously studied for the Sacramento Valley (Jackson and Schulz 1975,

Jackson 1986); however data gleaned from the lithic assemblage from CA-YUB-5 could further refine these findings.

Most chipped stone raw material will likely be semi-local (sources within 50 kilometer [km]). The presence of semi-local versus extra-local materials (sources greater than 50 km) would indicate that the inhabitants of the area are either ranging widely during their travels or trading with other groups, and the quantity of local and semi-local versus non-local materials would indicate the degree to which each method of procurement was used. The presence of marine shell would also tend to indicate a direct or indirect relationship with groups along the coast.

EXCHANGE AND INTERACTION SYSTEMS DATA REQUIREMENTS

- Chipped stone materials suitable for sourcing analysis.
- Intact stratigraphy or datable contexts.
- Hearths and other radiometric data in direct association with flaked stone materials and to a lesser extent ample samples of obsidian that may be submitted for hydration analysis.

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APPENDIX E

Correspondence with Enterprise Rancheria

APPENDIX E
RECORD OF CORRESPONDENCE WITH ENTERPRISE RANCHERIA

Date	Action	Comments
September 5, 2008	Forwarded an electronic copy of HPTP via e-mail, and a hard copy via Fed –EXD to Ren Reynolds.	E-mail message indicated that the HPTP had been submitted to the Corps and SHPO for review and requested a response from Enterprise at their earliest convenience.
September 6, 2008	Follow-up phone call with Ren Reynolds	Ren indicated that the HPTP had been received and was under review
September 12, 2008	Follow-up phone call with Ren Reynolds	Ren stated that the tribal council will be working on the review on Monday and will have a response by September 19, 2008
September 17, 2008	Follow-up phone call with Ren Reynolds	Ren indicated that as of this date the review by the tribal council had not been completed, however the council would like the Berkeley collection repatriated. Richard Deis explained that repatriation of the excavated material from 1953 was beyond the scope of the levee setback project and that Enterprise would need to coordinate directly U.C. Berkeley. Richard Deis stated that EDAW would provide all of the information (i.e. catalog of artifacts and human remains) from the 1953 Berkeley excavations, which may be of assistance to Enterprise. Ren also stated that the tribal review would be delayed until after September 20th, due to the death of one of the tribal elders.
September 29, 2008	Follow-up phone call with Ren Reynolds	Ren stated that the Enterprise Tribal Council would be considering the HPTP on Wednesday and would have a reply by the end of the week (October 3, 2008)
October 3, 2008	Follow-up phone call with Ren Reynolds	Richard Deis left voice mail message inquiring about the status of the HPTP review.
Week of October 10, 2008	Follow-up phone call with Ren Reynolds	Ren indicated that Enterprise had completed their review and that the only concern that they have are the Berkeley collections and their desire to have these repatriated. In addition, Enterprise would like an EDAW representative to attend a meeting with tribal representatives in Oroville. Richard Deis advised Ren that repatriation of the Berkeley collection was out of scope for this project, however EDAW could supply a catalog of the collection. Mr. Deis also expressed EDAW's desire to obtain a written response of these comments from Enterprise.
Week of October 24, 2008	Follow-up phone call with Ren Reynolds	Ren indicated that the formal response was in the process of being prepared and that the tribal administrator would be contacting Mr. Deis to set-up a date for a meeting with tribal representatives.

Date	Action	Comments
October 31, 2008	Follow-up e-mail from Richard Deis to Ren Reynolds	Message stated that EDAW will need to implement the HPTP during the week ending November 7, 2008, and that based upon a lack of substantive comments EDAW assumes that Enterprise would have no objections. If that is not the case it was requested that Enterprise contact Mr. Deis. Mr. Deis also stated in the e-mail that he had not heard from the tribal administrator regarding the schedule for the meeting with the advisory council.