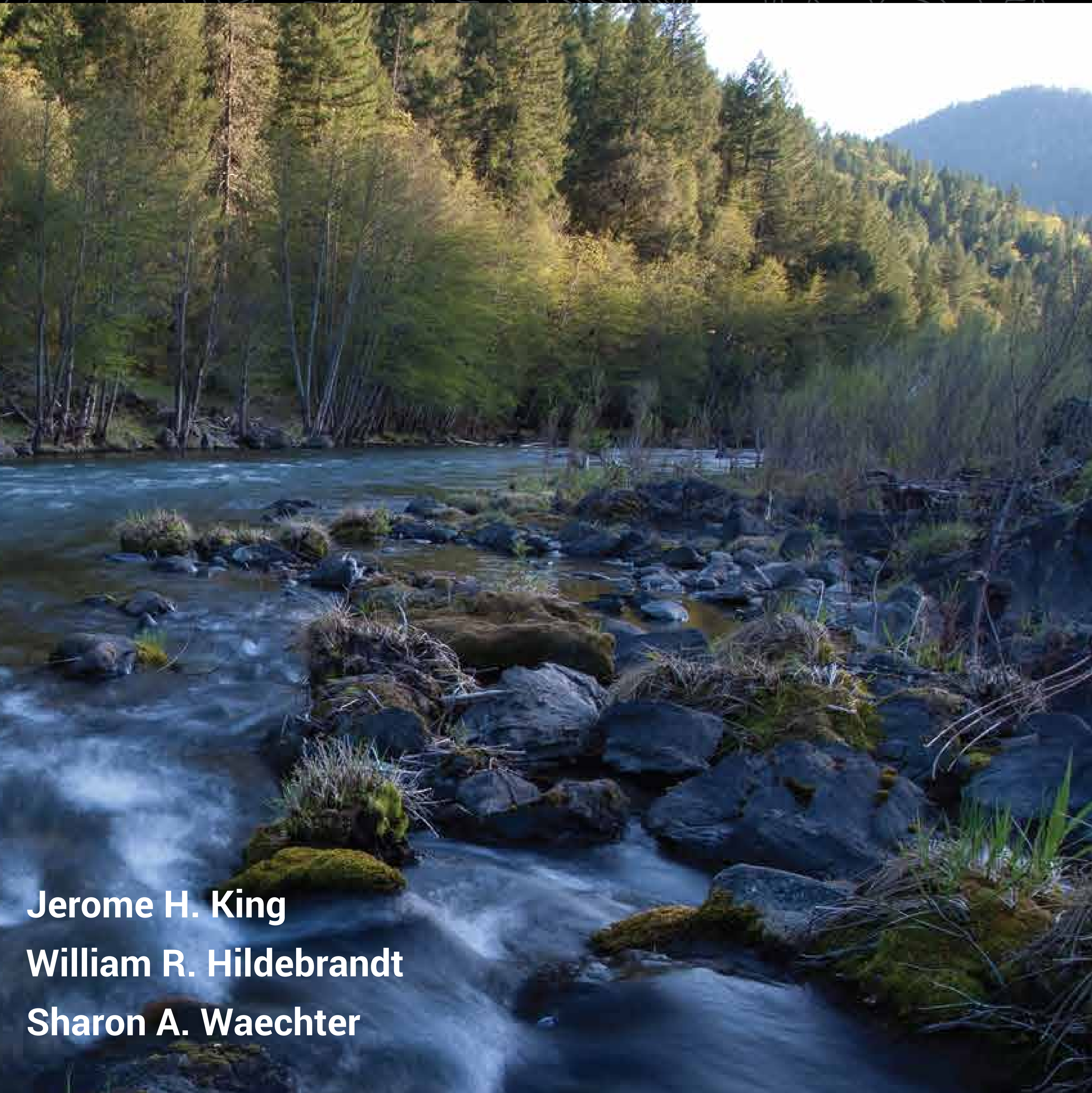
U.S. Department of the Interior
Bureau of Land Management

Cultural Resources Overview

Northwestern California



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Cultural Resources Overview for Northwestern California

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MANAGEMENT SUMMARY

This Class I Overview presents a comprehensive overview of the cultural resources on lands managed by the Bureau of Land Management (BLM) Redding and Arcata Field Offices, including prehistoric and historic-era archaeological sites, historic architectural properties, and traditional use areas. While BLM has produced cultural resources overviews as part of its past land-use planning efforts, this document represents a substantial update and expansion on previous overviews.

Per BLM Manual 8110, the purpose of this inventory is to "provide cultural resource specialists and managers with an informed basis for understanding the study area" in terms of:

1. The range of variety, the apparent extent, and the probable importance… of each of the various kinds of cultural resources presently known to exist within the study area, including how and by whom they may be considered important.
2. The natural settings and landscapes where the various known kinds of cultural resources might be expected to occur or not to occur within the study area, based on present information.
3. The potential for and probable consequences of conflict between the known kinds of cultural resources and the various types of land and resource uses that are likely to be proposed in the study area or already exist.
4. The need for new focused cultural resources surveys to improve the state of knowledge, especially where there are substantial data gaps because previous survey has been limited and/or biased, and the data gaps coincide with areas of potential land use.
5. The human uses of the land and resources through time, as evidenced in the ethnographic, prehistoric and historic record, and the ways that this knowledge of successful and unsuccessful past adaptations might apply to decision making for current land-use proposals.

BLM Manual 8110 also lays out a detailed outline for Class I Overview documents, which this document follows. It begins with a brief orientation to the study area. To aid in interpretation, a series of environmental/cultural zones, developed in consultation with BLM archaeologists, are presented. These include the Coast Range, the Klamath Mountains/High North Coast Range, the Upper Klamath, the Sacramento Valley, the Southern Cascade Foothills, and the Sierra Nevada. The *Environment Context* section follows, providing a brief overview of the natural environment of the planning area, including geology, climate, vegetation, and paleoenvironment.

The *History of Research* section offers a very brief overview of the history of cultural resources investigations in the planning area. While a typical Class I overview would contain a complete accounting of previous studies, this is impractical given the large size of the planning area included here.

The *Prehistoric and Ethnohistoric Archaeology* section provides a chronologically organized summary of the prehistory of each of the zones defined above, beginning with the earliest known human occupations in the region some 14,000 years ago, through to historic contact.

The *Prehistoric and Ethnohistoric Research Issues* section lays out a series of major research themes emerging from the prehistoric context, both to provide potential directions for future research, and to set the stage for determining the management significance of prehistoric resources. We discuss ten research issues, including: *Controlling Chronology*; *Identifying the First Colonizers of Northern California*; *Origins of Acorn-Salmon Economies in Northern California*; *Evolution of Milling Tools and Features*; *Inter-Regional Exchange*; *Rock Art*; *Historical Linguistics and Population Replacements*; *Pyrodiversity as a Land-Use Management Strategy*; *Native*

American Rock Features and the Spiritual World; and *Native Responses to Contact*. This list is by no means exhaustive; rather, it focuses on the most current and significant topics within the larger region, and those which can be addressed with archaeological data sets that are known or likely to occur within the study area.

The *Ethnographic Context* section provides a summary of the Native American groups inhabiting the planning area at historic contact, with a focus on material culture and its implications for the archaeological record of the region.

The *Historical Context* section provides a broad historical overview of the planning area, from the earliest non-Native presence in the region through the modern era. It is organized according to a series of themes, including: *Early Exploration and Colonization*; *The Gold Rush and Western Expansion*; *The Homesteading Era*; *The Extraction Economy*; *Maritime Activities*; *Infrastructure Development; and The New Century* (including *Federal Land Management*).

The *Historical Research Issues* section introduces a series of research topics which, like those presented earlier for prehistoric resources, form the basis for making management decisions regarding cultural resources. A distinction is made between "baseline" questions about the age, function, and occupants of historic-era sites and "higher-order" questions, including: *Technology, Innovation, and Adaptation*; *Economic Strategies*; *Household Composition and Lifeways*; *Immigration and Cultural Adaptation*; and *Socio-Cultural Dynamics.* Also in this section, the historical themes presented previously in the *Historical Context* are revisited and used as a basis for organizing historic-era cultural resources into a series of property types appropriate for making management decisions.

The *Contemporary Culture* section briefly describes the present-day culture of the planning area, including Native American and non-Native groups, with a focus on their uses of public lands.

The *Cultural Resources Synthesis* section views human history in northwestern California as a continuum, focusing less on ethnicity and more on changing patterns of human settlement, resource use, technology, and socio-cultural development. It begins with the first known human occupation of California.

The *Management Classification, Management Options, and Research Directions* section begins the management-focused part of the document. While previous sections of the document provide contextual information for the entire planning area, this section focuses specifically on the known cultural resources on lands currently managed by BLM. This section lays out the types of cultural resources known in the planning area, their likely significance, and the BLM use categories to which they can be assigned. The relevance of these resource types to the research issues discussed earlier is presented as a general guide for making future management decisions regarding cultural resources.

The *Future Inventory Strategy* section addresses one of the primary goals of this study, which is "to provide cultural resources specialists and managers with an informed basis for understanding the study area in terms of… the potential for and probable consequences of conflict between the known kinds of cultural resources and the various types of land and resource uses that are likely to be proposed in the study area or already exist" (BLM Manual 8110). This section concludes with a brief discussion of current BLM land uses and their relationships with the distribution of high-sensitivity BLM-managed lands. Also included is an annotated bibliography of the key cultural resources documents for the region, including both cited and uncited sources. It is intended to serve as a general reference for future cultural resources studies. The bibliography was compiled via an exhaustive study of documents on file at BLM, consultations with regional experts, and in-house research and literature reviews.

ACKNOWLEDGMENTS

We owe a debt of gratitude to a long list of people. In particular, BLM Redding archaeologist Eric Ritter was instrumental in guiding the creation of this document. He shared his vast knowledge of Northern California archaeology and history with us, and much of that knowledge is reflected in these pages. Eric, as well as BLM Arcata archaeologist Sharyl Kinnear-Ferris, provided many insightful comments on an earlier draft of this document and helped extensively with the compilation of the thousands of relevant reports, articles, and site records. Thanks are also due to Amy Jordan, Andy Suppiger, and Lisa Grudzinski in the BLM Redding office, who provided help and guidance throughout the project.

A number of other archaeologists also contributed their expertise to our summary of regional prehistory, including Greg White, Elaine Sundahl, Joanne Mack, Jeff Rosenthal, Jack Meyer, Jamie Roscoe, and Gerry Gates.

Many Far Western staff members contributed to this effort. A huge amount of data-entry, scanning, and GIS-digitizing work was ably done by Kaely Colligan, Kathy Davis, Laurel Engbring, Kari Osegueda, and Ruth Zipfel. Kaely compiled the annotated bibliography in Appendix A, while Kathy studied every single site record, as well as completing a technical edit of the entire document. Project manager Kim Carpenter kept the authors and everyone else on an even keel. Thanks too to Nicole Birney and Mike Pardee in the production department.

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This Class I Overview presents a comprehensive overview of the cultural resources of lands managed by the Bureau of Land Management (BLM) Redding and Arcata Field Offices, including prehistoric and historic-era archaeological sites, historic architectural properties, and traditional use areas. It begins by providing a synthetic treatment of the environment, prehistory, ethnography, history, and contemporary culture of the planning area as a whole. A framework for future management decisions regarding cultural resources is also provided, including a general approach to evaluating resources' eligibility to the National Register of Historic Places (National Register). A key element of the overview is the development of Geographic Information System (GIS)-based sensitivity models for prehistoric and historic-era archaeological sites, which will help BLM assess the likely effects of land-use decisions on cultural resources, even where existing field inventories are incomplete or lacking. These models also provide the basis for an assessment of high-sensitivity areas on BLM land that lack field inventories. Finally, this document also includes an annotated bibliography (Appendix A) listing the key cultural resources documents for the region.

This document was prepared by Far Western Anthropological Research Group, Inc., (Far Western) of Davis, California. Far Western's authorial team included William Hildebrandt, Ph.D., Sharon Waechter, M.A., and Jerome King, M.A. Dr. Hildebrandt authored the sections of the report having to do with prehistory and ethnography. Ms. Waechter wrote the sections having to do with history and contemporary culture. Mr. King authored the management-focused sections of the report and developed and tested the sensitivity models. Support in preparing this study was provided by Kaely Colligan and Kathy Davis. Data-entry work was completed by Laurel Engbring, Ruth Zipfel, and Kari Osegueda.

STUDY AREA ORIENTATION

The planning area includes the territories of the Redding and Arcata Field Offices, together covering some 22,590 square miles in northwestern California, including Del Norte, Humboldt, Trinity, Tehama, Butte, and parts of Mendocino, Shasta, and Siskiyou Counties (Figure 1). Lands managed by BLM within these two field office territories make up a patchwork of widely scattered parcels, interspersed among privately owned lands as well as other federally managed lands (National Forests, National Parks). These BLM-managed lands are mostly rural and undeveloped but include various public facilities such as off-highway vehicle areas, hiking trails, and campgrounds. In the Arcata Field Office area, BLM-managed lands also include a few former coastal military reserves and light stations with standing structures, such as the Trinidad Head Light Station. Not included in the current planning effort are the lands managed by BLM as part of the King Range National Conservation Area; the Headwaters Forest Reserve; and the California Coastal National Monument, which consists mostly of offshore rocks. Excluding these areas, BLM-managed lands in the planning area comprise about 606 square miles, or about 3% of the overall planning area.

In an attempt to summarize the truly daunting variety of environmental and cultural settings represented within the planning area, applicable sections of the document are organized according to six environmental/cultural zones, developed in consultation with Redding BLM archaeologist Eric Ritter (Table 1; Figure 2). These are based loosely on the Level III Ecoregion boundaries developed by the Environmental Protection Agency (2015), with some adjustments to account for cultural-historical considerations, and with some zone boundaries adjusted slightly to align with watershed boundaries. These zones should be understood as a general organizational tool, rather than a rigidly defined set of boundaries. The sizes and quantities of BLM-managed lands within these zones vary widely, and discussions in following sections of the document are scaled appropriately.

Table 1. Environmental/Cultural Zones.

ZONE	BLM FIELD OFFICE	AREA (SQUARE MILES)	BLM-MANAGED LANDS (SQUARE MILES)
Coast Range	Arcata	3,075.4	83.0
Klamath Mountains/High North Coast Range	Arcata, Redding	8,729.1	215.3
Upper Klamath	Redding	4,532.7	165.6
Sacramento Valley	Redding	742.7	22.8
Southern Cascade Foothills	Redding	2,834.2	53.6
Sierra Nevada	Redding	2,677.2	65.9
Total	**-**	**22,591.4**	**606.2**

Figure 1. Planning Area.

Figure 2. Environmental/Cultural Zones Used in This Document.

ENVIRONMENTAL CONTEXT

The study area consists of some of most diverse topographic, climatic, and ecological diversity found in California, and indeed in the Western United States. It encompasses six areas as defined for the project, four climatic regimes, five geological provinces, 28 vegetation communities, and countless combinations of these elements. At its most basic form, the region is defined chiefly by rugged and complex mountain ranges and the river canyons that divide them. Regional differences in topography, precipitation, and temperature produce distinct environmental conditions that determined past distributions of economically important plant and animal foods, which in turn influenced prehistoric human interaction, settlement-subsistence strategies, and land-use patterns. These environmental factors and changes in them through time, when combined with variations in geology, and the precious elements and minerals contained within certain units, influenced historic era land-use systems as well. This overview is necessarily broad and simplified, as a detailed description of each of the potential micro-habitats found at various BLM-managed lands would require dozens, if not hundreds, of pages of text. As such, future project-specific descriptions of environment should expand greatly upon those descriptions provided here to fully elucidate the types and nature of resources found in a specific project area.

GEOLOGY

Five major geomorphic provinces, segments of five major mountain ranges, multiple large river systems, and a limited number of large natural lakes fall within the study area. The geomorphic provinces roughly follow the broader study sub-areas defined in Chapter 1 (see Figure 2). The North Coast Ranges geomorphic province encompasses the *Coast* Range and portions of the *Klamath Mountains/High North Coast Range* sub-area. The Klamath Mountain province encompasses the northern portions of that same sub-area, while the Cascade Range Province includes sections of the *Upper Klamath, Sacramento Valley, and Southern Cascade Foothills* sub-areas. The *Sacramento Valley* and *Sierra Nevada* sub-areas match roughly the geomorphic provinces by the same name. The presence of five major geomorphic provinces means that there is varied and complex geology when the study area is taken together (Figure 3; California Geological Survey 2000). The following discussion follows the work of Meyer (2013) and Meyer et al. (2011).

North Coast Ranges

The North Coast Ranges consist of two main mountain belts that run north-south parallel to the coast, composed of many separate ranges, coalescing mountain masses, and major structural valleys (Page 1966). The majority of the range lies at elevations of about 2,000 feet, with at least two-dozen peaks or ridges that extend above 6,000 feet. The province contains many rivers and streams that flow through relatively narrow canyons in channels that are usually incised into, and often cross-cutting, the underlying bedrock. Within these ranges, the Eel River and its tributaries drain much of the southern portion of the study area, while important northern drainages include the Mattole, Mad, Klamath, and Smith, with the latter two originating in the Klamath Mountains. Numerous streams also drain eastward into the Sacramento River, the largest of which include Clear Creek, Cottonwood Creek, Thomes Creek, and Stony Creek.

This region is primarily underlain by a disorderly assemblage of upper Jurassic and Cretaceous-age marine sedimentary and metamorphic rocks known as the Franciscan complex (Page 1966). The range is generally bounded to the west by the San Andreas Fault and to the east by the Great Valley Fault, both composed of many individual fault segments. While chert and other siliceous rocks occur in most drainages, high quality obsidian is only available from the Borax Lake, Konocti, and Napa Valley sources located south of the study area.

The coast range province also includes the coastal margin. A series of elevated marine terraces is found along the coastal margin throughout much of the project area. These terraces generally consist of former wave-cut bedrock platforms that were uplifted by large-scale seismic and tectonic processes to their present position above the sea. Most are overlain by younger, near-shore sediments, and often by alluvium, colluvium, and/or sand dunes. North of Cape Mendocino, progressive uplift occurs along discontinuous areas where anticlines, or up-thrown sides of thrust faults of the Cascadia Fold and Thurst Belt, intersect the coast.

Coastal dunes are found along the shore of Humboldt and Del Norte counties in the region. The formation of coastal dunes is related to several factors including sediment supply, grain size, nature of the shoreline, and the local wind system. In contrast to arid regions, coastal dune formation is influenced not only by vegetation (stabilizing or trapping sediment), but also by wave action, which serves to shape the shoreline and deliver suspended sediment. Sea level changes have strongly influenced coastal dune deposition, primarily through a large increase in sediment supply during and following marine transgressions (Carter et al. 1990).

Finally, coastal lagoons and estuaries occur up and down the coast, but most are found north of Cape Mendocino (e.g., Humboldt Bay, Big Lagoon, Stone Lagoon, Lake Earl). This is also the case for large offshore rocks and islands, restricting the presence of major sea mammal rookeries and haulout areas to the more northerly latitudes. Most present-day estuaries are embayments formed in shallow depressions that have been partially or entirely sealed off from the ocean by the deposition of beach barriers and/or sand spits formed by wave action above the normal height of high tide (Bird 2008; Emmett et al. 2000). Seismic activity and the accompanying tsunamis periodically disrupt and reshape these coastal environments, often in ways that are visible in archaeological sites (e.g., van Bueren 2016).

Klamath Mountains

The Klamath Mountains are situated in the northeastern portion of Humboldt County, eastern Del Norte County, and the western portions of Siskiyou and Trinity counties. This rugged mountain range is composed of several smaller mountain ranges, including the Siskiyou Mountains, Trinity Alps, Scott Mountains, Salmon Mountains, and South Fork Mountains. Although the highest peaks reach elevations of 9,000 feet or more, the crest of the Klamath Range typically occurs at elevations between 5,000 and 7,000 feet (Figure 4).

The Klamath Mountains are composed of a series of accreted oceanic terrains that are generally older from west to east and include Paleozoic and Mesozoic marine sedimentary, volcanic, and plutonic rocks (Figure 3). The principal drainages in the region are the Smith River on the north and the Klamath and Trinity rivers on the south, all of which drain directly to the Pacific Ocean. These rivers generally flow through steep, narrow canyons, undergo extreme annual variations in stream flow, with low flows during the summer and early fall, and high flows during winter and spring. The Klamath and Siskiyou ranges contain gold and other precious metals (silver, copper, tin) that were the focus of early mining efforts following the California Gold Rush of the mid-nineteenth century.

Sacramento Valley

The Sacramento Valley forms a long and nearly level alluvial plain with elevations that range from a high of about 4,010 feet at Mill Creek Rim to a low of about 148 feet at lower Foster Island, both in Tehama County. Uplift and erosion of the surrounding mountains led to the deposition of large alluvial fans at the base of the foothills along both sides of the Sacramento Valley during the middle and late Pleistocene (Dupre et al. 1991). Where the major rivers emerge from the western slope, they have built a nested series of massive alluvial fans which decrease in age basin-ward and often coalesce to create broad, low-gradient pediments that fringe the eastern Sacramento Valley. Alluvium from subsequent depositional cycles

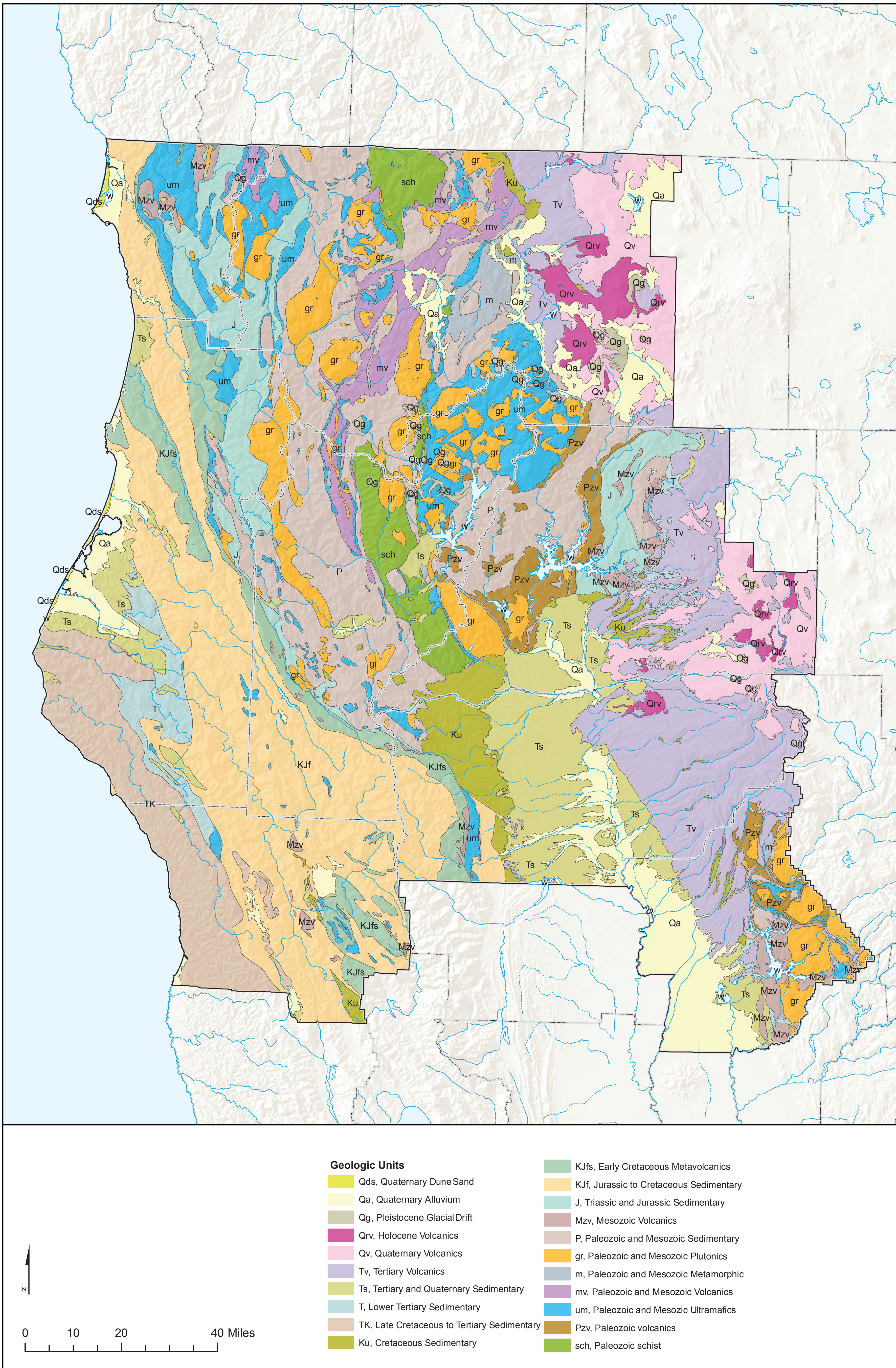

Figure 3. Geologic Units.

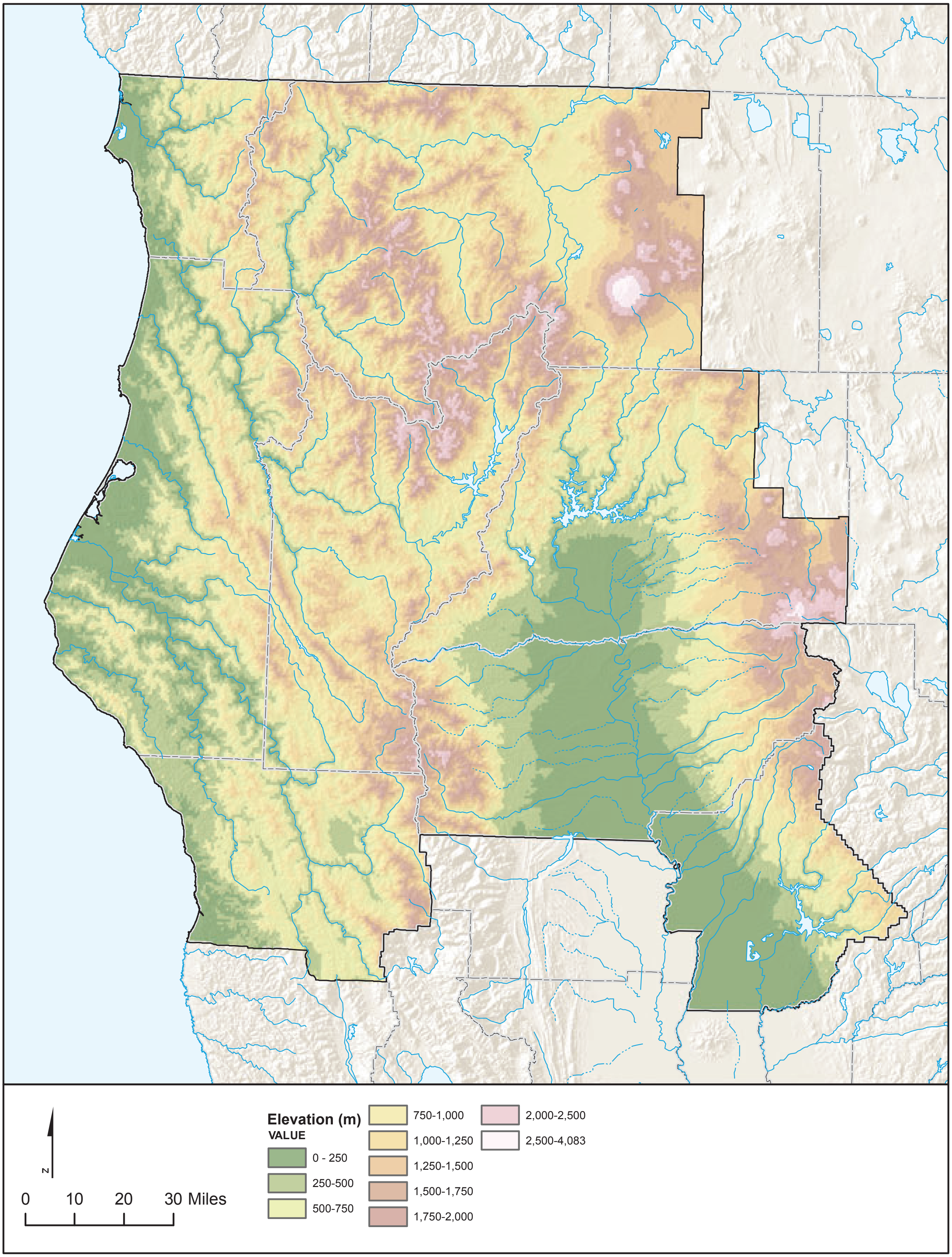

Figure 4. Elevation.

progressively buried the downstream sections of many older alluvial fans, terraces, and natural levees toward the center of the valley, along with their capping soils (Shlemon 1972).

Cascade Ranges

The Cascade Range province extends from southern British Columbia through Washington and Oregon to northern California. Mount Shasta is the highest summit within the study area reaching over 14,000 feet, while the lowest is the town of Ingot that lies at an elevation of about 1,160 feet. The southwestern end of this range stretches from Oregon through portions of Siskiyou and Shasta counties and reaches the northern parts of Butte and Plumas counties, where it ends. The divide between the southern Cascade Range and the northern Sierra Nevada provinces occurs in northern Plumas and Butte counties where it is variously placed near the North Fork or Middle Fork of the Feather River and upper reaches of Butte Creek.

The range is characterized by a series of steep, rugged ridges, with many intervening narrow canyons, and a few relatively large valleys (i.e., Shasta Valley, Butte Valley, Hat Creek Valley, and Big Meadow/Lake Almanor) that form intermediate depositional basins, respectively from north to south and west to east. The largest drainages include the Shasta River, upper segments of the McCloud and North Fork Feather rivers, and part of the Pit River. While the Feather, McCloud, and Pit rivers are tributaries of the Sacramento River that generally drain southwestward, the Shasta River drains northwest to the Klamath River. The rest of the region is drained by many smaller streams, with the upper reaches of North Fork Battle, Butte, Cow, Deer, Hat, Indian, Lost, Mill, Pine, and Rock Creeks being some larger examples.

In addition to Mount Shasta, the province contains numerous volcanic peaks, including Mount Lassen, as well as various non-volcanic formations. Despite the long history of volcanic activity, there are relatively few sources of toolstone-quality obsidian. Kelly Mountain is located several miles southwest of Mount Lassen in northern Plumas County, just outside the planning area boundary (Hughes 1986; White et al. 2005). The Tuscan formation, outcropping in a long belt throughout the Cascade foothills, also contains a number of isolated deposits of obsidian (Hamusek-McGann 1993).

Sierra Nevada

Only a small portion of the Sierra Nevada enters the study area. This steep, rugged mountain range is asymmetric in cross-section, with a broad, gradual western slope and a short, steep eastern slope. Unlike the crest of the central and southern Sierra Nevada, which lies well above 10,000 feet, the elevation of the northern crest is generally less than 8,000 feet.

The western slope of the northern Sierra Nevada is drained by the Feather River, which originates from headwaters located high in the mountains. It has carved deep canyons through underlying bedrock, many thousands of feet in depth. Granitic rocks of the upper Sierra crest are divided from bedrock of the lower foothills by a series of northwest-trending fault blocks, known as the Foothill Fault Zone. The most important prehistoric sources of toolstone in this region were basalt (e.g., Gold Lake basalt), chert/flint, and other siliceous rocks, which outcrop in parts of Plumas and Lassen counties. A source of toolstone-quality obsidian has not been identified in the northern Sierra Nevada. Like the rest of the Sierra Nevada, gold-bearing deposits on the Feather River and nearby drainages drew miners and prospectors to the northern Sierra Nevada during the Gold Rush.

CLIMATE

The climate in the study area is as varied as the geology and is, in large part, dictated by the orographic effects of geology on the building weather systems that generally move from west to east across the study area. The vast majority of precipitation in the area comes from Pacific frontal storms during the winter. These storms dump substantial amounts of rain and snow in the higher elevations of the Klamath Mountains and North

Coast Ranges (Figure 5; PRISM Climate Group 2016), with many locations reaching over 80 inches per year. As storms move east, however, rainfall decreases due to rain shadow effects and decreasing elevations. The rain shadow is most pronounced in the northern latitudes within eastern Siskiyou County where, despite overall high elevations, rainfall drops to below 16 inches per year in many locations. The Sacramento Valley, lying in the rain shadow of the North Coast Ranges averages about 24 inches per year, but benefits from the run-off of rainfall at higher elevations to the west, north, and east. As storms continue eastward, orographic uplift caused by the Sierra Nevada and Southern Cascade Range increases rainfall again where the southeastern margins of the study area can get 50 inches per year, and the headwaters of the Sacramento River can surpass 60 inches in some places. The northeast corner, however, remains quite dry.

A great deal of variation in temperature also exists across the study area. The combination of temperature and precipitation has been used to classify California's climate, with four zones established for most of northern California. The majority of the project area follows the Mediterranean climatic regime of warm and dry summers with wet and cool winters, but the continental weather patterns characterized by relatively higher summer and lower winter temperatures are found in the northeastern portions of the project area. These climatic patterns dictate, in large part, the vegetation that can grow and therefore the overall ecological setting throughout the region.

The moderating effects of the Pacific Ocean result in cool summers and relatively warm winters in the westernmost areas (Figure 6). These temperatures, when combined with high winter rainfall, result in a climatic regime of *Mediterranean/Summer Fog* immediately adjacent to the coast and *Mediterranean/Cool Summer* across much of the North Coast Ranges and the western margins of the Klamath Mountains. To the east, where cold winter conditions take hold in the eastern Klamath Mountains and across into the Cascade Range and Upper Klamath zones, the climate shifts to what is classified as a *Cool Continental/Dry Summer* regime. Due to the lower elevation and more southerly latitudes of the Sacramento Valley, cold winter temperatures are less extreme and summer high temperatures are much greater, creating a *Mediterranean/Hot Summer* regime. Finally, upon reaching the Sierra Nevada, average temperature again decreases, with cold winters and cool summers, returning to *Mediterranean/Cool Summer* conditions.

VEGETATION

The vegetation of the study area is extremely diverse and complex even when taking only the broad community-level classifications into account and ignoring more detailed microclimate effects of slope, aspect, and drainage. The climatic classifications outlined above are highly correlated with the distribution of vegetation communities across the study area (Figure 7; Küchler 1976). *Mediterranean/Summer Fog* of the Coast Range Province along the outer coast produce small stands of Coastal Saltmarsh along the bays and lagoons north of Point Mendocino, Coastal Prairie-Scrub Mosaic, combined with Grand Fir-Sitka Spruce Forest and Redwood Forest in the north, and Redwood Forest and Mixed Evergreen Forest (with Rhododendron) in the south. Both of the latter vegetation communities continue well into the interior along the southern latitudes, occupying the *Mediterranean/Cool Summer* zone, but are replaced farther north by Mixed Evergreen Forest (with chinquapin) and Klamath Montane Forest (with Douglas fir) within the higher elevations. Similarly, Coast Range Montane Forest also covers the higher elevations in area to the south.

Moving across the northern portion of the study area, Klamath Montane Forest (with Yellow Pine) takes over in lower elevation and slightly drier settings, and ultimately gives way to Oregon Oak Forest along this west-to-east trajectory. Upon reaching *Cool Continental/Dry Summer* regime of northeastern California, Sagebrush Steppe takes over the lower elevation areas and Yellow Pine, Sierra Montane, and Upper Montane Forest become dominant with increasing elevation. Sagebrush Steppe drops out when moving south in the more mesic Sierra Nevada, but Sierra Montane Forest remains dominant in the upper elevations, followed by Yellow Pine Forest in adjacent, lower elevation areas.

Foothill areas surrounding the Sacramento Valley include a band of Chaparral, followed large swaths of Blue Oak-Gray Pine Forest at slightly lower elevations. California Prairie takes over within the Sacramento Valley Lowlands, with Riparian Forest occurring along the Sacramento River and its major tributaries.

Although the bio-productivity of terrestrial habitats maps closely with precipitation patterns and remains consistently high throughout the project area, the distribution of economically important plants for Native Americans varies to a greater degree. Most notably, the great band of redwood forest that runs north to south along the Coast Range Province has been argued to represent a virtual food desert for hunter-gatherers (Colligan et al. 2015; Hildebrandt and Carpenter 2006). It is important, therefore to consider the distribution of economically important acorn species across the study area. The three most abundant varieties include black oak, tan oak, and blue oak (Figure 8), with tan oak and black oak being the two top-ranking species in the state, and Oregon oak coming in sixth place (Baumhoff 1978). As demonstrated by Figure 8, all three species are rare along the outer coast, the high elevation habitats of the Klamath Mountains and semi-arid areas to the east, and the Sacramento Valley lowlands. Overall distributions include blue oak surrounding the Sacramento Valley, black oak found in almost all adjacent upland areas, and tan oak dominant in the northwest. Both tan oak and black oak co-occur within the southwestern part of the North Coast Ranges, which was one of the most productive places in the state (Baumhoff 1963).

While acorns were certainly the most important economic plant in the study area prehistorically, each vegetation community also offered important berries, small seeds, and alternative nuts (sugar pine and gray pine), and tubers.

IMPORTANT ANIMALS

Prior to Euro-American settlement, the study area contained a wide range of economically important mammals, fish, and birds. Unfortunately, contemporary conditions bear only the slightest resemblance to the situation in prehistoric times. Many of the native species have been reduced in numbers, some to extinction, and their habitats have been modified or destroyed (Ingles 1965). Mammal resources once common to the area include black-tailed deer (*Odocoileus hemionus*), black-tailed hare (*Lepus californicus*), brush rabbit (*Sylvilagus bachmani*), western gray squirrel (*Sciurus griseus*), ground squirrel (*Spermophilus* sp.), and pocket gopher (*Thomomys* sp.). Game birds include California quail (*Callipepla californica*), mountain quail (*Oreortyx pictus*), mourning dove (*Zenaida macroura*), and band-tailed pigeons (*Columba fasciata* [Storer and Usinger 1963:263–264, 267]). In coastal areas and the Sacramento Valley river corridors elk (*Cervus elaphus*) roamed in large herds and pronghorn (*Antilocapra americana*) covered the grasslands surrounding the Sacramento Valley and the uplands in the eastern reaches of the Cascade range. Marine mammals were found along the coastal margin including most notably stellar sea lion (*Eumetopias jubatus*), California sea lion (*Zalophus californianus*), and occasional occurrences of northern fur seal (*Callorhinus ursinus*). Harbor seal (*Phoca vitulina*) and sea otter (*Enhydra lutris*) were also resident to coastal areas.

The lagoons and lakes of the region, as well as slower stretches of the numerous rivers and creeks were home to a variety of waterfowl that would have been attractive to both prehistoric and historic hunters. On the lagoons of the Coast Range province were various dabbling and diving ducks (Anatinae), geese (Anserinae), grebes (Podicephidae), coots (*Fulica americana*), and herons and egrets (Arededidae).

Perhaps the most important resources in the entire study area were the fish found throughout the rivers and creeks, with various runs of salmon looming large in the ethnographic and archaeological record of the Coast Range, Sacramento Valley, and Cascade Mountain portions of the study area. The most important species were king (chinook) salmon (*Oncorhynchus tshawytscha*), silver (coho) salmon (*Oncorhynchus kisutch*), and steelhead trout (*Oncorhynchus mykiss*). They were of paramount importance on the Smith, Klamath, and

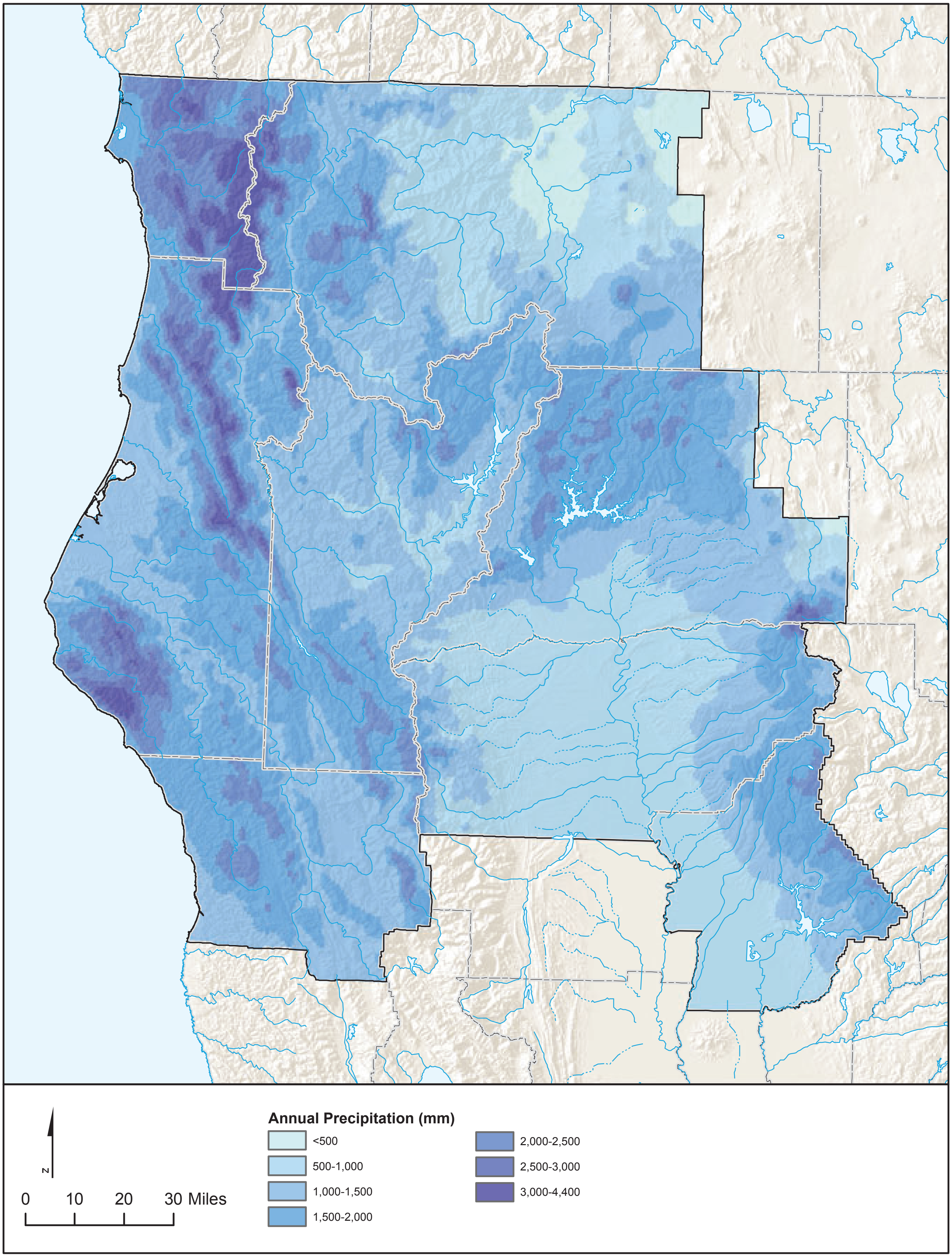

Figure 5. Yearly Precipitation Totals.

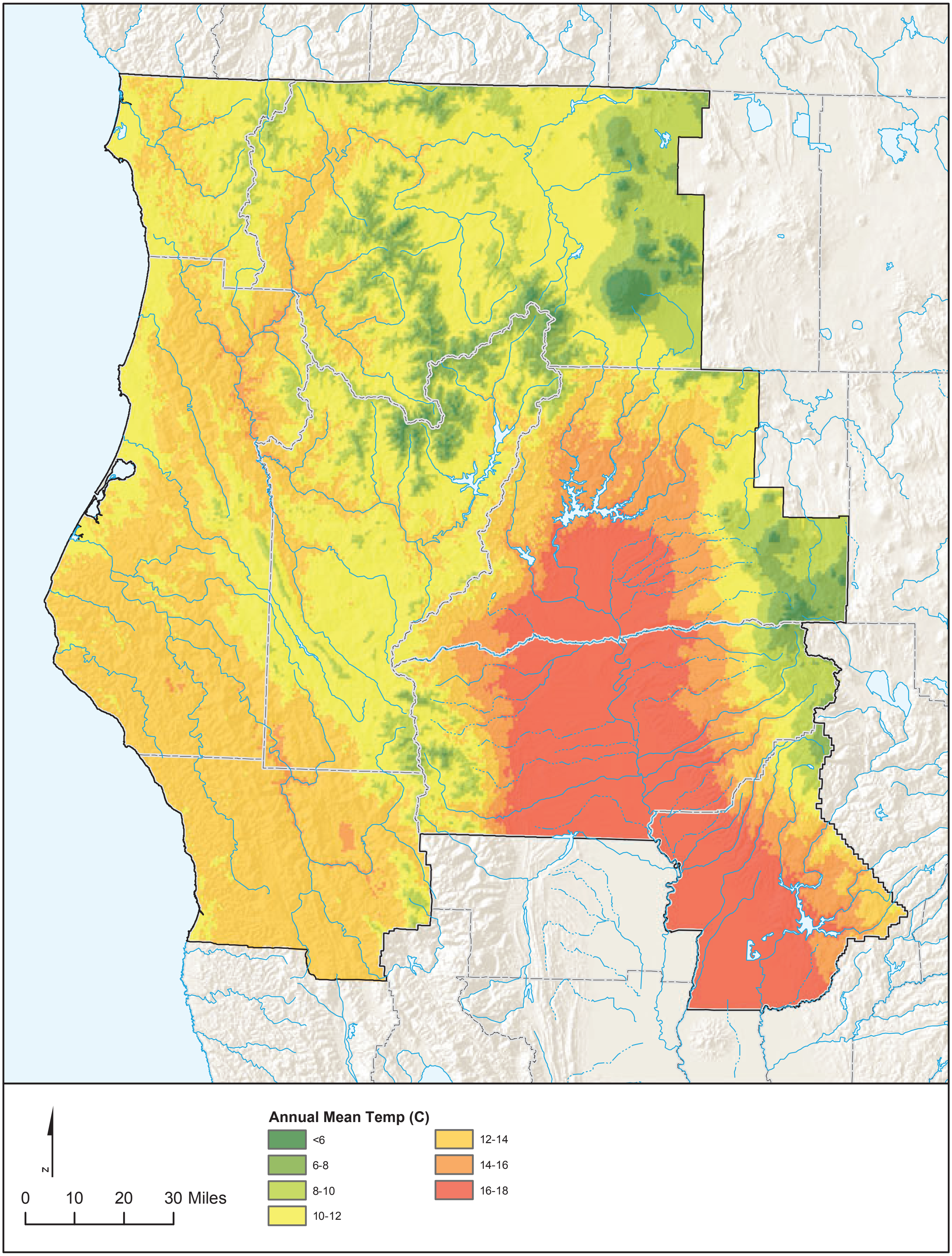

Figure 6. Annual Mean Temperature.

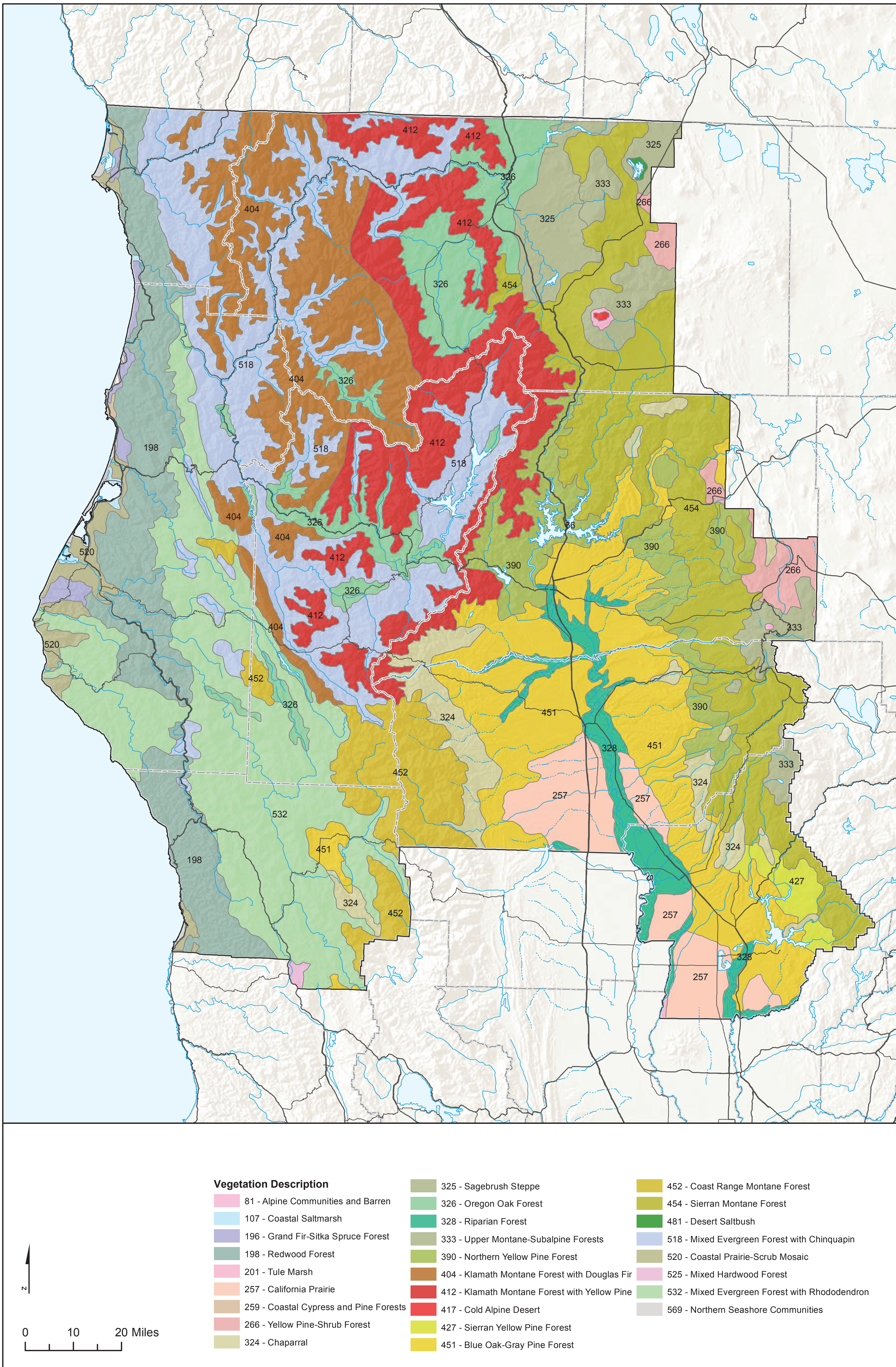

Figure 7. Natural Vegetation Communities.

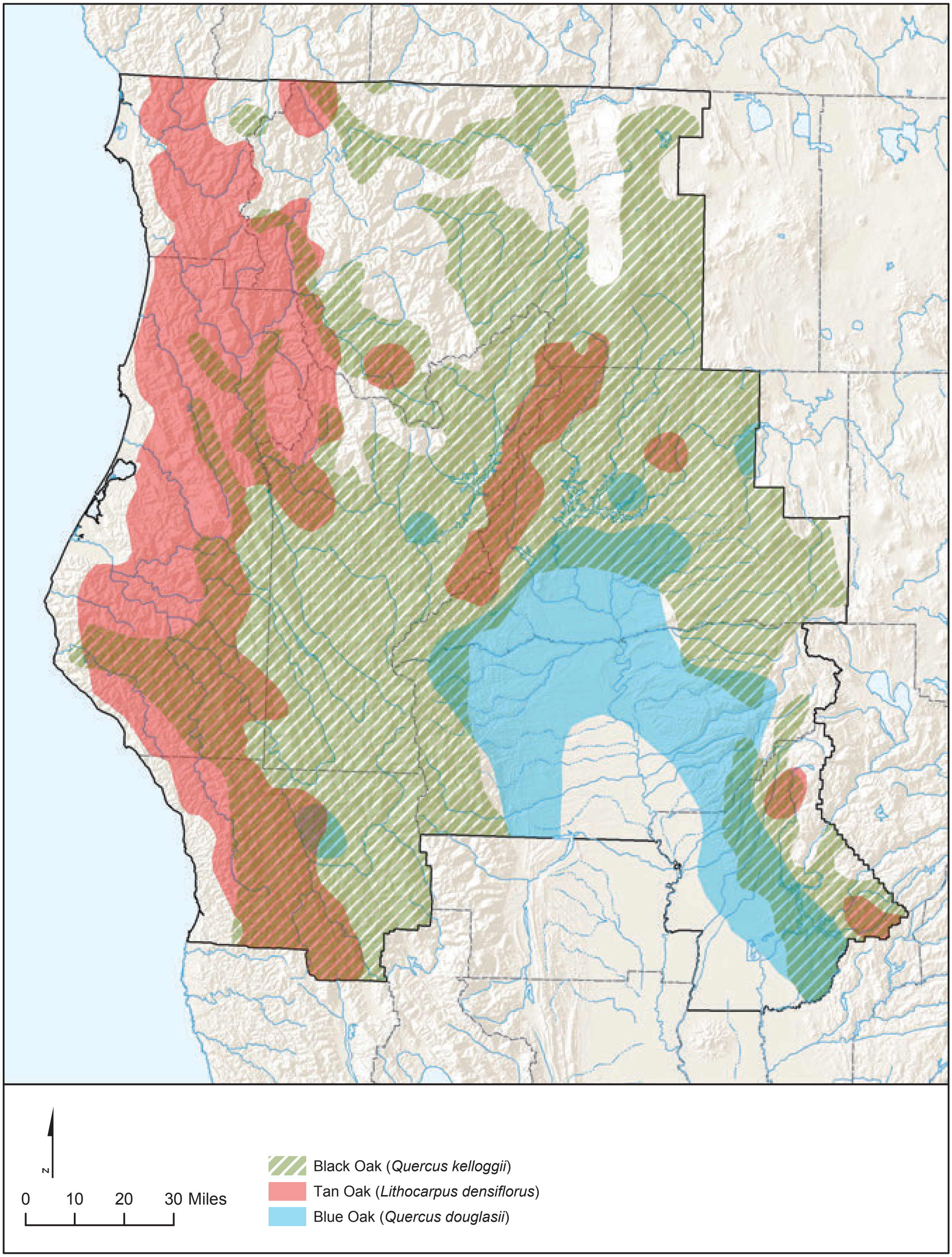

Figure 8. Distribution of Selected Oak Species.

Eel River drainages, and also significant along the Sacramento River and its tributaries (Baumhoff 1963). Of crucial importance was the spring run of king salmon which added fresh food after a long winter relying on stored resources, but they did not occur on all streams. Significant spring runs do occur in the Smith, Klamath, Trinity, and Sacramento rivers, although many tributaries of the Sacramento did not carry sufficient flows for spring spawning, especially in streams flowing east out of the North Coast Ranges (Moyle 2002); see also Chapter 6 for a review of salmon availability by ethnographic group. Other piscine resources were also important, including Pacific lamprey (*Lampetra lethophaga*), stickleback (*Gasterosteus* sp.), sturgeon (*Acipenser* sp.), eulachon (*Thaleichthys pacificus*), coast range sculpin (*Cottus aleuticus*), and prickly sculpin (*Cottus asper*).

Along the Sacramento River watershed a different set of fish taxa were available, including Sacramento sucker (*Catostomus occidentalis*), Sacramento pike-minnow (*Ptychocheilus grandis*), steelhead, California roach (*Hesperoleucus symmetricus*), riffle sculpin (*Cottus gulosus*), and hardhead (*Mylopharodon conocephalus*).

Molluscan species were important along the coast, most notably California mussel (*Mytilus californianus*) along with various limpets (family Lottidae), chitons (*Katarina spp./Cryptochinon spp.*), and purple sea urchin (*Strongylocentrotus purpuratus*). Although popular to modern divers, red abalone (*Haliotis rufenscens*) are lacking in the archaeological record of northern California (Colligan et al. 2015). Freshwater mussel (*Margaritifera falcata*) was widely distributed prehistorically in the rivers and streams of northern California along with various other species of freshwater mollusc (Taylor 1981:143).

PALEOENVIRONMENTAL OVERVIEW

The best synthetic accounts of paleoenvironmental conditions within the study area are available from West (2007), White et al. (2005), Meyer (2013), Meyer et al. (2011), and are only briefly summarized here.

The Latest Pleistocene (22,000–13,500 cal BP)

Climate in the study area during the last glacial maximum, 22,000 years ago, was considerably cooler than at any time since. Known as the Wisconsin Glaciation, much of the world's fresh water was tied up in glacial ice. Two massive ice sheets formed over most of Canada and portions of the northern United States (Grayson 1993). To the east, the 3,300-meter-thick (11,000-foot) Laurentide Ice Sheet extended from Labrador to the eastern foothills of the Rocky Mountains. On the west, the Cordillerian Ice Sheet formed an almost 2,400-meter-thick (8,000-foot) cap that extended as far south as modern Seattle. During the Wisconsin Glaciation, the crest of the Sierra Nevada and higher peaks of the Trinity Alps in the Klamath Range were covered by elongated sheets of ice. The glacier in the Sierra Nevada averaged roughly 50 kilometers (32 miles) wide and extended from the headwaters of the Keaweah River on the south, to the Feather River on the north.

Floral assemblages from throughout coastal central California indicate that late Pleistocene climate was more seasonal than today, with cooler temperatures, greater effective precipitation, and a longer rainy season (West 2000). Axelrod (1981) documents a near-continuous distribution of coniferous forest extending from the northern California coast as far south as the Channel Islands and Los Angeles. Pollen spectra and macrofossils from the north Coast Ranges also show a more continental and cooler climate during the late Pleistocene. In contrast to the coastal record, pollen and macrofossil evidence from the western slope of the Sierra Nevada-Cascade Range indicate that the late Pleistocene in the interior may have been equally cold, but comparatively dry. A cold climate is also indicated by lower surface water temperatures at Greenstone Lake (Porinchu et al. 2003) and Hidden Lake (Potito et al. 2006), reconstructed from Chironomid fossils (midge flies). Greasewood, which does not occur on the western slope of the Sierra today, is found in late Pleistocene sediments west of the crest in the central and southern Sierra, at Gabbot Meadow (Mackey and Sullivan 1991), Exchequer Meadow (Davis and Moratto 1988), Nichols Meadow (Koehler and Anderson 1994), and Lake Moran (Edlund 1991). A cold-dry climate is further evidenced by the ubiquity and high frequencies of sagebrush and grasses and low frequencies of pine and cypress in virtually all late Wisconsin pollen records from the western Sierra (e.g., Davis and Moratto 1988; Edlund 1991, 1994; Koehler and Anderson 1994; Mackey and Sullivan 1991; Smith and Anderson 1992) and western Cascade (Starratt et al. 2002; West 2005). The proxy records from above 6,560 feet (2,000 meters) evince cold-adapted alpine vegetation dominated by sagebrush, grasses, and herbaceous species in areas now encompassed by montane forest, including Medicine Lake in the southern Cascade Range (Starratt et al. 2002). At a slightly lower elevation (ca. 6,000 feet [1,829 meters]) in the southern Cascades, West (2005) also reports very high concentrations of sagebrush pollen in sediments from Little Willow Lake dating between 15,900 and 14,100 cal BP.

The Pleistocene-Holocene Transition (13,500–11,500 cal BP)

West (2000:19) points out that "the transition from the late Glacial Maximum (22,000 years ago) of the Pleistocene to the Holocene appears to have occurred in a step-like manner but with several reversals, the most significant being the period called the Younger Dryas." The Younger Dryas is a worldwide interval of colder climate that began abruptly around 12,900 years ago, lasting for approximately 1,100 years (12,900–11,800 cal BP). Evidence of this brief reversal in the general warming trend leading to the Holocene comes from marine sediments along the California coast (Kennett and Ingram 1995), fossil pollen records from Clear Lake (Adam 1988; West 2000, 2001, 2002), and from pluvial lake basins in eastern California and Western Nevada (Benson et al. 1997). Although not generally recognized in the Sierra, some paleoecological records reflect a brief period of cooler conditions around the time of the Younger Dryas. Midge fly remains from Greenstone Lake show a brief decline in surface water temperature between 12,000 and 11,500 cal BP, interrupting a sequential increase in temperature from the late glacial period through the early Holocene (Porinchu et al. 2003).

Elsewhere in the Sierra-Cascade Range, primary shifts in vegetation occurred prior to the Younger Dryas, marking the transition from the late glacial climate of the Pleistocene to the post-glacial climate of the Holocene.

Early Holocene (11,500–7000 cal BP)

As the continental ice sheets began to melt toward the end of the Pleistocene, oceans of the world rapidly rose, causing the Pacific shoreline to migrate eastward several kilometers. Between 15,000 and 11,000 years ago, sea levels rose about 55 meters (180 feet) at an average rate of about 13 meters (43 feet) every 1,000 years worldwide (Bard et al. 1996). By 10,000 years ago, 50% of the area formerly covered by glacial ice was exposed (Bloom 1983) and sea-level rise was progressing at an average rate of about 8.3 meters (27.23 feet) every 1,000 years (Stewart et al. 2002).

The transition to the Holocene after 11,800 years ago is reflected in a number of paleoenvironmental records marked by significant increases in temperature and decreases in precipitation (Adam and West 1983; West 2002). In the Clear Lake Basin, and elsewhere in the interior North Coast Ranges, the onset of the Holocene is marked by high oak and chaparral values, beginning about 9,500 years ago, reflecting an increase in drought-tolerant species (West 1993, 2001). On the western slope of the Sierra, paleoenvironmental records consistently indicate a transition to warmer and dryer conditions during the early Holocene. This drying trend is not reflected in the North Coast Ranges which appears to have received greater precipitation during this interval (Anderson 1990; Davis and Moratto 1988; Davis et al. 1985; West 1993). By about 11,500 cal BP, subalpine conifers such as lodgepole pine (*Pinus contorta*), white pine, and limber pine (*Pinus flexilis*) became established at elevations up to 9,840 feet (3,000 meters) in the Sierra. High altitude forests were structurally different during the early Holocene than they are today, with montane chaparral shrubs and other open-ground species, indicating a more open forest (Anderson 1990). Sagebrush frequencies remained high from the late Pleistocene to the early Holocene in virtually all pollen records from the upper Sierra, leading most researchers to believe that the climate remained quite dry (Anderson 1990; Davis and Moratto 1988; Davis et al. 1985; Edlund 1991; Smith and Anderson 1992). Additional evidence for a warmer early Holocene in the Sierra is provided by midge fly fossils from Greenstone Lake, which reflect surface water temperatures between 15.5 and 16.6 °C (60 and 62 °F), almost 2.0 °C (3.6 °F) warmer than temperatures recorded for the preceding Younger Dryas during the Pleistocene-Holocene transition (Porinchu et al. 2003).

Middle Holocene (7000–4000 cal BP)

A number of studies from the Coast Ranges suggest peak Holocene warming likely occurred prior to 5000 cal BP. Oak and chaparral pollen reached highest frequencies in the North Coast Ranges, along with peak amounts of redwood pollen in more maritime settings (e.g., Adam 1988; Adam and West 1983; Adam et al. 1981; Heusser 1978; Jones and Waugh 1997; West 1993). Axelrod (1981) estimates that July temperatures during the middle Holocene in central California were about 1.0 °C (1.8 °F) warmer than today, corresponding to the 1.4 °C (2.5 °F) increase suggested by Adam and West (1983; West 1993).

Of the paleoenvironmental records from the Sierra Nevada, those of the middle Holocene are the most variable, complex, and contradictory, especially between different regions. The middle Holocene (i.e., "Altithermal") has long been characterized as distinctly warmer and drier than today, based on studies from the Great Basin and Desert Southwest (Antevs 1955; Baumhoff and Heizer 1965). While some Sierran records support this view (e.g., dendrochronologic, paleohydrologic), much of the pollen and macrofossil evidence indicates that conditions were cooler and wetter between about 7000 and 4000 cal BP (Anderson 1990; Anderson and Smith 1994; Davis and Moratto 1988; Davis et al. 1976, 1985; Koehler and Anderson 1994; Wood 1975; Woolfenden 1996). The apparent inconsistency of these records has led to a lack of consensus among researchers attempting to interpret the nature, extent, and magnitude of middle Holocene paleoenvironmental change in the Sierra. In the North Coast Ranges, pollen profiles from Tule Lake record an increase in Douglas fir and tanoak between 6800 and 5800 cal BP, also reflecting an increase in effective moisture in the northwest part of the state (West 1993).

Late Holocene (4000 cal BP–AD 1850)

During the late Holocene, pollen records from central and northern California suggest a return to more mesic conditions, with increased precipitation and less pronounced seasonal temperature variations, more characteristic of the modern climate (West 2000). At higher elevations in the North Coast Ranges, Douglas fir begins to expand between 3800 and 2300 cal BP, and most pollen records studied by West (1993) show an increase in pine and a decrease in oak. In the Sierra, the upper tree line migrated downslope some 32 meters (105 feet) between 3400 and 2900 cal BP (Scuderi 1987) characteristic of declining mean temperatures. Greater abundance of charcoal in these sediments is thought to be a product of increased fire frequency and more pronounced seasonal drought (Smith and Anderson 1992). Elevated fir pollen frequencies are noted at Lake Moran where beginning 3800 cal BP (Edlund 1991) and in the Southern Cascade at Willow Lake beginning 3400 cal BP (West 2005). Cooler conditions are also evident beginning about 3200 to 2500 cal BP by the elevational lowering of mountain hemlock and grand fir at high and mid-elevation meadow sites studied by Anderson (1990). Increased effective precipitation during the late Holocene is also indicated by the development of wet-meadows across much of the western slope of the Sierra, beginning as early as 5000 cal BP at some locations, but widespread by 3000 cal BP (Koehler and Anderson 1994; Smith and Anderson 1992; Wood 1975). Floral and pollen records from the western Great Basin indicate an expansion of western Juniper woodland into sagebrush steppe beginning perhaps 4,500 years ago increasing dramatically about 3,700 years ago (Wigand and Rhode 2002).

Two periods of drought known together as the Medieval Climatic Anomaly (MCA), are recognized by low stands of Mono Lake between 1100 and 890 cal BP and 790 and 650 cal BP (Stine 1994). This is consistent with reconstructed Sacramento River flows using tree-ring data, which suggest droughts occurred about 1,020 and 700 years ago (Meko et al. 2001). Meko et al. (2001), however, indicate the most severe drought in the last 1,100 years occurred in the Sacramento watershed 420 years ago.

Evidence of a late drought in the Sacramento drainage notwithstanding, by about 650 cal BP warm, dry conditions of medieval times began to give way to the Little Ice Age in the Sierra Nevada, also known as the Matthes glaciation (Matthes 1939). This neo-glacial period reached its peak about AD 1850 and declined thereafter, ending about 1900 (Guyton 1998; Stine 1996). It is generally thought that this climatic shift was triggered by reduced solar activity which changed the atmospheric circulation of the winter storm track over the northern Pacific (Graham 2004). Increased precipitation and lower temperatures (1.0–2.0 °C cooler than today) led to greater snowfall and the expansion of glaciers during this interval. These changes are reflected in isotopic, lake sediment, macrofossil, pollen, and tree-ring records from throughout California (Stine 1996), along with a decrease in the frequency of fires as monitored by reduced quantities of charcoal (Swetnam and Baisan 2003). The Little Ice Age is the only widely recognized period of glacial growth in the Sierra during the Holocene, and the coldest period in at least the past 11,000 years.

HISTORY OF RESEARCH (by William Hildebrandt)

There is a deep history of anthropological study in northern California, beginning with an emphasis on ethnography and then continuing forward with both ethnography and archaeology. The vast majority of this work can be divided into four primary periods: (1) Early Ethnographic and Archaeological Studies; (2) Reservoir Surveys and Excavations; (3) Early Cultural Resources Management Projects; and (4) Contemporary Studies. The following discussion provides a brief review of this history, giving the reader a feel for the historical contexts that influenced how we arrived at where we are today. It is not meant to be a comprehensive review of these studies, as a detailed accounting of the archaeological records from throughout the study area is provided in the following *Prehistoric Context* section (page 29).

EARLY ETHNOGRAPHIC STUDIES

Although a handful of important ethnographic studies took place in the late 1800s (e.g., Powers 1877), the establishment of the Department and Museum of Anthropology at the University of California, Berkeley in 1901 marked the beginning of major ethnographic work in California. The research focus of the department and museum was defined soon thereafter by development of a program entitled the *Ethnological and Archaeological Survey of California*, but the true emphasis was placed on ethnography and not archaeology. Publication of this research was facilitated by the establishment of the *University of California Publications in American Archaeology and Ethnography* in 1903. The lasting significance of this series is clearly demonstrated in the *Ethnographic Context* (see page 91) where it is cited on numerous occasions (see also Golla 2011; Heizer 1978).

In addition to professors in the Department of Anthropology like Kroeber, Gifford and Goddard, many of the early researchers were graduate students hoping to obtain as much cultural and linguistic information as they could from the dwindling Native populations of California, and many of the individuals cited in Chapter 6 fall within this category. In one case, Kroeber was so shorthanded on personnel that he was forced to send out a custodian from the museum, L. L. Loud, who conducted an ethnographic and archaeological study along the shores of Humboldt Bay, which still ranks as one of the best pieces of research ever conducted in the region.

Other important ethnographers not directly associated with the University of California included C. Hart Merriam (privately funded), John P. Harrington (Bureau of American Ethnology), and Roland Dixon (American Museum of Natural History), all of whom made important contributions within our study area. We should also note that although Kroeber was not too interested in archaeology at this time, Phoebe Hearst did fund a limited amount of archaeological research around the state, including Sinclair's (1904) search for Pleistocene man at Potter Creek Cave in Shasta County.

Most of these ethnographic studies were published throughout the early 1900s, with many of them synthesized by Kroeber's (1925) epic *Handbook of the Indians of California*. Some of this work extended through the 1930s (e.g., DuBois 1935), 1940s (Gifford 1940), and 1950s (Goldschmidt 1951), with a major flurry of activity between 1934 and 1939 as part of the *Culture Element Survey of Native North America* program where many of the most knowledgeable Native American consultants were revisited to collect ethnographic information using more systematic, quantitative methods than were used by the original researchers (Kroeber 1935). After the 1930s, most of the primary information had been collected, and subsequent publications largely relied on existing data sets in their analyses (e.g., Baumhoff 1958; Kroeber and Barret 1960), culminating with publication of the California volume of the *Handbook of North American Indians* in 1978.

After Kroeber's retirement in 1946, Heizer took on more responsibility at the University of California and placed a greater emphasis on archaeology. Our study benefited from this new focus, especially along the north coast (e.g., Elsasser and Heizer 1966), the southern Cascade Range (e.g., Baumhoff 1957), and adjacent areas within the Sierra Nevada (Elsasser 1960). Although these studies were limited in number, they produced large samples of material that still figure heavily in our current interpretations of the archaeological record.

RESERVOIR SURVEYS AND EXCAVATIONS

The frequency of archaeological studies increased significantly between 1947 and the early 1950s when the Smithsonian River Basin Surveys program was established. The program sent numerous archaeologists out to conduct surveys and excavations at proposed reservoir areas throughout the American West. Some of the most important early reservoir studies conducted within or near our study area were by Smith and Weymouth (1952), Treganza (1954, 1958, 1959), Treganza and Heicksen (1960, 1969), and Treganza et al. (1950), all of which were published though the University of California and, later, San Francisco State College. Some of these studies provided Meighan (1955) with the data for his classic study "Archaeology of the North Coast Ranges" published by *University of California Archaeological Survey Reports*.

Additional reservoir studies continued into the 1960s, including those by Edwards (1966), King (1966), Childress and Chartkoff (1966), Olsen and Payen (1969), and Chartkoff and Childress (1966). Interestingly, very little of this latter work was published, and none through the standard University of California outlets. One exception was Ritter's (1970) publication of his excavations at Lake Oroville in the new series *Center for Archaeological Research at Davis*, which is still published by graduate students at the University of California, Davis (Greenwald and Burns 2016).

EARLY CULTURAL RESOURCES MANAGEMENT AND ACADEMIC RESEARCH PROJECTS

With the passage of the National Historic Preservation Act of 1966, the signing of Nixon's 1971 Executive Order 11593, and various National Park Service publications providing guidance for understanding and implementing these laws and regulations, archaeological research within the new field of cultural resource management exploded during the 1970s. For the purposes of this discussion, this phase in the history of research continues into the mid-1980s, culminating in the publication of Moratto's (1984) *California Archaeology*, where multiple archaeologists (including Moratto, Fredrickson, and Raven within our study area) summarized what was known about the record at the time. Chartkoff and Chartkoff (1984) also published their synthesis at this time in *The Archaeology of California*.

In addition to major Section 106 projects associated with the construction of reservoirs (e.g., Johnson and Theodoratus (1984a, 1984b, 1984c) and timber harvest projects (Hildebrandt and Hayes 1983), several agencies commissioned cultural resources overviews and research designs to better understand and manage the resources on their lands. Some of the most important ones for our study area were Theodoratus (1979, 1980, 1981), McCarthy et al. (1985), Bickle (1979), Jensen and Reed (1979), Tamez (1981), and Kowta (1975). In these studies, and in large-scale surveys that happened around the same time, a great deal of emphasis was placed on the development of prehistoric site typologies and settlement pattern models (Jackson 1976; Levulett et al. 1980; Stewart and Fredrickson 1979), many of which were tied to local ethnographies and synchronic in nature.

Several important excavation projects also took place during this interval, with some representing cornerstones for the development of the cultural historic reconstructions provided in Chapter 4. The most important of these include O'Connell (197 1) for the Upper Klamath Zone; Clewett and Sundahl (1983) for the Sacramento Valley; Gould (1966) for the North Coast; Hildebrandt and Hayes (1983) for interior northwest California; Fredrickson (1973, 1974) for the North Coast Ranges; and Ritter (1968, 1970) for the Sierra/Cascade region.

CONTEMPORARY STUDIES

The scope of research has grown significantly since 1984 and continues to do so to this day. Moratto and Chartkoff (2007:1), in the new synthesis *California Prehistory: Colonization, Culture, and Complexity* (edited by Jones and Klar [2007]), state that even a concise summary of major accomplishments since 1984 would require hundreds of pages of text. This is the case not only because the volume of work has increased exponentially, but because improvements in analytical methods (e.g., high precision radiocarbon dating, obsidian source and hydration studies, faunal and floral analyses, stable isotopes, ancient DNA), environmental reconstruction, and the application of advanced theoretical perspectives has expanded the number and range of research issues that can be addressed.

Much of this work has been funded by cultural resources management contracts initiated by California Department of Transportation (Caltrans), Bureau of Land Management, United States Forest Service, National Parks Service, Army Corp of Engineers, and State Department of Water Resources, employing both private firms and academic foundations. Support has also come from various academic institutions, especially Shasta College, University of California, Davis, and California State University campuses at Chico, Sonoma, Humboldt, and Sacramento. Many of these institutions have produced important M.A. theses and Ph.D. dissertations, as well as follow-up publications in professional journals. Because most of the text presented in Chapters 4 and 5 focus on these post-1984 studies, we let those chapters serve as an example of where we have come and, hopefully, provide some useful guidance for were we are going in the future.

PREHISTORIC AND ETHNOHISTORIC ARCHAEOLOGY
(by William Hildebrandt and Sharon Waechter)

As outlined above in the *Environmental Background*, the study area contains a wide diversity of habitat types with varying degrees of economic potential. This high level of diversity is also found on a cultural level, especially with regard to Native languages, which show some of the highest levels of linguistic diversity ever recorded on earth (Figure 9). Before reviewing the prehistoric archaeological records of the study area, which are also quite diverse, we begin with a brief review of the languages that were spoken at historic contact (and still spoken today in some cases), as they reflect the outcome of a dynamic history of culture change over at least 13,000 years.

Victor Golla (2011) provides an outstanding summary of the history and distribution of these languages, and his reconstructions will play an important role in the *Prehistoric Research Issues* section below, when addressing the research issue *Historical Linguistics and Populations Replacements*. It appears that Northern Yukian is the oldest language in the study area, and this isolated tongue was spoken in a relatively small area in the High North Coast Ranges, and on a narrow strip of land along the Mendocino County coast. Hokan languages are also thought to be quite old: these include Karok and Chimariko spoken along the Klamath and Trinity rivers; Shasta, Konomihu, and New River Shasta in the Upper Klamath zone; Achumawi and Atsugewi within the Pit River watershed and the northernmost part of the Southern Cascade Foothills zone; Yana in the remainder of the Southern Cascade Foothills zone; and Northern Pomo, spoken at the southern end of the Coast Range zone.

Penutian languages are thought to be the next oldest group, with most of them arriving into the study area after 1500 cal BP, during multiple migrations from the Plateau and northwestern Great Basin. Penutian is a generalized phylum composed of multiple language families including the Wintuan languages (Wintu and Nomlaki), which were centered in the Sacramento Valley zone; Maiduan (Konkow and Chico Maidu or Mechoopda) in the Sierra Nevada zone and the southeastern part of the Sacramento Valley zone; and the Klamath-Modoc language spoken along the easternmost part of the Upper Klamath zone.

Probably arriving during two separate migrations sometime after 1500 cal BP, the Algic languages (Yurok and Wiyot) were spoken on Humboldt Bay and the lower Klamath River within the Coast Range. Soon thereafter speakers of multiple Athabaskan languages arrived. These were located in the North Coast and High North Coast Ranges zones, and include the Hupa-Chilula, Mattole-Bear River, Kato, and the Eel River group (Nongatl, Sinkyone, Lassik, and Wailaki).

The archaeological records associated with these zones also show significant differences, but the scale of these differences is sometimes difficult to ascertain due to contrasts in the amount and quality of information available from place to place. This is especially true when moving deep into antiquity. With these considerations in mind, the prehistoric record has been divided into five cultural-historical narratives. Four narratives correspond quite closely to the project zones (Upper Klamath; Sacramento Valley; Sierra Nevada and Adjacent Lowlands; and Southern Cascade Foothills and Adjacent Lowlands), while the fifth combines two zones together (North Coast and Klamath Mountains/North Coast Ranges). We have combined the latter two zones because they largely share the same set of time sensitive projectile points, and both zones are necessary to produce a comprehensive culture history, as most of the earlier archaeological record occurs on the interior while most of the later-dating record is found on the coast.

This is not a historical review of previous research, where we chronicle the major archaeological studies that have occurred in the past. Instead, each narrative is organized according to time period, giving focus to studies that we feel contribute the most important information about that interval of time. We give special attention to local environmental setting, artifact assemblage, subsistence remains, site structure, adaptive pose, and socio-political organization, and to the time-space distribution of all of these things.

Information about archaeological studies not referenced in the narratives can be found in the annotated bibliography presented in Appendix A.

The narratives rely on chronological sequences that have already been developed for each zone (Figure 10). There are often differences in the nomenclature used to define temporal intervals from one zone to another (e.g., *Periods* versus *Patterns* versus *Complexes*), but we give no taxonomic or interpretive significance to them. We are simply interested in monitoring change over time, using the temporal intervals that have historically provided the highest resolution for doing so. All of the temporal ranges are expressed according to calibrated radiocarbon ages. This means that many of the age ranges will differ from their original publication because they were often based on uncorrected radiocarbon years at that time.

UPPER KLAMATH

The cultural historical time periods for the Upper Klamath zone (Figure 10) are drawn largely from the work of Mack et al. (1991) and Mack (2003), although we have added the Paleoindian and Paleoarchaic periods, which are not part of her original work. It is also important to note that that this zone stands apart from the others by having stronger cultural affinities to the northwestern Great Basin and Klamath Basin. This is especially true within Butte Valley and the adjacent Upper Klamath River Canyon, and to a lesser degree within Shasta Valley and the Lower Klamath River Canyon.

Paleoindian Period (14,500–12,800 cal BP)

Until relatively recently, most archaeologists believed that artifacts produced by Clovis people represented the oldest evidence of human occupation in North America (Haynes 1967; Waters 1985). These artifacts typically include fluted projectile points, large bifaces, and a variety of formal flake tools. Based on an analysis of radiocarbon dates from these ancient sites, Haynes (1992) argued that the Clovis adaptation dated between 13,390 and 12,810 cal BP. More recently, Waters and Stafford (2007) argue for a more narrow range of 12,960 to 12,740 cal BP, but this range has been rejected by many other Paleoindian researchers (Haynes et al. 2007).

The search for a pre-Clovis archaeological record has been an ongoing concern for several decades, and many archaeologists have claimed such a discovery. But most of these so-called discoveries have been flawed in one way or another. According to Grayson (2011), a legitimate pre-Clovis site must provide an affirmative answer to the following questions: (1) are the findings truly archaeological (created by humans)?; (2) have they been firmly dated with radiocarbon or some other reliable means?; (3) is the deposit free from disturbance, ensuring tight associations between the artifacts and dateable material?; and (4) are the findings published with a level of detail that allows an independent analysis?

Pre-Clovis (14,500–13,800 cal BP)

There is only one purported pre-Clovis site located relatively near the study area that appears to meet all four criteria: the Paisley Caves in south-central Oregon (Jenkins et al. 2012, 2014). The caves are located in the northwestern Great Basin on the margins of Summer Lake Basin, about 75 kilometers north of Lakeview, Oregon. Paisley Cave #5 has a deep stratified deposit that includes a lower component dating from about 14,500 to 14,100 cal BP (12,400 to 12,200 radiocarbon years before present), which pre-dates the earliest estimates for Clovis by 800 years. This component includes Pleistocene megafauna, as well as bifaces, debitage, cordage, butchered bone, and human coprolites, the latter documented by the presence of human DNA. Multiple radiocarbon dates were obtained from the human coprolites (Gilbert et al. 2008; Hockett and Jenkins 2013; Jenkins 2007; Jenkins et al. 2012).

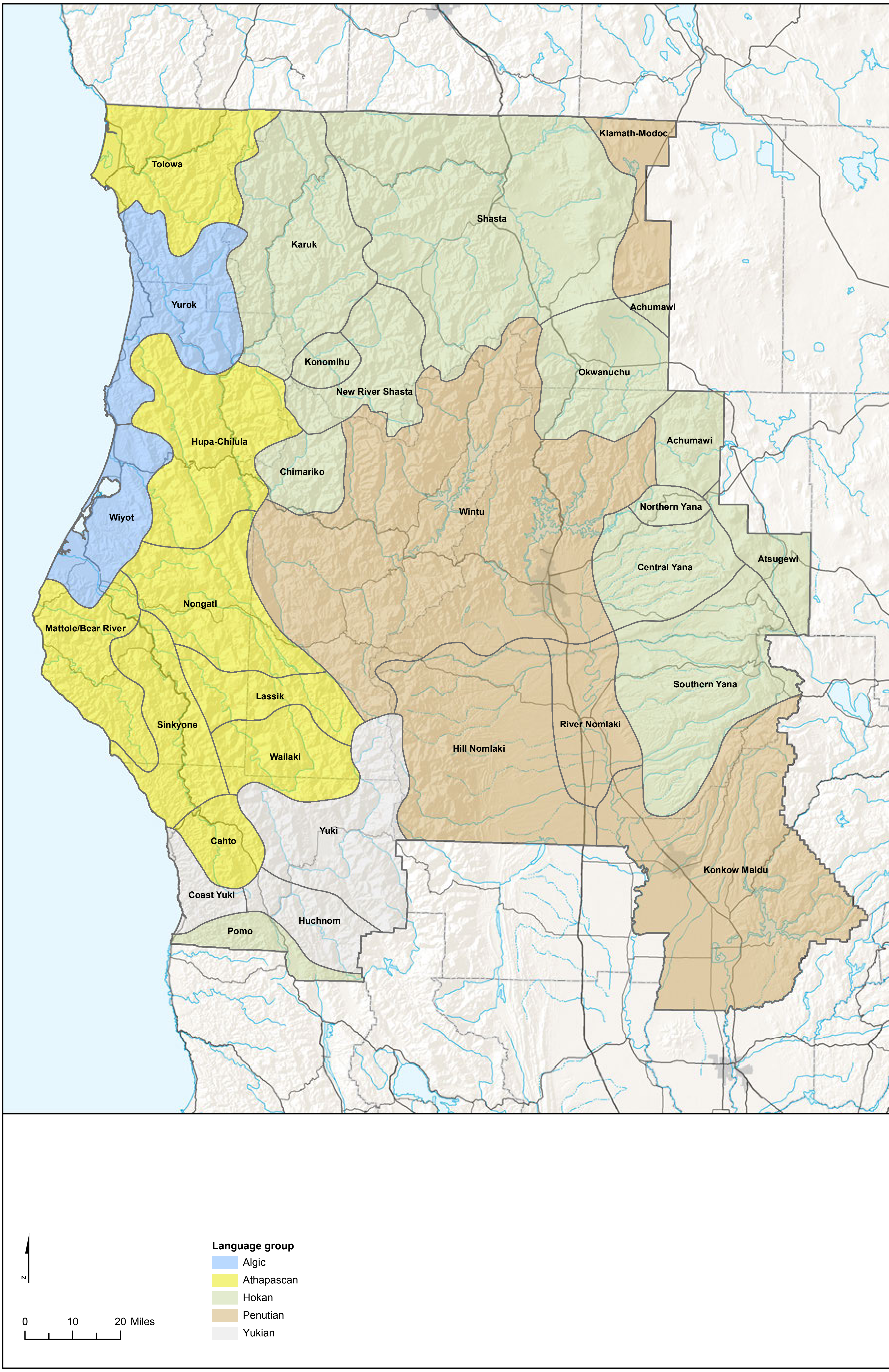

Figure 9. Ethnographic Language Groups.

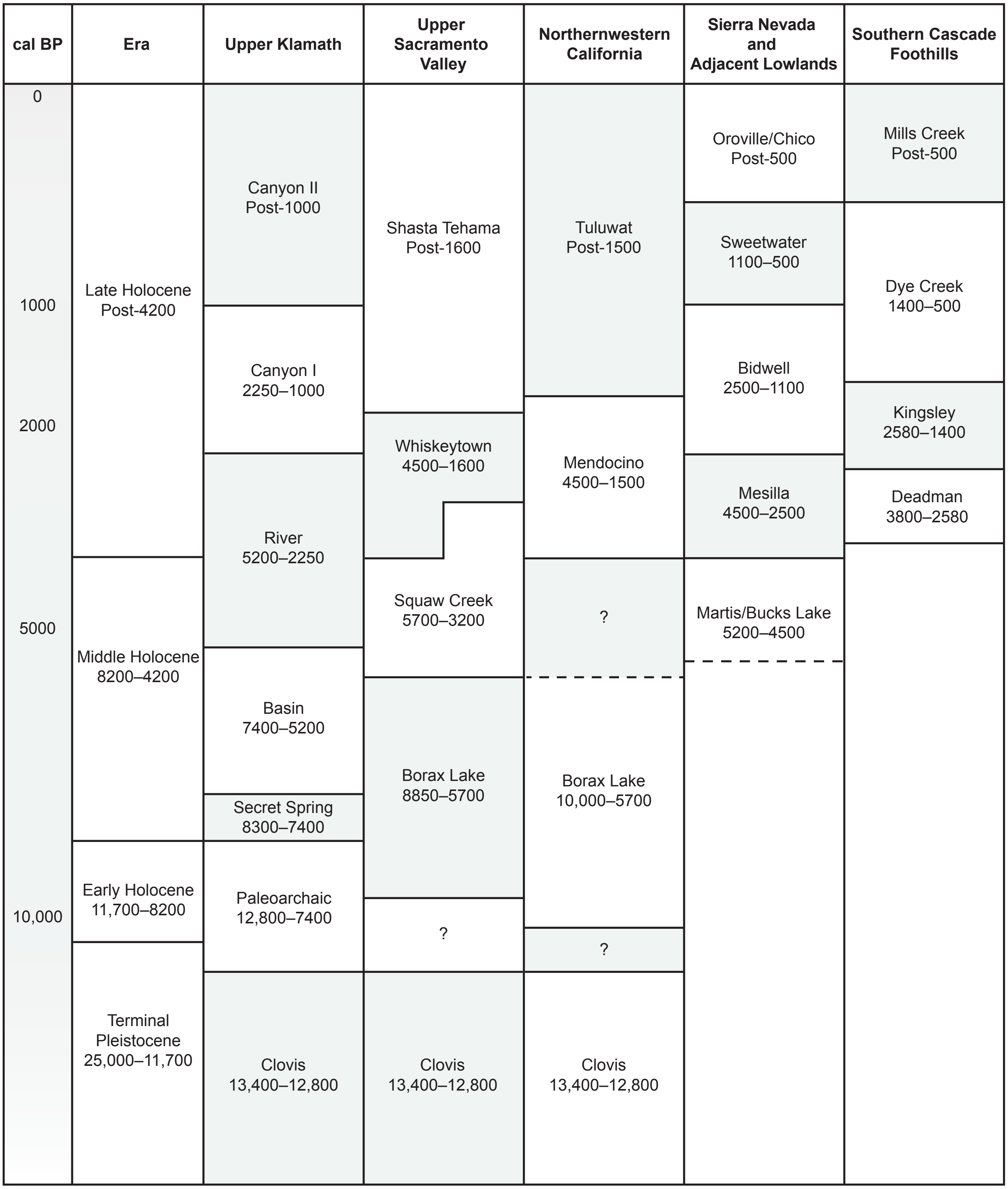

Figure 10. Regional Chronological Sequences.

Due to the great antiquity of these materials, they have been subject to a great deal of scrutiny, including independent research efforts. Goldberg et al. (2009) conducted detailed analysis of the coprolites and thought that their structure and composition were more consistent with ungulate dung than with human waste; Sistiaga et al. (2014) came to similar conclusions based on their analysis of lipids from the same samples. Poinar et al. (2009) argued that the human DNA found in the specimens could have leached in from later-dating components, and they identified some carbon isotope anomalies that lead them to question the radiocarbon dates as well. Rasmussen et al. (2009), Gilbert et al. (2008), and Jenkins et al. (2012, 2014) responded to these critiques by: (1) producing comparative samples of definitive human coprolites with similar structure and composition as the Paisley specimens; (2) clearing up issues with the radiocarbon assays; and (3) making a strong case for the absence of DNA leaching through the analysis of a series of control samples from the deposit. Based on these responses, the case for a pre-14,000 cal BP human occupation at the site seems quite strong.

Although unequivocal evidence for pre-Clovis people is quite rare, and only documented in areas to the north, it seems possible that people were present in northern California at this time as well. It is important to emphasize that if these people used simple flaked stone technologies similar to those used later in time (i.e., lacking distinctive attributes like fluted points), it may be difficult at first glance to spot archaeological materials dating to the Pleistocene. Nevertheless, future researchers should pay special attention when working on Pleistocene-aged landforms and, where possible, use obsidian hydration data to help isolate these important materials.

Clovis (13,400–12,800 cal BP)

Fluted points are relatively common in the Great Basin and Columbia Plateau, but less so in California. The vast majority of California points are from surface contexts lacking material suitable for radiocarbon assay, and none have been associated with the remains of Pleistocene megafauna (Rondeau et al. 2007). They usually occur in isolated contexts but are sometimes found in major concentrations. The most important concentration near the current study area is in the Alkali Lake Basin of southeastern Oregon (Fagan 1988; Pinson 2004, 2011).

There is one fluted point reported from Siskiyou County at Bartle Ranch (Jenkins 2005; Meyer 2013; Rondeau et al. 2007), and a few more noted in Butte Valley (Fentress 2002), along the Klamath River north of Butte Valley, and to the northeast within the Klamath Basin (e.g., Mammoth Springs, Sconchin Butte; Meyer 2013; Rondeau et al. 2007). Their precise age and cultural significance remains unknown due to their low number and isolated character. They are most often found adjacent to wetland habitats within the northwestern Great Basin, which also seems to be the case in our study area.

Beaton's (1991) excavations at Tule Lake Rockshelter (SIS-218A), located less than 12 kilometers east of the Upper Klamath zone, produced a radiocarbon date of 11,450 BP (13,300 cal BP) from a hearth feature. Later analysis of the materials from the site by Erlandson et al. (2014), however, concluded that the date was too old, and probably acquired from old wood. Their conclusion was based on the presence of several radiocarbon dates from deeper in the deposit that corresponded to the later Paleoarchaic Period (see below).

Paleoarchaic Period (12,800–7800 cal BP)

Paleoarchaic archaeological sites are more common than those dating to the Paleoindian Period, and are usually marked by Great Basin Stemmed projectile points, large bifacial knives, gravers, scrapers and, in rare cases, handstones and millingslabs. Flaked stone crescents are also common at a more limited number of sites located next to wetland areas, but they are not significantly present within the Upper Klamath zone. The Great Basin Stemmed series includes a variety of regional variants, but they are typically characterized by weakly shouldered specimens with long, square-to-contracting stems that are often edge ground (Beck and Jones 2009).

Most researchers have traditionally thought that Great Basin Stemmed sites post -date Clovis, which is consistent with the post-12,800 cal BP age of the Paleoarchaic Period used here. Beck and Jones (2010, 2012), following in the footsteps of Bryan (1979), have critiqued this position, arguing that stemmed points can be older than Clovis and reflect an entirely different culture that may have entered North America via a coastal route (see also Davis et al. 2012; Erlandson and Braje 2011). This hypothesis is quite intriguing, particularly given the recent reporting of stemmed points within a 13,223–12,964 cal BP component at Paisley Caves (Jenkins et al. 2012). This component is coeval with the Haynes et al. (2007) definition of Clovis (13,400–12,800 cal BP), but slightly older than the extremely narrow range (12,960–12,740 cal BP) proposed by Waters and Stafford (2007).

Beck and Jones' (2010:104) summary of the oldest radiocarbon dates associated with stemmed points in the western United States shows similar findings, but only five out of 25 overlap with Clovis, and none pre-date the Clovis interval (see also Goebel and Kenne 2014). There are also no radiocarbon dates from the California coast or adjacent Channel Islands that pre-date the age of Clovis, as the oldest known date is 12,900 cal BP on human bone from Santa Rosa Island (Johnson et al. 2000; Rosenthal and Fitzgerald 2012).

Early Holocene subsistence economies continued to focus on marshland habitats, but the addition of a few ground stone tools in a limited number of locations appears to signal a widening of the diet breadth. Due to the presence of multiple, exotic toolstones in many assemblages, it appears that there was a high degree of residential mobility (Beck and Jones 2010). The dominant presence of tools assumed to be associated with hunting and butchering, has led many researchers to argue that large game must also have been a primary subsistence resource during this time. This position has not been borne out by the vast majority of archaeological sites with faunal remains, however, as these assemblages are dominated by small game. Although we lack robust faunal assemblages from the Upper Klamath zone, Pinson's (2007) work in southeastern Oregon found a small game focus early in the Holocene followed by the addition of large game later in time.

The Erlandson et al. (2014) re-analysis of the Tule Lake Shelter (SIS-218A) noted above produced nine additional radiocarbon dates. Two of them had a two-sigma range of 13,090–12,930 cal BP, but these were from burned twigs at the very bottom of the deposit, and lacked good artifact associations. According to Erlandson et al. (2014), it remains unclear whether they were produced by people, or non-cultural processes like local wildfires. They argue that clear cultural deposits dating to the Paleoarchaic Period are present higher in the profile, and range between about 12,600 and 11,800 cal BP.

This Paleoarchaic component, which corresponds largely to the Younger Dryas cool event (12,900–11,700 cal BP), had an abundance of fish bone, reflecting a focus on the lakes hore/marsh resources of Tule Lake (Beaton 1991), consistent with similar focus elsewhere in the northwestern Great Basin. The artifact assemblage is not fully reported, but may include three small fragments of Great Basin Stemmed points and, most interesting, four bone needles. Osborn (2014) has hypothesized that this technology originated, and was used most intensively, during the Younger Dryas to make close fitting clothes needed to survive the frigid winter conditions of the time. The presence of these tools at Tule Lake Shelter, in a dated component contemporaneous with the Younger Dryas, is certainly consistent with this hypothesis (Erlandson et al. 2014).

Paleoarchaic findings within our Upper Klamath zone also include Great Basin Stemmed projectile points and formalized flake tools but, as noted above, appear to lack crescents. Butte Valley and the paleo-shorelines of Meiss Lake seem to be important locations for these materials (Meyer 2013); Goebel's surveys (1996 [cited in Fentress 1997, 2002]) and study of local landowner collections produced 50 lanceolate and/or stemmed points, one Clovis point, and many scrapers, gravers, and other formal flake tools. Large-scale excavations by Jensen and Farber (1982a) at SIS-342 found a single-component Paleoarchaic deposit containing multiple stemmed points, formal flake tools, a limited amount of fragmentary bone and egg shell, but nothing suitable for radiocarbon assay (note, however, that their work predated Accelerator Mass Spectrometer dating). Obsidian hydration data from the Grasshopper Flat/Lost Iron Wells source group, located in the Medicine Lake Highlands, produced a tight cluster around a mean of 6.9 microns, which reflects a high degree of antiquity especially given the cool weather conditions of this location. This mean value, when using the Grasshopper Flat/Lost Iron Wells hydration rate developed for Nightfire Island by Basgall and Hildebrandt (1989:198), produces an age estimate of 9100 BP (10,260 cal BP).

Paleoarchaic use of the Upper Klamath zone has also been documented by Hamusek et al. (1997), relying on obsidian hydration data from a variety of locations. Consistent with the findings outlined above, they found a bulge of hydration readings between 6.0 and 7.5 microns in Butte Valley, and a more sporadic presence in Shasta Valley, although the latter revealed readings in the 8.0 to 10.0 micron range. The relatively low frequency of activity in Shasta Valley could reflect the lack of a pluvial lake at this location (Meyer 2013).

Early materials have also been found within the Upper Klamath River Canyon, which correspond to the earliest phase of Mack's (1991) regional chronology (Secret Spring 8300–7400 cal BP). They were excavated from a component at 35KL21 dating to 7646 BP (8445 cal BP), and include a small assemblage of turtle and mammal bone, and a few bone tools. Despite the limited nature of these findings, the bone artifacts and use of wetland fauna are consistent with findings elsewhere in the region.

Finally, it is important to note that despite the fact that most of the identified Paleoarchaic sites are surface phenomena, there are a handful of rockshelters in the western Great Basin that have produced rich assemblages of perishable items dating to this period. Much of this material appears to be part of a single, widespread Catlow Twining basketry tradition composed of rectangular mats and flexible bags (Adovasio 1986; Baumhoff 1957). This tradition is represented in early Holocene components in southeastern Oregon (e.g., Fort Rock and Paisley caves), as well as western Nevada, where direct radiocarbon dates ranging from ca. 10,500 to 10,200 cal BP have been obtained from specimens excavated from Shinner Site A and Horse Cave. It is also expressed in the mats and bags associated with the Spirit Cave burial dated to ca. 12,600 cal BP (Connolly et al. 1998, 2016; Cressman 1942; Fowler and Hattori 2011). All of these findings place Catlow Twining basketry within the Paleoarchaic Period, and it seems highly likely that this tradition was used in our Upper Klamath zone as well, especially in Butte Valley.

Catlow Twining persisted for thousands of years in western Nevada until about 4800 cal BP, when the more rigid Lovelock Wickerware and coiled baskets became the dominant basketry tradition in the Winnemucca, Humboldt, and Carson basins. It remained dominant in the northwestern Basin until about 1000 cal BP when a completely different basketry technology (including seed beaters and winnowing trays) appeared in most of the western Great Basin with the arrival of Numic-speaking peoples (Adovasio 1986; Bettinger and Baumhoff 1982; but see Connolly 2013). Most importantly for this study, Catlow Twining survived in northeastern California where it was traded to outlying areas by "ancestors of the Modoc or the Achomawi/Atsugewi peoples, among whom aspects of the tradition persist" (Fowler and Hattori 2011:215). The tight association between this basketry tradition and Paleoarchaic Stemmed point assemblages, and persistence of the basketry tradition among Achomawi/Atsugewi speakers (ancient languages of the Hokan stock; Golla 2011), may signal a high degree of continuity between these modern groups and some of the earliest people in the region.

Basin Period (7800–5200 cal BP)

This temporal interval witnessed a great deal of change from the preceding Paleoarchaic Period. Beck and Jones (2012), for example, argue that increased aridity associated with the Middle Holocene essentially ended the Paleoarchaic Period, including the use of Great Basin Stemmed projectile points, and the adaptive focus on wetland habitats, which were either eliminated or severely compromised in many locations. We agree, and favor the 7800 cal BP dividing line because: (1) there is no doubt that people no longer used Great Basin Stemmed points; (2) this is about the time of the Mt. Mazama volcanic eruptions that sent ash over wide areas of the northern Great Basin, potentially pushing people into northeastern California; and (3) it marks the appearance of Northern Side-notched projectile points and a wholly different adaptation than existed before.

A number of researchers have speculated that middle Holocene climatic warming may have either reduced human populations or led them to totally abandon the central Great Basin for better-watered locations on the periphery like our Upper Klamath zone (Baumhoff and Heizer 1965; Beck 1995; Beck and Jones 2012; Grayson 1993, 2011; Layton 1985; Madsen 2002; Milliken and Hildebrandt 1997). Moreover, the unique morphology of Northern Side-notched points, and their northern distribution, have led several researchers to suggest that these points are "ethnic markers" of more northerly populations who occupied the Columbia Plateau and moved southward (Delacorte and Basgall 2012; Layton 1985; O'Connell 1975). Along these lines, Chatters (2012:148–151) argues that the eruption of Mt. Mazama at around 7600 cal BP, and the resulting tephra blanket across much of southern Oregon, helped push Plateau peoples to the south.

Throughout much of the wider region, this time period saw the rise of higher levels of residential stability, marked by the use of semi-subterranean house structures, greater investment in milling gear (including a variety of mortars), and a general elaboration of other flaked stone and bone implements in places like Surprise Valley (O'Connell 1971), the Fort Rock Basin (Helzer 2004) and, to a lesser degree, the Klamath Basin (Sampson 1985), where reliable sources of water still existed. Chatters (2012:149–151) characterizes the land-use strategy as "opportunistic sedentism." He suggests that during periods of resource abundance, these residentially mobile people, who normally had little reliance on either storage or use of temporary field camps, would build substantial semi-subterranean houses in which they would reside for several months to several years, and argues the system prevailed until about 6000 cal BP.

Within our Upper Klamath Zone, Mack et al. (1991) document the presence of Northern Side-notched, Humboldt Concave Base, and McKee Unifaces at several sites along the Upper Klamath River Canyon. In addition to a diversified set of flaked stone tools, these assemblages included portable mortars, mullers, and stone bowls, as well as mammal bone and turtle, but only limited amounts of fish. These findings led Mack et al. (1991:80) to conclude that "large, seasonal campsites were used within the canyon, presumably part of a seasonal round which included adjacent areas at other seasons of the year."

Similar findings have been made in Butte Valley where, despite the declining size of Meiss Lake, it was still a favorable location compared to many valleys farther into the Great Basin that were completely desiccated (Fentress 2002; Meyer 2013). Sites associated with the lake and adjacent creeks contained Northern Side-notched and Humboldt Concave Base points, and a variety of milling gear (including bowl mortars), and they seem to reflect seasonal residential bases.

Shasta Valley and the adjacent Lower Klamath River Canyon, which had minimal evidence of use during the preceding Paleoarchaic Period, show significant increases in occupation reflected by a bulge in obsidian hydration readings and relatively high frequencies of Northern Side-notched points and McKee Unifaces (Hamusek et al. 1997; Mack 2003). Other artifact types associated with this time period (stone bowls, mortars, mullers, and bone tools) have *not* been found in dateable contexts, but this could be the result of insufficient sample sizes (Mack 2003:60).

River Period (5200–2250 cal BP)

Climatic conditions began to improve during this interval, becoming significantly cooler and wetter between about 4500 and 2600 cal BP (Fentress 2002), and marked by an increasingly robust archaeological record. When placed within a wider context, this period is seen across much of the Great Basin and California as having been a cultural florescence or "golden age," especially after about 4000 cal BP (Hildebrandt and

McGuire 2002). Along with the increasing sophistication in material culture, there was the rise of true settlement hierarchies and a greater use of large semi-sedentary base camps in many areas for the first time. This period has also been associated with the rise of logistical large-game hunting (Hildebrandt and McGuire 2002; McGuire and Hildebrandt 2005; see also Broughton and Bayham 2003), and development of an unprecedented phase of toolstone production and biface manufacturing associated with major obsidian quarries, including those in the Medicine Lake Highlands (Hildebrandt and Mikkelsen 1994).

Northern Side-notched points appear to persist in Butte Valley, but most assemblages are dominated by Elko Corner-notched, Siskiyou Side-notched, and McKee Unifaces. The frequency of archaeological sites continues to build, doubling from the preceding period. Sites show deep midden deposits for the first time and greater quantities of milling equipment, both indicating greater residential stability (Fentress 2002).

This is certainly the case along the shores of Lower Klamath Lake at Nightfire Island, where centralized villages were established for the first time. These were accompanied by more complex assemblages of flaked stone, ground stone, and bone implements, which were used for a wider range of acquisition strategies (Sampson 1985). Mack (2003) has observed similar patterns along the Upper Klamath River where Elko Corner-notched, Siskiyou Side-notched, Clikapudi series, and Gold Hill Leaf-shaped points are dominant. In addition to extensive ground stone assemblages, more elaborate bone tool assemblages emerge, including bone and antler chisels and wedges, and harpoon barbs, the latter reflective of a greater emphasis on fishing. This was also the case at Nightfire Island (Mack et al. 1991:77).

It appears that populations were also increasing within Shasta Valley, especially between about 4000 and 2000 cal BP, as evidenced by increases in the number of time sensitive projectile points and obsidian hydration readings (Hamusek et al. 1997; see also Hildebrandt and Mikkelsen 1994). Nilsson (1991) also notes higher levels of settlement differentiation at this time, with lowland residential areas accompanied by an increase in logistical hunting in adjacent upland areas. Little is known about the character of other tool classes dating to this period, however.

Canyon Period I (2250–1000 cal BP)

Many of the projectile points used during the River Period persist into the Canyon I Period (e.g., Elko Corner-notched, Siskiyou Side-notched, Clikapudi series, and Gold Hill series). After about 1700 cal BP, however, bow-and-arrow technology, represented by the Tuluwat series (formerly Gunther; Rouvier 2007), is introduced to the Upper Klamath River Canyon (Mack 2003; Mack et al. 1991). Other important temporal indicators include shell beads (*Olivella* F2b saucers and G3a rings).

The subsistence-settlement pattern changes set in motion during the River Period (i.e., sedentism, logistical organization, obsidian exchange), seem to carry forward with the exception of the interval between 2600 and 2000 cal BP, when severe and persistent droughts took place throughout much of the Great Basin (Rhode 2016). These appear to have been felt in the study area as well. Fentress (2002), for example, suggests that increased aridity within Butte Valley at about 2000 cal BP caused people to move up from the valleys and focus more on upland root crops. This shift has also been recognized by Sundahl and Clewett (1988), based on a reduction in obsidian hydration readings in lowland settings during this time. Nightfire Island became a seasonal camp at 2700 cal BP, and was abandoned between 2100 and 2000 (Sampson 1985), perhaps due to lower water levels in the local area.

Although it is difficult to know how the Upper Klamath River Canyon was effected by this climatic event, it appears that the intensity of habitation continued to increase throughout the period. This is indicated by both a greater focus on fishing, and by the first evidence of house pits. This location also experienced an increase in settlement differentiation, including the establishment of upland root camps (Mack 1983).

Nilsson's (1991) work in the larger Shasta Valley area found a similar range of dart points between 2600 and 1400 cal BP (known as the Ager Phase), including Elko Corner-notched, Siskiyou Side-notched, and stemmed leaf-shaped points, but Tuluwat Barbed arrow points didn't appear until after 1500 BP. Other artifacts linked to this period within Shasta Valley include unifacial and bifacial manos, unifacial metates, end scrapers, and side scrapers but, importantly, an absence of bowl mortars and pestles (see also Nilsson 1987). Similar to the other areas discussed above, major habitation areas were established along river banks at transition between valley and hills, and more specialized upland camps were quite common as well (Ritter 1989).

Canyon Period II (post-1000 cal BP)

Bow and arrow technology dominates after 1000 cal BP and includes Rose Spring, Tuluwat Barbed, and Desert Side-notched points, with the latter post-dating 500 cal BP in most places. The use of obsidian declines significantly in Butte Valley during this interval, which is consistent with reduced production at the quarries within the Medicine Lake Highlands (Fentress 2002; Hildebrandt and Mikkelsen 1994). The number and size of archaeological sites in Butte Valley also declines, and are dominated by milling stations, some of which may have been wokas processing sites. At the same time, the frequency of upland camps continues to expand, probably reflecting a greater emphasis on the use of upland root crops, especially epos (Fentress 2002).

In contrast to Butte Valley, archaeological visibility continues to expand during the Canyon Period II along the Klamath River, reflecting a continued emphasis on fishing, acorns, and geophytes where available. House pit sites abound and ethnic differences seem to emerge, with upriver sites (probably Klamath/Modoc) containing unifacial shouldered mullers (probably for wokus processing), T-shaped drills, and house pits with benches and storage pits in the floors, but no multi-floored houses or pottery. Downriver sites (probably Shastan) and those within Shasta Valley have multi-floored houses, ceramic figurines and pottery fragments identified as Siskiyou Utility Ware, and a higher frequency of Tuluwat Barbed relative to Rose Spring projectile points (Fentress 2002; Mack 2011; Mack et al. 1991; Nilsson 1987, 1988, 1991). It is also important to note that bowl mortars and pestles were used throughout late prehistoric times in the Klamath Basin proper and, to a limited degree, in upriver locations, but this is not the case in locations downriver or in Shasta Valley; in these areas, hopper mortars and flat-ended pestles dominate after 1000 cal BP. Finally, one of the best examples of this downriver Canyon Period II pattern is found at Iron Gate Reservoir, where Leonhardy (1967) excavated a major house pit village dating AD 1400 to 1600. This site lacks Siskiyou Utility Ware, however, perhaps indicating that this technology was not used this late in time along this stretch of the river (Mack 2011).

Contact Period (AD 1820s–1850s)

Shasta peoples first came into contact with Europeans and Euro-Americans in the 1820s–1830s, as fur trappers passed through their territories. Like native groups in much of California, the Shasta were hit very hard by the Gold Rush. When gold was discovered on the Klamath River in 1850, they were crowded off their fishing and hunting grounds by Euro-American miners and subsequent settlers. One observer reported that their villages were burned and the people shot, as the newcomers "determined to wage a war of extermination against the Indians on the upper Klamath and its tributaries" (Gibbs 1853, cited in Silver 1978:212). Fort Jones was established in Scotts Valley in 1852, and by the following year Yreka had an estimated (non-native) population of 10,000. All of this disruption was visited upon native villages already hard-hit by European diseases like smallpox and malaria.

Silver (1978:212) notes that "by the 1870s the Shasta way of life had been badly shattered." One coping mechanism was the adoption of various religious cults, most famously the Ghost Dance, whereby the ancestors would be summoned to return and overthrow the invaders. This and similar movements spread through many tribal territories. Despite any attempts at resistance, however, the Shasta—like other northern California tribes—lost essentially all of their traditional lands and were forced to relocate to reservations established by the new government.

Undoubtedly some people escaped into the rugged uplands to avoid contact with the white miners, settlers, and military, but to our knowledge no refuge sites have been identified or investigated in the Upper Klamath region. The most common artifacts marking contact-period archaeological sites tend to be glass trade beads, which first entered California in the 1820s with Russian traders and Euro-American explorers. Glass beads and other trade items arrived even earlier in Oregon with the Lewis and Clark expedition (1805-1806), and some of these items could have entered northern California via inter-tribal exchange. However, no Euro-American trade goods have been found so far at the pit-house villages in the upper Klamath River Canyon (Mack 2003; Mack et al. 1991), suggesting that the end of permanent occupation of the river canyon occurred sometime before historic-era contact.

Waechter and Young (2015:Table 18) have assembled radiocarbon dates from nine sites in Shasta Valley and the Klamath River Canyon, the only sites in the vicinity for which radiocarbon dates have been reported. None of the sites returned an historic-period (or "modern") date: the latest was 320 ± 60 BP, uncalibrated (no calibration reported) from SIS-900, the Meek Site, south of the small town of Ager (Johnston and Nilsson 1983; Nilsson et al. 1989). Data from SIS-266, a rockshelter north of Mt. Shasta, led Ritter (1989) to conclude that the site had been occupied perhaps as recently as 200 years before (i.e., AD 1789). Hamusek and Haney (2001:11; see also Waechter and Young 2015) report that site SIS-329 on the Klamath River south of Yreka is believed to be at the approximate location of the Shasta village of *A' chīt' ter rah' kah*, as recorded by C. Hart Merriam. To date, however, no evidence of an ethnohistoric occupation has been found at the site. Similarly, site SIS-154 in northern Shasta Valley was hypothesized to be the location of the ethnohistoric Shasta village of *Em-mah-kwit-te*; however, as with SIS-329, no archaeological evidence was found to confirm this attribution (Nilsson 1987). In sum, no clearly contact-period sites have been reported for the Upper Klamath region.

SACRAMENTO VALLEY

The Sacramento Valley zone begins immediately south of the Upper Klamath zone, and corresponds quite closely to the western portions of Shasta and Tehama counties (see Figure 2). It also extends down into western Butte County, but this portion of the valley will be combined with the Sierra Nevada zone due to the tight geographical and cultural affinities between the two areas. The most useful chronological sequence for the larger Sacramento Valley zone comes from the work of Sundahl (1992). Rather than using simple time period designations, like those applied to the Upper Klamath zone, Sundahl's sequence identifies cultural *Patterns* that are assigned to each time period (see Fredrickson [1974] for a discussion of this system). We generally follow Sundahl's (1992) original system, but add a Paleoindian/Paleoarchaic interval (13,400–8850 cal BP) to the beginning. The subsequent cultural historical units include the Borax Lake Pattern (8850–5700 cal BP), Squaw Creek Pattern (5700–4500/3200 cal BP), Whiskeytown Pattern (4500/3200–1600 cal BP), and Shasta Pattern (post-1600 cal BP).

Paleoindian/Paleoarchic Period (13,400–8850)

There is very little evidence for Paleoindian or Paleoarchaic occupation of the Sacramento Valley zone. Fluted points have been found in only two locations, one within western Shasta County (Samwell Cave) and the other in Tehama County (Thomes Creek), and none have been associated with meaningful assemblages (Dillon and Murphy 1994; Meyer 2013; Rondeau et al. 2007; Treganza 1964). Meyer's (2013:127) review of early Holocene projectile points from the two counties also shows a complete absence of Great Basin Stemmed points, clearly demonstrating very little influence from the Great Basin. Instead, the predominant early point form is the Borax Lake Widestem (97% of the early assemblages) but, as will be discussed below, it has never been found in contexts pre-dating 8390 cal BP, leaving the Paleoindian and Paleoarchaic intervals largely devoid of an archaeological signature.

Attempts to fill this late Pleistocene/early Holocene gap have occurred at two primary locations. The first, Potter Creek Cave, is located on the McCloud River above Shasta Lake. It has been well known for its Pleistocene faunal remains for more than 100 years, and several researchers have argued for an association between human made artifacts and the extinct megafauna, either based on the presumed presence of bone tools made from these animals or flaked stone tools used to butcher them (Sinclair 1904). Subsequent work at the site by Payen and Taylor (1976), however, found that the fracture and damage patterns on the bone were probably due to carnivores, and most of the true artifacts from the site (including one of the only directly dated atlatls in California) were around 2,000 years old, post-dating the Pleistocene fauna by thousands of years.

The second attempt focused on surface scatters containing crude metavolcanic tools and debitage on old Pleistocene terraces in the Redding area (Brott and Dotta 1978; Clewett et al. 1982; Sundahl 1976). The heavy patination on much of this material, and the near absence of artifacts common to late Holocene sites nearby, led some to hypothesize that the artifacts were Pleistocene in age (Brott and Dotta 1978). Other researchers (Clewett et al. 1982; Ritter and Crew 2008) have suggested, however, that the most of the assemblages were probably late Holocene in age and probably represented specialized activity areas related to more permanent residential sites located in adjacent locations.

Borax Lake Pattern (8850–5700 cal BP)

Archaeological visibility increases significantly after about 9,000 years ago and is manifested by the Borax lake Pattern (8850–5700 cal BP). Most assemblages dating to this interval include Borax Lake Wide-stemmed projectile points, handstones, millingslabs, ovoid flake tools, and a variety of other utilitarian items (Clewett and Sundahl 1983; Kowta et al. 2000; Sundahl 1988, 1992). These materials are best represented at SHA-475 and SHA-499 in the Squaw Creek drainage where they have been associated with radiocarbon dates ranging between 8390 and 7450 cal BP (Sundahl 1992). Evidence for the Borax Lake Pattern is also found in upland areas surrounding the northern Sacramento Valley, especially to the west in Shasta (Kowta et al. 2000) and Trinity (Meyer 2013) counties. Palynological studies from a variety of locations show that the climate was generally warmer and drier at this time, and that oaks expanded into upland areas previously dominated by conifers (West et al. 2007), probably increasing the overall productivity of these habitats, and providing an incentive for local people to use these upland locations. Because many of the sites look like short-term residential bases (based on their diversified assemblages), and their assemblages often look quite similar in a variety of upland and lowland habitats, several researchers have hypothesized that they probably reflect a "forager" approach to subsistence-settlement organization (*sensu* Binford 1980), where little emphasis was placed on storage, and residential bases were frequently moved in response to seasonal changes in the availability of key economic resources (Hildebrandt and Hayes 1993; Kowta et al. 2000; Sundahl and Henn 1993).

Sundahl (1992) also notes that the Borax Lake assemblages show subtle but significant geographic differences in their character, with those from the upper Sacramento River watershed (known as the "Chirpchatter Aspect") distinguished by the dominance of Grasshopper Flat/Lost Iron Wells obsidian, by predominance of Wide-stemmed points with flat basal margins over those with indented bases, and by unshaped manos and millingslabs (see also Clewett and Sundahl 1983). Farther west, in the North Coast Ranges (see below), the "Trinity Aspect" shows preeminence of chert toolstone, indented bases on projectile points, a prevalence of deep serrations on projectile points and biface margins, and lateral wear facets on many of the unshaped manos (see also Sundahl and Henn 1993).

Finally, it is important to emphasize that, similar to the Upper Klamath zone, there are little similarities with areas north of the Oregon border (including the Klamath River) at this time. Connolly (1986:256) notes that there is no evidence for the Borax lake Pattern in Oregon, as early Glade Tradition assemblages are dominated by foliate (Cascade) projectile points, broad/oval bifaces, blade tools, and edge-faceted cobbles, which seem to show much stronger ties to the Pacific Northwest.

Squaw Creek Pattern (5700–4500/3200 cal BP)

At about 5700 cal BP several new artifact forms appear in the archaeological record. These materials are assigned to the Squaw Creek Pattern by Sundahl (1992), and correspond to the Pollard Flat Phase identified by Basgall and Hildebrandt (1989), based on their work in the Sacramento River Canyon. The assemblage is composed of Squaw Creek Contracting-stemmed, Pollard Diamond-shaped, and Mckee Uniface points, as well as handstones, millingslabs, ovoid flake tools and, in some places, incised slate. Most of the latter artifacts (nearly 1500) come from three sites in the Sacramento River Canyon (SHA-475, -1169, and -1175), and represent one of the largest portable rock art assemblages in North America (Gilreath 2007; McGuire 1989; Figure 11). On average, the artifacts measure 45 x 30 x 6 millimeters, and they typically have either parallel bands in-filled with a series of straight lines or crosshatching, or they have triangular and diamond bands in-filled with incisions. Some have perforations indicating that they were worn or carried by their owners, and their association throughout site deposits with utilitarian artifacts suggests that they commonly broke or were lost during everyday activities. Based on these findings, McGuire (1989:D43) argues that were amulets used by group members to provide "stylistic reinforcement of group affiliation and social integration."

Faunal remains from Squaw Creek Pattern sites are usually restricted to small calcined fragments, owing the acidity of soils within the conifer forest-dominated habitats, inhibiting our ability to learn much about hunting patterns. Plant remains, by contrast, were recovered from the Sacramento River Canyon sites, and show a dominance of gray pine and manzanita, with lesser, but significant, quantities of acorn. Small seeds were also found in low frequencies, represented by clover and plantain (Wohlgemuth 1989).

Similar to the Borax Lake Pattern, many Squaw Creek sites are found in forested contexts, as well as lower elevation foothill areas where more diversified vegetation communities exist. This is especially true to the north, on the upper reaches of the Sacramento River watershed (Basgall and Hildebrandt 1989; Boynton 1973; Cassidy et al. 1994; Clewett and Sundahl 1983) and in foothill areas along the west side of the Sacramento Valley (Baker 1990; Bevill and Nilsson 1999; Kowta et al. 2000; Tyree and Sundahl 2002). Moreover, intersite similarities in assemblage composition, coupled with the presence of artifact caches, evidence for flaked stone tool curation, and the near absence of mortars and pestles, are thought to indicate the continuance of a relatively mobile, forager-type adaptive strategy (Basgall and Hildebrandt 1989; Kowta et al. 2000).

Whiskeytown Pattern (4500/3200–1600 cal BP)

A major shift in subsistence-settlement organization appears to have occurred between about 4500 and 1600 cal BP. Archaeological findings from this interval are assigned to the Whiskeytown Pattern by Sundahl (1992). These include a wide range of corner- and side-notched projectile points belonging to the Clikapudi series, handstones, millingslabs, notched pebble net weights, and bowl mortars and pestles (see also the Deadman and Kinsley complexes in Tehama County outlined below [Greenway 1982; Johnson 1984]). As opposed to a generalized forager strategy, Basgall and Hildebrandt (1989) propose a "fission-fusion" model of subsistence settlement where "during the fall and winter the population was logistically organized around a strategically situated residential base camp, but at other times during the year the social unit dispersed and smaller groups followed a forager strategy, moving between productive resource tracts as warranted" (Basgall and Hildebrandt 1989:450). The fall-winter residential bases are thought to have been concentrated along the northern Sacramento Valley foothills, where both salmon and acorns were

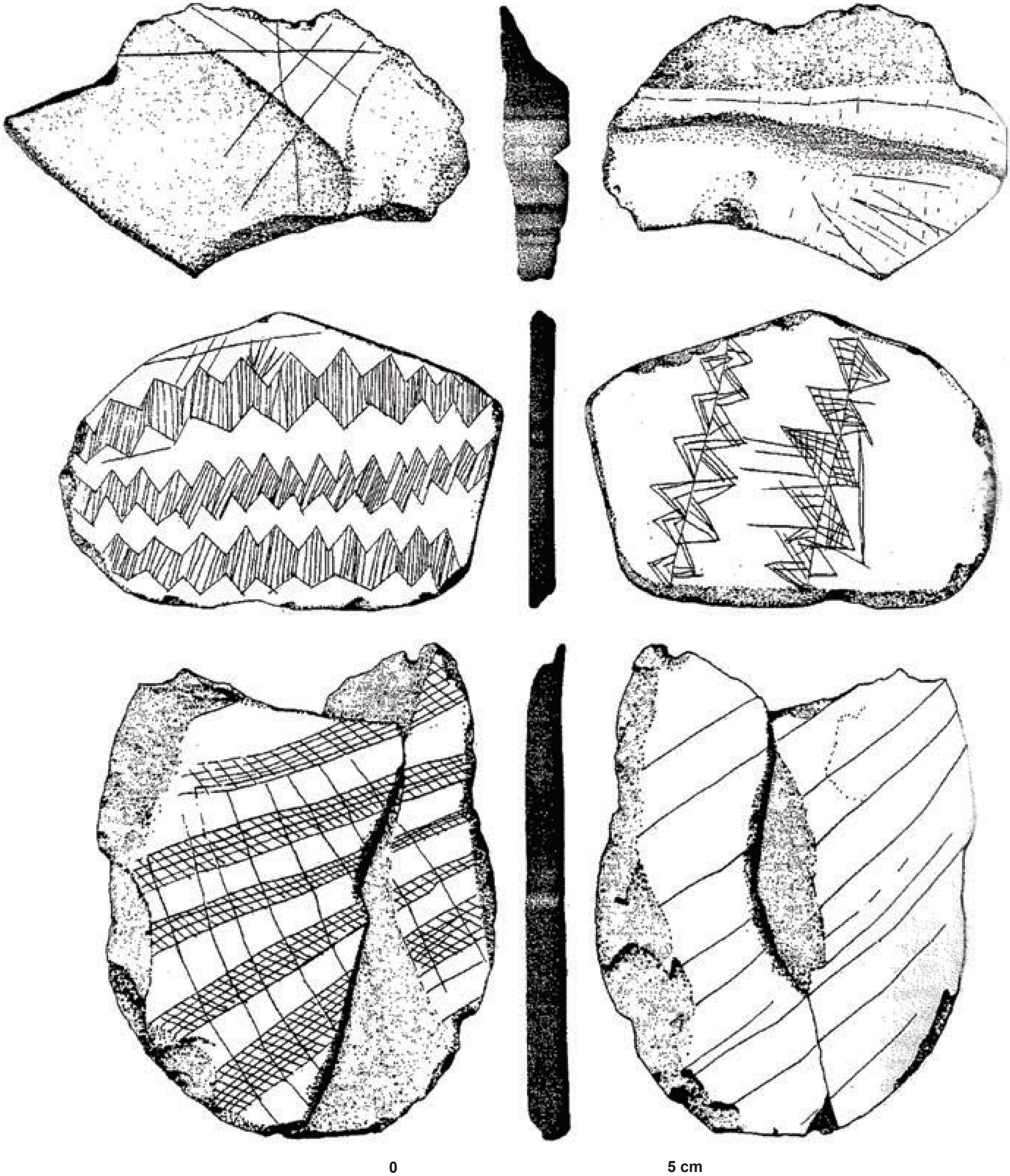

Figure 11. Squaw Creek Pattern Incised Slates.

plentiful (Baker 1984, 1990; Bevill and Nilsson 1999, 2001; Sundahl 1999; Tyree and Sundahl 2002), while warm-season camps were situated in a much wider range of environmental settings, often commingling with Squaw Creek Pattern sites in upland areas to the north.

The spatio-temporal overlap of these contrasting assemblages led Basgall and Hildebrandt (1989) to conclude that the Squaw Creek and Whiskeytown groups exploited the same territories for at least 1,000 years. Rather than occupying these areas simultaneously, they argued that occupations were disjunct in micro-time, with spatial overlaps in assemblage distributions reflecting the continuous shifting of a territorial boundary along the headwaters of the Sacramento River. The large number of incised stones (perhaps used as amulets) found in Squaw Creek Pattern contexts was also considered a reflection of boundary competition, as ethnographic data have shown that emblematic style transmission is often most pronounced under conditions of increased intergroup competition (McGuire 1989; Weissner 1983; Wobst 1977). It should be noted, however, that evidence for this type of boundary competition has not been reported elsewhere in north-central California during this temporal interval, and it is considered a controversial issue by several local scholars (Kowta et al. 2000; Sundahl 1992).

Before moving forward it is important to note that the Basgall and Hildebrandt (1989) hypothesis for winter sedentism within the Whiskeytown Pattern settlement system was based on a minimal amount of evidence from the local area. Rather, it was inspired by relatively high degrees of sedentism during this interval in many other parts of California (e.g., mounded villages on San Francisco Bay and the San Joaquin-Sacramento Delta, major residential sites in Clear Lake Basin and on the flanks of the Sierra Nevada, and along the Pit River), leading to the expectation that similar developments would have occurred along the major salmon streams of Shasta and Tehama counties. A growing body of data from the Redding area is beginning to show that this hypothesis is probably incorrect. More recent work by Hildebrandt et al. (2005) has demonstrated a lack of Whiskeytown Pattern riverine focus at numerous sites in the region (see also Clewett and Sundahl 1982; Jackson et al. 1997; Shapiro and Jackson 2001). Fish bone and shellfish remains are commonplace in later Shasta Pattern sites, as are large diversified artifact assemblages reflective of major residential bases (e.g., mortars and pestles, drills, bone tools, fishing gear, and shell ornaments). Of the six Whiskeytown Pattern deposits along the Sacramento River reviewed by Hildebrandt et al. (2005), none had significant frequencies of riverine resources (fish and shellfish), and the artifact assemblages are much narrower in scope.

Plant remains are available from a lesser number of Whiskeytown Pattern sites, but provide important subsistence information nonetheless. Along the Sacramento River Canyon, and similar to the Squaw Creek Pattern, gray pine and manzanita dominate, followed by lesser quantities of acorn (Wohlgemuth 1989); this is also the case along Clear Creek at SHA-479 (Baker 1990) and at SHA-47 along the Sacramento River near Redding (Shapiro and Jackson 2001). The importance of small seeds increases to a limited degree relative to the preceding period, especially bedstraw and tarweed (Wohlgemuth 1989).

Based on these findings, it appears that there was significantly less residential stability associated with the Whiskeytown Pattern than originally hypothesized by Basgall and Hildebrandt (1989). Instead, it appears more likely that although acorn (and some storage thereof) was an important component of the economy, higher levels of sedentism did not take place until later, when the intensive harvest and storage of salmon took place.

Shasta Pattern (post-1600 cal BP)

Geographic differences in artifact assemblages and presumed subsistence-settlement strategies continue into the Late Period (<1600 cal BP). Archaeological manifestations concentrated along the upper Sacramento drainage, originally referred to as the Shasta Complex (also referred to as the Redding Aspect of the Augustine Pattern; Sundahl 1992), include the bow and arrow, bone-tipped harpoon, and hopper mortar and pestle, among others. Variation in the artifact assemblage has been used to define three chronologically discrete phases (Sundahl 1982). The earliest (1250–750 BP) tends to have square-stemmed Tuluwat Barbed projectile points (with lower frequencies of expanding-stem variants), winged drills, bipointed fish gorges, bone gaming pieces, incised bone pendants, and spire- lopped *Olivella* (recently renamed *Callianax*) shell and *Glycymeris* shell beads. Expanding-stem projectile points and winged drills are not present in the intermediate phase (750–350 BP), while a contracting- stemmed variant of the Tuluwat Barbed point, the Desert Side-notched point, and crudely flaked obsidian blanks, large chert and basalt drills, paired arrowshaft abraders, and abalone shell pendants are relatively common. The late phase (450–100 BP) is identified with the Redding subtype of the Desert Side-notched series, triangular unnotched arrow points, hafted drills, incised pebbles, biconically drilled pebble pendants, incised charm stones, and clam shell disk beads.

These materials have been associated with the arrival of the Wintu to northern California, and are thought to reflect a sedentary adaptation made possible by a subsistence system dependent on new fishing technology, and the large-scale storage of salmon and acorns (Broughton 1988; Dotta 1964; George 1981; Hildebrandt and Darcangelo 2008; Smith and Weymouth 1952; Sundahl 1982, 1992, 2006; Wohlgemuth 1992). As the frequency of trade items (e.g., shell beads) increased substantially in the late phase, intergroup exchange of subsistence resources and other important commodities may also have contributed to a reduction in settlement mobility.

Subsistence remains are much more abundant in these later dating sites, especially in rich midden deposits located along the Sacramento River (Hildebrandt et al. 2005). An especially good example is SHA-1043, located six miles south of Redding. At this site, mammals and fish were found in equal amounts. Mammals were represented by a relatively even mix of elk, deer, rabbits, and squirrels. Fish, by contrast, were more than 50% salmon, followed by lesser quantities of minnows and suckers. Plant remains from the site included both large and small seeded varieties, with the former group dominated by acorn, followed by manzanita nutlets and pine nuts. Small seeds included a variety of grasses and herbs, especially filaree and farewell to spring (Hildebrandt and Darcangelo 2008). Up in the Sacramento River Canyon, the importance of acorn also increased, but the most significant change was an increase in the abundance and diversity of small seeded plants including bedstraw, clover, and goosefoot (Wohlgemuth 1989).

A large burial population was also excavated, moved, and reburied at SHA-1043 (Hildebrandt and Darcangelo 2008). The population exhibited a high degree of violence, with fully 63% of the males suffering from traumatic injuries to their bones: this included depression fractures to skulls from clubbing, and bones riddled with arrow points. A portion of the cemetery also overlaps the historic period, as evidenced by trade items from the Hudson's Bay Company (e.g., glass beads and a covered copper kettle). The cemetery also contains proposed evidence of the 1832 malaria epidemic, as indicated by unusually high levels of mortality found among the youngest and oldest members of the population (Hildebrandt and Darcangelo 2008).

Late Period Foothill Adaptations

A contrasting Late Period record is found in upland areas surrounding the northern Sacramento Valley. It is represented by much smaller sites and rather simple assemblages consisting of small side- and corner-notched projectile points, Tuluwat-series forms, hopper mortars and pestles, handstones, millingslabs, and notched pebble weights. On the east side of the valley, these findings are assigned to the Tehama Pattern (Clewett and Sundahl 1982; Sundahl 1992), and are thought to reflect a more mobile pattern of settlement by populations speaking Hokan languages (e.g., Yana). These groups were pushed to the hinterlands by the late-arriving Wintu, who ultimately restricted access to the Sacramento River.

Application of the Tehama Pattern to the west side of the valley has met with a great deal of controversy for a variety of reasons. First, the area was occupied by Wintuan-speaking peoples, leading to the conclusion foothill sites represented short-term, seasonal habitations by people affiliated with the Shasta Complex (Farber 1985; Farber et al. 1985). Although Farber (1985) recognized the presence of artifacts not normally associated with lowland Shasta Complex occupations (e.g., notched projectile points, handstones, and millingslabs), he argued that these tools were simply used to obtain and process resources more commonly found in upland contexts. Baker (1990), in contrast, questioned the chronological integrity of the hypothesized assemblage, noting that notched projectile points, handstones, and millingslabs are typically associated with the preceding time period (i.e., Whiskeytown Pattern) and therefore should be decoupled from the more traditional Shasta Complex traits (see also Johnson 1993).

Later excavations in the western foothills have produced a series of single-component assemblages more clearly related to the Shasta Complex (Bevill and Nilsson 1996, 1999; Farber and Neuenschwander 1984; Jensen 1993, 1994; Sundahl 1996, 1999; Tyree 1992). Artifact assemblages and features from some of these foothill sites appeared quite similar in content to assemblages from sites located along the Sacramento River. This similarity led Jensen (1993, 1994) and Sundahl (1996, 1998) to propose that some of the sites represent permanent or near-permanent residential bases, rather than small ephemeral camps associated with large Shasta Complex villages on the Sacramento River (DuBois 1935). Jensen (1993, 1994) and Sundahl (1996, 1998) further hypothesized that several centuries of successful exploitation of resources along the Sacramento River led to significantly higher population densities, causing a budding-off of groups who established year-round settlements along the smaller stream course in the foothills sometime after 700 BP (see also Guilford-Kardell and Dotta 1980).

Similar findings have been made in the western foothills farther south in Tehama County within the original homeland of the Nomlaki, or near the Wintu-Nomlaki boundary (Darcangelo et al. 2015; Hildebrandt and Darcangelo 2001; Dondero and Johnson 1988; Johnson and Dondero 1990; Johnson and Theodoratus 1984a, 1984b, 1984c). Most of the sites in this locality had strong affinities with the Shasta Pattern, as their projectile point assemblages were dominated by the Tuluwat series and they contain rich midden deposits not unlike those found along the Sacramento River. They differ, however, by being much smaller and containing low numbers of human burials, probably reflecting extended family hamlets rather than large, multi-family villages. Due to the lack of high quality salmon streams in these locations (reflected by the paucity of fish bone in most deposits; Hill and O'Brien 2003), and the relatively recent age of most midden sites (most post-date 600 cal BP), it is possible that the western foothill settlements split off from those on the river when population densities reached critical mass in the latter, more productive habitats. This resulted in establishment of the Hill Nomlaki and Bald Hills Wintu in the region at historic contact (Darcangelo et al. 2015; Johnson and Theodoratus 1984a).

Contact Period (AD 1820s–1850s)

The Wintu and Nomlaki are the primary groups occupying the Sacramento Valley Zone (see *Ethnographic Context*) and are the ethnohistoric representatives of the Shasta Pattern. Both groups first met Euro-Americans during a series of expeditions into the Sacramento Valley in 1826 and 1827 by Jedediah Smith and Peter Ogden. Visits intensified in the early 1830s when trappers from the Hudson Bay Company traveled through, sometimes in groups composed of over 100 people (Maloney 1945). These groups brought a variety of trade items like glass beads and copper kettles which were of great value to the Wintu and Nomlaki, but they also brought a devastating malaria epidemic that decimated much of the local Indian population during 1833 (Cook 1943; Hildebrandt and Darcangelo 2008).

Although local populations recovered to some degree over the next 15 to 20 years, they were impacted again with the discovery of gold in the 1850s that brought thousands of miners into the area, especially within Wintu territory. These immigrants had little respect for the land or the indigenous people who lived there. Indian people were driven from their land and often killed in cold blood, including several massacres that have been documented by LaPena (1978) and Goldschmidt (1978). Native resistance to these atrocities resulted in several battles, including the "Wintoon War" that lasted for six months between 1858 and 1859, where 100 Indians were killed and many of the survivors were moved to a variety of reservations (Castillo 1978).

But many people survived the killings and forced removals, occupying small villages located away from the larger White settlements, often in foothill settings away from their most productive salmon streams and other important foraging areas. Other tribal members secured work as laborers and domestic workers on ranches and farms as part of the growing agricultural industry. By the early 1870s, however, a series of religious revitalization movements began to take hold in an attempt to bring the old ways back (Bean and Vane 1978; Du Bois 1939). The Ghost Dance, for example, was introduced to northern California by a series of Northern Paiute prophets in 1871. Practitioners believed that if they participated in the traditional Round Dance for five nights, the White people would leave, and the dead ancestors and important animals like bear, deer, and wolf would return. A derivation of this religion, known as the Earth Lodge Cult, was adopted among the Wintu and Nomlaki soon thereafter, which included construction of large subterranean structures with the goal of bringing back the dead. The Earth Lodge Cult soon converted to the Bole Maru religion in 1874, and then the Big Head Dance among the Nomlaki (which is still practiced today), while the Wintu developed the Dream Dance which lasted only a few decades before fading away (Woolfenden 1970).

Wintu and Nomlaki archaeological sites dating to this transitional period are relatively common within the Sacramento Valley Zone. Excavations along the Sacramento River eight miles south of Redding by Hildebrandt and Darcangelo (2008), for example, encountered a village site with a prehistoric Shasta Pattern component followed by one reflecting direct contact with the Hudson's Bay Company and probably the John Work expedition of 1832–1833. The latter component included a cemetery population with an assemblage of glass beads similar to those supplied to Work at Fort Vancouver (Ross 1990), as well as a Hudson's Bay Company covered copper kettle. This cemetery population also seemed to reflect the malaria epidemic, as it included multiple group burials with much higher rates of mortality among the youngest and oldest members of the group than was the case earlier in time.

The next phase of occupation dates between 1850 and the early 1860s, and its archaeological manifestation is concentrated along the Sacramento River. Findings from these sites have been synthesized by Vaughan (2001) and show the addition of many Euro-American tools to the local economy (see also Woolfenden 1970). While most people were buried using traditional methods and were interred with traditional artifacts, many of the graves also included glass beads, ironstone cups, buttons, iron gold pans, ax heads, knives, shovels, ceramic bowls, and many other utilitarian items. The high frequency of these items may reflect the proximity of these sites to Shasta and other nearby early towns and the Sacramento River, and the relatively large Euro-American settlements that developed there.

Occupations dating between about 1870 and 1880 have been documented in the Trinity Reservoir area (Treganza 1959), at Redbank Reservoir in Tehama County (Treganza 1954), and along Salt Creek, about 15 miles northeast of Redding (Sundahl and Clewett 1991). The Salt Creek sites show a significantly different pattern than that reported by Vaughan (2001), including a much lower frequency of Euro-American goods. Although the region was fully occupied by Euro-Americans by this time, Sundahl and Clewett (1991) encountered multiple Wintu houses that differed little from their pre-contact forms, except for very large and deep dance houses that were probably related to the Earth Lodge Cult. Euro-American clothing and glass beads (Ritter 1991) were plentiful, but metal cookware, crockery dishware, and other items were not. Glass was predominately used to make tools, including projectile points, and there was little evidence for the use of guns or metal hooks for hunting or fishing. Despite maintaining many traditional parts of their culture, perhaps made possible by living away from major population centers along the Sacramento River, most of their major economic needs were probably met through the new market economy, with important commodities like flour obtained in return for their labor on local farms and ranches (Sundahl and Clewett 1991).

NORTH COAST AND KLAMATH MOUNTAINS/NORTH COAST RANGES

The North Coast includes the outer coast and nearby mountains from central Mendocino County up to Oregon, while the Klamath Mountains/North Coast Ranges extend up to the major divide between the Sacramento River drainage and the western rivers that flow directly to the sea (e.g., Smith, Trinity/Klamath, Mad, and Eel). We have combined these zones into a single discussion because the same set of time sensitive projectile points apply to most of the land they encompass, and both zones are necessary to produce a complete and coherent culture history for the larger region, as most of the earlier archaeological record occurs on the interior while most of the later-dating record is found on the coast.

Similar to the Sacramento Valley, the chronological sequence is ordered around a series of *Patterns* developed by Fredrickson (1974, 1984; see also Hildebrandt 2007), but with one exception. The exception occurs at the beginning, where we add the *Paleoindian/Paleoarchaic* interval (13,400–8850 cal BP) to be consistent with the other zones within our study. The next cultural historical unit is the *Borax Lake Pattern* (8850–5700 cal BP), followed by the *Squaw Creek Pattern* (ca. 5700–4500 cal BP), *Mendocino Pattern* (4500–1500 cal BP), and *Tuluwat Pattern* (formally known as the *Gunther Pattern*), post-dating 1500 cal BP. Finally, the *Berkeley Pattern* (2300–1500 cal BP) and *Augustine Pattern* (post-1500 cal BP) are relevant in the southernmost margins of both zones, as they probably reflect a relative late arrival of Pomoan speakers from the Clear Lake area.

Paleoindian Period (13,400–12,800 cal BP)

Similar to the preceding regions, the Paleoindian Period is the earliest cultural manifestation along the North Coast and Klamath Mountains/North Coast Ranges, and is best illustrated by the fluted (Clovis-like) projectile points and chipped stone crescents. Although they have been found south of the current study area at the Borax Lake site near Clear Lake, well-defined assemblages have not been found elsewhere in northwest California (White 2013). Fluted points have been discovered near the coast in Mendocino County (Simons et al. 1985) and in Siskiyou County (Jenkins 2005), but they were found in isolated contexts lacking strong associations with well-dated strata or other artifacts.

Like the Sacramento Valley, there is not a well-defined projectile point type that pre-dates the Borax Lake Widestem and post-dates Clovis points, as the earliest radiocarbon date we have for the former type is 7945 cal BP from a site on Pilot Ridge in Humboldt County (Fitzgerald and Hildebrandt 2002); however, White et al. (2002) estimate a maximum age of 10,500 cal BP at Clear Lake based on obsidian hydration readings. Even with the White et al. (2002) earlier estimate, there remains a gap in diagnostic artifacts between about 12,800 and 10,500 cal BP.

Borax Lake Pattern (10,000–6300 cal BP)

Much more is known about the Borax Lake Pattern, as archaeological manifestations have been discovered and studied throughout the interior of Northwest California. Borax Lake Pattern sites extend from Clear Lake Basin north into Humboldt and Trinity counties, with many located in upland habitats. White (2013), in an excellent synthesis of this topic, pushes the age of the pattern back in time relative to what has been proposed for the upper Sacramento Valley, and identifies geographic variability in the age and composition of its assemblages. Projectile points in the Clear Lake Basin tend to be flat-based, basally thinned (essentially fluted), and significantly older (10,000–8,500 cal BP), than the later (8500 to 6300 cal BP) indented-base points with less basal thinning found within the northern reaches of the North Coast Ranges. These northern assemblages also include serrated bifaces, ovoid flake tools, handstones, millingslabs, and edge-flaked spalls. This diversified assemblage is commonly found in sites located across a wide range of environmental contexts, including ridgetops between 4,500 and 6,000 feet along Pilot Ridge and South Fork Mountain (Hildebrandt and Hayes 1993), in upland areas within Mendocino County (Huberland 1989), and along terraces adjacent to the Trinity River (Sundahl and Henn 1993). Excavations at one of the ridgetop sites discovered a hard-packed house floor associated with the aforementioned assemblage and three possible post holes. A soil sample from the floor produced the radiocarbon date of 7945 cal BP mentioned above, making it one of the oldest houses ever excavated in California (Fitzgerald and Hildebrandt 2002). Obsidian hydration data collected from both upland and lowland settings indicate that the pattern may have persisted in Humboldt and Trinity counties until roughly 5000 cal BP, but this is far from certain as we have a limited understanding of obsidian hydration rates in this area.

Faunal and floral remains have not been discovered in these northern sites, largely because conifer leaf litter and heavy rainfall compromise the preservation of subsistence remains. The composition and homogeneity of the Borax Lake artifact assemblages, however, appear to represent a "forager" approach to subsistence-settlement organization. With this strategy, little emphasis is placed on storage, and incongruities in the distribution of resources over time and space are solved by moving people from places of declining productivity to areas where foraging opportunities are enhanced. This approach requires frequent residential moves by the entire social unit, resulting in the generalized assemblages and homogeneous settlement structure observed in the archaeological record.

Borax Lake Pattern sites are absent in southwestern Oregon, with the possible exception of site 35JA53, which is located just over the California border on the Applegate River approximately 75 miles from the coast (Brauner and Nisbet 1983). They are also quite rare on the coast, largely due to sea level rise that has inundated most near-shore habitats dating to this interval (Meyer et al. 2011). One exception is a site located near McKinleyville about 1.5 kilometers from the coast, where Borax Lake Pattern artifacts have been found. Preliminary investigations at the site by Roscoe (1995) revealed an artifact assemblage consisting of both flaked and ground stone tools, but no evidence for marine resource use (e.g., no shellfish remains). Due to the widespread prairie and marshland habitats in the area, and the large number of projectile points and butchering tools found, Roscoe (1995) argued that the hunting and processing of large game (predominately Roosevelt elk) was probably a major activity at the site.

Deposits dating to Borax Lake Pattern times have also been discovered on the Smith River near Hiouchi Flat (Tushingham 2005), though the artifact assemblage is more similar to that of *Glade Pattern* sites identified in southwestern Oregon. As summarized by Tushingham (2013), the Glade Pattern dates between 10,200 and 3800 cal BP and, in southwestern Oregon, seems to represent seasonal camps of small groups of highly mobile hunter-gatherers. Diagnostic artifacts include leaf-shaped projectile points (foliates), side-notched projectiles, and edge-ground cobbles. They have been found at a series of sites on mainly the Rogue and Coquille rivers.

According to Schreindorfer's (1985) work at the well-dated Marial site on the Rogue River, as well as findings from a variety of sites farther upstream along Elk Creek (Minor 2014), there appears to be some temporal patterning of Glade Pattern point styles. Large serrated foliates are more common before 8500 cal BP, and they increasingly co-occur with contracting-stemmed and side-notched points from 8500 to 4500 cal BP. Smaller, non-serrated foliates, along with contracting-stemmed points, continue in time until the introduction of bow and arrow technology at about 2000 cal BP (Minor 2014; Pettigrew and Lebow 1987), though others have argued that leaf-shaped points are found in Late Period sites and may represent a functional class of artifacts used throughout most of antiquity (Connolly 1988).

Provisional Squaw Creek Pattern (5700–4500 cal BP)

Very little is known about this temporal interval in northwestern California. In the Pilot Ridge/South Fork Mountain area, for example, Hildebrandt and Hayes (1983, 1993) could not find single component assemblages falling between the Borax Lake and Mendocino Patterns, so they (probably incorrectly) pushed the age of the Borax Lake Pattern forward in time. Substantial evidence for this time period is also lacking in the river valleys (Hildebrandt and Levulett 1997), although Tushingham (2009, 2013) did produce a radiocarbon date of 5840 cal BP along the Smith River associated with a small assemblage of flaked stone tools. This is also the case for the north coast (Eidsness 1993; Gould 1966; Hildebrandt and Levulett 2002), where evidence for occupation does not occur until after 4500 cal BP when the Mendocino Pattern emerges.

Hildebrandt and Hayes (1983) did find a significant number of contracting-stemmed points on Pilot Ridge/South Fork Mountain quite similar to those assigned to the Squaw Creek Pattern in Shasta County (Basgall and Hildebrandt 1989; Clewett and Sundahl 1983; Sundahl 1993). They also found several serrated lanceolate points (called the "Oregon Series") comparable to those found in Glade Pattern sites, where they are found with contracting-stemmed points within the 5700–4500 cal BP time frame (Minor 2014). Although we still do not have well-dated, single-component assemblages for this interval, we hypothesize that when they are discovered, they will have strong affinities to the Squaw Creek Pattern, thus our provisional creation of this pattern for the local area. Why its visibility is so marginal compared to Shasta County, where it is robust and relatively widespread, remains an important research issue for northwestern California.

Mendocino Pattern (4500–1500 cal BP)

The Mendocino Pattern first appears around 5,000 years ago in a limited number of places in Northwest California, but is not common until after about 4000 cal BP. Common artifacts include side-notched, corner-notched, and concave-base dart points (of the Willits and Mendocino series), handstones and millingslabs, various types of flake tools and cobble tools, and, in some cases, a limited number of cobble mortars and pestles. McKee unifaces are also an important part of the assemblage.

Dowdall (2002), Layton (1990), and Kennedy (2005) have excavated Mendocino Pattern components along the Mendocino and Sonoma coasts, where they estimate the pattern persists between about 5000 and 1500 cal BP. Most of these sites represent either temporary hunting camps or short-term forager residential bases occupied by people with a largely terrestrial subsistence orientation.

The earliest manifestations of the Mendocino Pattern in the more northerly areas come from a variety of coastal and interior settings. Coastal evidence is available from Point St. George (Gould 1966), Humboldt Bay (Eidsness 1993), and the King Range of southern Humboldt County (Hildebrandt and Levulett 2002; Levulett 1985), but none of these sites pre-date 2500 cal BP. Similar to the Sonoma and Mendocino coasts, the sites appear to represent temporary hunting camps or seasonal encampments by people with a terrestrial orientation.

Up in the northern mountains, most of the sites are specialized hunting camps, which is significantly different from the earlier Borax Lake Pattern where the uplands were dominated by residential sites. This finding led Hildebrandt and Hayes (1993) to hypothesize that the Mendocino hunting camps represented logistical forays from more substantial residential sites in the lowlands. Rather than representing a mobile system of settlement like the more southerly areas, they argue that a sedentary settlement system supported by the intensive harvest and storage of salmon and acorns emerged at about 2500 cal BP.

Tushingham (2009, 2013) tested this hypothesis based on her excavation findings along the Smith River (see also Eidsness 1985). She found clear evidence for lowland residential activity beginning around 3100 cal BP, reflected by a hard-packed house floor and associated hearth, and a full complement of flaked, battered, and ground stone tools, including mortars and pestles. These deposits also yielded charred acorn remains, but only limited amounts of salmon bone, and a near-absence of fishing gear, with the latter not becoming dominant until after 1500 cal BP (see below). Similar findings have been made farther south along the Mattole River at McKee Flat, where excavations yielded a diversified assemblage of both flaked and ground stone artifacts (including some mortars and pestles), and dark midden soils, but lacked the preservation of bone

(Hildebrandt and Levulett 2002). Both of these studies provide some support for greater residential stability during Mendocino Pattern times, perhaps made possible by a greater dependence on acorn storage, but the a heavy dependence on salmon appears to have occurred somewhat later.

Berkeley Pattern

The Berkeley Pattern appears to have originated near Clear Lake but extends up into the southernmost edge of our study area in Mendocino County at about 2300 cal BP, where it infringes upon the Mendocino Pattern. Artifact assemblages are quite elaborate and include leaf-shaped (Excelsior) and stemmed projectile points, a highly developed bone tool industry, many fishing-related implements (spears, harpoons, hooks, net sinkers), and a relatively high frequency of mortars and pestles. Site structure is also quite formalized, and includes black midden deposits, well-defined house floors, and a variety of other residential features. This higher degree of sedentism appears to be based on a subsistence economy built around the intensive use of acorns (Basgall 1987), large terrestrial game, and fish (Hildebrandt 2007; White et al. 2002).

Berkeley Pattern occupations on the Sonoma and Mendocino coasts vary in intensity from place to place. Large residential bases are established in southern Sonoma County near Bodega Bay between 2300 and 2000 cal BP, and include Excelsior points, shellfish hooks, notched net sinkers, bone tools, and mortars and pestles (Dowdall 2002; Kennedy 2005). These data, combined with stable isotope analyses on shellfish by Kennedy (2005), indicate year-round occupations during this interval. Similar findings have been made in Mendocino County north of Fort Bragg (MacKerricher State Park) where White (1991) excavated large house structures with multiple storage pits. These were associated with artifacts dominated by Clear Lake obsidian and other Berkeley Pattern indicators (e.g., Excelsior points, bone and antler tools, mortars and pestles), as well as rich faunal assemblages composed of sea lion, elk, and salmon.

Most researchers attribute the expansion of the Berkeley Pattern as a reflection of the out-migration of Pomoan populations from their Clear Lake homeland, presumably replacing earlier Yukian speaking peoples who occupied these outlying areas (Basgall 1982; Baumhoff 1980; Fredrickson 1984; Golla 2011; White et al. 2002).

Tuluwat (formerly Gunther) Pattern (post-1500 cal BP)

After 1500 BP, several major changes occur in northwestern California and southwestern Oregon, especially along the coast on Humboldt Bay and areas to the north (Hildebrandt and Levulett 2002; Tushingham 2009). Site frequency increases dramatically, and many locations were used as permanent villages for the first time. Artifact assemblages are increasingly diverse and include a large number of specialized woodworking tools (e.g., adzes, mauls and wedges) used for the construction of substantial plank houses and canoes. Excavations at multiple sites north of Cape Mendocino, where offshore rocks and islands are plentiful (Elsasser and Heizer 1964, 1966; Gould 1966; Milburn et al. 1979), have yielded high frequencies of Tuluwat barbed projectile points and thin concave-based points used to tip composite harpoons used for taking both marine mammals and fish.

Ground and polished stone artifacts are also quite abundant, some exhibiting a great deal of artistic elaboration. Flanged pestles, well-made mauls (used with antler wedges), and notched net sinkers are common, while significant frequencies of steatite bowls, zoöform clubs, and polished stone adze handles have also been found. Fishing gear is common, represented by various bone and antler spears, harpoons, and hooks (Bennyhoff 1950). The emphasis on implements geared toward the marine environment is complemented by faunal assemblages dominated by seals, sea lions, and marine fish, including high frequencies of small schooling species (Tushingham and Bencze 2013; Tushingham and Christiansen 2015; Tushingham et al. 2013; Whitaker 2012). Many of these resources were obtained with the use of oceangoing canoes, either from distant offshore rocks or on the open water (Hildebrandt 1984; Hildebrandt and Jones 2004; Whitaker 2008; Whitaker and Hildebrandt 2011). Shellfish were also important contributors to the diet but, unlike central and southern California, species from relatively deep in the intertidal like red abalone are essentially absent from the archaeological record (Colligan et al. 2015).

Many northern coastal sites are structurally complex, as they typically have well-defined houses, cemeteries, artifact caches, and midden/refuse areas (Gould 1966; Whitaker and Tushingham 2014). Redwood houses have been discovered on multiple occasions and often have stone patios and prepared clay floors. In addition to the zoöform clubs, ceremonial items include large obsidian bifaces (used ethnographically in the White Deerskin Dance) and dentalia, most recovered from burial contexts. These items are buried with only a limited number of people in the population (including some children), and probably reflect the high level of social stratification known among the local peoples at historic contact (Hildebrandt and Levulett 2002).

South of Cape Mendocino, along the southern Humboldt County and Mendocino coasts, offshore rocks are rare and the adaptation appears to be more terrestrial in its orientation (Hildebrandt and Levulett 2002; Layton 1990). Although Tuluwat barbed projectile points are still used, harpoons, wood working tools, plank houses, and ceremonial objects are quite rare. Archaeofaunal remains also lack the maritime focus of the more northern areas, as they are typically dominated by deer and a lesser frequency of near-shore marine mammals. Most of these sites represent a seasonal littoral adaptation, with a large portion of the subsistence economy geared toward the interior.

An interesting exception to this rule is a brief intrusion of Tuluwat Pattern people identified farther south by White (1991) in Mendocino County just north of Fort Bragg. The site is located next to a lagoon (Inglenook Fen) and was occupied between about 1600 and 1400 cal BP. It contained many northern artifact types including Tuluwat barbed projectile points, small concave-based harpoon tips, elk bone chisels, and stone mauls. Almost all of the obsidian in the site came from the northern Medicine Lake Highlands source area (as opposed to Clear Lake) and the faunal assemblage was dominated by elk and offshore birds, a pattern also similar to findings from northern sites at places like Stone Lagoon (except for the absence of seal and sea lion bone). This discovery led White (1991) to conclude that the initial colonization of Northwest California by Tuluwat Pattern people (probably Algic speakers) extended well south of their ultimate range, but retracted back to the more northerly areas (e.g., north of Cape Mendocino) where the presence of offshore rocks and islands allowed the more maritime-oriented subsistence economy to develop and flourish up to historic contact.

The interior record is less clear due to the absence of large-scale excavations, but there are some important findings on some of the larger drainages in the region. In the early 1970s, for example, Chartkoff and Chartkoff (1975) conducted a survey of the middle reaches of the Klamath River, below Happy Camp, specifically targeting named Karok ethnographic villages identified by Kroeber (1925) and Bright (1978). This effort identified 160 sites, all of which were thought to post-date 1600 cal BP. More than 90% lay at the mouths of tributary streams, as the rugged nature of the surrounding terrain discouraged occupation of outlying areas. Later studies in the area pushed the settlement chronology back to between 2000 and 1500 cal BP, but this earlier interval lacked evidence of intensive use of acorns or the local salmon fishery, leading Chartkoff (1989, 1991) to conclude that this economic system must have developed later in time.

Tushingham's (2009) excavations on the Smith River discovered a robust Tuluwat Pattern component composed of four semi-subterranean redwood plank houses with slab-lined hearths and, in one case, a paved floor. The artifact assemblage was much larger and diversified than during earlier Mendocino Pattern collection she documented there, and included Tuluwat barbed projectile points, net sinkers, fishing gear, mortars and pestles, and a wide range of other residential materials (e.g., steatite pipes) post-dating 1000 cal BP. Faunal remains showed a significant increase in salmon and, combined with the aforementioned fishing gear, indicated that the ethnographic salmon economy was fully in place by this time.

Tushingham's (2009) findings are important because they show a time lag between the intensification of acorns (Mendocino Pattern) and salmon (Tuluwat Pattern). Why would this be the case? According to Tushingham (2009; see also Tushingham 2013; Tushingham and Bettinger 2013), the answer lies in the sequence of labor inputs required. Acorns are a *back-loaded* resource. Initial collection and storage is relatively cheap and easy, and only gets expensive later on when they need to be processed for consumption (ground, leached, and cooked). So as Mendocino Pattern people began to experiment with higher levels of sedentism and storage, creating multiple, low-cost caches of acorns enlisted minimal risk, because if they needed to be abandoned, the loss would be minimal. Salmon, in contrast, is a *front-loaded* resource. They are more difficult to acquire than acorns and, more importantly, they must be smoked/dried for storage right way. Once this expensive upfront work is completed, there is little effort required during the later consumption side of the process. Because of this upfront expense, salmon caches were much more valuable than acorn caches, and tended to tie people down in a much more significant way during Tuluwat Pattern times than was case before.

Information from late prehistoric interior sites located farther south in Humboldt and Mendocino counties is largely derived from large scale surveys, with only limited amounts of data coming from excavations. Multiple surveys within the Round Valley region (e.g., Jackson 1976; McCarthy et al. 1985; Stewart and Fredrickson 1979; Treganza et al. 1950) found a large number of midden deposits, many including house pits. These studies, along with excavations at a series of nearby sites (e.g., Eidsness 1986; Holson 1986; Meighan 1955), show that lowland villages were first established during Mendocino Pattern times and became larger and more intensively occupied later in time, but none found evidence for a major focus on the local salmon fishery. They also revealed that Tulawat barbed projectile points reach down into Mendocino County, but overlap with Augustine Pattern materials when moving farther south, and are ultimately replaced by Rattlesnake Corner-notched points upon reaching the Sonoma-Mendocino county line (Baumhoff 1985; Jaffke 1997).

The center of the Augustine Pattern is in the Sacramento-San Joaquin Delta region and is marked by Rattlesnake Corner-notched projectile points, *Olivella* and clamshell disk beads, and a whole suite of artifacts linked to hunting, fishing, intensive acorn use, and a variety of domestic activities. There are also distinctive items associated with a large-scale ceremonial complex, including magnesite cylinder and "banjo" abalone ornaments, bird bone whistles and tubes, and flanged steatite pipes (Bennyhoff 1994). A full complement of these traits has not been found everywhere in the North Coast Ranges, showing a clear contrast between the Augustine and Tuluwat patterns in this region.

Contact Period (AD 1700s–1850s)

Tushingham (2013:24) notes that direct and sustained contact between Native and non-native peoples in far northwestern California came relatively late, when compared to the southern and central parts of the state. Even so, non-native influences were felt early-on, with the arrival of European trade goods and diseases like cholera, smallpox, and measles, spread between tribal groups. Kellawan and Costello report that "In the early 1830s, smallpox was particularly lethal in the North Coast Ranges," and that there were also outbreaks of cholera, scarlet fever, whooping cough, and tuberculosis among coastal tribes (2011:73). Those authors go on to say that, "Based on Tolowa oral traditions, the village at Point St. George in Del Norte County was abandoned due to a cholera epidemic in the 1700s to early 1800s." The Tolowa also suffered "horrific massacres in the 1850s, when hundreds of men, women, and children were killed and their villages were burned" (Tushingham 2013:112). Reportedly "many Tolowa survived simply by taking refuge in the inland mountains to flee violence … For example, at the time of the [Crescent City] massacres, several Tolowa from coastal villages moved to Mill Creek, located across the river from DNO-26, 'to wait until things died down'" (Tushingham 2013:146). It was a gruesome story that repeated itself across the state.

Introduced diseases are difficult to trace archaeologically (but see Hildebrandt and Darcangelo 2008 for one example). The most common and readily identified archaeological markers of this period are glass trade beads. Motz et al. (1986) note that glass beads were introduced by the first European mariners, were distributed widely by the Spanish mission system, were used by the Russian-American Fur Company to purchase the land for Colony (Fort) Ross, and continued to be traded to Native people in California by fur trappers, gold miners, settlers, and merchants well into the nineteenth century. Those authors report on two protohistoric Shasta cemeteries (SIS-168 and SIS-837) in north-central Siskiyou County, both containing multiple varieties of glass beads. They note the different hypothesized date ranges and sources (e.g., Russian-American versus Hudson's Bay fur trappers) of the various types, and interpret the differences in varieties between the two protohistoric cemeteries as indications that the two groups traded with different sources. They also concluded that some bead types were of higher value among the Shasta than were others, thus perhaps marking differences in status and wealth among those interred at the cemeteries.

Another ethnohistoric site in the Klamath Mountain region is TRI-862, documented by Vaughan in 1984. Using archaeological remains, public records, and oral history, Vaughan surmised that the "Salt Flat Ethnohistoric Complex" reflects multiple generations of Wintu occupation, from the early prehistoric period through the mid-twentieth century. (Several artifacts of Chinese origin suggest the possibility of site use by Overseas Chinese, as well.) As part of the Request for Determination of Eligibility documentation for the site, Ritter prepared a list of research questions relating to site chronology and structure, subsistence and settlement, technology, trade and exchange, and acculturation—questions that, with minor modifications, are appropriate for protohistoric sites in general.

Perhaps the first protohistoric site investigated on the North Coast was the Yurok village of *Tsurai* (HUM-169) on Trinidad Bay. In 1949, archaeologists from the University of California excavated part of the village, finding iron swords, copper bracelets, glass beads, and arrowheads chipped from bottle glass, along with traditional artifacts (Heizer and Mills 1952; also see Elsasser and Heizer 1966). The site appeared to represent four different periods of native occupation: prehistoric (AD 1620[?]–1775, Discovery and Exploration (1775–1800), Exploitation and the Fur Trade (1800–1849), and Decline and Fall—the American Invasion (1850–1916). This makes HUM-169 especially significant, as it documents changes in Yurok life over the period before, during, and after initial contact with non-native people. As one example, the archaeologists found several items that seemed to be transitional between native and non-native design: a three-tined iron fork with a handle made of local bone, a crudely designed bone brush (tooth or hair) with native markings on the back, and what appeared to be whetstones fashioned of native schist or shale. In addition, Tushingham (2013:24) tells us that "there is evidence that historic contact changed the subsistence patterns of *Tsurai* villagers. For example, an increase in elk and deer bone suggests the hunting of these animals became more important, a development Heizer and Mills (1952:14–15) hypothesize is related to the introduction of guns."

In Tolowa country, the Contact-period component of site DNO-26 (within the ironically-named Jedediah Smith Redwoods State Park) contained a heavily burned, semi-subterranean sweathouse with a plank floor and *in situ* upright planks, along with glass and metal artifacts (Tushingham 2009, 2013). Oral history information collected by E. Ritter during his initial recordation of the site in 1969 indicated that it had last been occupied in 1902, by a "renegade" who was shot while fleeing into the forest. During excavations at the site, Tushingham found a wide variety of Native artifacts (net weights, arrow points, bowl mortars and pestles, steatite pipes) in association with brass shotgun shells, flaked glass, ammunition, buttons, mining tools, cut nails, and historically introduced foods (including beef). She notes that "comparison of the Contact Period artifact assemblage to that of the Later Period contexts has provided information critical [for] understanding the effects of Euro-American settlement on Native populations" (2013:81). Among other things, "the archaeological evidence suggests that[,] not only did people persist in living at Red Elderberry [DNO-26], they also continued to live much as they had before white contact" (Tushingham 2013:147). She surmises that one reason may have been the site's location inland from the major white settlement at Crescent

City, where the Tolowa were "close to, and perhaps part of, a marginal multi-ethnic community" (2013:147). This shift from a mainly coastal settlement pattern to a more inland one was one of the most significant changes in Tolowa lifeways during the Contact period.

In coastal Mendocino County, Van Bueren (2013) has reported on nearly a dozen Coast Yuki/Northern Pomo ethnohistoric sites near the mouth of the Ten Mile River, on the northern outpost of the Mendocino Reservation (1855-1868).[1] He describes "shallow deposits with a mixture of traditional and historic artifacts [including many types of glass beads] that likely date from the 1850s to the 1860s" (2013:iii). Among the transitional items at the sites were flaked glass tools and debitage (greatly outnumbering stone), shell ornament blanks in association with glass beads, and dietary remains including both wild species and domestic sheep and cattle. Van Bueren concludes that these sites "offer initial insights into a poorly understood period of radical adjustments for indigenous inhabitants of the region" (2013:iii).

SIERRA NEVADA AND ADJACENT LOWLANDS

The Sierra Nevada and Adjacent Lowlands essentially correspond to Butte County for this study. The original archaeological sequences developed for this zone were largely based on work completed as part of the Oroville Dam project (Olsen and Riddell 1963), but were later improved by Ritter (1968, 1970) and then Kowta (1988) with more expansive data sets from surrounding areas. For the purposes of this discussion, we rely heavily on the work of Kowta (1988), especially after 5200 cal BP when formal archaeological patterns emerge in the record. We begin with the *Paleoindian/Paleoarchaic* interval (13,400–8850 cal BP) to be consistent with the other ecological zones within our study. The next cultural historical unit is ill-defined in the local area, so we simply call it the *Middle Holocene* (8850–5200 cal BP). We then move into the better defined local sequence, including *Martis/Bucks Lake* (5200–4500 cal BP), *Mesilla* (4500–2500 cal BP), *Bidwell* (2500–1100 cal BP), *Sweetwater* (1100–500 cal BP) and *Oroville/Chico* (post-500 cal BP).

Paleoindian/Paleoarchaic (13,400–7800 cal BP)

To our knowledge, no fluted points have been found within Butte County. A few isolated Clovis-like forms have been recovered in the adjacent areas, including Thomes Creek in Tehama County (Dillon and Murphy 1994), Big Meadows in Plumas County (Kowta 1988), and Loyalton in Sierra County (Kowta 1988). These findings indicate at least ephemeral use of the area between about 13,400 and 12,800 cal BP. Similar to the larger Sacramento Valley zone, we also lack clear indicators of the Paleoarchaic Period (12,800–7800 cal BP), as Great Basin Stemmed projectile points (or whatever the equivalent might be) have not been found in the local area. They have been found, however, in the Gold Lake area of Plumas County and farther to the southeast in the uplands of Nevada and Placer counties (McGuire et al. 2006).

Middle Holocene (7800–5200 cal BP)

This time period is well established in the larger Sacramento Valley and adjacent North Coast Ranges by the Borax Lake Pattern and Borax Lake Wide-stemmed projectile points. Age estimates are much older (10,000–6300 cal BP) in the North Coast Ranges (especially in Clear Lake Basin; White 2013) than in the Upper Sacramento Valley (8850–5700 cal BP; Sundahl 1992), and extend back into Paleoarchaic times. The interval is represented by a completely different pattern in the Upper Klamath Zone, as Basin Period (7400–5200 cal BP) assemblages are dominated by Northern Side-notched and Humboldt Concave-based projectile points. Well defined assemblages have not yet been established for the local area, however.

[1] Van Bueren notes that the coastal boundary between the Yuki and the Northern Pomo "was nebulous as a result of intermarriage and visits between the two groups" (2013:22).

Some headway has recently been made by a series of excavations along the Sacramento River near Hamilton City (Hildebrandt and Kaijankoski 2011). Work at a deeply buried deposit (2.2 to 2.5 meters below surface) produced a suite of radiocarbon dates ranging from 6600 to 6100 cal BP. The artifact assemblage included one corner-notched dart point, a flake tool, handstones, millingslabs, core/cobble tools, notched net weights, bone awl fragments, and a baked clay pipe fragment. Faunal remains were poorly preserved but did include deer and rabbit, minnow/sucker, salmon, and western pond turtle; only one piece of fresh water mussel was found. Plant macrofossils included abundant wild cucumber (perhaps used as fish poison; Starkey 2014), and smaller amounts of acorn, gray pine, juniper, and some local small seeded plants (mostly farewell to spring).

Another deeply buried deposit (3.0 to 3.5 meters below surface) dating to 6020 cal BP has been found farther south along the Sacramento River between Princeton and Colusa (COL-247; White 2003). This lower component was sampled with auger borings (it could not be formally excavated), so it was not possible to retrieve a robust assemblage from this portion of the deposit.

Martis/Bucks Lake Complex (5200–4500 cal BP)

Our knowledge of the local archaeological record improves significantly after about 5200 cal BP. It appears that cultural diversity increased at this time, as the Squaw Creek Pattern (5700–3200 cal BP) is fully established in the northern Sacramento Valley area (Sundahl 1992), while the *Martis* (*Bucks Lake*) *Tradition* is found to the east along the Sierran/Cascade front (Kowta 1988).

As outlined above, artifacts associated with the Squaw Creek Pattern include Squaw Creek Contracting-stemmed points, McKee unifaces, handstones, millingslabs, and ovoid flake tools (Basgall and Hildebrandt 1989; Bevill and Nilsson 1999; Clewett and Sundahl 1983; Kowta et al. 2000). Kowta (1988) identifies a very similar artifact assemblage along the west slope of the Sierra Nevada at Bucks Lake and considers it a variant of the larger Martis Tradition that characterizes much of the Sierra Nevada at this time. It is composed of Bucks Lake series projectile points (Markley 1981), which Kowta (1988:111) thinks are morphologically and temporally linked to the Squaw Creek contracting-stemmed points. The remainder of the assemblage is also dominated by handstones and millingslabs, and is thought to reflect short-term residential activities by relatively mobile populations.

Mesilla Complex (4500–2500 cal BP)

The Mesilla Complex along the Sierra/Cascade front includes corner-notched and contracting-stemmed dart points, a predominance of handstones and millingslabs, limited use of mortars and pestles, bone pins and spatulae, small steatite bowls, a limited number of marine shell beads and ornaments, and is thought to reflect a continuance of the mobile, forager-like adaptation (Delacorte and Basgall 2006; Kowta 1988; Ritter 1968, 1970). Kowta (1988) views the Mesilla as a western variant of the Martis Tradition, which is distinguished from the eastern variants by the absorption of central California traits such as shell and polished stone ornaments that probably had ceremonial functions.

The valley bottom archaeological record remains rather sparse until about 4300 cal BP, but improves significantly based on the excavation of residential midden deposits at COL-247 (4385 to 3575 cal BP; White 2003) and Llano Seco (BUT-233; 4300 to 2200 cal BP; Dreyer 1984). These components include a combination of contracting-stemmed, notched, and concave-base dart points that are somewhat consistent with findings in the larger region, but have not been affiliated with a formal pattern or time period (see also Zancanella 1987). Artifact assemblages from these sites are variable in size, but include a wide diversity of domestic tools and the first evidence for the use of mortars and pestles in the local area. Acorn macrofossils have also been found in both sites, clearly documenting the long-term importance of this dietary staple.

White's (2003) discovery of another component at COL-247 dating between 3222 and 2750 cal BP seems to represent a permanent village with affinities with Windmiller Pattern sites in the Delta, and Berkeley Pattern (Houx Aspect) settlements in the Clear Lake Basin. Major residential components have also been found within the current study area at the Cana Highway site (BUT-288; Deal 1987), the Wurlitzer site (BUT-294; Dreyer 1984), and GLE-700 (Hildebrandt and Kaijankoski 2011), although their relationships to other cultural complexes have not been proposed. Artifact assemblages from these sites reflect a greater reliance on mortar-pestle technology, have a wide range of cooking features, show more intensive use of bone tools and, where analyzed, a greater emphasis on fish and shellfish, as well as floral and faunal remains reflecting multiple seasons of occupation. Combined, these attributes appear to represent the development of a fundamentally new collector adaptation (sensu Binford 1980) where centralized villages were supported by logistical forays to outlying areas, exchange relationships with neighboring groups, and greater dependence on long-term storage. It is important to emphasize, however, that this shift is not seen in the foothills, and may reflect a time-lag between the foothills and valley in the establishment of a more sedentary settlement system.

Bidwell Complex (2500–1100 cal BP)

By around 2500 cal BP, the Bidwell Complex emerges along the foothills, and seems to reflect the higher degree of settlement stability observed in the valley during the previous period. Higher settlement stability is reflected by the emergence of formalized cemetery areas (Ritter 1968), and a diversified artifact and feature assemblage (Delacorte and Basgall 2006; Ritter 1968, 1970). Key artifacts include large corner-notched, side-notched, and stemmed dart points, and a variety of smaller arrow points. Both handstones and millingslabs, and mortars and pestles continue to be used, with the latter showing a significant use of wooden mortars. Steatite bowls reach maximum frequencies, also supporting the notion of higher settlement stability given that these heavy items are rarely used by mobile people (Ritter 1968:233). Fishing gear becomes more important, evidenced in increased frequencies of grooved and notched line/net sinkers. This is also supported by the continued importance of fish and shellfish in a variety of sites. Finally, formal cemetery areas are first established in the foothill areas at this time (Delacorte and Basgall 2006).

Although Ritter (1968, 1970) thinks the foothill Bidwell Complex represents a shift to a more collector-like system similar to what occurred in the lowlands during the Mesilla Period, and that it might signal the establishment of tribelet social organization (see also Delacorte and Basgall 2006), Kowta (1988) sees it as an extension of the Mesilla adaptation with a more intensive use of local resources, and the addition of cultural traits borrowed from central California. According to Kowta (1988), it was not until after 1000 cal BP that a major reorganization of the adaptation took place.

A relatively high degree of settlement stability continues forward throughout Bidwell times within the valley. White's (2003) work along the Colusa Reach, for example, shows year-round settlement and only minor changes in subsistence, as the economic focus remains on acorns, deer, and fish. This is also the case near Hamilton City, where Hildebrandt and Kaijankoski (2011) see a general persistence of economic systems established during the preceding period.

Sweetwater Complex (1100–500 cal BP)

Cultural complexity and diversity continue to increase throughout most of northern California after 1100 cal BP. As outlined above, the Shasta Complex spread across the northern Sacramento Valley (Sundahl 1992), while the Augustine pattern developed farther south along the Colusa Reach (White 2003) and down into the Sacramento-San Joaquin Delta (Rosenthal et al. 2007). Both of these archaeological cultures reflect the establishment of large riverine villages supported by intensified subsistence economies with increasing dependencies on fish.

Archaeological findings along the Sierran front and in the Chico area also show several major changes. The Sweetwater Complex (1100 to 500 cal BP) within the foothills is marked by a dispersal of populations, breaking into smaller groups associated with bedrock mortar complexes established throughout the oak woodland zone (Delacorte 2015), or small task groups working upslope from larger villages along the Feather River (Ritter 1968). This shift in settlement structure and milling technology probably reflects a greater reliance on the storage of acorns, perhaps associated with a greater emphasis on private ownership (Bettinger 2015; Delacorte 2015). Centralized residential sites continue within the Chico area, characterized by large midden deposits containing rich artifact assemblages and cemetery areas (Basgall and Delacorte 2006; Ritter 1970). Tuluwat Barbed projectile points dominate, as do mortars and pestles (bowl and hopper forms) which largely replace handstones and millingslabs. It is also important to note that multiple burial populations show a significant increase in violence during this interval, perhaps related to increasing population densities and greater competition for resources (Nelson 1997). This also appears to be the time when Hildebrandt and Kaijankoski (2011) discovered a cache of four decapitated skulls near Hamilton City thought to reflect trophy-taking behavior.

Highly polished schist tools thought to be sickles appear for the first time, and may have been used to harvest small seeds, the more intensified use of which is confirmed by plant macrofossil data from the valley (see below). Bone tools are also abundant, including utilitarian items such as gorge hooks and awls, as well as tubular bone beads and hair pins. Non-utilitarian objects include stone pipes, sucking tubes, and a variety of shell beads and ornaments, including split-punched *Olivella* beads (D-series) and banjo-shaped abalone pendants. Steatite bowls also occur at this time.

A major shift in the subsistence economy was observed by White (2003) during this interval along the Colusa Reach, perhaps due to the in-migration of a new people. Small resident fish become much more important, probably due the use of new technologies like weirs, dip nets, and drag nets. The importance of small seeded plants relative to acorns also increase (as do all plant foods in general), although mortars and pestles are the primary form of milling gear used.

Oroville/Chico Complex (post-500 cal BP)

The post-500 cal BP record is called the Oroville Complex in the foothills (Olsen and Riddell 1963; Ritter 1968, 1970; see also Jewell 1964; Pritchard et al. 1966) and the Chico Complex down in the valley (Chartkoff and Chartkoff 1976, 1984), the latter of which has been thoroughly dated with a new suite of radiocarbon dates produced by Snyder (2014). The dispersed settlement system observed during Sweetwater times in the foothills, shifts back to the occupation of centralized villages that include formal cemetery areas separated from the main habitation areas (Delacorte and Basgall 2006). There are also cases where cemeteries were placed within village deposits, perhaps in places that were no longer occupied (Ritter 1968). The Oroville and Chico complexes are quite similar to one another, with the former including a high frequency of bone tools (e.g., bone beads, gorge hooks, gaming tubes, and bone awls) and milling equipment represented by both hopper and bowl mortars and pestles. Several new artifact classes are added to the assemblage as well, including Desert Side-notched points (in addition to the existing Tuluwat Barbed), stone beads, clam disk bead money, and a greater variety of other shell ornaments (Bayham and Johnson 1990; Chartkoff and Chartkoff 1984; Ritter 1968, 1970; White 2003).

The valley record is represented by several major villages and appears to reflect significantly higher densities of people than living in the foothills. They contain highly diversified artifact assemblages, domestic features (many with house structures), and a rich assortment of subsistence remains. These findings reflect a relatively sedentary settlement system that relied on the intensive use of mortar-pestle technology, fishing (probably using weirs in some locations), and long-term storage of these foods. Although White (2003) lacks a post-500 cal BP component along the Colusa Reach, Hildebrandt and Kaijankoski (2011) found increases in the importance of small resident fish relative to salmon, and small seeds relative to acorn. Both of these findings reflect a greater investment in technology, and more intensive uses of more costly, but abundant, resource types. They are also consistent with findings elsewhere in California where sedentary peoples dependent on the local fishery will intensify the use of small-seeded plants to a higher degree that people living in non-riverine settings (Wohlgemuth 2004, 2010).

Contact Period (AD 1820s–1850s)

Within the planning area, this region encompasses most of eastern Butte County, omitting only Lassen National Forest lands on the north. A good deal of important archaeological research has been done in this area, most recently at Lake Oroville by archaeologists from CSU Sacramento and Sonoma State University. The Lake Oroville vicinity falls within the traditional territory of the Konkow or Northwestern Maidu (Kroeber's [1932] "Hill Konkow"), northward to their uneasy boundary with the Yana in the vicinity of Rock Creek.

According to Riddell (1978), the Konkow's earliest contact with non-native people probably came in the 1820s, with Captain Arguello's explorations up the Feather River and Jedediah Smith's fur trapping expeditions. Contact was intermittent until the gold discovery in 1848, but it was sufficient to bring a disease epidemic, thought to have been malaria, that decimated the Maidu and many other groups in 1833. Riddell tells us that "this was a blow from which the natives never effectively rallied" (1978:385).

With the Gold Rush came an onslaught of miners and settlers into Konkow territory. As their traditional food sources became scarcer, the Native people were forced to kill domestic livestock; retaliation from settlers and the military was "swift and excessive" (Riddell 1978:385). Hostilities escalated, with atrocities on both sides. McGowan (1961:138) states that "Indians north of the Feather River and in the Shasta and Siskiyou areas were more hostile and warlike than those in the valley." An uneasy (and inequitable) peace came only with the establishment of reservations, in particular the Nome Lackee reservation, founded in 1854, and the forced removal of the Maidu from their lands (McGowan 1961).

Protohistoric or Contact-period archaeological sites have been found in the foothills near Oroville that appear to have been refuge sites, where Maidu people were hiding from miners and other whites (E. Ritter, personal communication, September 2016). In addition, at least half a dozen Contact-period sites have been reported from the vicinity of Lake Oroville (e.g., Delacorte and Basgall 2012, 2014; Duncan and Smith 1963; Ritter 1968). Most recently, Delacorte and Basgall (2014) have investigated two Native American habitation sites with glass trade beads and other non-native materials, including a percussion cap, a Federal Navy button, and a drill chipped from olive-green bottle glass. One of the sites, BUT-383/H, yielded no fewer than 14 different types of glass beads. The archaeologists conclude that "native people occupied one or more of the Euro-American homesteads at BUT-383/H," probably working there as well. They go on to say that such sites offer "an unusual opportunity to investigate this dynamic and still poorly documented period in the state's history and the social adjustments and turmoil that characterized it" (2014:105).

SOUTHERN CASCADE FOOTHILLS AND LAKE BRITTON AREA

This zone includes the Southern Cascade Range within eastern Tehama County and southeastern Shasta County. It encompasses a diversity of habitats, beginning in the Mt. Lassen uplands, and extending down through the foothills to the Bend area adjacent to the Sacramento River. Its northern reaches cover both sides of the Pit River drainage, including lands between Lake Shasta and Lake Britton. The Bend area is included here, and not in the Sacramento Valley zone, because it has much greater affinities with the Yana hill country to the east than with the Wintu valley lands west of the Sacramento River. Because the Lake Britton archaeological record is uniquely different from the rest of the Southern Cascade zone, it will be discussed separately below.

Southern Cascade Foothills and Adjacent Lowlands

There is very little evidence for a deep archaeological record within this zone. In fact, prior to about 4000 cal BP, the record is quite sporadic, consisting mostly of isolated projectile points, flaked stone scatters, and obsidian hydration readings (Johnston et al. 2001; White et al. 2005). One exception to this situation is the discovery of a stratified rockshelter located in the Bend area that contains a deeply buried middle Holocene component; the report was not completed at the time of this writing, however (White, personal communication 2016). The record dating after about 4000 cal BP is much clearer, and has been organized into four time periods: *Deadman Complex* (3800–2580 cal BP), *Kingsley Complex* (2580–1400 cal BP), *Dye Creek Complex* (1400–550 cal BP), and *Mill Creek Complex* (550 cal BP-AD 1845).

Deadman Complex (3800–2580 cal BP)

The full range of artifacts associated with this interval are not fully known but appear to include side-notched, unifacial leaf-shaped, and contracting-stemmed dart points, large disk-shaped abalone shell beads, large triangular abalone pendants, and scoop *Olivella* beads (Johnson and Theodoratus 1984a). Handstones and millingslabs are common, while mortars and pestles appear to be absent. Johnson and Theodoratus (1984a) hypothesize that the foothill areas were first colonized by the Yana at this time, when they used these habitats on a sporadic basis during a larger, residentially mobile seasonal round.

Kingsley Complex (2580–1400 cal BP)

Archaeological visibility increases during this interval, with sites found in a wide range of upland and foothill habitats (Baumhoff 1957; Bevill et al. 1996; Greenway 1982; Hamusek 1988; Johnson and Theodoratus 1984a; Johnston et al. 2001; White et al. 2005). Side-notched and leaf-shaped dart points decrease in number, while corner-notched forms become quite common in a variety of locations; contracting-stemmed points also decrease in abundance. A series of wide-stemmed points have also been included in this assemblage, but this association has been contested by a variety of researchers (Johnson and Theodoratus 1984a:192). Other temporal indicators include scoop *Olivella* beads and spatulate bone tools (Greenway 1982).

Hopper mortars and flat-ended pestles are added to the milling assemblage which was formerly restricted to handstones and millingslabs. Both single and multi-family structures have been observed in foothill habitats, as well as some tightly flexed burials, but none of these sites were occupied for long periods of time, leading to the conclusion that they reflect small residential areas occupied by relatively small band of mobile foragers (Bevill et al. 1996; Johnson and Theodoratus 1984a).

Sundahl (1993, 2004, 2009) also finds the first evidence of occupation along the Sacramento River in the Bend area at this time, corresponding to Phase I of the local sequence established for this location. The assemblages are limited in size, but do include large corner-notched and leaf-shaped projectile points and cobble tools. Faunal remains include artiodactyls and rabbits, but little fresh water mussel and no fish, leading to the conclusion that the location was only used on a sporadic basis.

Dye Creek Complex (1400–550 cal BP)

Populations appear to have increased significantly during this interval. White et al. (2005) found an explosion in the frequency of Tuluwat Barbed arrow points (especially those with maximum neck widths greater than 6.5 millimeters) in the uplands of Lassen National Park after about 1100 cal BP. Excavations by Johnston et al. (2001) in the Ishi Wilderness found evidence of this time period in every site they sampled (which was not the case for any other interval); this was also the case for Sundahl's (1993) work in the Bend area.

Common artifacts associated with this period include the aforementioned Tuluwat Barbed points and small corner-notched arrows (often called Southern Cascade Corner-notched; Sundahl 1993; White et al. 2005; see also Johnson and Theodoratus 1984a), rectangular and barrel *Olivella* beads, large circular abalone ornaments, perforated freshwater shell ornaments, and deer ulna artifacts. Ground stone implements continue to include hopper mortars and flat-ended pestles, and handstones and millingslabs.

According to Bevill et al. (1996), this seems to have been a time of greater residential stability, with longer-term (but still seasonal) residential bases being established in the lowlands, and more logistical use of outlying, upland areas. This hypothesis is supported by deer dental increment analyses conducted by Johnston et al. (2011), and by occupations that occurred in the winter. Contrary to the expectations of Wiant (1981), however, these occupations do not appear to be focused on the capture of anadromous fish (Bevill et al. 1996).

Mill Creek Complex (500 cal BP-AD 1845)

The adaptations initiated during the preceding period continue forward into Mill Creek times. Tuluwat Barbed and Southern Cascade Corner-notched points continue to be used, while Desert Side-notched points are added to the assemblage as well (Baumhoff 1957). White et al. (2005) hypothesize that the size of Tuluwat series points decreases over time, with specimens from this interval tending to have maximal neck widths of less than 6.5 millimeters. Other temporal indicators include medium-sized clamshell disk beads, *Olivella* spire-lopped beads, *Glycymeris* shell beads, magnesite cylinders, and twined basketry. Ground stone assemblages continue to include hopper mortars, flat-ended pestles, handstones, and millingslabs. The retention of handstones and millingslabs (Greenway 1982) is rather unusual, as these are replaced by mortar-pestle technology in all other parts of our study area.

Many foothill sites retain a strong residential character, containing both family dwellings and larger communal houses represented by rock ring structures. Pitted boulder petroglyphs are sometimes found at these sites as well (Johnston et al. 2001). Judging by their size and midden constituents, Bevill et al. (1996) argue that they were probably seasonal encampments and not long-term, sedentary villages (Bevill et al. 1996), which is consistent with several small residential sites reported later by Ritter and Tyree (1990) and Vaughan et al. (2011). Bevill et al. (1996) also note that there is no evidence for the depletion of large game in the local area, perhaps due to the relatively low densities of human population in the foothills, but they did note more intensive use of small seeds during this interval. Finally, the low density of bedrock mortars in Yana territory may also signal more residential mobility (and, perhaps lower population densities) than surrounding areas, especially to the south in Maidu country (Bevill et al. 1996).

Moving to the lowlands, there seems to be a major increase in the frequency of these small residential sites, especially around the Bend area (Sundahl 1993, 2001, 2004, 2009). Most sites contain both handstone-millingslab and mortar-pestle technologies, as well as a continued emphasis on the use of heavy cobble-core tools. Net weights and probable bone harpoon fragments evidence fishing activities, but fish bone itself is quite rare in most sites. Freshwater mussel was also an important part of the diet. The persistence of handstones, millingslabs, and corner-notched points, and the absence of ceremonial blades, drills, arrowshaft smoothers, copious clamshell disk beads, and a variety of other artifacts diagnostic of the Shasta Pattern west of the Sacramento River, led Sundahl (1993) to conclude that sites located in the Bend locality probably represented the Yana, while the more elaborate assemblages to the west represented the Wintu or their ancestors.

The distinctive nature of Yana settlement has also been emphasized by Johnson (2003), who argues that their low-density, highly mobile subsistence-settlement system was largely self-reliant, allowing them to stay isolated from their neighbors. In addition to their continued use of handstone-millingslab technology long after it was abandoned by valley-dwelling Wintu, and their distinctive Southern Cascade Corner-notched points (Dugas 1995), Johnson (2003) speculates that they may have been isolated genetically as well. Whitaker et al. (2009) also found territorial differences in the stylistic attributes of Desert Side-notched projectile points, with the Redding subtype falling predominately in Wintu territory and the General subtype found more often in Yana lands. Dugas (1995) also notes that Yana Desert Side-notched points differ from those in Maidu territory based on a variety of morphological attributes.

The Lake Britton Area

The Lake Britton area lies along the Pit River within the northeastern corner of the Southern Cascade Foothills zone. Excavations by Cleland et al. (1995) produced a comprehensive prehistoric sequence documenting subsistence-settlement pattern shifts that differ from the Southern Cascade Foothills and Sacramento Valley zones, including earlier evidence for intensive use of riverine settings. Although Cleland et al. (1995) recognize six time periods within their study area, they highlight the presence of two basic adaptive patterns: Strategy II (8300–3200 cal BP) and Strategy III (post-3200 cal BP). While these sites were rich in flaked stone tools and subsistence remains, ground stone artifacts were surprisingly rare, providing little information on the evolution of milling technology in this area.

Strategy II (8300–3200 cal BP)

This strategy encompasses three time periods: Early Archaic A (8300–5700 cal BP), Early Archaic B (5700–4300 cal BP), and Middle Archaic A (4300–3200 cal BP). Surprisingly, the Middle Archaic A assemblages include very few stemmed points (e.g., Borax Lake Wide-stemmed), which are dominant downstream at this time (Sundahl 1992), instead they are dominated by Clikapudi Side-notched forms. The early age of these side-notched points could reflect greater affinities to the Upper Klamath zone (and northeastern California in general), as the Northern Side-notched point is a dominant temporal indicator for these areas during this period of time (see the *Basin Period*, page 36). Occupations along the Pit River are rather sparse at this time and largely confined to mid-slope terraces and benches well above the river.

Occupations increase significantly during the Early Archaic B (5700–4300 cal BP), this evidenced by an increase in the number of components dating to this interval. Ground stone tools occur for the first time (handstones and millingslabs), as does evidence for pithouse structures. The upper terraces and benches remain the primary loci for occupation, but freshwater mussel begins to occur with regularity. Clikapudi Side-notched points continue to be used, but Clikapudi Corner-notched points are added to the assemblage as well.

This basic assemblage continues into the Middle Archaic A (4300–3200 cal BP) Period, but clear settlement differentiation occurs for the first time, with habitation sites easily distinguished from specialized logistical sites. Habitation sites also begin to drop down onto the lower river terraces and true shell middens occur for the first time.

Based on the predominant use of mid-slope benches and terraces at Lake Britton, and the emphasis on upland areas elsewhere, Cleland et al. (1995) argue that the Strategy II represents a forager-like adaptation, with relatively high levels of residential mobility. Faunal remains show an emphasis on deer hunting, and when combined with the low density of fishing implements, support this hypothesis, although the presence of freshwater mussel (taken mostly in the summer) show that riverine resources did figure into the overall adaptation.

Strategy III (post-3200 cal BP)

Both the Middle Archaic B (3200–2000 cal BP) and Late Archaic (2000–900 cal BP) Periods show increased residential activity along the lower river terraces, with every favorable location being occupied. Special-purpose flaked stone sites fall out of the record, indicating increasing logistical mobility with specialized hunting parties going farther afield for their prey. Side-notched projectile points are completely gone by 2000 cal BP, while Clikupudi Corner-notched continued to be used until they are replaced near the end of the Late Archaic. By the Emergent Period (post-900 cal BP), use of the lowland habitation sites continued to grow, and Tuluwat Barbed and, at the very end of the sequence, Desert Side-notched arrow points, dominate the assemblages.

These findings represent a fundamental reorganization of settlement, more in line with a "collector" adaptation (see also Kaijankoski et al. 2011). Seasonality studies on mussel show that major winter villages (based on sites established close to the river), were accompanied by dense shell midden, elaborate fishing gear (e.g., bone toggle harpoon fragments), and a greater amounts of fish, especially after 2000 cal BP. A more intensive use of local resources is documented by a decrease in the proportion of large versus small game, and in declining ages of mussels, the latter reflecting a depletion of larger more productive individuals. A greater use of seed crops also occurred at this time (mostly gray pine and manzanita).

This pattern of human population growth and resource intensification continued forward until about 300–400 cal BP when there seems to have been a release in harvest pressure on local populations of both deer and mussels. This change was quite surprising, leading Cleland et al. (1995) to suggest that it may have been related to epidemics introduced to California by Europeans between AD 1650 and 1770 that may have reached the Pit River long before direct interactions with the Europeans occurred.

Contact Period (AD 1820s–1850s)

Johnson (1978:362) says that the earliest contact between the Yana and whites probably took place in 1821, during Arguello's expedition from San Francisco up the east side of the Sacramento Valley. In the decades that followed, trappers from the Hudson's Bay Company "probably had contact with the Yana along the Pit River and northeastern Sacramento valley" (Johnson 1978:362). In the mid-1840s, several Mexican land grants were awarded along the upper part of the valley, including two—*Bosque* (granted to Peter Lassen) and *Rio de los Berendos* (granted to Job Dye)—that extended into Yana territory. The California-Oregon Trail, the Lassen Trail, and Noble's Road brought miners and settlers through the tribe's territory, although most of these travelers were passing through on their way elsewhere. Despite these various incursions, Johnson (1978:362-363) reports that the Southern Cascade Foothills "was one of the regions in California that was least affected by early American mining and settlement."

Nevertheless, conflict between the Yana and the newcomers was inevitable, as the latter began to establish ranches and settlements in the valleys and graze their livestock in the adjacent foothills. The eastern side of the upper Sacramento Valley abuts the foothills of the Southern Cascades, whose many large streams flow westward to join the Sacramento River. On one of these streams, Deer Creek, lay a Yana village that was home to Ishi. This Yahi Yana man, made famous by anthropologists from the University of California, Berkeley, lived for 50 years with a small band of other Yahi in "the rocky confines" of the Southern Cascade foothills (Johnson 1978:363) in what was surely the longest-occupied refugium of the contact period in northern California. He finally emerged, starving, only after all the rest of his small group had died.

That these people hid out in the hills is no surprise, given the many published accounts of hostilities between Euro-Americans and local native people. Several of these accounts were compiled by Dr. Norris Bleyhl, former director of the Merriam Library at CSC Chico, and published as part of an annotated bibliography (Bleyhl 1978-1979). A few of the more relevant annotations are excerpted here:

> In 1859 the valley declared an all-out campaign against the Indians. $3000 was used to finance the campaign. A group of seven men would hunt Indians for two months. Captain Burns proceeded up the south side of Deer Creek. They camped on Mill Creek at the Black Buttes.
>
> In July 1863 a party of Mill Creek (actually Yahi) Indians "on the warpath" passed through Clear Creek country between Chico and Oroville. The Lewis family was attacked and members killed, which aroused the community to vow to kill Indians[,] guilt[y] or not.
>
> In August 1865 the final conflict with the Mill Creeks occurred. The Yahi had murdered

> three people in the area.[2] … The Yahi camp was found on the banks of Mill Creek and a battle took place. The result was most of the Indians were killed. This put an end to the scourage [sic] of the Mill Creek Yahis. However, *those that hid in Mill Creek Canyon* surfaced to kill cattle in April 1871. … The settlers followed the raiders to Kingsley Cave, where more than thirty trapped Indians were killed [Nopel 1959; emphasis added].

There have been few formal investigations or technical reports on refuge sites or other Contact-period sites in this region, although there are many articles, books, films, and other media focused on Ishi (e.g., Burrill 2011; Heizer and Kroeber 1979; Izzi 2014; Kroeber 1961; Pope 1920; Roberts 2012; Sackman 2010; Waterman 1917). One exception is Baumhoff's (1957) *Introduction to Yana Archaeology*, in which he discusses Contact-era materials from Payne's Cave on Antelope Creek in northern Tehama County. Other studies (unpublished) have identified glass projectile points and flakes, glass trade beads, metal nails, remains of domestic cattle, and other non-Native items (Ritter, personal communication, October 2016).

[2] Note that Indians (as with cattle) were "killed," but whites were "murdered."

PREHISTORIC AND ETHNOHISTORIC RESEARCH ISSUES
(by William Hildebrandt and Sharon Waechter)

The prehistoric sequences proposed for the project area (see the *Prehistoric Context* section, page 29) isolate the major trends exhibited by both the local and regional archaeological records. They also reveal a series of research issues or themes that range from interesting hypotheses in need of further evaluation, to major gaps in the archaeological record that need to be filled. Focusing on these research issues in the future will not only improve our knowledge of the past, but will also assist in determining the significance of archaeological sites based on their ability (or inability) to address them.

We discuss ten research issues, including: *Controlling Chronology*; *Identifying the First Colonizers of Northern California*; *Origins of Acorn-Salmon Economies in Northern California*; *Evolution of Milling Tools and Features*; *Inter-Regional Exchange*; *Rock Art*; *Historical Linguistics and Population Replacements*; *Pyrodiversity as a Land-Use Management Strategy*; *Native American Rock Features and the Spiritual World*; and *Native Responses to Contact*. This list is by no means exhaustive; rather, it focuses on the most current and significant topics within the larger region, and those which can be addressed with archaeological data sets that are known or likely to occur within the study area.

CONTROLLING CHRONOLOGY

In the most general terms, the issue of chronology is concerned with the temporal ordering of archaeological data in terms of either absolute or relative time, and in the refinement of local and regional cultural-historical sequences. As such, chronological concerns represent an essential prerequisite to the investigation of all "higher-order" research questions having to do with diachronic changes in human behavior. Two chronological topics were identified as especially significant to this study: refinement of regional projectile point sequences, and development of obsidian-hydration age-conversion equations for certain widely used geochemical glass types. Shell beads and a variety of other ornaments are also important tools for controlling chronology, but they are discussed under *Inter-Regional Exchange* (page 76).

Projectile Point Chronologies

As outlined in the *Prehistoric Context* section above, multiple projectile point sequences exist within the current study area. The Upper Klamath Zone has strong affinities with the northwest Great Basin (e.g., Clovis, Great Basin Stemmed, Humboldt Concave-base, Northern Side-notched, Elko, Rosegate, Desert Side-notched) and, to a lesser extent, influences from the Klamath Basin (e.g., Siskiyou Side-notched) and northern California (e.g., Tuluwat Barbed [formerly Gunther Barbed]; Figure 12). As a result, researchers working in this zone can rely to a large extent on the most recent syntheses provided by Hildebrandt and King (2002), and subsequent contributions from Hildebrandt and King (2012), Smith et al. (2013), Hockett et al. (2014), and Smith et al. (2014).

Moving to the Sacramento Valley, especially the upper Sacramento Valley in Tehama and Shasta counties, the projectile point sequence provided by Sundahl (1992; see also Basgall and Hildebrandt [1989]) remains quite viable (e.g., Clovis, Borax Lake Wide-stemmed, Squaw Creek Contracting-stemmed, Clikapudi Side- and Corner-notched, Tuluwat Barbed, and Desert Side-notched). The main problem with this sequence is the approximately 3,000-year void between Clovis and Borax Lake Wide-stemmed. This void also occurs in the North Coast and Klamath Mountains/North Coast Ranges zones and is discussed in more detail below (see *Identifying the First Colonizers of Northern California*, page 72).

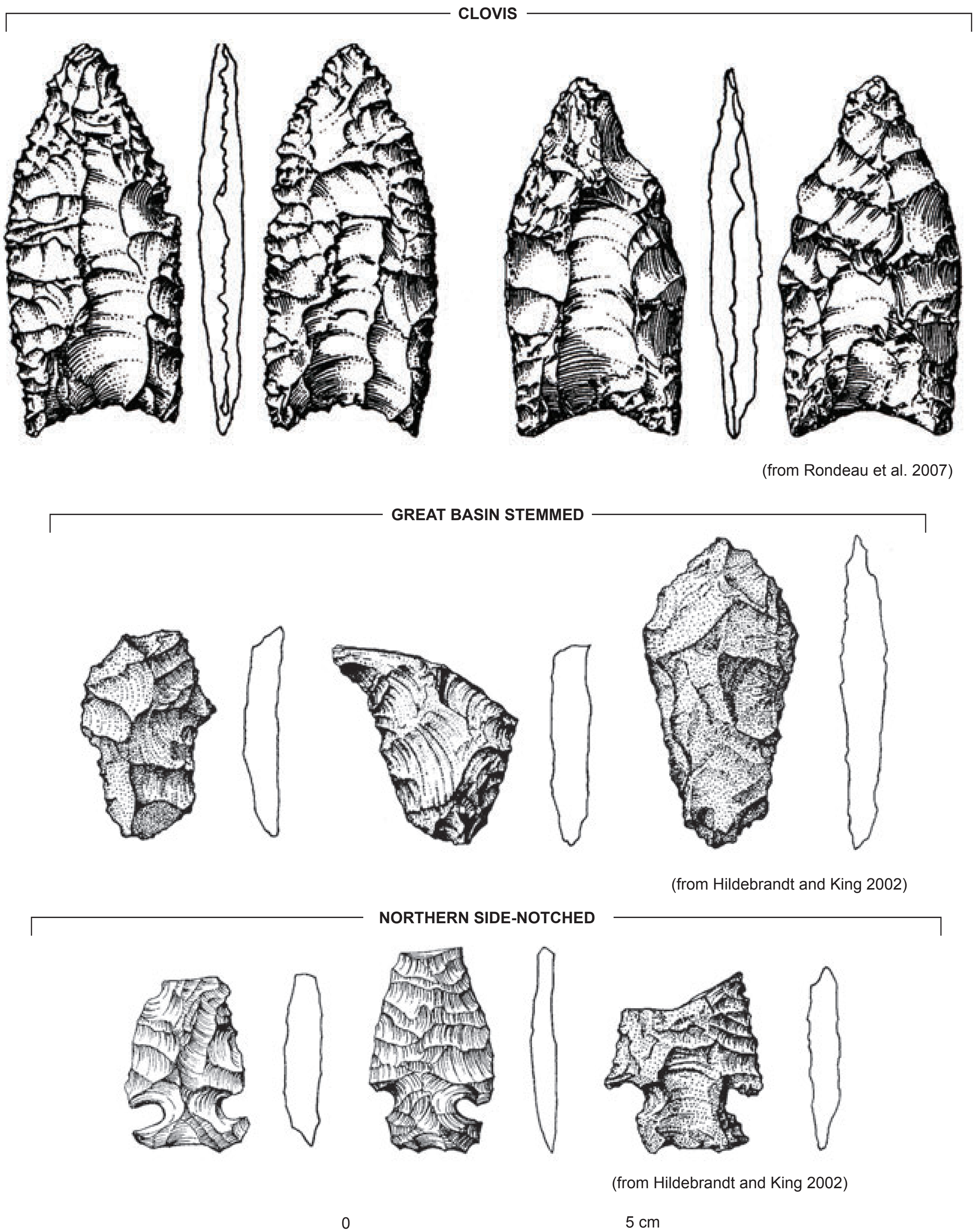

Figure 12. Regional Projectile Point Types (1 of 4).

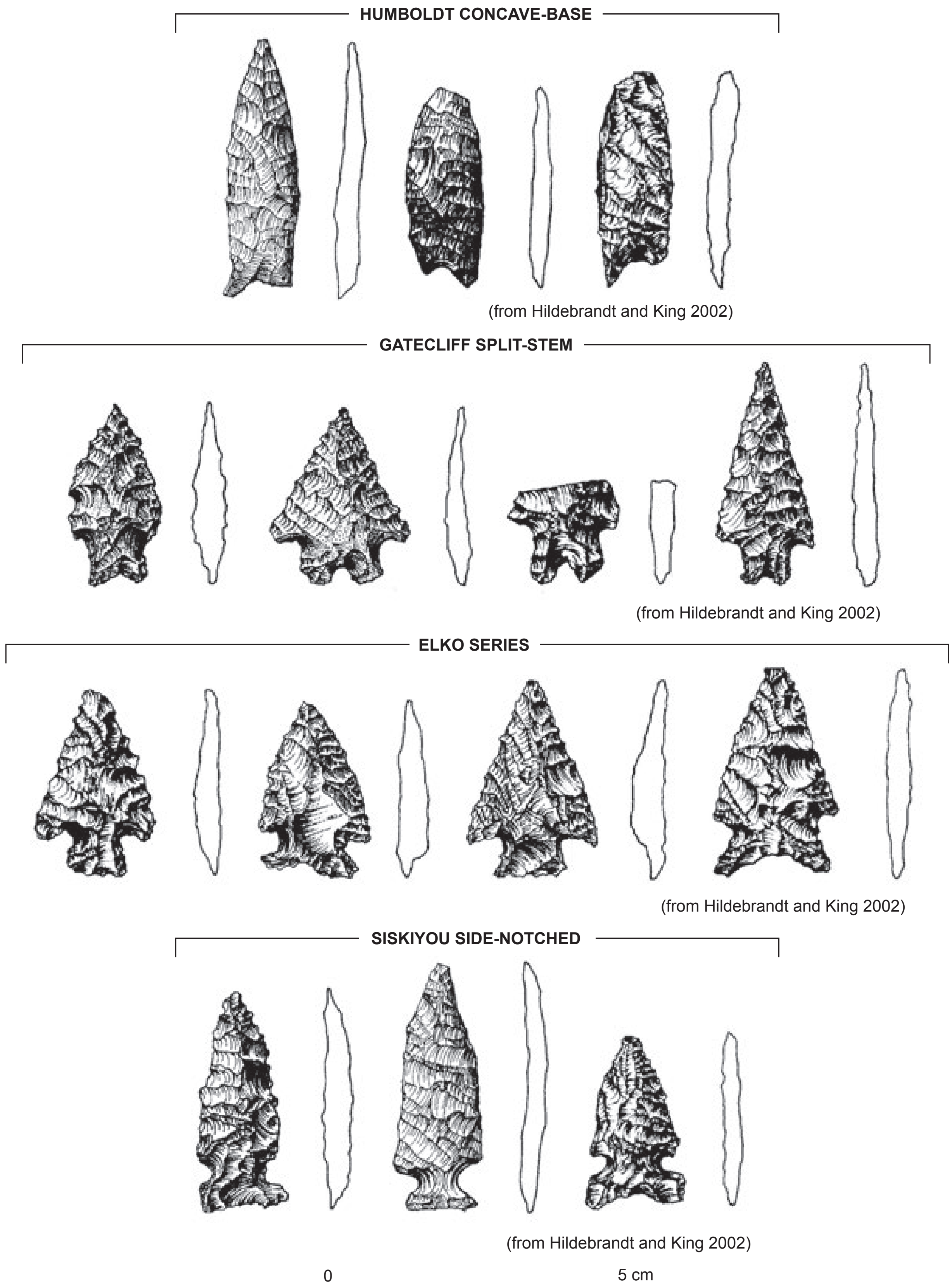

Figure 12. Regional Projectile Point Types (2 of 4).

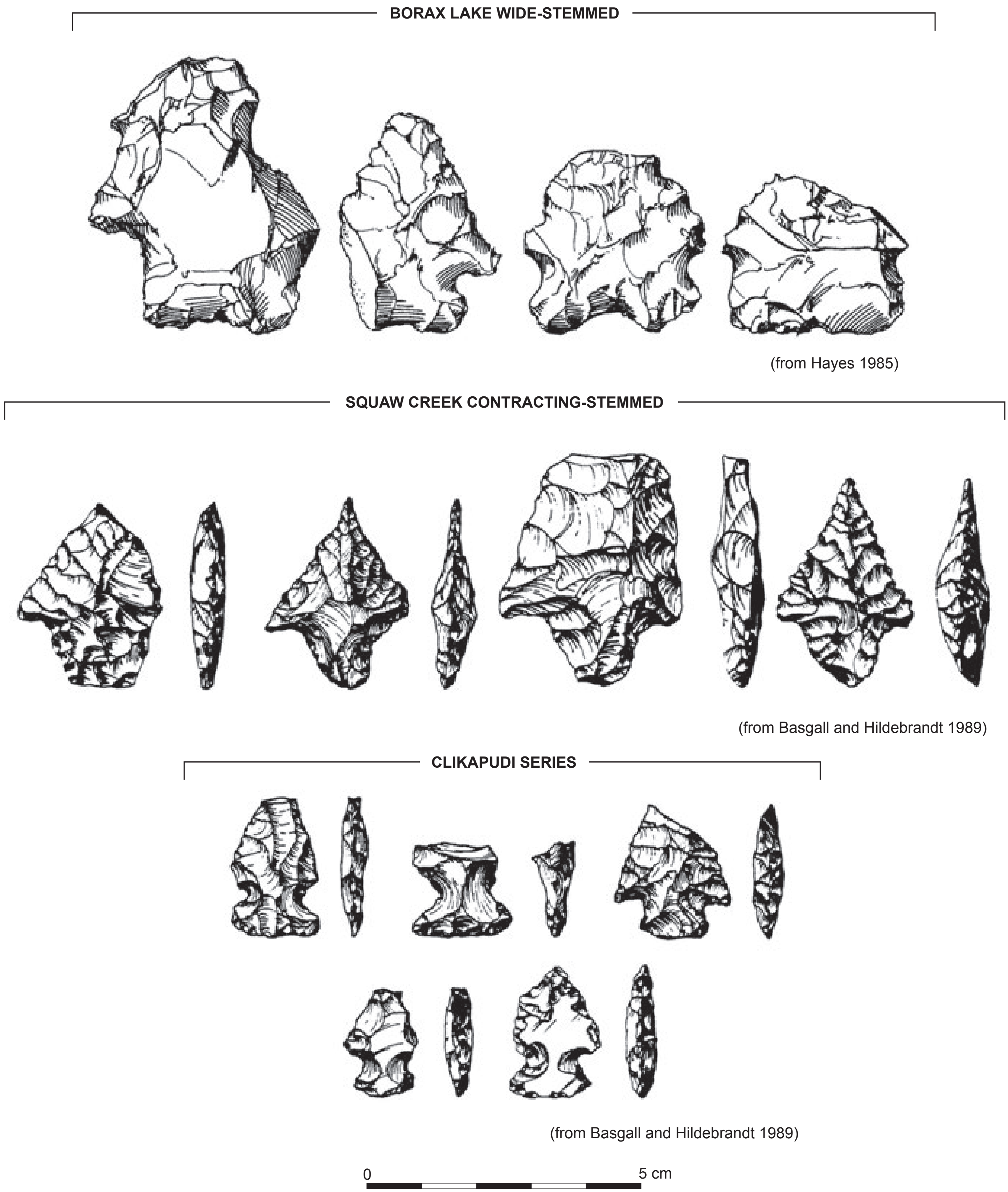

Figure 12. Regional Projectile Point Types (3 of 4).

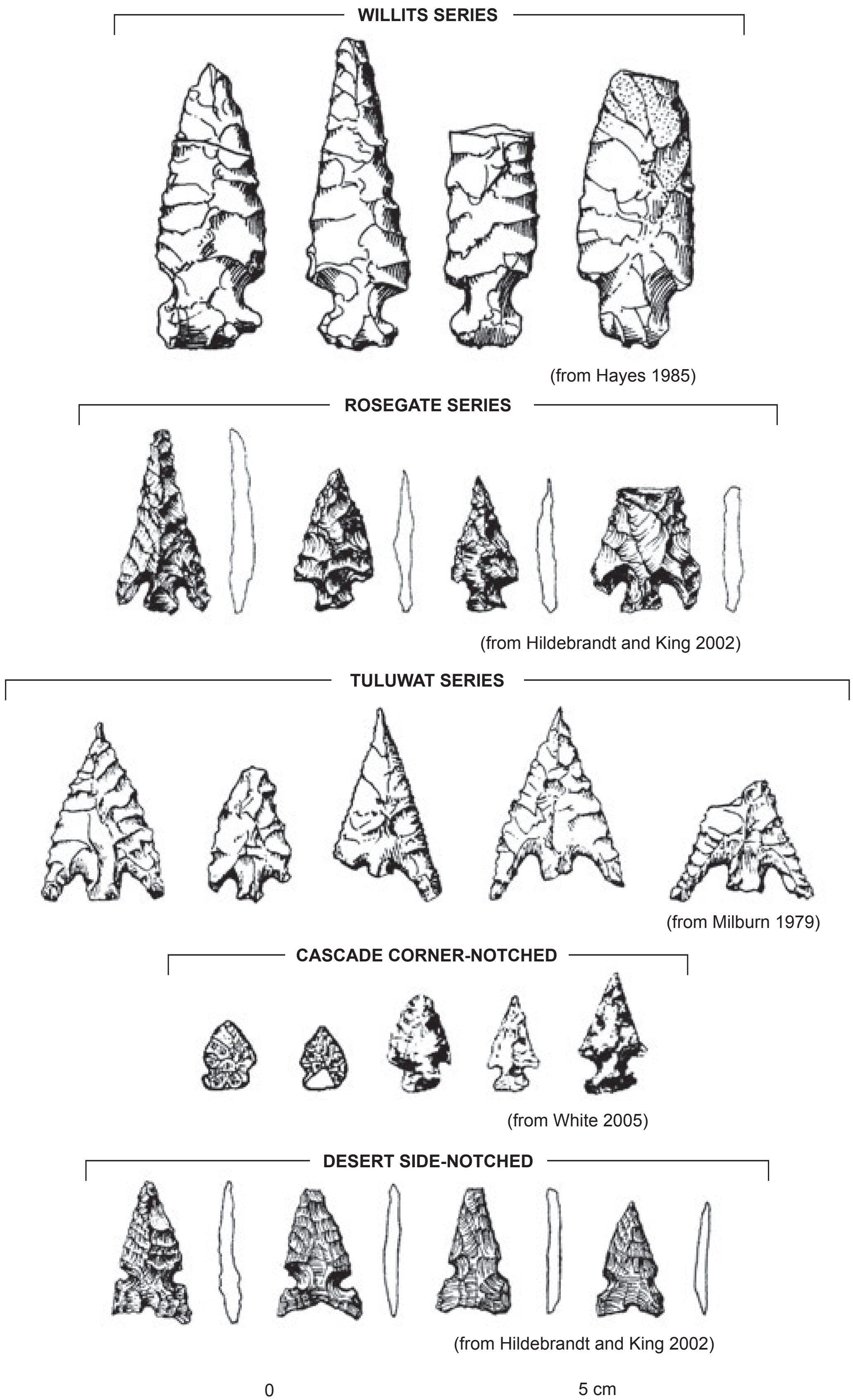

Figure 12. Regional Projectile Point Types (4 of 4).

The southernmost end of the North Coast and Klamath Mountains/North Coast Ranges zones, especially ancestral Northern Pomo lands, has strong cultural affinities with the Clear Lake Basin. As a result, the comprehensive projectile point sequence developed by White et al. (2002) should be applied to these locations.

Chronological patterns become much more problematic when moving north, as the availability of high-quality archaeological data is significantly reduced in many areas. Based on what we do know, it appears to begin with Clovis and Borax Lake Wide-stemmed (and the aforementioned gap between the two), but what comes next (i.e., between about 5700 and 3200 cal BP) remains an open question. The lack of a clear temporal indicator dating to this interval led Hildebrandt (2007:89) to extend the Borax Lake Wide-stemmed forward in time, hypothesizing that it may have been a holdover within this portion of the state. This was probably incorrect, as it seems more likely that this interval was filled by Squaw Creek Contracting-stemmed points (as in the upper Sacramento Valley); these points exist in the mountains of northwest California but have not yet been found in well-dated, single-component contexts.

It is also important to note that Jensen and Farber's (1982b) excavations at the confluence of the North Fork and Trinity rivers revealed a deeply buried deposit containing large side- and corner-notched points. They hypothesized that the component dated to between 5700 and 4500 cal BP, which would also fill this problematic time period.

Between about 4500–1500 cal BP things become clearer, with the interval filled with Mendocino-series projectile points (largely corner-notched dart points). These are quite similar to the Clikapudi series, and may differ in name only. After 1500 cal BP, the Tuluwat Barbed points take over. Unlike areas to the east, however, Desert Side-notched points do not make it out to the north coast.

There is not a clear projectile point chronology for the Sierra Nevada and adjacent lowlands. Early workers in the region (e.g., Kowta 1988; Markley 1980; Ritter 1968, 1970) have proposed local sequences along with probable projectile point types that go with each time period (see the *Prehistoric Context* section, page 29), but more recent researchers in the region have called into question the utility of this work. Delacorte and Basgall (2006:35), for example, state that the projectile point chronologies proposed for the Lake Oroville vicinity and surrounding areas "have not proven particularly useful…for establishing more than coarse-grained temporal controls" (see also Delacorte and Bethard 2015). They also note that "Although some of the points appear to conform to types or categories previously defined in other regions (Gunther, Desert Side-notched), it would be imprudent to assume that their cultural or temporal significance is necessarily the same" (Delacorte and Basgall 2006:72).

These chronologies do provide temporal ranges for five categories of points that are commonly found in the area. They include large corner-notched (5000–1300 BP), large stemmed points (5000–1300 BP), small corner-notched points (1150–450 BP), small stemmed points (that look like Tuluwat Barbed, 1150–450 BP), and small side-notched points (that look like Desert Side-notched, 450–120 BP). These temporal ranges are fully consistent with the small sample of projectile points recovered from White's (2003) excavations along the Colusa Reach.

Moving up to the Southern Cascade Foothills, the White et al. (2005) study in Lassen National Park simplifies a series of previous projectile point sequences where a multitude of types were proposed (e.g., Dugas 1995; Greenway 1982; Johnson and Theodoratus 1984a). The White et al. (2005) provisional chronology includes Wide-stemmed 10,500–7500 cal BP, Stemmed (5000–3500 cal BP), Contracting-stemmed (3500–2200 cal BP), Corner-notched (3500–1100 cal BP), Large Gunther/Tuluwat (1100–650 cal BP), Small Gunther/Tuluwat (650 BP – Contact), Cascade Corner-notched (650 cal BP – Contact), and Desert Side-notched points (350 cal BP – Contact).

Finally, Cleland's (1995) findings farther north in the Southern Cascade Foothills at Lake Britton appear to reflect influences from both California and the Great Basin. His earliest phase of occupation (8300–

5700 cal BP) is represented by what he calls Clikapudi Side-notched, but given their great age at this location (much older than in the upper Sacramento Valley where the type was first identified; Sundahl 1992), it seems they have a greater linkage with Northern Side-notched points and the Great Basin region (as well as with our Upper Klamath Zone). They continue through the 5700–4300 cal BP phase, during which Clikapudi Corner-notched points are added, which might also be thought of as Elko (note also the absence of contracting-stemmed points which are found in all the other California sequences). Both forms continue forward into the 4300–3200 cal BP phase, but the side-notched points drop out after 3200 cal BP. Finally, a clear California influence comes in sometime between 2000 and 900 cal BP with the Gunther/Tuluwat Barbed, and the Desert Side-notched arriving later.

Data Requirements

Projectile point sequences are always a work in progress, especially in regions lacking deeply stratified sites with strong associations between well-defined types and radiocarbon dates. It follows, therefore, that future researchers should recognize the data gaps outlined above (and others), and do their best to fill them. The best approach is to isolate single-component assemblages and their associated projectile points, and date them with radiocarbon. If obsidian artifacts are also found in these contexts, they need to be subjected to geochemical sourcing and hydration analysis, so that we can improve our ability to develop accurate hydration rates for the various obsidian sources that were used throughout northern California. Finally, it is also important to build on the source-specific hydration database that already exists for individual projectile point types, as these findings will also improve our ability to control time in the archaeological record.

Obsidian Hydration

Source-specific obsidian hydration has been a very important tool for developing almost all of the chronological sequences reviewed in *Prehistoric Context* (page 29). The primary obsidian sources used for this purpose in the current study area are from the Medicine Lake Highlands, Tuscan, Borax Lake, and Napa source groups. Medicine Lake Highlands (predominately the Grasshopper Flat/Lost Iron Wells/Red Switchback subgroup) and Tuscan are the most commonly found obsidians in the study area, especially in the more northerly areas. Basgall and Hildebrandt (1989) originally proposed hydration rates for both of these source groups based on associations with radiocarbon dates. These constructs have seen relatively good success when applied to a variety of locations, but subsequent improvements have been made by a variety of researchers, the most important being Bayham and Johnson (1990) and Whitaker et al. (2009).

Borax Lake and Napa obsidian tend to occur in the southernmost parts of the study area. The most useful hydration rate for Borax Lake obsidian has been proposed by White et al. (2002). Origer's (1982) rate for Napa has also seen long term utility, but Rosenthal's (2005) more recent contribution is an improvement on this original work.

Data Requirements

Similar to projectile points, obsidian hydration rates should always be considered an ongoing research concern. Whenever possible, it will be useful to develop additional radiocarbon-hydration pairings to improve the databases used to develop the existing rates and, if appropriate, propose a new, more accurate rate for a particular obsidian source. It will also be important to control for differences in local temperature, and how depth of deposit influences this variable. Rogers and Yohe (2016, and references therein) provide guidance in this regard.

IDENTIFYING THE FIRST COLONIZERS OF NORTHERN CALIFORNIA

Clovis projectile points are sparsely scattered across northern California, with a significant number falling with the current study area. They date to between 13,400 and 12,800 cal BP (Haynes et al. 2007), and have long thought to be the oldest evidence of humans in North America. More recently, however, findings from the Paisley Caves in southern Oregon show evidence for people dating back to between 14,500 and 14,100 cal BP, and this component appears to have a Great Basin Stemmed projectile point with it (Jenkin et al. 2012). These findings give support to the hypothesis forwarded by Beck and Jones (2010, 2012) that there were people here before Clovis, and that Clovis was an in-situ development that probably originated east of the Rocky Mountains.

Beck and Jones have further hypothesized that the pre-Clovis people may have entered North America via a coastal route, and moved into the interior along large drainage systems like the Columbia River. Although coastal data capable of testing this proposal are difficult to come by due to Holocene sea level rise, and pre-Clovis radiocarbon dates have yet to be found in these locations, some of the oldest radiocarbon dates from California do come from the Channel Islands (e.g., 12,900 cal BP; Johnson et al. 2000; Rosenthal and Fitzgerald 2012). It is also important to note that obsidian hydration data from the Clear Lake Basin, including the Borax Lake Site, provide hints of pre-Clovis activity (White 2013).

So if there was a pre-Clovis coastal entry into California, and this entry and dispersal could be marked by Great Basin Stemmed projectile points, it makes good sense to search for Great Basin Stemmed projectile points within the current study area and attempt to determine their actual age. Significant headway has already been made by Meyer (2013), as he has mapped out the geographic distribution of Clovis, Great Basin Stemmed, and Borax Lake Wide Stemmed points throughout northern California. What he found, however, is that almost all of the Great Basin Stemmed points are found in northeastern California associated with old pluvial lake basins (e.g., Butte Valley), while almost all Borax Lake Wide-stemmed points are found in the west, often in upland habitats.

The fact that Great Basin Stemmed points are essentially absent from northwestern California does not necessarily reject the hypothesis that pre-Clovis people came down the coast and later dispersed into the interior, but it certainly provides no support for the idea. It is also important to emphasize that the oldest post-Clovis temporal indicator in northwest California—the Borax Lake Wide-stemmed—has a maximum age of about 10,000 cal BP at Clear Lake (White 2013) and, perhaps, somewhat later farther north. This leaves at least a 3,000-year gap between Clovis and Borax Lake Wide-stemmed for which we have no temporal indicator in the current study area.

Data Requirements

So what fills the 3,000-year void between Clovis and Borax Wide stemmed points in the current study? Part of the early end of the gap could be filled with Clovis points, as Beck and Jones (2010, 2012) argue that the western versions of the type persisted longer than they did in their point of origin in the southern plains (see also Rondeau et al. 2007). With regard to the later end of the gap, it is possible that we are underestimating the age of Borax Lake Wide-stemmed points. The fact that many of them have large basal thinning flakes reminiscent of fluting could indicate a technological linkage between Clovis and Borax Lake Wide-stemmed, and a chronological one as well (White 2013).

If it is not the Borax lake Wide-stemmed, what could it be? One possibility is Cascade points. They are laurel-leaf-shaped (lacking stems), and either bipointed or with slightly rounded bases. These points are commonly found in the Pacific Northwest and on the Columbia Plateau (including southern Oregon; Ames et al. 1998; Connolly 1988), and may be chronologically equivalent to Great Basin Stemmed points found farther to the east. Because they lack obvious diagnostic features, they could exist in northern California assemblages and have yet-to-be-identified potential as late Pleistocene-early Holocene temporal indicators.

It follows, therefore, that future researchers should recognize this important gap in the northern California archaeological record, and search existing and newly discovered assemblages for potential artifact forms that can fill it. Clear descriptions of these artifacts should be made, and they should be dated with radiocarbon (if good associations exist) or source-specific obsidian hydration readings whenever possible.

ORIGINS OF ACORN-SALMON ECONOMIES IN NORTHERN CALIFORNIA

The ethnographic review (see *Ethnographic Context*, page 91) reveals that harvest and long-term storage of acorns and salmon were major economic pursuits among the majority of people living within the project area. A review of the archaeological record, however, shows a great deal of geographic variability in how and when this system developed. Tushingham (2009, 2013), for example, found that the intensified use of the two resources was not synchronous in northwest California. Instead, it appears that even though high levels of residential stability developed in the lowlands at around 3100 cal BP (as evidenced by house floors, a full complement of flaked, battered, and ground stone tools including mortars and pestles, and charred acorn remains; also see Hildebrandt 2007), fishing gear and salmon bone were not found in meaningful amounts, probably reflecting a more casual use of the fishery at the time. After 1500 cal BP, the frequency of both fishing gear and salmon bone increased significantly, and seemed to reflect the economic system observed during ethnographic times.

Tushingham (2009, 2013; see also Tushingham and Bettinger 2013) proposed that this time lag was best explained by the sequence of labor inputs required for the two resources. Acorns are a *back-loaded*, as the initial collection and storage is relatively cheap and easy, and only gets expensive later on when they need to be processed for consumption (i.e., ground, leached, and cooked, or coated with clay and baked). So when people began to experiment with higher levels of sedentism and storage, creating multiple, low-cost caches of acorns entailed minimal risk, because if they needed to be abandoned the loss would be minimal. Salmon, in contrast, is a *front-loaded* resource—they are more difficult to acquire than acorns and, more importantly, if they are to be stored for later use, they must be smoked, dried, and stowed right way. Once this expensive upfront work is completed, there is little effort required during the later consumption side of the process. But because of this upfront expense, salmon caches were much more valuable than acorn caches, and tended to tie people down in a much more significant way once this commitment was made.

Moving to the upper Sacramento Valley, Basgall and Hildebrandt (1989) originally proposed that the acorn-salmon, semi-sedentary economic system developed around 4000–3000 cal BP. But similar to Tushingham's findings, subsequent work by Hildebrandt et al. (2005) showed that the major riverine focus (with fish bone and fishing gear; see also Hildebrandt and Darcangelo 2008) did not develop until after 1500 cal BP. Also similar to Tushingham's findings, plant macrofossil remains from the Sacramento River Canyon (Wohlgemuth 1989) and farther south along the Sacramento River (Dreyer 1984; Hildebrandt and Kaijankoski 2011), all indicate that acorns were an important resource by at least 4300 cal BP.

The discontinuity between acorns and salmon seems to have occurred farther south along the Colusa Reach of the Sacramento River as well. During the phase dating between 4385 and 3460 cal BP, when acorn was important, White (2003:179) found that, "Cyprinids, perch, and sturgeon were probably harvested during spring and summer spawning runs. Intensive waterfowl and acorn harvest dominated the fall. Little use was made of salmonid fisheries." Even between 3222 and 2750 cal BP, "Fish harvest was unchanged from the previous phase [with] little attention to salmonids" (White 2003:179). Finally, by his 1180–970 cal BP phase, White (2003:180) found that, "For the first time, salmonids were a significant part of the local diet." These finding are consistent with those of Broughton (1988, 1994), and could reflect a rather late introduction of weirs to the Sacramento Valley economic system (White 2003).

A possible exception to this emerging pattern comes from the Lake Britton area, where there was a fundamental reorganization of settlement at about 3,000 years ago. Here, seasonality studies on mussel shells show that major winter villages were established close to the Pit River, and were accompanied by dense shell middens, elaborate fishing gear (e.g., toggle harpoon fragments), and greater quantities of fish remains, especially after 2000 cal BP (Cleland et al. 1995). Unfortunately, it is difficult to determine how much salmon contributed to this increase based on the data presented.

Data Requirements

This exciting research issue can be addressed on a variety of levels by future researchers. Following the lead of the studies outlined above, it will be important to (1) monitor settlement pattern changes vis-à-vis key riverine habitat types; (2) assess the composition of artifact assemblages and features, paying special attention to tools associated with fishing and acorn processing, and features linked to long term habitation and storage; and (3) carefully study subsistence remains, making sure that proper fine-grained sampling procedures and analytical methods are used, similar to those used by White (2003) and Hildebrandt and Darcangelo (2008). It may also be useful to consider how construction of weirs and intensive salmon storage relate to higher levels of sedentism, and once they are in place, how the increased sense of permanent space relates to the establishment of formal cemetery areas (Ritter 1968).

Finally, because salmon are keystone predators within a marine ecosystem composed of multiple trophic levels (many more than in terrestrial systems), and because carbon and nitrogen isotopes enrich when moving up through the food chain, humans relying on salmon will have a completely different isotopic signature than those who do not. These differences can be preserved in the osteological remains of these individuals, providing additional evidence for when this important economic transition occurred (Bartelink 2009; Greenwald and Burns 2016). There are obvious issues of cultural sensitivity regarding the analysis of human bone for these purposes, but it is our experience that Native American tribal representatives can be open to isotopic studies in certain select situations. The importance of archaeological human bone from well-controlled contexts for these kinds of studies should not be overlooked.

EVOLUTION OF MILLING TOOLS AND FEATURES

The prehistoric archaeological sequences outlined above (see the *Prehistoric Context* section, page 29) show a great deal of variability across both space and time in the kind of milling tools and features that were used. All areas show no milling gear during the late Pleistocene and earliest Holocene, followed by a dominant presence of handstones and millingslabs beginning about 8,000 years ago. Bowl mortars and pestles come on the scene quite early in the Upper Klamath zone, where they are present in the Basin Period (7800–5200 cal BP; Mack et al. 1991), especially in areas to the east well beyond the distribution of oak trees (O'Connell 1971). They were not regularly used until significantly later elsewhere, with sporadic evidence showing up in Sierra Nevada foothills and adjacent lowlands as part of the Mesilla Complex (4500–2500 cal BP), in the upper Sacramento Valley as part of the Whiskeytown Pattern (4500/3200–1600 cal BP), and in the southern part of the North Coast Ranges as part of the Mendocino Pattern (4500–1500 cal BP).

Bowl mortars and pestles were never used at all in the Southern Cascade Foothills, nor in the northern reaches of the North Coast and Klamath Mountains/North Coast Ranges. Instead, hopper (basket) mortars and distinctive pestles were used, and introduced throughout the study area after about 1500 cal BP, except in the Cascade Foothills where they are thought to be part of the Kingsley Complex (2580–1400 cal BP). They co-occur with bowl mortars and pestles south of Yana territory within both foothill and valley habitats, but largely replace bowl mortars and pestles elsewhere.

Bedrock mortars are only abundant in the Sierra Nevada south of Yana territory, and appeared during Sweetwater Complex times (1100–500 cal BP). It is also important to emphasize that the old handstone and millingslab technology was completely replaced within areas where large semi-sedentary populations took over (e.g., the Sacramento Valley and North Coast), but persisted in hinterland areas, especially in Yana territory and perhaps parts of the Klamath Mountains/North Coast Ranges where populations were smaller and used more mobile settlement systems.

Most researchers have long assumed that handstones and millingslabs were primarily used for small seeds, and mortars and pestles for acorns. This view was not based on archaeological findings, but on ethnographic analogy—ethnographers observed California groups processing acorns with mortars and pestles, and Great Basin peoples processing small seeds with handstones and millingslabs (the latter observation not being in California because the technology was so rare in the state during ethnohistoric times). But we are beginning to learn from the archaeological record that this assumption has not always been correct, especially deep in the prehistoric past.

As noted above, the first exception occurs in northeastern California, where bowl mortars and pestles were used between 7800 and 5200 cal BP over 100 kilometers from the nearest major stands of oak. Second, plant macrofossil data from early Holocene components at Clear Lake, Los Vaqueros (Contra Costa County), and the Sky Rocket site (Calaveras County) show that acorns were a primary resource at this early time, but associated with handstones and millingslabs, and not mortars and pestles (Hildebrandt 2007; Rosenthal et al. 2007). Third, although small seeds were used throughout prehistory, plant macrofossil data show that there was a major increase in their use late in time (Wohlgemuth 2004, 2010), including within the current study area (see *Prehistoric Context*, page 29), long after mortars and pestles became the dominant form of milling gear.

Based on these findings, it has been hypothesized that the different types of milling gear may have been more highly linked to settlement organization than to the type of resource being processed (Hildebrandt 2007; Rosenthal et al. 2007). People operating within a mobile system of settlement that could not carry their milling gear (e.g., Martis/Bucks Lake Complex, Borax Lake and Mendocino Patterns) would have used the more expedient handstone-millingslab technology, as it could be produced on demand with little investment. Mortars and pestles, in contrast, are more costly to produce, but more efficient at processing food resources, and work well among more sedentary peoples who could rely on the regular use of their tools. It should be emphasized, however, that increased sedentism was often linked to acorn storage, so the intensive use of acorns and mortar-pestle technology obviously went hand-in-hand in many places during the late Holocene (Basgall 1987).

If this proposal is correct, it would help explain why: (1) mortars and pestles were not accepted and used simultaneously throughout northern California, (2) mortars and pestles are not typically found in early Holocene contexts even though acorn plant macrofossils are, and (3) mobile peoples like the Yana continued to use handstones and millingslabs into the Late Period, even though they relied on acorns as a subsistence resource.

Explaining the origin and distribution of bedrock mortars is also an important research issue that may be related to social organization. According to Bettinger (2015), their emergence at about 1,000 years ago co-occurs with a transition from a centralized, group-level system of food sharing, to one focused more on the private, family-level of ownership. The explosion of bedrock mortars at this time, and their distribution (small clusters in multiple locations), could reflect family ownership of both the milling features and the adjacent oak groves. Their concentration in the Sierra Nevada could partially be due to the presence of high-quality granitic bedrock (not present elsewhere), as well as higher population densities and levels of territoriality, at least when compared to the Yana where they are only sporadically present.

Understanding the origin and distribution of hopper mortars and pestles is even less secure than the other forms of milling technology discussed above. Based on findings within the upper Sacramento Valley, the technology appears to have arrived with the Wintu (and the Shasta Pattern), and may have spread out from there. Even if this were the case, it has yet to be determined why it replaced bowl mortars and pestles in so many places, and why it did not in others, especially when moving into the southernmost margins of the study area.

Finally, tracing the origin and distribution of wooden mortars and pestles is also an important research issue, especially in parts of the Sacramento Valley where lithic resources were limited. In fact, some of the earliest evidence for mortar-pestle technology is evident in the lower Sacramento Valley and Delta, where wooden pestles (with their distinctive polish) have been found in components dating to 5800 cal BP (Rosenthal et al. 2007). Although the earliest well documented presence in northern California dates to Bidwell Complex (2500-1100 cal BP) times, it seems likely that older examples will eventually be found in residential sites along the Sacramento River.

Data Requirements

This is a major, multi-dimensional research issue that will take several years to solve. First, it will be important to refine our knowledge of the time-space distribution of the various types of milling technologies (including their environmental settings), and document the settlement systems they were operating within (e.g., where are they along the mobile-sedentary continuum?). Second, a continued focus on the collection and analysis of plant macrofossils will help in this endeavor. And finally, future researchers should explore the collection and analysis of starch grains, as this appears to be a promising avenue of research that has the potential to clarify the full range of resources with which these tools and features were used.

INTER-REGIONAL EXCHANGE

Obsidian and shell beads are the primary archaeological indicators of exchange in California, as both commodities are relatively common in most parts of the state (Hughes 2011; Hughes and Milliken 2007). This is clearly the case in the current study area where obsidian from the Medicine Lake Highlands, Tuscan, Borax Lake, and Napa (Figure 13) is widely distributed across a wide range of places and times. Shell beads are less common, but also provide important insights about past interaction spheres and, ultimately, the rise of monetary systems late in time (Bettinger 2015). The following discussion highlights some previous studies of exchange, and provides guidance on how researchers could improve on this work in the future.

We begin with obsidian, distinguishing between utilitarian and non-utilitarian uses, as they (and the exchange systems associated with them) followed differing pathways over time. We then turn to shell beads, which also appear to be associated with exchange systems that were disjunct from those linked to the utilitarian use of obsidian.

Utilitarian Obsidian

All of the prehistoric sequences reviewed by this study reveal major adaptive changes over time linked to a series of important economic developments, especially those associated with increased sedentism, population growth, territorial circumscription, and inter-regional exchange. Several researchers in the past have hypothesized that inter-group exchange should have reached maximal proportions late in time (after 1000 cal BP) largely due to increased population density and less residential and logistical mobility. As local populations became increasingly restricted to smaller and smaller territories (see the tribelets described in the *Ethnographic Context* section, page 91), it was thought that non-local resources located significant distances from those territories were primarily obtained through trade rather than direct access by logistically organized forays, which was more likely earlier in time when population density and territoriality were significantly lower. Given the need to obtain both food and non-food resources from non-local areas, the movement of exotic obsidian was thought to be an important archaeological indictor of exchange, both for the obsidian itself and as a proxy for other commodities that do not preserve in the archaeological record.

Although this hypothesis makes good sense, and finds some support in the ethnographic record, it has not been borne out by archaeological findings throughout most of California (Gilreath and Hildebrandt 2011; King et al. 2011), including those from the current study area. A study of Medicine Lake

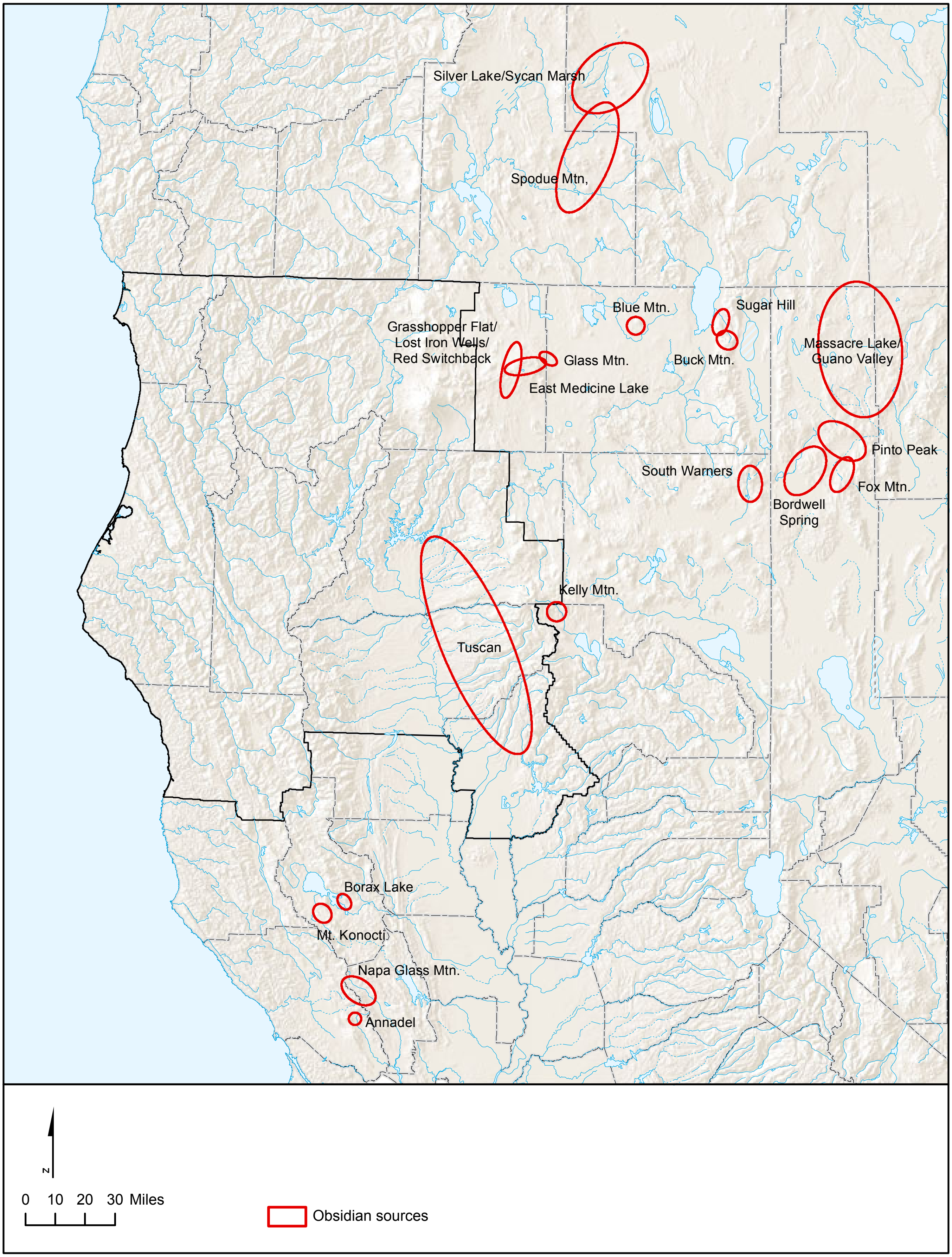

Figure 13. Regional Obsidian Sources.

Highlands obsidian profiles by Gilreath et al. (1995; see also Hildebrandt and Mikkelsen 1994), for example, found that the production and exchange of this material, with a few exceptions, peaked between about 3000 and 1000 cal BP, followed by a steep decline in this activity thereafter. This peak and decline was also found by Hildebrandt et al. (2005) in the northern Sacramento Valley, where they also observed that the post-1000 cal BP decline in Medicine Lake Highlands obsidian was replaced by the more local, but lower quality material from the Tuscan obsidian sources (see also Hamusek-McGann 1993; Jensen 1994; Sundahl 1982; Vaughan 1992; Vaughan and Sundahl 2002), as well as by local cryptocrystalline silicate stone (CCS) and metavolcanic stone at archaeological sites in the western foothills (Bevill and Nilsson 1996; Darcangelo et al. 2015).

Moving south, a similar peak in production has been observed within the Borax Lake obsidian zone, but it appears to have started earlier, ranging between about 5000 and 1500 cal BP (White et al. 2002). Excavations at Hamilton City along the Sacramento River, at the southern end of the current study area, show a peak use in both Borax Lake and Medicine Lake Highlands obsidian between about 3000 and 1000 cal BP, and the same decline and replacement with Tuscan obsidian thereafter (Hildebrandt and Kaijankoski 2011). Delacorte and Basgall's (2006) work near Lake Oroville shows a significant presence of Borax Lake and Napa obsidian between about 5500 and 2300, the familiar peak in Medicine Lake Highlands obsidian between 2300 and 1200 cal BP, and the collapse thereafter, being replaced by more localized basalts, various CCS material, and Sierran obsidians.

The reasons for the decline of obsidian production and exchange at the big obsidian quarry complexes are poorly understood. Most researchers working elsewhere in the state think it resulted from two main factors: social and economic disintegration stemming from the MCA (Jones et al. 1999; Moratto 2011), and the reduced need for toolstone with the introduction of the bow and arrow (Gilreath and Hildebrandt 1997, 2011; Hildebrandt and McGuire 2002; Delacorte 2004). With regard to the MCA, Moratto (2011) argues that drought conditions significantly lowered the availability of useful plants and animals, reducing overall carrying capacity. This economic stress increased competition for declining resources, creating greater intergroup enmity and eroding social contexts that previously favored exchange. Simultaneous to the MCA, bow-and-arrow technology took hold throughout California and, in many cases, was accompanied by a change from biface-reduction technology (which requires a great deal of toolstone), to a simpler core-flake technology, where many tool types (including arrow points) were much smaller than before and could be made from flake blanks. Not only were lesser quantities of material required, making local toolstone more viable, a significant amount of material could be scavenged from older archaeological sites, effectively expanding the distribution of quarries.

Data Requirements

Despite the strong patterning outlined above, our knowledge of the dynamic nature of prehistoric obsidian exchange is far from complete, and the reasons why it changed over time and space are even less well understood. As a result, future researchers should continue to conduct obsidian source and hydration studies whenever possible, expanding on the existing database and improving the production profiles at the quarries and, more importantly, widening the geographic and temporal distribution of consumption activity in the study area. Obsidian hydration data alone, however, is not good enough to address this issue, because the ratio of obsidian to local non-obsidian toolstone is crucial; this means it is necessary to identify single-component assemblages (i.e., to determine what these ratios are for each time period within each localized study area).

Determining the effects of the MCA on local adaptations is a more difficult task, requiring the analysis of large-scale settlement pattern data, and it is beyond the scope of this discussion. But testing the hypothesized shift in flaked stone technology associated with the introduction of the bow and arrow is much more approachable, as documenting a shift from biface-reduction to core-flake strategies is a relatively straightforward task for those trained in flaked stone analysis. The combination of source-specific obsidian hydration profiles, ratios of non-local obsidian to local toolstones from single-component areas, and technological analyses of single-component flaked stone assemblages, when compared to the larger regional database, will make great strides toward expanding our knowledge of inter-regional exchange deep into the prehistoric past.

Non-Utilitarian Obsidian

The current study area is unique when it comes to this topic because there are two documented exchange systems focused on non-utilitarian obsidian artifacts that are not known elsewhere in California. They include ceremonial blades imported to northwest California (mostly into Wiyot, Yurok, Hupa, Karok, and Tolowa territory), and the practice of placing burials on beds of obsidian debitage, found mostly in Mattole/Bear River, Sinkyone, Wintu, and Nomlaki territory. Unlike the exchange of obsidian for utilitarian purposes, both of these systems seem to have occurred quite late in time, probably post-dating 500 cal BP.

Large ceremonial obsidian blades or bifaces, which range between 25 and 50 centimeters long, were used as part of the White Deerskin Dance (Kroeber 1925). They also represented important markers of wealth and social rank, which is clearly evidenced by their distribution across burial populations in the region (Hildebrandt and Levulett 2002). Hughes' (1978) analysis of the geochemical source of the blades and other, everyday utilitarian artifacts like projectile points, found that the latter items were from the closest Medicine Lake Highlands quarries, while the blades were almost always from more distant sources, including ones that included red obsidian (e.g., Warner Mountains, Vya, and Glass Buttes). He concluded that the exotic nature and more distant origin of the blades probably gave them added value beyond their large size and exquisite manufacture.

Burying people on beds of obsidian debitage is documented farther south along the coast, especially within the King Range. The obsidian in these cases originated from the Medicine Lake Highlands and, in one example, included a bed of about 4,500 pieces of debitage produced by rapid hard hammer percussion. Based on obsidian hydration readings and associated temporally diagnostic artifacts (including clam disk beads), this burial practice appears to date within the last 300 years. Although the practice is not widely known, Levulett and Hildebrandt (1987) note that it has been found in Tehama County along Blue Tent Creek (Treganza 1954).

Data Requirements

Although both of these examples are concentrated on the coast, ceremonial blades and obsidian-bed burials are also sometimes found in the interior as well. It follows, therefore, that future researchers should map their respective time-space distributions, with the goal of discovering their origin and possible ethnic connections, especially given that the blades seem to be associated with the core northwest California groups, and that the obsidian beds seem more linked to the southern Athapaskan area. It also goes without saying that obsidian source analyses should be conducted whenever possible.

Shell Beads and Other Ornaments

Shell beads were exchanged in California and the Great Basin for a long time. Small numbers of *Olivella* (recently renamed *Callianax*) spire-lopped beads were moved from the coast to the interior southern California deserts about 10,000 years ago (Fitzgerald et al. 2005), while the Middle Holocene (roughly 5500–4500 cal BP) saw the movement of a limited number of grooved rectangle beads moving from southern California up the coast to the San Francisco Bay Area, as well as into the northwestern Great Basin, not that far from the northeastern margins of the current study area (Vellanoweth at al. 2014). Soon thereafter (about 5000 cal BP), the production and exchange of shell beads increased, with rectangular *Olivella* beads regularly placed in burials throughout the greater San Francisco Bay area, lower Sacramento Valley, and the Sacramento-San Joaquin Delta, but south of the current study area. The average number of beads per burial (represented by a variety of *Olivella* wall beads) remained the same until about 1,000 years ago when the frequency quadrupled and remained relatively high thereafter (Rosenthal 2011).

Although Rosenthal's (2011) study does not extend into the current study area (it essentially ends in Colusa and Sutter counties), a comparison of his data with archaeological assemblages from these more northerly areas (including the study area) shows that they lie outside of the major *Olivella* bead trade network. South of our study area it is not uncommon to have tens of thousands of *Olivella* beads at a single site, and thousands of specimens with a single individual (Rosenthal 2011). Archaeological excavations within or near the study area in the Sacramento Valley also include *Olivella* beads, but only a handful compared to areas to the south (e.g., Hildebrandt and Kaijankoski 2011; White 2003). This is also the case when moving up into the adjacent foothills where Ritter (1968:148) states that "The number of beads per site seems to increase with a decreased distance to the valley" (see also Delacorte and Basgall 2006).

Everything changes with the introduction of clam shell disk beads at about 450 cal BP. They become quite common in a variety of locations in the study area, dominating assemblages in the foothills (e.g., Delacorte and Basgall 2006; Ritter 1968), up the valley into the Redding area (e.g., Hildebrandt and Darcangelo 2008; Meighan 1955; Sundahl 1982), out to the north coast (Levulett and Hildebrandt 1987), and in the North Coast Ranges (Fredrickson 1984; Meighan 1955). The significance of these beads is noted in the ethnographic record, including their value as a medium of exchange which, consistent with the original hypotheses outlined at the beginning of this discussion, appear to have been used as a way to redistribute food in many parts of the state (Rosenthal 2011).

Finally, it is important to note that several other bead and ornament types became important late in time throughout much of northern California. These include abalone ornaments, *Dentalium*, *Glycymeris* and limpet shell beads, pine nut beads, *Vibunum* seed beads, and steatite and magnesite beads. Their distribution in the archaeological record is best summarized by the following references (Dotta and Hullinger 1964; Farris 1982; Elsasser and Heizer 1964; King 1978; Loud 1918; Levulett and Hildebrandt 1987; Milburn et al. 1979; Ritter 1968; Smith and Weyouth 1952; Sundahl 1982; Treganza 1954, 1963; Treganza and Heicksen 1960; Woolfenden 1970).

Data Requirements

There are many useful avenues of research to increase our knowledge and understanding of prehistoric bead exchange within the study area. First, it is important to classify them correctly, as subtle differences in their morphology can have significant implications for their age and place of origin. Classification of the beads should rely on Bennyhoff and Hughes (1987), supplemented by Milliken and Schwitalla (2009), and their ages derived from Groza et al. (2011). It is also important to obtain direct radiocarbon dates on a sample of beads whenever possible, to further our knowledge of their age in geographic locations for which we lack such information, especially in outlying places where there may have been a time lag in their arrival. And, finally, it is important to quantify their presence, and compare these data to other regional assemblages, to better understand their changing role in local economic systems over time.

ROCK ART

Three basic kinds of rock art exist in or near the study area: petroglyphs (art pecked, incised or abraded into the stone); pictographs (art painted on the rock); and portable art (small pieces of stone that are typically incised or painted). Pitted petroglyphs are relatively common in northern California, widely distributed in the northern Sierra Nevada, southern Cascades and the North Coast Ranges. They are variously known as *cupule rocks* or, when associated with lines or grooves carved into the rock, *pit-and-groove* petroglyphs. Three sub-groupings (also called styles) have been defined by Payen (1962): (1) pitted boulders (simply cupules); (2) pit-and-groove (two pits connected by a groove or a pit terminated by a groove, or unconnected pits and grooves); and (3) complex pit-and-groove (extensive compositions [sometimes hundreds of cupules] and elaborate grooves). The latter sometimes has elliptical to rounded grooves bifurcated with a line, perhaps representing vulvas (see also Gilreath 2007).

According to Gary and McLear-Gary (1988), nearly half of the of the more than 50 petroglyph sites recorded in Mendocino County include only cupules. They are usually located near water, and most researchers think they are associated with weather control and fishing (Kroeber and Gifford 1949; Heizer 1953; Kroeber and Barrett 1960; Nissen and Ritter 1986). This form of art is thought to have originated deep in antiquity, perhaps starting around 7800 cal BP (Baumhoff 1980; Heizer and Baumhoff 1962). It seems to have persisted into ethnographic times in a limited number of places, especially among Hokan speaking groups and their neighbors (e.g., Pomo [known as baby rocks] and Karok [known as rain rocks]) as part of their world-renewal ceremonies (Nissen and Ritter 1986). They are also thought to be footprints of the first people by contemporary Achomawi tribal members, and places of great power that were used to initiate spirit quests into the mountains (Benson and Buckskin 1992).

Based on these rough patterns, Baumhoff (1980) hypothesized that an ancient Hokan cultural substrate once covered much of northern California, and that the pitted petroglyphs may have been part of this cultural pattern. It was further hypothesized that the rock art tradition was largely replaced in the territories of newly arriving ethnolinguistic groups (e.g., peoples speaking Penutian languages), perhaps resulting in their continued production among Hokan speakers and an absence among other, more recent peoples. It was also expected that this would not be a one-to-one relationship, due to the probable borrowing of traits among certain groups.

More recent work in the North Coast Ranges by Gary and McLear-Gary (1988) and Foster and Foster (2002) indicates that pit-and-groove may not be the oldest form art in the region. Based on the superposition and differential patination of a variety of key motifs, it appears that, in addition to pit-and-groove, some of the oldest elements include large ovals (also known as Pecked Curvilinear Nucleates), concentric circles, and grooved lines. These are followed by abstract curvilinear elements, and then by fine-scratched lines, and ultimately deep incised lines.

Pit-and-groove rock art also occurs across the Sacramento Valley in the Sierra Nevada Zone, with concentrations in the Butte County foothill areas (Heizer and Clewlow 1973; Payen 1962). The area also includes a presumably later series of abstract curvilinear elements, also known as Valley-Sierra Abstract. Finally, incised lines are also found in this area and, as in the North Coast Ranges, probably tend to post-date the other forms (Payen 1962). A fine-grained analysis of these elements by Ritter and Parkman (1992) indicates that some (especially the circular motifs) could mark the arrival of the Konkow to the area.

Another important rock art class well known in the northern Sierra Nevada is High Sierra Abstract-Representational (also known as Style 7; Payen 1962). Although its northern distribution appears to fall just south and east of the current study area, its distinctive character is worth noting because it looks to be an ancient cultural indicator. Perhaps its most distinguishing attribute is the relatively high frequency of rough anthropomorphs and animal tracks, especially bear paws. Despite being linked to the Great Basin by some researchers (Elsasser 1960; Kowta 1988; Whitley 2000), its unique character and restricted distribution in the northern Sierra, as well as its strong geographical overlap with Martis Complex sites, appear instead to be a unique, ancient California phenomenon (Foster et al. 2005; Gortner 1984; Payen 1966).

Several important rock art sites also exist up the valley not far from Redding. Van Tilburg et al. (1987) and Millett and Ritter (2013) document a concentration of panels known as the Church Rock site (SHA-39), composed of many cupules, grooved elements, and a more limited number of representational motifs including animal prints. The presence of representational figures has also been found at other nearby sites, including SHA-217, where humans, artiodactls, and birds are found, as well as foot prints of birds and bears (Heizer and Clewlow 1973). Although the age of these elements is difficult to determine, it is certainly a distinctive, and a highly localized cultural pattern.

A completely different kind of rock art was produced farther north, just east of our Upper Klamath Zone within Klamath-Modoc territory; it includes both petroglyphs and pictographs (Ritter 1998; Whitley 2000). Whitley associates some of it with the Columbia Plateau and states that the:

> Plateau Tradition rock art is characterized by simple stick-figure humans, block-bodied animals, rayed circles or arcs, concentric circles, and 'tally' marks (or sets of short parallel lines), along with a variety of other, but less common geometric designs. The art includes engravings, usually pecked, and paintings, which tend to be thick lined and crudely rendered (Whitley 2000:68).

Much of this art is concentrated within Lava Beds National Monument, adjacent to Tule Lake, and at Petroglyph Point, where there are several petroglyph panels located high on the cliff faces associated with wave-cut notches that would have been accessible (by boat) only deep in the past. The pictographs, in contrast, are found in more accessible areas, indicating that they are significantly younger in age (Gilreath 2007; Lee et al. 1988).

Three additional, and somewhat unusual, rock art forms are worthy of comment. The first, highly isolated finding, is a series of engraved stones incorporated among the pavers along the margins of a Hupa redwood slab house. They included various concentric arches, pits, and small grooves. One had 13 groves that may have been re-grooved according to lunar periods and, hence, they are known as Hupa Calendar Stones (Goldschmidt 1940).

The second is an isolated petroglyph fragment found in the Yolla Bolly Mountains. It is unusual because it was made on non-local stone and had abstract curvilinear and rectilinear elements pecked into the stone, reminiscent of Great Basin styles and quite different from the local incising and grooving techniques (Meacham 1984).

The third includes a limited number of pictographs found near Shingletown, including a polychrome painting of a face. This unusual element is not found in California but is common in the Pacific Northwest, perhaps reflecting visits by Native peoples traveling south with the large Hudson's Bay Co. trapping expeditions, or by individuals associated with the Ghost Dance, which brought people together from many faraway places (Ritter 1986).

Finally, a major concentration of portable rock art is located within the current study area, centered in the Sacramento River Canyon and adjacent lands. It is composed of small tablets that have been incised, often producing parallel bands in-filled with a series of straight lines and Xs, or more complex cross-hatching using triangular or diamond shapes. It appears to be one of the largest (1,500 have been found) and well-dated (5700–3200 cal BP) assemblages in North America and is thought to be associated with a contested boundary area; wearers/owners of the tablets would be afforded "stylistic reinforcement of group affiliation" and differentiation from their neighbors (McGuire 1989:D43).

Data Requirements

The most obvious data requirement for the study of rock art is to continue finding it, and carefully record it. Once the panels have been found, each element should be classified using the most up-to-date methods developed in the local area. These data should be quantified and presented in a tabular fashion (i.e., provide counts of each element or motif type per site). Non-quantitative, presence-absence data are not sufficient to differentiate rock art complexes from each other and adjoining areas, nor are they sufficient for isolating change over time.

Observations concerning superpositioning and differential weathering should also be made, as these data may help isolate any chronological change in the mix of elements produced, and help place the overall complex in time. Chronological ordering can also be accomplished by analyzing the age of the associated archaeological record. With regard to the latter, Foster et al. (2005) and Gortner (1984) have made good headway on this topic within the northern Sierra by cross-tabulating projectile point types against rock art elements. Gilreath and Hildebrandt's (2008) study of the relationship between land-use chronology and changing rock art styles in the Coso region might also provide a good model for future researchers in the current study area.

HISTORICAL LINGUISTICS AND POPULATION REPLACEMENTS

Due to the high level of linguistic diversity within the study area, and significant differences in the ages of the languages that were spoken, it is clear that new ethnolinguistic populations entered the region on multiple occasions. This situation has led historical linguists to work with archaeologists in the attempt to identify these hypothetical population movements in the archaeological record. While this is an interesting and worthy task, it is not an easy one because there is no guarantee that ethnicity, language, and material culture will co-vary with one another (Hughes 1992). Despite these issues, multiple models have been proposed to elucidate the linguistic prehistory of northern California. For the purpose of this study, we highlight three of them: the arrival and expansion of the Wintu, the arrival of Algic and Athapaskan populations in northwest California, and the arrival of Maiduan speakers in the northern Sierra.

Arrival of the Wintu

The Wintuan family includes Wintu, Nomlaki, and Patwin. Analysis of historical linguistic data by Whistler (1977) indicates that proto-Wintun split apart between about 3,000 and 2,500 years ago in Oregon, while Wintu/Nomlaki became a discrete branch about 500 years later. The Patwin probably migrated down the Sacramento Valley first, and ultimately pushed up against Miwok territory in the Suisun/Carquinez area by about 1500 cal BP. The Wintu/Nomlaki moved south out of Oregon next, settled the northern valley, divided into two distinct languages, and then spread up the various tributaries of the Sacramento and upper Trinity rivers. Whistler identified Oregon as the homeland of these languages, as he was able to identify several proto-Wintun words for plants and animals that live in Oregon, and also found that they borrowed new words from an existing population in California (the Miwok) for species in the Sacramento Valley area that were absent in Oregon (see also Golla 2011).

The estimated arrival of the Wintu fits fairly well with the emergence of the Shasta Pattern at 1500 cal BP, which represents a radical change in the archaeological record that one would expect with the arrival of a new people. An Oregon homeland is also consistent with the introduction of advanced salmon fishing technologies and large-scale riverine villages, as both of these phenomena were in existence at an earlier date in the northwest than in California (Moratto 1984). The displacement or assimilation of Chimariko speakers in the Trinity drainage, and Shasta speakers on the upper McCloud, indicates that the Wintu expansion was ongoing at the time of contact as well (Golla 2011). Expansion into Yana territory has also been documented within the archaeological record by Sundahl and Clewett (1991).

Arrival of Algic and Athapaskan Populations in Northwest California

The limited time depth of the coastal archaeological record in northwest California (see the *Prehistoric Context* section, page 29), and the high degree of linguistic diversity that characterizes the area, has also sparked interest of historical linguists, including Whistler (1979). The earliest people in the area were thought to be ancestral Karok (of the Hokan stock), who had an interior subsistence focus. About 1,000 years ago, the Wiyot and soon thereafter the Yurok (both speakers of Algic languages) entered the area. It appears that they originated from the Columbia Plateau, judging from similar cultural traits found in both areas (see also Fredrickson 1984; Moratto 1984: 565). The Wiyot occupied the previously underused coast and estuary habitats of Humboldt Bay, while the Yurok occupied the lower Klamath and adjacent coastal lands. These intrusions were made possible by their superior technological abilities to fish, build boats, and store salmon. Finally, Athapskan peoples are thought to have entered the region about 700 cal BP. Except for the Hupa, these groups occupied mainly peripheral areas, bringing with them knowledge of forest and riverine environments, as well as the toggle harpoon and sinew-backed bow (Fredrickson 1984).

This model has been challenged by Gmoser (1993) who argued that the riverine-coastal interface had one of the highest resource potentials in the region and therefore should have been occupied for a long time (see also Codding and Jones 2013). He further suggested that the Wiyot and Yurok might be linguistic isolates, and may have actually lived in the area much longer than originally thought. This position, however, has not been adopted by more recent linguistic studies (e.g., Golla 2011).

Although Tushingham (2009, 2013) has shown that people began to increase their settlement of riverine areas at about 3100 cal BP, she found that the intensive use of salmon (including storage) and coastal resources (including oceangoing canoes) did not happen until sometime after 1500 cal BP, and that these changes were so abrupt and significant that they probably reflected population intrusions similar to these hypothesized by Whistler (1979). Moreover, the higher settlement priority given to interior riverine habitats by Whistler's (1979) model is largely matched by the distribution of Yurok settlements at historic contact, where there were more villages along interior riverine settings than along the coast (Pilling 1978), and higher population densities estimated for the interior as well (Baumhoff's 1963). Finally, it is interesting to note that Kroeber (1939:28) also concluded, based on the spatial distribution of cultural traits, that the people of northwest California were "originally a river or river-mouth culture, later a beach culture, and only finally and in part a seagoing one."

Finally, the Late Period arrival of people from northern latitudes may also be reflected by changes in the use of certain key obsidian sources over time. Whitaker et al. (2008) found that prior to 1500 cal BP most obsidian in southern Humboldt and northern Mendocino counties originated from the south, largely from the Borax Lake source. After 1500 cal BP, presumably after the arrival of the Athapaskan speakers from the north, almost all obsidian also came from the north, mostly from the Medicine Lake Highlands. They concluded from these findings that the shift in conveyance patterns was probably due to stronger social ties among the new arrivals to their linguistic relatives to the north.

Arrival of Maiduan Speakers in the Northern Sierra Nevada

Most researchers agree that ancestral Maiduan-speakers originated in the northwestern Great Basin (Golla 2011; Moratto 1984; Whistler 1978). The minimal linguistic divergence among Maiduan languages probably reflects a single, relatively late entry into California. Kowta (1988) thinks they arrived about 1500 cal BP and settled to the south along the foothills or valley edge in what is now Nisenan territory. Later, they expanded north into the Oroville area, assimilating Hokan-speakers who are reflected archaeologically by the Mesilla (4500–2500 cal BP) and Bidwell (2500–1100 cal BP) complexes. These Proto-Nisenan also grew in number and began to enlarge into what is now Konkow territory in Butte County, introducing various traits ultimately derived from neighboring groups from the south and forming the Sweetwater Complex (1100–500 cal BP), and representing the earliest Maiduans in Konkow territory. Finally, but still during Sweetwater times, the Proto-Konkow population expanded into Plumas County to establish Maidu-speakers there, as well as into the Sacramento Valley where numerous settlements of the Chico Maidu (Mechoopda) were established.

Golla (2011:251) has a different view of where the first peoples settled, stating "That three of the four historic Maiduan languages were located in the northern third of Maiduan territory indicates a southward spread, probably from a Proto-Maiduan homeland in the Feather River drainage." He agrees with the timing and probable association with the Sweetwater Complex, stating that "this spread could not have begun before 800–1000 AD," and with the late expansion out into the valley which probably occurred only during the last few centuries.

Finally, Golla (2011:252) notes that a phonological profile shared by the Maidu and Washo, probably "diffused from Washo into Maiduan, most likely through Washo being substratal in all or part of Proto-Maiduan"—meaning that the Washo probably occupied large swaths of the western Sierra deep in the past.

Data Requirements

Archaeological data sets required to address hypothetical models of population replacements like those outlined above are similar to those required to deal with most other complex issues. It will be necessary to investigate sites with one or more temporally discrete depositional components that can be tied to a specific population or ethnic group on the basis of artifact types or other evidence. Generally, the best artifacts for this kind of analysis are those imbued with distinctive stylistic characteristics, such as projectile points, harpoon types, or other distinctive tools or ornamental gear. In addition, methods of house construction and interment, as well as styles of rock art have been used with varying success to address this issue within the study study area.

Finally, the whole argument surrounding the identification of ethnic groups in archaeological assemblages has been revolutionized by advances in DNA fingerprinting, and there have been attempts to characterize both modern and prehistoric Californian and Great Basin human populations (Eshleman and Smith 2007). There are obvious issues of cultural sensitivity regarding the analysis of human bone for these purposes, but it is our experience that Native American tribal representatives can be open to genetic studies in certain situations.

PYRODIVERSITY AS A LAND-USE MANAGEMENT STRATEGY

The effects of human activity on past ecosystems is a topic that has recently come to the forefront of cultural resources studies. A recent book by Lightfoot and Parish (2009) reviews how Native burning, also known as the pyrodiversity approach to land management, served to maintain a complex mosaic of vegetation communities, enhancing the productivity of economic plants such as small seeds and acorns (see also Anderson 2005), as well as benefiting local deer populations (see also Taber and Dasmann 1958). One of the most important outcomes of this strategy was to prevent the encroachment of dense climax conifer forests on more-productive habitat types. This encroachment is, in fact, currently obscuring historically recorded ecotones in the current study area where many archaeological sites tend to be located (Keter 1995). Lightfoot et al. (2013) are currently making headway on this issue by forming collaborative programs composed of archaeologists, Native Americans, and biologists, to better understand the distribution of archaeological sites through controlled burning, archaeological survey and excavation, and traditional knowledge.

Another aspect of the pyrodiversity approach is the dramatic change in fire-management philosophy and practice with the arrival of Euro-Americans in the region, and how that change continues to influence fire regimes and land management practices to the present-day. This unconformity in land-use practices between the native and non-native populations is also obvious in mining landscapes and clear-cut timberlands. These striking changes in land and resource use, from small-scale manipulation to wholesale extraction, have had long-lasting consequences for the local environments throughout the study area.

Data Requirements

One of the most obvious ways the archaeological record can contribute to the study of pyrodiversity and how post-contact landscapes have changed over the years is to conduct archaeological survey in areas that have been previously burned. These types of studies have found multiple cases in which dense, impenetrable vegetation has covered up major prehistoric habitation sites, clearly showing that climax vegetation communities were not favored by Native peoples at these locations, and that they took measures to prevent encroachments of that type. Such surveys have also found previously unknown feature types in otherwise well-studied areas (Schneider 2008).

Other approaches to this kind of study have been presented in a special issue of *California Archaeology* (2013; Volume 5[2]), where papers looking for evidence of prescribed burning through the analysis of plant macrofossils, archaeofaunal remains, phytoliths, and pollen spectra from the central coast could serve as a model for the current study area.

NATIVE AMERICAN ROCK FEATURES AND THE SPIRITUAL WORLD

Rock features made by Native Americans are important cultural resources in northern California, including certain parts of the current study area. Some were created deep in antiquity and some are still produced today by people following traditional religious practices. Based on what we know from the ethnographic and archaeological records, there are two geographic areas (with two differing traditions) within the study area where they occur in greatest abundance: one in northeastern California and the other in northwestern California.

The northeastern California area is centered on the original homelands of the Klamath Tribes (Ray 1963:xiii), but probably extends west into Shasta territory as well. Early interviews with local Indian people revealed that many rock features were built as part of religious activity geared toward obtaining power, as well as wisdom to help overcome periods of grief and hardship encountered during one's life (Ray 1963; Spier 1930).

A great deal of this activity was associated with boys' puberty rites. During these rituals, boys would often go up into the mountains or other remote locations on multi-day vigils with the goal of obtaining power to help them acquire property, be a good hunter, become a leader, and develop the means to deal with difficult issues later in life. Questing activities included fasting, exerting a great deal of energy by running, stacking rocks into large piles, and swimming in mountain pools. Eventually, due to their total exhaustion, they could receive power through visions received while sleeping or praying, often in the form of a song. Similar methods of exertion and rock stacking could be used later in life by a shaman to enhance his powers, or by more common people to cope with the death of a loved one, improve gambling success, or deal with other life challenges (Spier 1930:95–96).

Some of these early accounts, as well as information from modern Tribal members, show that a variety of other spiritual activities also occurred, and created a wider range of rock feature types in a diversified set of environmental settings. Many people, for example, would begin their spiritual questing and rock stacking at lower elevations, and did not move up to high elevation areas until they reached enhanced levels of training and understanding (Deur 2008; Spier 1930). It was also common to create modest features to enhance hunting success in places where game was especially abundant, and to build them adjacent to important plant gathering areas as well (Deur 2008).

The archaeological manifestations of these activities take many forms (e.g., single rock placements, multiple rock placements, and larger rock mounds). Other less common rock features include talus pits/ hunting blinds, rock ring structures, U-shaped prayer seats, and defensive structures. A study of the frequency and distribution of these features in and around the Klamath Basin and Modoc Plateau by Hildebrandt et al. (2015) found that most of the features recorded are either single rock placements or small multiple rock placements. They were rarely associated with residential sites, and differed from sites lacking features by being more frequently found in basalt landscapes, at higher elevations, in low-growing vegetation, and within the viewsheds of important mountain peaks; they also tended to be located closer to these mountain peaks than sites lacking rock features. These findings are consistent with the ethnographic record and highlight their spiritual significance to people past and present.

The northwestern California features are best known through the work of Chartkoff (1983). They tend to be concentrated in Yurok, Hupa, and Karok territory and are composed of multiple types including U-shaped prayer seats often found on high landforms with excellent views, small rock stacks often used to mark traditional trails leading up to the prayer circles, and larger cairns and rock alignments also associated with the trails and prayer areas. Although difficult to date, Chartkoff (1983:745) feels that they have considerable time depth and, based on largely modern ethnographic interviews, that they are "associated with patterns of traditional religious activity involving power quests, ritual and medicinal training, and individual prayer."

Data Requirements

Some of these rock features are quite subtle and difficult to identify in the field. As a result, it is important for field workers to familiarize themselves with this part of the archaeological record by reviewing previous archaeological studies on the subject, having discussions with knowledgeable archaeologists and tribal representatives about them, and making field visits to known sites. Upon finding them, it is important to describe the features in detail, including descriptions of their local environmental setting and viewshed. Although few formalized typologies exist, Hildebrandt et al. (2015) have developed one for south-central Oregon and northeastern California that might prove useful in the current study area as well.

Finally, as noted by Chartkoff (1983:745) with regard to the northwest California findings: "It is not known yet whether the complex is unique to northwestern California or is manifested over a wider region." This also applies to the features studied by Hildebrandt et al. (2015) farther to the north and east, indicating that the two zones identified here could be more apparent than real. This question can certainly be answered by reviewing survey results from the intervening areas, especially within the northern reaches of our Klamath Mountains/North Coast Range Zone.

NATIVE RESPONSES TO CONTACT

With the exception of disease epidemics, contact between Native and non-native peoples in the planning area did not begin to truly disrupt traditional lifeways until the late 1840s and 1850s, with the rush for gold and the prospect of "free" land. The newcomers' greater numbers and more advanced technology (particularly in weaponry) gave them an overwhelming advantage in the battle over the land and its resources. Within a few decades, the Native people found themselves with little choice but to flee into marginal areas or find a way to survive in the new world order. As Tushingham (2013:145) has stated, "how northwestern California Indians [and other Native groups] survived during this period is an important research topic."

Delacorte and McGuire (1993), in their study of 23 sites in Owens Valley, divide the Contact period ino three phases that are applicable to the planning area as well (we have added the date ranges): indirect interaction and incipient contact [ca. 1800–1840], direct contact and cultural disruption [1840s–1850s], and post-contact economic assimilation and marginalization [post-1850s]. Those authors state that "post-contact culture change can be identified in the archaeological record" (1993:292), at the same time cautioning that "prehistoric artifactual remains (e.g., debitage and bone) can easily be mixed with [unrelated] historic debris, skewing the latter assemblages," and that "some historic accumulations may reflect multiple occupations that incorporate both Native and Euro-American components" that are unrelated (1993:294). As with any interpretations of archaeological components and assemblages, it is critical that we are able to identify datable, single-component sites, loci, features, or strata that represent discrete occupations (in Delacorte and McGuire's study, these were discrete house features).

Delacorte and McGuire (1993:34) are interested in “the timing, processes, and sequence of acculturative changes that eventually led to the collapse of native adaptations”; in other words, “the order and rapidity in which tradition pursuits were discarded for new economic opportunities afforded by the influx of European technologies, wage labor, and so forth.” They argue that, all other things being equal, “elements of the subsistence economy should be abandoned in order of their relative returns to labor and only if new economic opportunities furnish an equal or greater return.” By that theory, the use of rifles for hunting should be one of the first adaptations, given the longer range and greater force of such weapons. Where this is not the case, we can ask whether the use of rifles might be a disadvantage—for instance, when a group is in hiding and does not want to draw attention to itself by using such a noisy technology.

Not all changes were quite so abrupt, however. In many—perhaps most—cases, Native people absorbed new technologies and practices into their traditional ones, creating a continuum rather than a distinct break in tradition (Schneider 2015). For example, Native American groups of northwestern California were well known for their woodworking skills, particularly the construction of dugout canoes and large fishing weirs. When historic-era logging became a major local economic activity, many Native men adapted their skills to this new activity, and multiple generations found jobs in the timber industry. These jobs allowed some Native people to continue living in their traditional homelands, maintaining many of their traditional activities while at the same time adapting their knowledge to the new economy.

The adoption or adaptation of new artifacts and technologies was only one aspect of the Native response to contact with non-native peoples, however, albeit perhas the most visible one. Changes in resource use, settlement patterns, and even religious practices also occurred. We have noted elsewhere in this document that Native hunters were often forced to kill the settlers’ cattle, as their traditional prey (deer, elk, etc.) became more and more scarce. They also had to abandon many of their villages on the open grasslands or broad river terraces and retreat into less accessible “refuge” areas to avoid being murdered or herded onto reservations. Sometimes traditional religious practitioners were killed by their tribesmen for failing to cure those who had contracted the strange new diseases; in many cases, tribes adopted new religious practices, such as the Ghost Dance, hoping that higher powers would drive out the trespassers and restore the traditional order.

None of these methods was entirely successful, however, and ultimately Native tribes were “assimilated” into the dominant social order (some to a greater degree than others). Many children were taken away to “Indian schools,” where they were forbidden to speak their native languages or wear their native dress. While being instructed in English, math, and other subjects, they missed the handing-down of traditional knowledge of things like medicinal plants, tool-making, and oral history. This created a social and cultural gap between generations, a gap that Native groups today are still working to heal.

It is also important to consider changes in social and family structure brought about by the arrival of non-native people. Nearly all of the early arrivals were men, and many of these men lived with or married Native women and fathered children by them: thus, not only was there cultural and technological blending, but kinship and genetic blending as well. Such households, where they can be identified through archival research, could provide a wealth of documentary and archaeological information on transitions in material culture, diet, household composition, and other aspects of daily life. In addition, the offspring of these inter-racial unions would, potentially, have faced discrimination from both sides. How they dealt with this discrimination, how they defined themselves, and whether they continued to practice the traditions of both parents, are all interesting research topics.

Data Requirements

Ritter (in Vaughan 1984:72-74) has developed a set of research questions for investigating acculturation and related issues of interaction between Native occupants at Salt Flat (TRI-862/CA-030-0075) and both Euro-American and Chinese immigrants. These questions have to do with how non-native materials were acquired and used, which goods were accepted and which were rejected (and why), whether the site contains evidence of revitalization movements or religious activities (e.g, the Ghost Dance, the Earth Lodge Cult, the Big Head Dance), and the like. To address these issues, as well as those outlined by Delacorte and McGuire (1993), Tushingham (2013), Delacorte and Basgall (2014), Van Bueren (2013), and others, will require careful examination of both the archival and the archaeological records; oral histories may also be very useful here. The most objective, unbiased source will be the archaeological record, provided that unmixed protohistoric/early historic-period contexts can be identified.

ETHNOGRAPHIC CONTEXT (by William Hildebrandt)

As outlined in the *Prehistoric Context* section above, the current study area includes a high level of ethnolinguistic diversity (see Figure 9). This level of diversity, however, is not matched by the economic and social adaptations among these groups. One of the most compelling examples of this situation comes from northwestern California, where the linguistically diverse Karuk (Hokan), Yurok (Algic), and Hupa (Athapascan) shared many traits with the larger Northwest Coast Culture Area, including plank houses, dugout canoes, salmon fishing, sea mammal hunting, ceremonial cycles, dentalium currency, use of wealth to acquire power and status, and an emphasis on the family (and not the tribelet) as the primary unit of social organization (Kroeber 1925). This regional cohesiveness can also be seen in other parts of the study area, and is often tied to ecological setting, sometimes (but not always) corresponding rather closely to the zones established for this study. As a result, the following discussion is organized according our zones, but we feel free to cross those boundaries whenever cultural affinities long recognized by early ethnographers are encountered.

It should also be noted that we give primary focus on those parts of culture that are most strongly linked to the archaeological record, so that they might help us interpret the archaeological record in the future. These include subsistence-settlement strategies, and the technological systems used to implement those strategies, and how these things relate to socio-political organization. Construction of a large communal weir, for example, requires the organization of a relatively large group of people, and should be reflected by significant amounts of fish bone in the archaeological record, while casual fishing by more mobile, smaller groups of people should produce a different outcome. Similarly, the structural aspects of the archaeological record should also vary depending on whether people were living in permanent villages with well-made houses, or practiced a more mobile settlement strategy with lower investment in their housing. This continuum of residential stability also appears linked to the establishment of formal cemetery areas, which has obvious implications for the archaeological record as well.

We are also interested in inter-group interactions, including amiable trade relationships where surpluses in one area may be redistributed to other areas experiencing resource short falls, increasing the benefit for all. Adversarial relationships are also important and will be documented, as these can create rigid boundaries between groups that restrict the flow of goods from one place to another, with some creating clear archaeological signatures (e.g., obsidian and shell beads).

Finally, the languages groups outlined on Figure 9 are simply that—they delineate what people spoke and do not represent the actual landholding groups at the time of European contact. These groups were local communities, composed of people closely bound by blood, marriage, and proximity of residence. As discussed below, Kroeber (1932) introduced the term "tribelet" for the type of territorial multi-family landholding community that prevailed across most of the study area, except in northwest California where the family was primary socio-political unit. As a result, the tribelet or family will be the focus of the following discussion.

UPPER KLAMATH

This zone largely corresponds to the Modoc and Shasta. The boundary between these two groups is often used to offset the Northeast California Culture Area (which includes the Modoc) from the Northwest California Culture Area (which includes the Shasta), as the former occupy high plateau lands, much of it lacking salmon and acorns, while the latter occupy large swaths of land on the headwaters of the Klamath drainage where acorns or salmon are often abundant.

Modoc

Much of what follows is derived from an ethnographic study conducted by McCarthy and Scotten (2004) as part of BLM's *Class I Cultural Resources Overview and Research Design for the Alturas, Eagle Lake, and Surprise Resource Areas* (King et al. 2004). As illustrated by Figure 9, only a small segment of Modoc land falls within the study area, as most of it extends east of the Cascade Range and a little bit into Oregon where it meets lands held by its close relatives the Klamath. The Modoc and Klamath speak separate dialects of the Klamath-Modoc language which is a member of the Plateau Penutian subphylum (Golla 2011:133). Their language was unintelligible to their neighbors in every direction (Ray 1963:xiv).

Traditional Modoc land centered around Lower Klamath Lake, Tule Lake, Clear Lake, and Lost River, the latter of which flows between Tule and Clear lakes (Kroeber 1925:318; Merriam and Talbot 1974:14; Ray 1963:xi-xii). Their western boundary with the Shasta, which is most relevant to the current study area, largely followed the Cascade divide, extending northward from Mount Shasta to near the Oregon border [Ray 1963:xii]. The southern boundary with the Achumawi is less clear, with Merriam defining it as "a straight line from Mt. Shasta through Glass Mountain to Goose Lake" (Merriam and Talbot 1974:14), while (Kroeber 1925:318) is more conservative, saying that it probably corresponds to uninhabited lands just north of the Pit River watershed.

Tribal territory was divided into three geographic areas, with named groups (tribelets) occupying each place (Ray 1963:202). They included the *Gumbatwas* ("people of the west"), the *Paskanwas* ("river people"), and the *Kokiwas* ("people of the far-out country"). *Gumbatwas* lands extended into the current study area, ranging between 14,000 and 4,000 feet in elevation, and encompassing a variety of habitats including broad river valleys, lake shore and marshes, alpine zones, timbered uplands, barren lava flows, and sagebrush flatlands.

In response to extreme seasonal differences in resource availability, the Modoc used a semi-sedentary settlement system. This was characterized by winter sedentism supported by stored foods, followed by warm season occupation of a variety of resource procurement camps. Permanent winter villages were established in the river valleys and could be quite large, occupied by up to 100 people (Stern 1998:451). They were composed of multiple dwellings, which included earth-covered lodges, mat lodges, and wikiups. The semi-subterranean, earth-covered lodge ranged from 12 to 35 feet in diameter, and was entered through a hatchway on the roof (Kroeber 1939:327; Ray 1963:146; Stern 1998:450). The mat lodge was erected over a shallow pit, framed with willow poles, and covered with tule matting (Kroeber 1939:326). This type of dwelling was more typically used in the spring fishing camps and summer villages. The third type of structure, also favored during the warmer months, was the wikiup, a portable dwelling made of bowed willows and tule mats. The wikiup was also used as a utility house in which foods were stored and women prepared food (Ray 1963; Stern 1998:451). Another structure used by the Modoc was the semi-subterranean sweat house. The sweat houses were for common use, and a sweat bath preceded the hunting of large game (Ray 1963:183; Stern 1998:451).

The spring marked the beginning of the sucker spawning runs, which would occur in a variety of places into the summer. Camps were set up close to the fishing grounds, and reused year after year. Women gathered desert parsley (*Lomatium* spp.) and as the fish run intensified, they devoted their activities to the drying of fish. At the end of the main sucker runs, people moved to "the digging grounds for epos, the root crop which played the largest role in the Modoc economy" (Ray 1963:181). Camps were set up in locations that were close to the epos grounds, as well as local streams and rivers where resident trout were available. Waterfowl eggs were also gathered at this time.

In early July, populations dispersed to some degree, moving from the root digging camps into a broader range of habitats to collect small seeds and hunt large game. Summer hunting focused largely on antelope and bighorn sheep, the former on the plains and the latter in extensive lava beds that cover much of the local area. This was also the time that camas bulbs ripened and were gathered in the meadows throughout Modoc territory. In July, the yellow pond lily (*Nuphar polsepalum*) and its seeds, called *wokas*, became ripe (Colville 1904; Stern 1998:449). By August and September the men exploited a second run of suckers, while women harvested and dried several varieties of berries.

Upland hunting of mostly deer and elk began in late September, as well as a continued harvest of the slower maturing mountain berry crop. This was also considered a good time to visit the Medicine Lake Highlands obsidian quarries. People began moving back to the winter villages during October to rebuild their houses and make other preparations for the winter. Although stored foods were of critical importance during winter, communal antelope drives were organized early in winter, and trout were harvested during a December run. Solitary hunting and ice fishing also supplemented the diet during the long winter months (Ray 1963).

Social life was most elaborate when family groups congregated in the winter villages. Three types of leaders were recognized: a political leader or chief, a war leader, and a shaman. The role of chief was largely hereditary, but some leaders were also chosen for their oratory skills, and for their success in hunting, warfare, games and gambling (Kroeber 1939:320; Stern 1998:454). Also important to obtaining this position was economic and social support, as alliances were formed through marriage with other villages and regional areas.

The position of war leader, which was a formal office among the Modoc, was autonomous from that of political chief. A man became such a leader on the basis of his proven abilities in warfare, which was relatively well developed by the Modoc. War was undertaken for territorial encroachment by other groups, for retaliation, and to take slaves (Ray 1963:134–136). Their main adversaries were the Pit River peoples to the south, from whom they took captives. The captives were kept by the Modoc as slaves or traded north through the Klamath for the lucrative slave trade on the Columbia River (Ray 1963:134–135). Their relations with Pit River peoples were not uniformly bad, however, as shell beads and various textiles from Pit River were sometimes exchanged for furs, bows, and dentalia (Davis 1961).

Upon the death of a person, the body was immediately prepared for cremation by washing and dressing it in the person’s best clothing; other gifts and finery might be added. Ideally, cremation took place within 24 hours of death. A wood pyre was built at the burning ground, usually a rocky prominence near the village. When the pyre, body, and offerings had been entirely reduced, the ashes were covered with rock. Sometimes a slave was killed and cremated along with a Modoc (Ray 1963:113–117). In addition to the cremation ground near Sheepy Creek, some of these cremation sites have been identified to the east of Tule Lake.

A man could develop a leadership role based on his abilities in warfare, which was relatively well developed by the Modoc. War was undertaken for territorial encroachment by other groups, for retaliation, and to take slaves (Ray 1963:134–136). Their main adversaries were the Pit River peoples to the south, from whom they took captives. These captives were kept by the Modoc as slaves or traded north through the Klamath for the lucrative slave trade on the Columbia River (Ray 1963:134–135).

Shasta

Multiple languages fall within the Shastan language family. *Shasta* and *Konomihu*, and probably *New River Shasta* were spoken in the central and western parts of Siskiyou County. A fourth language, *Okwanuchu*, was spoken at the headwaters of the Sacramento River, but appears to be a mixture Shasta and some unknown other language. Their ancestral territory is quite large, stretching from the Rogue River near Jacksonville, Oregon, across the Siskiyou Mountains to the upper Klamath River Canyon in California, south to the headwaters of the Salmon, Shasta, Scott, and Sacramento rivers, and north again from Mt. Shasta to the upper tributaries (e.g., Little Butte Creek) of the Rogue (Golla 2011:91).

Recounting the annual subsistence-settlement system used by the Shasta is somewhat difficult, as this was not the focus of early ethnographers that studied them (e.g., Dixon 1907; Holt 1946), nor those that have produced more modern texts (e.g., Renfro 2009; Silver 1978). It is clear, however, that (like the Modoc), the Shasta used a semi-sedentary settlement system composed of relatively large winter villages supported by stored foods, followed by warm season occupation of a variety of resource procurement camps. Villages were usually situated at the confluence of major streams, often along the interface between the valley floor and adjacent mountains (Silver 1978). Some of the largest villages had formalized internal structure with an assembly house in the center and dwelling houses surrounding it. The larger villages also had sweat houses for the men and menstrual huts for the women (Dixon 1907; Holt 1946). Both the assembly and dwelling houses were semi-subterranean and constructed out of large wooden planks. The dwelling houses had steeply sloping roofs, while the assembly structures had flat roofs covered with dirt.

With advent of spring, most of the population moved out of the winter villages and occupied seasonal brush structures located at major fishing areas to for the spring king salmon run (Swezey and Heizer 1977). Fish were caught with a variety of methods including weirs, nets, harpoons, hook and line, and basketry traps (Dixon 1907). In addition to salmon, other riverine resources included suckers, eels, crayfish, turtles, and mussels, as well as steelhead, which had multiple runs during the year. Despite the riverine focus of the Shasta, canoes were rarely used or made (Silver 1978). A variety of large game were also pursued from the fish camps at this time of year, the most important being deer and elk (LaLand 1990).

A variety of greens were used in early spring and, though not emphasized by most ethnographic studies (e.g., Dixon 1907; Silver 1978), geophytes must have been an important resource as well (Gleason 2001; Todt and Hannon 1998). Dixon's (1907:424) equivocal perspective on this subject is illustrated by the following:

> Roots and bulbs seem to have formed a rather smaller portions of the food-supply here than in the central part of the State, although camass (*Camassia esculenta* Lindl.) and "ipos" (*Calochortus* sp.), with one or two other roots and bulbs, were eaten to a considerable extent.

This quote, combined with Gleason's (2001:207) ranking of epos as the second most important plant food in the Shasta diet (second to fall-ripened acorns), indicates that people moved out of the lowland fish camps during the late spring and early summer to higher elevation areas where this important crop was available. Other important summer foods included wild current, spiderbush berries, wild grapes, chokecherries, blackberries, elderberries, serviceberries, thimbleberries, and gooseberries, as well as manzanita and madrone berries (Hamusek et al. 1997). The hunting of large game also intensified during summer, again requiring a dispersal into upland areas.

The fall run of salmon began in late August and people again congregated in areas optimal for fishing. The focus on fishing during the fall differed from that in the spring because most of the fall harvest was stored for use during the winter. The most intensive form of capture involved the construction of a weir or dam across the river, with basketry traps set within them. According to Dixon (1907:428), these facilities were rare in Shasta territory, with only three known to him—at the mouth of the Shasta River, on the Scott River, and on the Klamath River at Happy Camp (the latter actually in Karok territory). Kroeber and Barret (1960:27) also report that small dams were built during the winter in Scott Creek Canyon and along Horse Creek.

Once the main late summer/early fall salmon harvest was completed, the all-important acorn crop became available. People left the lowlands for the hill country, harvesting a variety of species including black oak, valley oak, and canyon live oak, occupying temporary small bark houses during these forays. Other nut crops harvested at this time included hazelnuts, in addition to those produced by the gray, ponderosa, and sugar pine. Once the harvest was in, people moved down to the lowland villages for the winter (Silver 1978).

Shasta social organization was based on the family. Some of the smaller villages were composed of a single extended family, and most consisted of multi-family communities. These villages were organized into larger divisions, not unlike the more formally defined tribelets identified by Kroeber (1925, 1962). The three main divisions in California were in Shasta Valley, Scott Valley, and in the Klamath River area, from the Scott River to Hornbrook. Each large village, and each of the above divisions, had a headman who was responsible for preserving the peace and helping resolve both intra- and inter-group disputes. When offenses were committed, the headman negotiated appropriate payment, often in the form of clamshell disk beads and dentalia. Other items of wealth used for exchange included *Olivella* beads, abalone ornaments, deer skins, and woodpecker scalps (Silver 1978).

Land ownership occurred at the village level, with well-defined territories for its members. Certain fishing places, however, were privately owned, and a few wealthy families had the right to build fish weirs at key locations. The weir owners would commission workers to help build the weir and pay them with a portion of the catch. Certain hunting grounds could also be owned (Dixon 1907; Holt 1946; Silver 1978).

The Shasta buried their dead. Only people who died far from home were cremated, with their remains brought back to the local area for burial. Each family had its own burial plot, and the person's possessions were either burned or buried with them. The dead person's dwelling was usually torn down and rebuilt for someone else, although the house of a headman was sometimes burned (Silver 1978).

Violent interactions with other Shastan groups, as well as with their more distant neighbors were commonplace. Revenge was the primary motivation of inter-group conflict. The Shasta fought with the Modoc, for example, in response to the Modoc's annual summer raids into California, and with the Wintu with which they had longstanding issues marked by regular battles (Merriam 1955; Silver 1978). The Shasta seemed to have more friendly relationships with the Karuk, Hupa, and Yurok, from whom they received acorns, baskets, dentalia, abalone, and other shells in exchange for pine nuts, obsidian blades, juniper beads, and "Wintu beads" (Silver 1978), the latter probably referring to clamshell disk beads.

SACRAMENTO VALLEY

The Sacramento Valley Zone is dominated by two major groups, the Wintu and Nomlaki (see Figure 9). The *Okwanuchu*, although occupying the northernmost part of the Sacramento Valley Zone, have already been discussed within the larger Shasta linguistic group, while the Konkow Maidu, who fall within the southernmost part of the Sacramento Valley Zone, will be addressed below within the Southern Cascade Foothills Zone. Due to the large degree of similarity between Wintu and Nomlaki subsistence-settlement patterns and social organization, they are combined into a single discussion.

The Chimariko lived directly west of the Wintu within the headwaters of the Trinity River. Due to the location of their homeland, it makes sense to include them with other groups living in northwest California. But this small group of Hokan speakers had little in common with their western neighbors (i.e., Hupa, Yurok, Karok, Wiyot, and Tolowa), all of whom are linked to the larger Northwest Coast Culture Area (see below). Instead, the Chimariko appear to reflect an older cultural pattern that appeared to be fading fast, as they were losing territory to both the Wintu and Hupa (Golla 2011; Kroeber 1925), and numbered only a few hundred people at European contact (Silver 1978). As a result, they are briefly discussed in this section after the Wintu and Nomlaki.

Wintu and Nomlaki

Wintu and Nomlaki are both members of the Wintuan language family. Other members of this family include Patwin and Southern Patwin. The Wintuan language family is a branch of the larger Penutian linguistic stock. Wintuan, previously named Wintun or Wintoon, has three divisions, Northern, Central, and Southern (DuBois 1935; Goldschmidt 1978; Kroeber 1932; Merriam 1967). Northern Wintun corresponded to the Wintu, Central Wintun to the Nomlaki (alternately termed Wintun and Nom'-lak-ke), and Southern Wintun to the Patwin. The Patwin "are well marked off culturally, and in speech as well, from the Wintun and the Wintu" (Kroeber 1932: 253).

The Wintu were originally a large population made up of nine local tribelets: *Nomtipom* (upper Sacramento Valley), *Winimem* (McCloud region), *Dau-pom* (Stillwater), *Elpom* (Keswick), *Klabalpom* (French Gulch), *Nomsus* (Upper Trinity Valley), *Norelmuk* (Hayfork), *Waimuk* (upper McCloud River valley), and *Dau-nom* (Bald Hills; DuBois 1935; LaPena 1978). Wintu territory covered parts of Trinity, Shasta, Siskiyou, and Temama counties, including the headwaters of the Trinity River and large portions of the upper Sacramento River drainage (LaPena 1978:324).

The Nomlaki were also divided into several tribelets, further separated by Hill dwellers and River dwellers (Goldschmidt 1951, 1978). River Nomlaki inhabited the Sacramento Valley and were composed of two local groups: the *Memwaylaka* (north region) and the *Puymok* (easterners). Hill Nomlaki occupied the foothill region to the west of the Sacramento River. There were four major Hill Nomlaki groups: *Waykewe* (Redbank drainage), *Waltoykewe* (north of Elder Creek), *Nomlaka* (Elder Creek to below Thomes Creek), and *Noykewe* (Grindstone Creek; Goldschmidt 1978:341).

Each tribelet was an independent social group that owned a well-defined territory, and was further organized into a series of villages and camps. Villages were the primary social, political, and economic units of the society. Wintu village sizes probably ranged from 20 to 150 men, women, and children, and included between five and 50 houses. These dwellings were made from a conically shaped frame of wood, using three or four main vertical poles which were lashed together with smaller stringers. The house pits were excavated one to three feet into the ground, and the backdirt was banked up around the perimeter to form a raised footing; bark and evergreen boughs were used to cover the structure. They were about nine feet (three meters) in diameter, and were typically occupied by three to seven family members (DuBois 1935; Goldschmidt 1951).

Some of the larger villages containing 50 to 70 people also had an earthen lodge. They were large circular, semi-subterranean structures measuring 15–20 feet in diameter. Earthen lodges served as gathering places for the men, who would enter through a hole in the roof via notches cut into its center pole, or by using a separate wooden ladder lashed together with grape vines. The pit was deeper than a standard house, excavated to shoulder depth. Rafters radiated out from the center post every three or four feet, while pickets were lashed at right angles to the rafters every one to two feet. The roof was covered with a mixture of bark, brush, and earth (DuBois 1935; Goldschmidt 1951).

Cemeteries were usually located away from the dwellings, with relatives buried close to one another. Decisions regarding the location of a specific grave were made by the old people who remembered the places where previous people had been interred. The body was placed in a crouching position with the elbows inside the knees, and it was tightly wrapped with deer sinew or rope. The grave pit was usually four feet deep, and sometimes lined with rocks and bark. Personal items like a bow and arrows, beads, or feathers were often interred with the body. Once the body and associated items were placed in the grave pit, it was covered with bark, stones, and soil (DuBois 1935; Goldschmidt 1951).

Settlement and subsistence strategies of the Wintu and Nomlaki are similar enough to be discussed as a single entity, as both tribes practiced a semi-sedentary collecting scheme. They lived in permanent villages in the winter, subsisting mainly on stored food; they then occupied resource procurement camps, typically temporary brush shelters, during the spring and summer months (DuBois 1935). Kroeber (1925:354) states that valley people occupied permanent villages along the Sacramento River during winter, and moved to the adjacent plains near tributary streams during the dry half of the year. Hill people established winter villages where tributary streams reached the open valley, and moved to the mountains and hills during summer (see also Waugh 1995). Permanent villages were never entirely abandoned (Goldschmidt 1978), as a few elderly individuals would be left behind while the other villagers traveled to their seasonal camps to collect food. According to Goldschmidt (1978), each village had its own special site in the hinterlands that it moved to each summer.

The main food items collected for winter storage included salmon, acorns, deer, and manzanita berries (Merriam 1967). Additional resources included bears, rabbits, birds, steelhead trout, suckers, grasshoppers, seeds, tubers, clover, pine nuts, and other vegetable matter (DuBois 1935; Goldschmidt 1951, 1978; LaPena 1978; Merriam 1967).

Multiple runs of Chinook (king) salmon occurred in the Sacramento River, the most important being the fall run which began in October and extended until December. Several fishing strategies were used, some by a single person and others requiring a group. Single fishermen used elaborate composite harpoons to capture fish. Communal fish drives were used during summer when the water was low. With this technique, a net made from wild iris fiber was stretched across the river, and men with torches would drive the fish into the net at night; a dip net could also be used during communal fish drives. The most elaborate approach to fishing, and one of largest community projects among the Wintu and Nomlaki, was construction of a fish weir. Although little direct evidence from the Wintu is available, the Nomlaki pounded large posts (six to eight inches in diameter) into the bottom of the river with stones. Smaller stringers were lashed cross-wise with grape vine, and willows were then woven into the structure at one inch intervals, stopping the fish from moving upstream. Three pens (woven onshore) were attached behind gates left in the weir; platforms were often built on top of the pens to facilitate netting and spearing fish caught in the pens. Some gates were always left open to allow a portion of the fish to move up into adjacent territories, thereby avoiding hostilities with neighbors.

The acorn harvest also occurred in the fall, with families gathering within the most productive groves for this event. Unshelled acorns were carried back to the village where they were processed for immediate consumption or stored for later use. Acorns were stored in the shell and placed in bark lined pits. Those to be eaten were cracked, shelled, and pounded using a stone pestle and a hopper (basketry) mortar. The Nomlaki exploited acorns from no less than eight species of oak trees (Goldschmidt 1978; Merriam 1967), and the Wintu had access to at least six species (DuBois 1935). Acorns were harvested in large quantities, especially in summer/fall procurement camps, and were then cleansed and stored in dry granaries for use during the winter months.

The fall and winter diet was supplemented with the hunting of deer, bear, and rabbits. This was done either individually with bow and arrow, or communally with drives and snares. Bears were typically hunted in the fall, when they were more apt to be sluggish (DuBois 1935). Bear furs were highly prized possessions, used in trade and as burial wraps (Kroeber 1932). "The Wintoon say that they were 'strong on bears'…and were called 'Bear people' by the Nose or Yahnah" (Merriam 1967:265).

With the advent of spring, people moved out of the permanent winter villages into the hill country to harvest a variety of plant foods, including clover, miner's lettuce, other greens, and a number of tubers. Summer brought a new set of plant resources, among them multiple species of berries (e.g., manzanita, skunk bush, and service berries). This was also the time for a variety of small seed resources, especially in the Bald Hills region, the specialty being "cotton flower" or salal (DuBois 1935).

The spring salmon run began in May and continued until October, and salmon were caught both individually and in groups, but not with the large communal weir. Spring salmon were not dried when caught because they were considered to be too greasy. Instead, the fish were laid in a pit lined with hot rocks and covered with additional preheated stones. They were eaten after cooking, and any remaining meat was boned and flaked. The flaked flesh was then dried and pulverized into salmon flour, which could be stored for a considerable amount of time (DuBois 1935).

Both Wintu and Nomlaki tribes were non-egalitarian societies. A wealth complex and secret society among Nomlaki groups was described by Goldschmidt (1978). Items associated with the wealth complex included clamshell disk beads, tubular magnesite beads, and bear skins. A limited number of adult men were initiated into a secret society based on social and/or political status, and these men had more power in public matters. They also had the right to engage in trade of wealth objects and exerted control over most of the skilled crafts and professions. Flexed burials were likewise associated with the Nomlaki wealth complex (Goldschmidt 1978).

Shamanic doctors were also important members of the social group. They were initiated once a year, and the position was open to both men and women. The ceremony took place in an earthen lodge, where the initiates would dance through the night until they received the supernatural spiritual power. Every shaman was expected to be a good singer, and possess several doctoring songs linked to his or her special spirits. Doctoring often began with the smoking of wild tobacco to help bring on the spirit helper through a trance, after which the sickness was usually sucked out of the body. Shamanistic prophesy was equally as important as doctoring, and also took place during a tobacco induced trance. Prophesies covered a wide range of subjects, including predictions about the location of game and the success of hunting trips, the future health of certain individuals, and upcoming weather. Poisoning was also known to occur, in which an unsavory shaman would send sickness to his or her rivals and enemies (DuBois 1935).

For the Wintu tribe, inter-village trade comprised the majority of exchange; inter-tribelet and inter-tribal exchange was less common but perhaps of more economic importance. Specialty craftsmen in Wintu villages would exchange their wares with each other, and women would exchange baskets (LaPena 1978). Inter-tribelet exchange in the Wintu tribe consisted mainly of trading fish for seeds and acorns. The McCloud region was the richest in food supplies in the Wintu territory (DuBois 1935), particularly with its access to salmon runs. As such, food exchanges "were frequent between the Wintoon of the McCloud and those of the Trinity" (Merriam 1967:265) as well as others. Bald Hills Wintu obtained salmon from the more northerly groups by trading clam-disk money, deer, salt, and vegetable foods (DuBois 1935). Shasta Indians to the north provided Wintu groups with dentalia and obsidian, but the Wintu also obtained obsidian directly from Glass Mountain, which is approximately 60 miles to the northeast (LaPena 1978), as well as from the nearby Tuscan sources within Yana territory.

Similar to the Wintu, internal trade between families in the same village was the most frequent form of exchange amongst the Nomlaki. As a result of occupational specialization, neighbors would need to purchase different tools and supplies from each other. Inter-tribelet exchange, particularly between Hill and River Nomlaki, played a key role in the culture. This trading involved the "transfer of the surplus produce of one environment for the different produce of another" (Goldschmidt 1951). Hill Nomlaki traded acorns, seeds, other vegetable items, and terrestrial animals for salmon and other aquatic animals from the River groups. Nomlaki groups also participated in a north-south trading system that extended from the San Francisco Bay to Shasta territory. The Bay region tribes traded shell and shell beads to tribes in central California for obsidian, animal pelts, and yew wood (Goldschmidt 1951). Kroeber (1932:358) notes that "white bivalve shells, dautede, perhaps small clams, that came from a distance and were worn in the ears, were rated at 200 beads; and belts of twenty brought up to 4,000 beads."

Disputes among members of the group often stemmed from criminal behavior. Murder sometimes demanded blood revenge, but the chief could often negotiate a payment to the grieving family and avoid capital punishment. Problems stemming from thievery could be solved by returning the stolen item, but the chief was ultimately responsible for assigning a price for the unsanctioned behavior of the guilty party. Finally, habitual trouble makers could be, with the sanction of the chief, soundly beaten by the group. On rare occasions certain people were killed if they refused to change their behavior.

Large dances and other social gatherings were an important part of life, and were organized by the chiefs. Before a big event, runners were sent out to outlying villages to invite the guests and tell them what to bring. They were often organized around times of food surpluses like big pine nut harvests and salmon runs. Some people had to travel up to two days to reach a celebration, and each community did their best to bring plenty of food and a variety of trade goods, both being measures of prestige. Sometimes 200–300 people would come to these "Big Times," where the feasting, dancing, and gambling would last from three to five days. Gambling contests were a huge activity, with fortunes of shell money and other valuables changing hands on a regular basis.

Although the Wintu and Nomlaki usually had friendly relationships with outsiders and other tribelets within their territory, they did have traditional enemies that were viewed with caution. The Bald Hills Wintu, for example, did not like the *Nomsus* ("west people"), who were probably Athapaskan speakers from the uplands like the Lassik or Nongatl. They also had boundary issues with the *Noze* (Yana) who occupied the hills to the east, and many of the Wintu groups referred to them as "enemy" and "strangers." When inter-group conflicts did arise, they were often solved through negotiations between the chiefs of the groups or individuals involved. But when negotiations failed and inter-group violence erupted, chiefs would organize tribesmen to fight, but not necessarily lead them into battle. These were usually small-scale battles caused by local problems, such as the murder of a relative or the theft of women by neighboring peoples (DuBois 1935; Goldschmidt 1951).

Chimariko

Chimariko territory measured only about 35 x 30 kilometers, and occupied the headwaters of the south and main forks of the Trinity River (Golla 2011; Silver 1978b). According to Kroeber (1925:109), they "were one of the smallest distinct tribes in one of the smallest countries in America." They appear to have been divided into two tribelets (Trinity River and South Fork), each of which a limited number of villages (Golla 2011). Each village had a sweathouse and several smaller family dwellings. They were circular in shape with single ridge poles that were covered with bark and earth, showing much greater affinities to the Wintu than to their western neighbors who built plank structures.

The Chimariko had an abundant food supply, with large quantities of salmon and eel from local streams and an abundant acorn crop available from the surrounding uplands; both were stored for winter use. Other important subsistence resources included deer, elk, and bear, as well as a variety of plant foods like roots, small seeds, berries, and pine nuts. Because of the richness and small size of their territory, the lowland villages were permanently occupied and the upland seasonal procurement camps were used on only a limited basis. Due to the permanent nature of their villages, the Chimariko buried their dead in formalized cemeteries located away from their dwellings.

Because the headwater streams in their territory were relatively small, canoes and formalized weirs were not used (Kroeber 1925; Kroeber and Barret 1960). Instead, a variety of nets were sufficient to obtain the desired amount of fish. Most fishing, hunting, and gathering places were communally owned, but tobacco plots could be owned by individuals. Differential wealth did develop within the community and, like their western neighbors, obsidian blades, redheaded woodpecker scalps, and dentalia were all valuable commodities. Little is known about their trade relationships, as Davis (1961) notes only one item of exchange—obsidian from the Wintu. They were on bad terms with the Hupa, who regularly raided their territory and encroached on their land. Although they were also losing land to the Wintu, they were on more friendly terms with them, and inter-marriage and bilingualism were common (Kroeber 1925).

COAST RANGE AND KLAMATH MOUNTAINS

Native American groups living in northwest California have long been associated with the larger Northwest Coast Culture Area, differing significantly from other groups in California (Kroeber 1939). The Northwest Coast Culture Area extends from Canada and Alaska (including groups like the Tlingit and Kwakiutl) south to near Cape Mendocino, where groups like the Tolowa, Yurok, Wiyot, Karok, and Hupa represent the southernmost expression of the culture. Kroeber (1925, 1939) saw the Yurok as the nucleus of this expression in northwest California, as they had the strongest linkages with groups to the north in the areas of technology, art, and ceremonial life, while the neighboring Tolowa, Wiyot, Karok, and Hupa had a secondary degree of relatedness.

All of these groups lived in relatively high densities, and occupied permanent coastal and interior riverine settlements. Many of the settlements were supported by the storage of acorns, and the use of large communal fish weirs. River canoes, large oceangoing canoes, composite harpoons, and redwood smoke houses also facilitated the harvest and storage of fish and marine mammals. Wealthy families owned many of these capital-intensive technologies, as well as important resource areas such as acorn groves, river eddies for obtaining fish, and portions of offshore sea lion rookeries (Drucker 1937; Goddard 1903; Goldschmidt 1951; Kroeber 1925; Waterman 1920).

Individual households possessing superior pools of labor could generate substantial food surpluses and other items of wealth, ultimately separating themselves from the less successful family units. Unlike most populations elsewhere in California, these northern groups lacked the tribelet organization originally defined by Kroeber (1925, 1936). Instead, Goldschmidt (1951) argued that the concept of village and tribe was essentially non-existent, as the individual or immediate family took precedence. "Though persons were identified by their village of residence and their tribe of origin, neither of these groups had any direct claim upon the action of the individual" (Goldschmidt 1951:507). There was a universal concept of privately owned property, including money (e.g., *Dentalium*), which was linked to differential wealth and power within the population (Fredrickson 1984; Gould 1975; Kroeber 1925).

Moving south within the current study area, the southern Athapascan peoples (Chilula, Mattole/Bear River, Nongatl, Lassik, Sinkyone, Wailaki, and Cahto), as well as Yukian speakers (Yuki, Huchnom, and Coast Yuki) and the Northern Pomo (see Figure 9) all fall within Kroeber's (1939) California Culture Area. Rather than focusing on maritime and riverine resources, they relied on a broader array of terrestrial foods, most notably the acorn. Tribelet organization took precedence, and groups living along the coast did not venture out to sea like the Yurok and Tolowa. Instead, they practiced a littoral adaptation where marine resources like shellfish and small schooling fish were obtained on a seasonal basis from the shore or near-shore locations. This economic system often resulted in a higher level of residential mobility than that observed farther north, as many people used a seasonal round that encompassed both coastal and interior habitats.

As a result of these patterns, the following discussion is organized into three sections: (1) the Core Northwest California Groups (Tolowa, Yurok, Wiyot, Karok, and Hupa); (2) Southern Athapascan Groups (Chilula, Mattole/Bear River, Nongatl, Lassik, Sinkyone, Wailaki, and Cahto); and (3) Yuki and Northern Pomo Groups.

Core Northwest California Groups

The Tolowa, Yurok, Wiyot, Karok, and Hupa all lived in semi-subterranean plank houses located in permanently occupied villages. Major villages were located in strategic foraging areas such as estuaries and lagoons, protected river mouths, and high quality fishing areas along interior streams. Two types of houses were used, family houses and sweat houses. Construction of both types of houses required a great deal of labor to split and prepare the redwood planks with adzes, mauls, and wedges. There were usually three family houses for every sweathouse, forming what was known as the sweathouse group, which was organized along family lines (Gould 1966; Kroeber 1925; Tushingham 2009).

Occupied by women and children, family houses were square or rectangular with maximum dimensions ranging between 15 and 21 feet. The walls were made of upright planks, and the plank roof was held up by a single roof beam. Although the Tolowa houses were single pitched, houses made by the other groups typically had double-pitched, gabled roofs (Tushingham 2009). Sweat houses were occupied by men and post-pubescent boys, and were smaller than family houses, measuring roughly 12 feet (3.7 meters) in maximum dimension. They were entirely subterranean and the single-pitched roofs were covered with soil. Both houses often had stone pavers placed at their entrances and around the internal hearth (Gould 1978).

As mentioned above, the household was the fundamental economic and social unit, lacking the higher level political organization of the tribelet that is found elsewhere in the study area. In addition to a variety of wealth items like obsidian blades, white deerskins, and dentalium shell money, all valuable property was privately owned, including mussel beds on offshore rocks, beaches where whales might wash up, salmon fishing spots, oak groves, and certain items like oceangoing canoes (Kroeber and Barret 1960). Each family also had its own cemetery plot placed away from the dwellings, where the deceased were often buried with their possessions within a series of redwood planks (Bright 1978; Elsasser 1978; Gould 1978; Pilling 1978; Wallace 1978).

All groups lived in their permanent villages during the winter, relying on stored resources. With the advent of spring a variety of greens and root crops were harvested, and people took advantage of the spring salmon run. For those living on the coast, sea mammal hunting was a major enterprise, in which hunters would venture out to sea in oceangoing canoes to exploit offshore sea lion rookeries (Gould 1975; Hildebrandt and Carpenter 2006, 2011). Deepwater fishes were also obtained on occasion, but they were much less important than marine mammals due largely to the abundant anadromous fishery (Hildebrandt and Carpenter 2006, 2011) and surf fish resources that could be obtained during the summer (Tushingham and Christiansen 2015; Tushingham et al. 2013; Whitaker and Tushingham 2014).

Smelt were the primary surf fish harvested along the northern beaches. Once they began to run, the fish could be mass-harvested as they swarmed to lay their eggs and spawn in shallow water. Men caught the fish with V-shaped nets, and the women dried them on the beach for approximately three days while occupying fish camps located nearby (Gould 1966; Kroeber and Barret 1960; Tushingham et al. 2013). Once dried, the fish were returned to the main village where they could be stored for winter use. The runs could last a month, representing one of the most important subsistence resources on the north coast (Tushingham and Christiansen 2015).

Fall brought the acorn harvest and the large salmon run, both of which were major resources for all people living in northwest California. Acorns ranked second only to salmon, and were stored and processed in ways similar to other groups in California. Salmon (both Chinook and silver), as well as other anadromous fishes like steelhead, lamprey, and sturgeon, were obtained using a variety of technologies ranging from large communal weirs to simple fish spears and poisons (Kroeber and Barret 1960). All ethnographic accounts emphasize the importance of this resource. Rostlund (1952), for example, estimates that the Yurok may have harvested about 34,000 kilograms of fish a year, or about 110 kilograms per person (see also Baumhoff 1963). Most of this harvest occurred during the fall when the large weirs were constructed and produced a winter's supply of fish in a relative short period of time.

The largest weir was built by the Yurok along the Klamath River at Kepel. It was constructed during low water in September, when the river was uniformly six feet deep and no greater than 80 yards across. It was a complex barrier made of logs and poles with small openings allowing fish to enter enclosures or pens where they could be easily caught. Construction began by driving a series of vertical piles into the river bottom, which were shored against the current with slanting braces. Stringers were lashed between the piles, and hundreds of smaller stakes were placed upstream of the stringers to form the body of the dam (Hildebrandt and Carpenter 2006, 2011; Kroeber and Barret 1960).

According to Kroeber and Barret (1960:12), strict construction techniques were used, some imbued with ceremonial significance.

> The weir was an elaborate structure built in ten named sections by ten groups of men…Vast numbers of fish were taken during the ten days that the dam was allowed to

stand. After that it was deliberately torn down, at least in part…Its destruction again cleared the channel and permitted the fish to ascend the stream to spawn, at the same time providing the upriver residents with their essential supply of fish.

The absence of tribal-wide political authority seems to have affected the scale of intergroup conflict as well. Typical causes for conflict were murder, insult, or trespass and poaching, but most groups "recognized no crimes against the tribe or community" (Bright 1978:185). Instead, most crimes could be worked out through payment from one family to another. There were cases in which conflicts escalated to a higher level and multiple kinsmen would gather together and attack a neighboring village, claiming women and canoes, and burning down structures. Such a multi-battle feud occurred between the Yurok and Hupa, but was ultimately settled with payment of large quantities of wealth by each side (Kroeber 1925:51).

Many items of wealth were obtained through exchange, such as the large obsidian blades and dentalia acquired from eastern and northern neighbors. In addition to other forms of treasure (e.g., redheaded woodpecker scalps), an active trade of subsistence commodities took place, with dried smelt, shellfish, and seaweed moving into the interior, and acorns and pine nuts coming back in exchange. Redwood dugout canoes were also an important trade item, originating among the coastal groups and distributed to those living in the interior (Davis 1961).

Southern Athapaskan Groups

As outlined above, the southern Athapaskan groups lacked the maritime adaptation of the people living to the north. In contrast to the Yurok and Tolowa territory, where sea mammals could be harvested from the offshore rocks and islands in oceangoing canoes, the coastal territories of the Mattole/Bear River and Sinkyone lacked offshore rookeries and oceangoing canoes were not used (Jobson and Hildebrandt 1980; Hildebrandt 1984; Hildebrandt and Jones 2004). Instead, terrestrial mammals were much more important than marine mammals (Hildebrandt 1984) and deep water fishes were rarely caught (Nomland 1935, 1938; Tushingham and Christiansen 2015).

Another important distinction between the two groups is the anadromous fishery. First, southern Athapaskans did not benefit from a major spring salmon run (Baumhoff 1963:174) and, second, the fall runs did not reach the magnitude of those to the north. The latter is reflected by the construction of weirs, which were simpler than those of the Tolowa, Yurok, Wiyot, Karok, and Hupa. The Mattole, for example, built weirs from a series of vertical stakes placed in knee-deep water supported by multiple rocks. The stakes were infilled with brush, and three or four gaps were left for the fish to pass through. "Such a weir was the work of a single day for a half a dozen men, or even a smaller number." (Kroeber and Barret 1960:26). The Sinkyone weirs "were merely a wall of rocks or a line of brush built across a stream" (Kroeber and Barret 1960:26).

All groups lived in semi-permanent winter villages, but expanded into outlying areas during the warm times of the year, showing a higher degree of residential mobility than people living farther to the north. Houses differed too, as, for example, the Wailaki winter dwellings, which were "made of split slabs, standing upright or sloping in at the top to form a conical house" (Baumhoff 1958:176). Winter subsistence relied on stored foods that included fish, game, and plant foods such as acorn, gray and sugar pine nuts, hazelnuts, and buckeye. Emphasis on wealth was much less developed than it was among the northern groups, restricting status differentiation among the families belonging to a tribelet. They did, however, use family cemetery plots to bury the dead.

In spring, people moved out to collect greens (especially clover), soap root, angelica, and a variety of other roots and bulbs. By late spring and early summer, they moved to seasonal camps up in the mountains. Usually only a few families would stay together in these camps, where men hunted deer and small mammals, and women collected a variety of plant foods such as berries and small seeds; steelhead and resident trout were also caught from some of the larger streams.

In September or October, when the acorns were ripe, people would return to their winter villages. Each family built a new house, and began to harvest acorn, buckeye, and peppernuts for immediate consumption and storage; deer meat was also smoked for storage at this time. After the first rain, the salmon ran again and these were processed for winter storage as well.

Most warfare among tribelets or families was retaliatory in nature, a response to murder, witchcraft and, to a lesser extent, abduction and rape. Most was small scale (on the extended family level), and often accompanied by mythical stories (Kroeber 1925:152). There were, however, some cases in which larger-scale conflicts took place, as when multiple Matttole/Bear River tribelets joined forces to fight the Wiyot along their shared border (Elsasser 1978).

Intergroup exchange appears to have been less developed among the southern Athapaskan groups than with their northwest California neighbors, perhaps due to the lower priority placed on the development of wealth and large world-renewal ceremonies, both of which required significant quantities of exotic materials. Davis (1961) does note that an active shell bead exchange network was in place, with dentalia coming in from the north and clam disk beads arriving from southern and interior groups.

Yuki and Northern Pomo Groups

The Northern Yukian language include Yuki, Huchnom, and Coast Yuki, each of which represent distinct dialects or emergent languages (Golla 2011). Yuki speakers lived in and around Round Valley along the Middle Fork of the Eel River, and were composed of six tribelets. Their territory was quite diverse, ranging from 1,000 to 7,500 feet at the crest of the North Coast Ranges, where their eastern boundary joins that of the Nomlaki. The principal village of a tribelet could include up to 25 family houses, in addition to a large dance house used for ceremonial gatherings of all members of the tribelet (Foster 1944).

Family houses were conical in shape, made with bark, and had no central post; the floors were excavated to a depth of about one foot. The main dance houses were 30 to 40 feet in diameter and excavated to a depth of four to five feet. They had center posts and were covered with soil. Small storage pits were also common, as were earth ovens used to bake a variety of items, including accord bread. Upon death, people were buried in flexed position within family plots, and interred with their personal possessions (Foster 1944).

The Yuki seasonal round has been summarized by Stewart and Fredrickson (1980), based largely on the ethnographic accounts of Foster (1944). During winter (approximately November through February) they lived in their winter villages relying on stored foods that included acorns, pine nuts, hazelnut, peppernut, buckeye, and dried venison and fish. Spring (March to April) brought fresh food to the diet, including a variety of clovers, soaproot shoots, and angelica roots. By late spring/summer (May through August), people moved out of their winter villages to collect a diverse assortment of foods as they became available. Berries and small seeds were collected from a variety of locations, deer and small game were hunted, and steehead and resident trout were obtained from the larger streams. These outward movements eventually resulted in the establishment of seasonal base camps, many of which were located in upland areas. Finally, with the arrival of fall (September through October), deer hunting intensified, and acorn and pine nut collection began, all with the goal of creating winter stores. Fall salmon also ran at this time, and they were captured with simple brush weirs and dip nets (Foster 1944).

The Huchnom lived along the South Fork of the Eel River. Their adaptations were quite similar to the Yuki, but differed in that they practiced cremation, similar to their Pomo neighbors to the south (Miller 1978).

The Coast Yuki included 11 tribelets along a 50-mile stretch of the rugged Mendocino coast. Each tribelet had communally owned territory extending from the ocean into the interior. They occupied beach camps during the summer, relying on shellfish and surf fish (largely smelt), with the latter dried and stored for future use. Summer houses were simple brush huts that were rebuilt every year. They did not use marine watercraft (Gifford 1939; Miller 1978).

Similar to other Yukian groups, their interior winter villages included conical, bark-covered family houses, and each tribelet had a larger, more substantial assembly house. They also relied on the fall salmon run and acorn harvest, the former assisted by the one of the simplest types of weir reported by Kroeber and Barret (1960); it was composed of a log laid across the stream with a single post driven in the middle for reinforcement.

Only a small sliver of Northern Pomo territory enters the current study area (see Figure 9). This zone was occupied by a single tribelet known as the *Mato* whose territory centered on Sherwood Valley, which included the headwaters of the Eel River and most of the Noyo River (Golla 2011). Similar to the Coast Yuki, they inhabited the coast during the summer, focusing on shellfish and smelt, and spent winters in villages in the interior, relying on stored acorns and salmon (McClendon and Oswalt 1978).

Small-scale warfare was common among the Yuki, with their primary enemies being the Nomlaki, Kato, and some Pomoan groups. Revenge was the primary motive, and targets were often killed, with the decapitated heads of the vanquished used in victory dances. Most conflicts were eventually resolved when the "side suffering the heavier losses might be willing to quit, in which case the victors would be notified and, with the chief's consent, a payment made to the losers and friendly relations resumed" (Kroeber 1925). Northern Pomo, as well as other Pomoan groups, sometimes formed larger multi-tribelet confederations, initiating war in response to "poaching, poisoning (witchcraft), abduction of women and children, theft of goods, or to protect or acquire prime resource areas" (Bean and Theodoratus 1978:298). Sometimes these relationships became permanent alliances, which was the case among the Northern Pomo and Yuki (Bean and Theodoratus 1978).

Yuki trade relationships were primarily internal, and with their Northern Pomo neighbors. Coastal foods were exchanged for clam shell disk beads and dentalia, and salt was obtained from Northeastern Pomo groups. Pomo trade was more highly formalized through use of the trade-feast system, where multiple tribelets would gather together, exchanging goods, services, and marriage partners across a wide range of ecological zones. These feasts helped maintain intergroup ties, and distributed resources from places with surpluses to those falling short, with the latter groups repaying the debt through a system of delayed reciprocity (Bean and Theodoratus 1978; see also Hildebrandt 2009).

SIERRA NEVADA

The Sierra Nevada zone and adjacent Sacramento Valley lands largely correspond to lands occupied by speakers of Maiduan languages. These closely related languages include Konkow, Chico Maidu, Northeastern (or "Mountain Maidu"), and Nisenon. The current study area largely corresponds to Konkow and Chico Maidu territory (Golla 2011:137).

Konkow

Konkow was spoken along the Feather River watershed from just north of Marysville-Yuba City up to the Plumas County line. Twelve tribelets have been recognized, and there appears to be a dialect and cultural boundary between what Kroeber (1932) calls the "Hill Konkow" above Oroville and the "Valley Konkow," people who lived downstream in the Sacramento Valley. Chico Maidu was spoken by multiple tribelets along the Sacramento River, including people living west of the river. The Chico Maidu and Konkow languages are quite similar to one another (they could actually be dialects; Golla 2011), and Kroeber (1932) has included the Chico Maidu into his "Valley Konkow" group based on their cultural similarities. Following Kroeber (1932), we will discuss the Konkow as a single group.

Konkow tribelets subsisted on a diverse diet that included multiple species of fish, mammals, birds, insects, and plants, with acorn accounting for the largest portion of diet. Their main villages were relatively large, housing as many as 150 to 200 people in up to 20 family homes built around a central dance-house (Dixon 1905; Kroeber 1925). The large degree of storage practiced by the Konkow (especially the Valley

Konkow) allowed them to remain in their villages year-round, with logistical forays out to resource patches such as seed-bearing fields, acorn groves, and fishing and hunting areas. The tribelet territory was communally owned by members of the group, which provided rights to hunt, fish, and gather within the established boundaries. Territories were small, with Dixon (1905:201) noting that "twenty miles was an unusual distance to go, and few went to greater distances from their homes."

While the territory as a whole was owned communally, private property also existed: a man's nets, bows and arrows, spears, canoes, clothing, and house were all private, while a woman's baskets, utensils, pestles, mats, and digging sticks were her property. Some fishing holes were also privately owned by families, though others could fish in them if they received proper permission. The right to erect drive fences for deer hunting was similarly owned by families (Dixon 1905:223–225).

Community territorial boundaries appear to have been rather strictly demarcated and guarded. Boundaries were determined through meetings between village headmen; once established, these boundaries might be marked by a symbol known to all which was carved into rocks at the edge of a territory. One such rock was reported by Ritter and Parkman (1992) and could indicate that this practice occurred in the prehistoric past as well. Dixon also reports that "each tribe or group of communities kept its boundary-lines constantly patrolled by men, who were to see that no poaching took place, and that the rights of each tribe were respected" (1905:225).

Three types of houses were constructed: (1) large circular, semi-subterranean earth-covered houses; (2) smaller, conical huts built on the surface; and (3) temporary wind-breaks constructed during the summer (Dixon 1905:168–172). It appears that the more-sedentary valley peoples rarely used the latter two types, as they remained in or near their central villages much of the year. The subterranean type was used for residential houses, sweat houses, and in larger form, as a central dance house in important villages. House sites were excavated to a meter in depth and measured between six and 12 meters in diameter. At least two main oak posts were erected in the center of the depression, with a row of shorter posts on either side. The sides of the pit excavation were lined with wood or large slabs of bark, and roof beams were run from the edge of the excavation to the center posts. Large pieces of bark, branches, and leaves were placed on these beams, which were then covered with dirt excavated from the hole.

Granaries were also built in and around the village. These were made by planting poles in a circle about a meter in diameter and twining willow between them to make a cylindrical receptacle capable of holding approximately one-third of a cubic meter of seeds or nuts (Dixon 1905:176).

After subsisting largely on stored foods during the winter, people began to forage away from the village during the spring in pursuit of a variety of greens such as clover, sour dock, and waterleaf. Most importantly was the spring salmon run along the Sacramento and Feather rivers and their tributaries, where the fish were harvested using a variety of methods. In addition to dip nets, seines, basketry traps, spears, harpoons, and hook-and-line, the Konkow built simple weirs (also called guide fences) designed to direct fish through openings in the fence where they could then be speared. Eels and a variety of resident fish were also important components of the diet (Dixon 1903; Kroeber and Barret 1960).

During summer, small seeds (particularly grasses) were harvested both for immediate consumption and for storage through the winter (Dixon 1905:188). Roots and bulbs were gathered with a digging stick and boiled, roasted, or eaten raw. Manzanita berries, available in the foothills, were stored for winter and used to make manzanita cider. Women and children also gathered large insects such as grasshoppers, crickets, and locusts (Dixon 1905:190). To gather these insects, they excavated a shallow pit and set the surrounding grass on fire, driving the insects into the pit where they were collected "by the bushel" (Dixon 1905:191). These too were dried and stored for winter use.

Large and small game were hunted throughout the year, with deer inhabiting a wide range of environments, and elk and pronghorn favoring more open, grassland habitats. The acorn harvest occurred during the fall, and large quantities of nuts were stored in the above-ground granaries. Dixon (1905:181) reports a dozen varieties of acorn harvested, with the most popular being black oak, canyon live oak, and interior live oak. Gray pine and sugar pine nuts were also harvested and stored at this time (Dixon 1905). Granaries were apparently capable of holding enough acorns to last between one and two years, facilitating year-round occupation of the valley floor and providing a fallback food during periods of scarcity. Salmon fishing again became important at this time, with large amounts caught and stored for winter use.

Given the presence of tribelet property and distinct social boundaries, inter-group conflicts developed from time to time, with the Yana being a common foe. Although raiding and ambush were the typical forms of conflict, there were instances where multiple villages would band together for a fight. Dixon notes that inter-tribelet conflict included violent bouts of raiding and ambush using clubs, spears, and arrows: "Prisoners, if men, were usually killed…Slaves were not taken or used. As a rule, the slain were scalped…it is custom to torture captives of the male sex" (Dixon 1905:207). He also notes that "if a person of distinction were killed in an attack, and the body or head could be secured, it was tied to a pole on returning to the home village, and treated as described [tortured and despoiled] in the case of a live prisoner" (Dixon 1905:207). This narrative is consistent with the four scalped and decapitated skulls found in the archaeological record by Hildebrandt and Kaijankoski (2011) near Hamilton City.

Dixon (1905:201) notes that the Maidu were not particularly active traders. They are thought to have traded mainly with the Wintun to the west and north, acquiring beads which they then traded to tribelets in the eastern Sacramento Valley for salt, obsidian arrowheads, bows, raw toolstone, and pine nuts.

SOUTHERN CASCADE FOOTHILLS

This zone includes portions of Pit River (Achumawi and Atsugewi) territory and most of traditional Yana (Northern, Central, and Southern Yana) lands.

Achumawi and Atsugewi

Pit River Indians have traditionally inhabited a vast area of northeastern California which encompasses the mountainous Pit River drainage, from southern Goose Lake all the way to Big Bend in Shasta County. Pit River tribes are comprised of two groups: the Achumawi, consisting of nine tribelets, and the Atsugewi, with two tribelets (Garth 1978; Kniffen 1928:303; Olmstead and Stewart 1978). The Achumawi and Atsugewi languages form the Palaihnihan family, a member of the Hokan stock; each language contains dialects which correspond to the tribelet divisions (Golla 2011; Olmsted 1966; Shipley 1978).

The current study area includes only the westernmost margins of their original territory. The Achumawi included nine bands (*Astariwawi*, *Kosalektawi*, *Hammawi*, *Hewisedawi*, *Atwamsini*, *Achomawi*, *Ilmawi*, *Itsatawi*, and *Madesiwi*), but only the *Madesiwi* and parts of the *Ilmawi* and *Itsatawi* fall within the study area. The Atsugewi, who occupy the southern Pit River territory, consist of two bands: the *Atsuge* and the *Apwaruge*, with the former falling within and the latter located east of the study area.

Traditional Achumawi territory contained great environmental diversity, ranging between 2,000 and 14,000 feet and crosscutting vegetation communities characteristic of both California and the Great Basin. The western areas, which encompass the current study area, provided habitat for salmon and acorns, while steep waterfalls and adverse climatic conditions prevented these important resources from reaching lands to the east. The Achumawi subsistence-settlement system comprised a winter sedentism reliant on stored foods, followed by warm-season occupation of several resource procurement camps. Most winter villages among the western tribelets were located along the Pit River, and consisted of several large semi-subterranean structures, including family dwellings and ceremonial dance houses (also called sweat houses). Family dwellings (measuring roughly 2.5 x 4.0 meters) consisted of shallow excavations covered by a sloping roof of poles and bark. The larger ceremonial structures (about 6 x 9 meters) had a center post and were covered by posts and brush, with a final layer of soil (Kniffen 1928; Kroeber 1925; Olmsted and Stewart 1978).

With the arrival of spring, people set out on foraging trips focusing on several types of greens (clover, thistles), resident fishes (pike, suckers), aquatic invertebrates (mussels, crayfish), root crops (epos, camas), and the spring salmon run west of Fall River. These lowland subsistence pursuits continued into the summer, when people began to move upslope toward foraging opportunities in the mountains. Deer hunting became a common activity, as was the collection of berries and small seeds, and long trips to the Medicine Lake highlands were taken to obtain obsidian (Kniffen 1928; Olmsted and Stewart 1978).

Large and small game hunting appears to have intensified during the fall, including organized drives with the use of fire (Merriam 1926). The most important fall resources in western Achumawi territory were salmon and acorns. High-quality fishing areas were sometimes owned by individual or village groups (Kniffen 1928), and were harvested with a variety of nets (e.g., dip, gill, and seines), bone tipped harpoons, basketry traps, and simple weirs made from poles and brush (Dixon 1905; Kroeber 1925; Olmsted and Stewart 1978).

Upon the death of an individual, the body was wrapped in a hide or net and cremated on the top of a pyre prepared at the regular burning place near the village; the personal belongings were also burned with the body (Voegelin 1942).

The Achumawi and Atsugewi were generally on good terms with their immediate neighbors, sharing "hunting and gathering resources, thus insuring that when a wild crop failed in one area its inhabitants could always use a neighbor's land where crops were better" (Garth 1978). They were also able to trade commodities during these interactions, as well as larger gatherings when people would get together for festivals. Primary items of exchange included clam disk beads, dentalia, obsidian, a variety of textiles, and other utilitarian objects (Davis 1961).

Occasionally, low-level conflicts would emerge where, for example, a shaman was suspected of poisoning someone in a neighboring village. Of much larger consequence were the regular raids by horse-riding Modoc and Paiute who would capture Achumawi and Atsugewi members and either keep them as slaves or sell them up on the Columbia River where the major slave trading markets were located.

Yana

The Yana occupied the east side of the Sacramento Valley, bordering the Achumawi and Atsugewi to the north, the Konkow to the south, the Maidu to the east, and the Wintu and Nomlaki to the west (see Figure 9). Their western boundary did not quite reach the Sacramento River, as a narrow strip of land east of the river was controlled by the numerically superior Wintu and Nomlaki (Johnson 1978). Yana is a single language divided into three dialects: Northern Yana, Central Yana, and Southern Yana. Southern Yana was spoken in a series of subdialects, each associated with a small mobile band, including Yahi, which was spoken by Ishi (Golla 2011).

Yana territory ranged between 300 and 10,000 feet in elevation and encompassed a wide range of habitat types. The foothills included several varieties of oaks and grasses, while the uplands were covered with a mixed conifer forest. Game animals, mostly deer, were quite plentiful, and salmon entered most of the larger streams, forming an important component of the diet.

Similar to the Pit River peoples to the north, the Yana used a semi-sedentary adaptive strategy, which combined winter sedentism with relative mobility during the warmer times of the year. During winter, when most of the uplands were covered with snow, populations congregated in lowland villages and relied on stored foods. Most of the settlements were located along a narrow strip of land ranging between 1,000 and 2,000 feet, and included semi-subterranean earth covered structures among the Northern and Central Yana, and less substantial conical houses covered with cedar or pine bark in the south among the Southern Yana (Johnson 1978; Sapir and Spier 1943).

Numerous tribelets existed in Yana territory. Each included a major village with a principal chief and large assembly house, surrounded by several smaller allied villages. Tribelets owned particular tracts of land among the Northern Yana, and there was private ownership of certain seed plots and fishing places (Johnson 1978; Gifford and Klimek 1939). Upon the death of an individual, the body was flexed and placed in a deep burial pit with their valuables broken and buried with them. After burial, their house and other possessions were burned. There is no mention of formal cemetery plots, but most accounts indicate that burial occurred near the village (Sapir and Spier 1943).

Although seasonal population movements are not clearly described by Yana ethnographers, discussions of particular resource types provide a rough view of the probable subsistence-settlement strategies that were used. According to Sapir and Spier (1943:249), Yana populations were dependent on "hunting, fishing, and, most important of all, gathering of wild roots, seeds, berries, nuts, and other vegetable products." Beginning in spring, several varieties of roots were harvested, including epos, annis root, camas, tiger lily, and brodiaea.

During the spring and early summer the Yana were given permission to occupy salmon fishing camps along the Sacramento River within Wintu territory (Sapir and Spier 1943). Similar sites must have been occupied in the uplands during summer, because "during the hot summer months after the greens had shriveled and the seeds were spent, few food items were available below 2,500 feet" (Johnson 1978). Other important summer foods included trout and suckers, numerous insects, sunflower and Clarkia seeds, a variety of berries, and hazelnuts (Johnson 1978; Sapir and Spier 1943).

The acquisition and storage of acorns and salmon was a major undertaking in the fall, although salmon are considered a secondary resource (Johnson 1978:2364). It was customary for men to help knock down acorns in the foothills and then travel to the Sacramento River where they would catch and dry a winter's supply of salmon. Salmon were obtained with spears, harpoons, hook and line, and small seine nets, but the use of weirs is not mentioned. While the men were busy fishing, women would collect the acorns and prepare them for storage. During the remainder of the fall and winter, populations congregated at winter villages, subsisting largely on stored foods (Sapir and Spier 1943).

The Yana tended to be isolated from their neighbors and "were never on good terms with surrounding peoples for any length of time" (Johnson 1978:363). Most conflicts arose from poaching and to avenge the taking of women (Gifford and Klimek 1939), and took the form of small, tribelet- or village-level attacks. Sometimes multi-tribelet alliances occurred, including cases where the Northern Yana were paid by the Atsugewi to help fight the Wintu (Johnson 1978:363).

Inter-group exchange was also minimized by the poor relationships with outsiders, but it did include obsidian and barbed arrows from the north (Shasta and Achumawi), as well as clamshell disk beads, magnesite cylinders, and dentalia from the south and west (Maidu, Nomlaki, and Wintu). These items were exchanged for baskets, buckeye fire drills, deer hides, and salt (Davis 1961; Johnson 1978). The limited nature of these interactions, however, is clearly evidenced by comparing the frequency of beads found in Nomlaki and Wintu sites, where they are plentiful, to sites in Yana territory, where they are found only rarely (see *Prehistoric Context*, page 29).

HISTORICAL CONTEXT (by Sharon Waechter)

The non-native history of the planning area has been a complex continuum of events, trends, technological advances, demographic changes, inter-group contact and conflict, socio-economic development, and environmental alteration. While it can be seen as part of the larger continuum of human occupation in northwestern California, beginning with the first arrivals millennia ago, this latest phase of human history also represented an abrupt and momentous change in all aspects of human lifeways, and environmental alteration in the region and throughout the American West. Perhaps the biggest factor in this change—besides the sheer number of people entering the region—was a fundamental shift in the philosophy of land use. We explore this topic again in a later section of this overview.

This history has been written many times: in diaries, journals, and newspaper accounts by those who witnessed the actual events; in "period" histories by professional historians who were somewhat removed from the events and who often introduced the social and racial biases of their times; and by modern authors, many of whom tend to simply repeat what has already been written, with little or no critical analysis. It is not our intention to write yet another version of this history. Instead, the following narrative is meant as a brief synthesis of those events and developments which (1) had the greatest impact on the social, cultural, environmental, and economic history of northwestern California, and (2) left historical and archaeological remains on the landscape that now fall under BLM jurisdiction and management. While primary research and re-analysis are beyond our scope here, we try to focus as much as possible on key sources, those that present actual historical or archaeological data.

The documents reviewed for this overview draw on a variety of sources. Probably the most reliable of these are official maps and records (USGS topographic maps, County Assessor's Records, company records, census records, etc.), especially those that have been "ground-truthed" through archaeological investigations; histories that are based directly on those records; and the archaeological data itself. Next are the period newspapers and first-person accounts, which are sometimes colored by personal biases and lapses of memory but otherwise provide our best view of particular events. "Official" histories, especially those written in the late nineteenth or early twentieth century, tend to be influenced by contemporary social and cultural attitudes, but these are still valuable secondary sources. Tertiary sources—those that merely quote from or reproduce earlier works—are only marginally useful and are rarely included in this review.

Any attempt to subdivide the non-native history of such a vast and heterogeneous area must be somewhat arbitrary, but some kind of organizational structure is necessary for both research and management purposes. The following narrative is presented largely by period, emphasizing the major historical events and developments in each region, particularly those that left archaeological remains on the landscape. Certain topics—particularly the Gold Rush and its aftermath—are applicable to all regions to one degree or another, and others (for instance, the Extraction Economy) span essentially the entire historic period. For this reason, we have not assigned specific date ranges to the various topics.

"DISCOVERY": EARLY SPANISH AND ENGLISH MARINERS

It was along the coast that the non-native history of California began, first with sporadic visits by Spanish and English mariners and then by explorers and fur trappers from Spain, Russia, England, and the United States. Unfortunately, there is little evidence of these activities in the surviving archaeological record of the region.

The search for a northern sea route between the Old World and the New, and for safe harbors along the way, became a primary objective for Spain and England within half a century after the European "discovery" of North America. For some 250 years, mariners from both nations traveled along the coast, apparently without ever making landfall in Mendocino, Humboldt, or Del Norte County. Finally, in 1775, Spanish sailors under the command of Lieutenant Bruno de Heceta and Juan Ferdinand de Bodega y Quadra came ashore at Trinidad Head on Cape Mendocino.[3] The day was Trinity Sunday, and the Spaniards named the bay accordingly.[4]

Nixon (1966:162) states that Trinidad Bay and Cape Mendocino soon became a stopping point for Manila galleons sailing between Manila and Acapulco. Paterson et al. (1978:6) say that British sea captain George Vancouver visited the bay in 1793 but "formed a low opinion of the supposed harbor, the only one then known on the north coast."[5] According to Hotchkiss (1957), he referred to it as a "nook."

Although there are several other accounts of explorations along the far northern California coast, the dearth of detailed records for this period suggests that these early visitors did not venture far from shore or have prolonged encounters with the local native populations. The earliest such encounters north of Sonoma seem to have been in the Fort Ross area to the south of our study region, between the Russians and the Pomo people among whom they settled (e.g., Lightfoot 2005). Consequently there are no documented archaeological resources from this time period within the planning area.

COMING INTO THE COUNTRY: EARLY EXPLORATION AND COLONIZATION

The early decades of the nineteenth century were a period of multi-national exploration of the American West, triggered in part by the Lewis and Clark expedition and by the competing interests of certain European powers. The first tentative explorations of the planning area were driven, like so much of human endeavor, by economics: what kinds of natural resources would be found there, and who would be the first to get rich by exploiting them? Enter the fur trading companies and explorers.

Trappers and Explorers

The histories of the North West Company, the Russian-American Company, and the Hudson's Bay Company in northern California are well known. Leader (1928) gives an almost painfully detailed description of the early fur companies in California and Oregon, noting that, despite Spanish regulations, "American merchants were [already] trafficking for sea otter skins along the coast of California" by the late eighteenth century (1928:38). They came by land and by sea. Many overland parties entered from British territory to the north, others from American lands to the east. Some of the earliest were led by now-famous explorers like Peter Skein Ogden (1825-ca. 1830), Jedediah Strong Smith (1826–1828), John Work (1832–1833), and James Douglas (1840). All of these men left journals of their travels, now available on-line (for example, transcripts of Smith's journals can be found at (http://www.mtmen.org/mtman/html/jsmith/index.html). The journals are perhaps most valuable for their first-hand accounts of encounters with Native groups whose traditional lifeways had not yet been completely disrupted. The entries suggest that local tribes were variously curious, hostile, or afraid of the outsiders.

The Northern California Coast

Within two years of Lewis and Clark's famed explorations, fur trading companies were landing at Humboldt Bay. In an atlas and explanatory volume compiled by a Russian named Tebenkof in 1848, credit for the "discovery" of Humboldt Bay is given to Captain Johnathan Winship, "an American, in an American vessel, with an American crew—but all…temporarily in the service of the Russian American Company"

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[3] Some authors have argued for a much earlier discovery of the Humboldt Coast by British mariner Francis Drake. Paterson et al. (1978:5) name Bodega as the discoverer of Trinidad Bay; they do not mention Heceta at all.

[4] Diary excerpts from Heceta and several other early mariners are recounted at length by Heizer and Mills (1952).

[5] Paterson et al. (1978) draws heavily from official maps and records, and is considered here to be a reliable source of "first-hand" information on the histories of Humboldt, Mendocino, and western Trinity Counties.

(Irvine 1915:26).[6] Historian and geographer George Davidson, reading the same atlas, cites part of the text: "[a]ccording to the Colonial Documents of the Russian American Company, it appears that [the bay] was discovered by citizens of the United States. In 1806 there was in it (an American vessel) under the command of (Jonathan) Winship" and a party of Aleut sea otter hunters (Hotchkiss 1957:31).[7] Within a decade, the fur trappers had greatly diminished the sea otter population on the coast, and the Russian-American Company withdrew, leaving the region to the British and American trappers. While it is not mentioned in most histories, the loss of sea otters also must have deprived the region's Native populations of an important source of food and pelts.

Paterson et al. (1978:6–7), citing Coy (1929), provide the following information on early Native/non-native encounters during this period:

> In 1803 the American ship *Lelia Byrd* under the command of Captain William Shaler arrived at Trinidad Bay after a voyage from Canton…The ship and the work parties attracted the attention of the local Indians[,] who came to observe the proceedings in a civil manner. As more and more Indians arrived, however, the tone of the gathering became more ominous…No violence erupted despite the tense situation and the *Lelia Byrd* sailed away to the south.

Hotchkiss (1957:29) describes this "tense situation" in a bit more detail:

> Trade was started with the Indians[,] who at first appeared to be quite civil, but as their numbers increased, they became more troublesome. Distribution of presents restored some harmony, but as they were gradually augmented by reinforcements from neighboring tribes, the situation became so critical that all the work on repairs had to be done under the protection of the guns.

We know that trapper and explorer Jedediah Smith also visited the North Coast during his travels in northern California: on May 6, 1826, he wrote that he had encountered "the noblest trees I had ever seen[,] being 12 or 15 feet in diameter[,] tall straight & handsome." Smith also noted that the party had killed several elk, and that they camped that night in sight of the ocean. These explorers may have been the first American citizens to stand among the giant coastal redwoods of northwestern California.

The Northern Interior

The standard wisdom is that the overland parties of trappers and explorers who traveled into northern California in the 1820s and 1830s were the first non-native people to visit the interior of the state. Both Peter Ogden and Jedediah Smith traveled through the upper Sacramento Valley and into the Trinity country in the 1820s. In February 1827, Ogden reportedly camped among the "Sastise" or Shasta (Leader 1928:14–15).

Smith describes his travels along what he called the "Buenaventura River," trapping beaver and hunting elk along the way. He and his party were almost certainly traveling along the Sacramento River: in his journal entry of December 26, he reports that "It was the instruction of the Genl to Don Lewis that I should cross the Buenaventura River near its entrance into the Bay of St. Francisco." The party traveled up the river in rainy weather, crossing muddy "Slous" and encountering several "indian villages" and "dirt lodges." In April and May 1828, Smith and his party ventured through southern Trinity County near Hyampom. By that time Smith had exchanged the fur trade for the horse trade, driving some 300 horses

[6] Irvine provides a lengthy and detailed discussion of early exploration along the coast, with many anecdotes (but few references).

[7] This apparently was the last recorded vessel to enter Humboldt Bay until 1850. The bay was "rediscovered" from inland by the Gregg-Wood Party in December of 1849.

up the Sacramento Valley and west through a low gap in the coast ranges west of Red Bluff: "His route probably followed Hayfork Creek from the present location of Wildwood to the South Fork of the Trinity River to the Klamath River" (Paterson et al. 1978:8).

Leader (1928) describes John Work's party of trappers in the Feather, and possibly Yuba, River areas. (Although several of Work's journals are available on-line, his account of the expedition into the Sacramento Valley is not one of them.) There were so few non-native settlements in the region at that time (1832–1833) that some of the trappers had to go all the way to Colony Ross on the Sonoma coast to buy ammunition. Northern California was still a wide-open frontier—if you conveniently overlooked the fact that Indian people inhabited every part of it, and had done so for millennia.

The Rush for Territory

By the time the first white explorers entered the study region, the southwestern part of "Alta California" had already been under Spanish rule for several decades, as part of an expansionist plan "for missionaries to establish missions and civilize the Indians, but also for soldiers to found frontier outposts and settlers to start farming communities" (Robinson 1948:33). This grand plan was foiled by Mexican independence in 1821. By the time Ogden entered the north state in 1825, California was part of the newly independent "empire" of Mexico, whose colonial government was understandably hostile toward the British, Russian, and American incursions. Smith's journal entries describe the "welcome" he received from missionaries at Mission San José ("St. Joseph"):

> They did not appear disposed to hear me, and told me I could go no further and soon showed me the way to the guard house. My horses were [taken] away and for two days I could get no satisfaction whatever. They would neither put me in close confinement nor set me at liberty. No provision whatever was made for my subsistence…
>
> …Finally Lieut. Martinos came up from St. Francisco. After a little conversation with him I found I was to be tried for an intruder…[Smith's Journal of His Second Expedition to California, 13 Jul 1827 – 3 Jul 1828].

The lack of hospitality was not limited to the Spanish and Mexican authorities, either. According to the journals of John Work, the Russians at Colony Ross would not sell him as much ammunition as he requested, and they charged him "high prices for an inadequate supply of powder, lead, and tobacco" (Leader 1928:97). They also warned him that there were "no beaver in the few small rivers" along the coast, in order to "discourage any encroachment on their preserves." For his part, Johann Sutter wrote to the Hudson's Bay Company at Fort Vancouver, forbidding them to send trappers into his "Tularies." Apparently his letter was ignored (Leader 1928:102). The European settlers and Mexican authorities were right to be worried: by the early 1840s the first emigrant wagons were rolling into northern California via the Siskiyou, Yreka, Nobles, Applegate/Lassen, and other trails.[8] The race for territory was on.

Mexican Land Grants

Agriculture began in this region even before the Gold Rush, with the Mexican land grants awarded to a number of early settlers. The young Mexican government began accepting private applications for grants of land under the jurisdiction of the pueblos and presidios. While the majority of these grants were made in central and southern California, in 1844 and 1845, Governors Manuel Micheltorena and Pio Pico granted nearly 300,000 acres in Shasta, Tehama, Butte, and Colusa Counties alone to American or Euro-American settlers (http://www.sos.ca.gov/archives/collections/ussg/index-us-surveyor-general-maps/).

[8] Rose et al. (2010), Sullivan et al. (2005), Tveskov et al. (2001), and Wilson (1998) provide archaeological information on some of these trails.

Many of these, the northern-most Mexican grants in California, clustered along both banks of the upper Sacramento River (Smith 1997:7–10). The northernmost of all California ranchos was *Rancho de Buenaventura* (sometimes written as *Buena Ventura*), a three-mile-wide swath of land stretching for 19 miles along the west side of the Sacramento River from Cottonwood Creek northward beyond what is now the city of Redding, granted to P. B Reading in 1844 (further evidence that Smith's "Buenaventura" river was actually the Sacramento). These ranchos were typically made up of the most fertile and desirable lands. Maps (*diseños*) are available for many of these grants, including Buenaventura, but they lack detail and are not to scale, so they are of limited value for historical or archaeological study.

A recent study by Greg White (2015) of John Bidwell's *Rancho Chico* provides a wealth of photographs and primary information on another of the northern California ranchos. White summarizes the development and layout of the rancho headquarters, and the archaeological evidence that has been uncovered there over the years. He also describes Bidwell's relationships with the native Konkow people, including his use of Indian labor on the rancho (and the fact that "Indian attacks" burned his operation to the ground in 1851). Other studies have also provided information on the early ranchos: Treganza (1957) performed test excavations and architectural details on Ide's Adobe near Red Bluff and, more recently, Shasta College has been excavating in Vina, searching for Peter Lassen's second adobe.

Summary

As with the previous period, the events of the first half of the nineteenth century in northwestern California left little in the way of archaeological remains. In general, the 1830s and early 1840s was a time when "Yankees in California still remained but a small handful…a tightly-knit community of traders and seafarers, despite their wide dispersal up and down the coast" (Hawgood 1958:27). The early trappers were followed in the 1840s by settlers encouraged to emigrate to the far west in response to federal land policies, such as the Preemption Act of1841, which encouraged the transfer of lands from the public to the private domain (Moratto et al. 1994). During this period the US became interested in annexation of California and sent "scientific expeditions" to the Pacific Coast, beginning in 1841 with US Navy Lt. Charles Wilkes (Martin et al. 1981:12). Even so, until 1846 Alta California remained primarily a Mexican territory, and most of the population was of Mexican, Spanish, or Native American ancestry.

THE WORLD RUSHES IN: THE GOLD RUSH AND WESTERN EXPANSION

This period was, without a doubt, the defining era in the history of northwestern California. Growing tensions between the Mexicans, Russians, British, and Americans over ownership of Alta California (and events in Texas) led ultimately to the US declaring war on Mexico in May 1846. The war lasted less than two years, and in 1848 Mexico ceded more than half a million square miles of western territory to the United States. While this added significantly to the size of the US, it was overshadowed by another event that would affect not only California but the entire country: the discovery of gold. The events that took place after that discovery would truncate the development of Native society, throw multiple ethnic and racial groups together in one relatively small area, and unleashed a storm of economic rivalries and environmental changes that would affect California up to the present-day.

In other words, the Gold Rush was about much more than just mining. It changed every aspect of northern California: the social, cultural, and ethnic makeup; philosophies of land use and ownership; hydrology and vegetation patterns; governmental legislation; even the physical landscape itself. To investigate "Mining" as a theme unto itself is to over-simplify this complex web of relationships and interactions. As Selverston et al. (2005:147) found in their study of mining in the Oroville district, "The sites do not fit into tidy thematic packets, as many of them represent more than one theme." They go on to say that "[m]any of the resources discovered are strongly related to more than one expected historical theme, creating a mosaic of interrelated parts of a complex past" (2005:191). In this overview we attempt to present historic mining as part of that mosaic: we consider the discovery of gold as an impetus for western expansion, mining as part of the Euro-American economic mindset of resource extraction, and the major demographic and technological changes that gold mining brought to the north state.

The Discoveries

Every school child in California learns that gold was discovered at Johann Sutter's sawmill on the American River in Coloma, El Dorado County, in 1848, and that the central Sierra Nevada foothills held the "Mother Lode" of gold-bearing quartz veins. (There were earlier discoveries in southern California by the Spanish, and no doubt Native Americans were aware of its presence). But this was only the first of many such discoveries, and only one of several gold-rich areas. Clark (1970:Figure 2) provides a coarse-grained map of the two largest and richest gold-bearing regions of California: the "Sierra Nevada Province," including a wide swath of foothills and lower mountains from Plumas and Butte Counties on the north to Fresno County on the south; and what he calls the "Klamath River Province," taking in all of northern Del Norte, western Siskiyou, northeastern Trinity, and far western Shasta Counties. It is easy to recognize where gold mining had the biggest impact, and why, when we look at a more-detailed adaptation of Clark's map (Figure 14). Eastern Butte County, for instance, lies at the northwestern-most tip of the Sierra Nevada province, and—not coincidentally—the Oroville District produced more gold ($55 million) than any other single mining district in the planning area (Clark 1970:Table 6). Even more impressive, however, was the Klamath Mountains geomorphic province. Smith (1995:1) tells us, for example, that the Trinity region was "[t]he second highest gold producing area of California." It was the placer deposits along the Trinity and Klamath River drainages that produced the most gold overall. It has been estimated that (as of 1970) $35 million worth of gold had been mined from the Trinity River placers alone (Clark 1970).

"Ho! For the Trinity!"[9]

Trinity and neighboring areas of Shasta and Tehama Counties saw some of the earliest gold mining activity outside the Mother Lode region; Beason and Wee (in Byrd et al. 2008) provide an excellent summary of this activity. In their study of the Horsetown Mining Complex, Vaughan and Ritter (1992) relate the well-known story of how fur trapper and explorer-turned Army paymaster Pearson B. Reading and his Indian laborers discovered gold at what would become Readings Bar on Clear Creek, near Douglas City, in July 1848. Petersen (1965:22; cited in Vaughan and Ritter 1992) says that the Clear Creek district became the most important gold mining district in Shasta County, bringing would-be miners over the Lassen Trail to the Clear Creek Diggings (later One Horse Town and then Horsetown). "On an 1851 map of California, Shasta and One Horse Town were the only towns [depicted] in northern California" at that time (Vaughan and Ritter 1992:7). Before long, however, the region would be overrun by placer miners, forcing the Native peoples to abandon their villages along the creeks and rivers.

Forks of the Feather River

In the Sierra Nevada foothills of Butte County, the first gold panning on the Feather River took place just months after the "discovery of gold by Euroamericans on the American River" (Selverston et al. 2011:3-2, 3-10), when early settler and rancho owner John Bidwell found placer gold on a bend of the river in March 1848. He made a second discovery farther upriver, at what would become the town of Bidwell Bar (now inundated by Lake Oroville). Soon the area was swarming with miners, as nearly 2,000 of them moved in: "wherever the eye wandered on the slopes and ravines close to the edge of the river, tents were

[9] *Alta California* newspaper, April 10, 1850.

Figure 14. Mining Districts (after Clark 1970).

pitched" (Gerstaecker 1946:162, cited in Selverston et al. 2011:3-10). Many of these newcomers arrived from Oregon Territory, as reflected in the names of several mining areas on the Feather River: Oregon Gulch, Oregon Gulch Creek, Oregon Bar. The first several years of the Gold Rush in this area "experienced sustained and intensive placer gold mining made possible by a large and diverse influx of miners into the state, and rapid advances in simple placer technology" (Selverston et al. 2011:3-9). We summarize those technological developments later in this overview.

On the North Coast

The discovery of gold had a more indirect effect on the coastal region. Although there was a short-lived "rush" at Gold Bluffs, where gold existed in the sands on the beach, no one was ever able to find a practical, cost-effective way to separate it out. Instead, the mining "pay dirt" for early Coast Range towns like Trinidad, Union (now Arcata), and Eureka were as entry points and supply centers for the Trinity and Klamath River mines (Paterson et al. 1978). By 1852 Union/Arcata led the trade, bringing in more than half a million dollars in 1855 alone.

Reading's naming of the Trinity River, on the mistaken belief (based on early Spanish navigation charts) that it flowed into Trinidad Bay on the north coast, led to a search for a coastal route to the river. In 1848, the first ships began to arrive in Humboldt and Trinidad Bays in nearly half a century: Bailey (2008:13) reports that, because of the rugged terrain bordering Shasta County to the east, "most of the miners arrived at the isolated Trinity River gold fields from San Francisco via Trinidad Bay and Eureka." This opened up pack trails that ran overland to the mouth of the Trinity River and then up the Klamath, over the Bald Hills, or directly east to Weaverville. These trails also carried supplies from the ships to the mines. For a time, steamboats traveled from San Francisco Bay up the Sacramento River, mainly as far as Red Bluf but on several occasions as far as the vicinity of Redding, giving miners and their suppliers another way of accessing the rugged mountains region.

In the Klamath/Siskiyou Mountains

Once it was discovered that it was the Klamath River, not the Trinity, that flowed to the ocean, many miners followed it into the interior—despite the opinion of at least one early individual that "[t]he treacherousness of the entrance to the river, owing to the shifting channel at its mouth…finally forced conviction on the most sanguine that the Klamath River was not a practicable line of communication with the mines of the interior" (Van Dyke 1891). Undoubtedly the many Native tribes along the river were even less pleased to see it used as a travel route for the would-be miners.

The first mining in the Klamath River region reportedly was conducted by Lindsay Applegate, who traveled south from Jacksonville, Oregon, in 1849 to mine along Beaver Creek and the Klamath and Scott Rivers (Wells 1881:53). By June of the following year, prospectors from the Trinity River had crossed the Salmon-Trinity Alps and found gold in the Klamath/Siskiyou region. Within a year, the "northern mines" were drawing prospectors from all corners of the earth. Without roads, they traveled by foot or mule train, staying for only a short time in any one place (Fiorini-Jenner and Hall 2002:8). The Klamath River Gold Rush came principally in 1852, however, when 500 to 1,000 miners were working near its junction with the Salmon River. Three of the first mining camps in the area were Cottage Grove, Cottonwood (Henley), and Happy Camp; only the latter still exists as a settlement (Waechter and Marvin 2011).

Although some placer mining took place along the Scott and Shasta Rivers, the mountainous region of the Upper Klamath River did not see the kind of large-scale mining boom that would transform areas like the Trinity basin or the Sierran foothills. Beckham (2006:4) says that "[t]he Upper Klamath River Canyon yielded no useful mineral deposits," and that placer mining on the Klamath did not extend above the mouth of the Shasta River. Most of the miners eventually departed for other regions after the easily accessible gold was depleted, while others died penniless and destitute. A few settled in the valleys, meadows, and along the edges of the rivers, some to ranch and others to log the vast stands of timber in the steep riverine canyons.

Summary

More than any other historic-era activity, mining left its mark on the landscape as archaeological sites and features: prospect pits, ditches and flumes, adits, shafts, placer tailings, dredger tailing fields, hydraulicked hillsides, miners' camps, and settlements. Many mining camps and supply centers evolved into permanent settlements. Of the recorded historic-era components in the planning area, nearly 40% can be directly linked to mining; if we omit the indeterminate components, the total rises to 52% (see ahead to Table 20, page 202). No doubt this is due to the sheer scale of mining in northern California, the conspicuousness of the archaeological remains left by mining, and the enduring nature of these remains. Sometimes less obvious, but no less significant, are the social and economic effects mining has had on the development of the state. We return to this topic in a later section.

PUBLIC DOMAIN: THE HOMESTEADING ERA

The discovery of gold in several areas of northern California brought the region keenly to the attention of the US government. In November 1848, President James K. Polk "pronounced that economic opportunity in California would allow the US to compete with Great Britain, the dominant global power" of the time (Selverston et al. 2011:3-9). After California was granted statehood in 1850, many in the US government began to push for the opening of western lands to independent farmers. Southern politicians, however, feared that western farmers would compete with southern plantations for the agricultural market, and would lead to the creation of more anti-slavery states. It was not until the South ceded from the Union at the start of the Civil War that Congress was able to pass the first Homestead Act, in 1862. Ultimately there would be nearly 10.5 million acres of Homestead Act lands granted in California alone (https://www.nps.gov/home/learn/historyculture/statenumbers.htm).

The Homestead Act Opens the West

Although there were certainly thousands of acres under cultivation and livestock grazing in the planning area before that time, the Homestead Act created the next big influx of settlers to California. It offered "unoccupied" land to any US citizen who was willing to settle on the land and farm it for at least five years. With this opening of public lands to private ownership came the need for cadastral surveys to identify property boundaries; enter the General Land Office, first established in 1812 and now of critical importance in the implementation of the Homestead Act (Crazier n.d.; White 1982).

Not all of the claims were legitimate, though: it was common practice for eligible children of large families to file separate (but adjacent) claims, locking up large areas of land; mining and lumber companies sometimes did the same. Some, though certainly not all, of the large family landholdings in California today originated from these fraudulent practices.

Another impetus for the growing number of farmers and ranchers in 1860s California was the fact that they could sell much of their production to mining camps, for up to 10 times the pre-boom rates. Sheep and cattle production in many areas doubled during this period, to meet the miners' increasing desire for fresh meat and dairy products (e.g., Moratto et al. 1994). The extensive networks of mining ditches built in the 1850s–1860s also provided irrigation water for the early farmers and ranchers in and near the mining regions, further encouraging settlement there.

The Birth of California Agriculture

While agriculture in California actually began in the late eighteenth century with the Franciscan missions, it was the US government's forced relocation of Native people from their ancestral territories in northwestern California that opened that region to large-scale agriculture. In the North Coast Ranges, the 1860s saw the expansion of small farms and dairies into the fertile valleys and prairie lands of Humboldt and Mendocino Counties, especially along the Eel, Bear, and Mattole Rivers. Maniery and Millett (2008:6) also mention settlers along the Smith River in Del Norte County who "planted fruits, raised cattle, sheep, and chickens, sold butter, and lived a self-sufficient life." Paterson et al. (1978:16) describe an expansion outward from the "coastal enclaves" like Humboldt Bay and the heavily cultivated regions of southern Mendocino and northern Sonoma Counties, into more hinterland areas.

But stock raising was the main agricultural activity for much of Humboldt and Mendocino Counties, as cattle and sheep ranchers expanded into the upland prairies and mountains east of the redwood belt. In the nineteenth century, ranchers had essentially free and unregulated access to grazing lands. Although small family farms and dairies were the norm in the early years, a few large ranching operations were established, notably George White's vast holdings in Mendocino County, Townsend and Cary's Eden Valley Ranch south of Covelo, and the 250,000-acre Russ family dairy and stock ranches in Humboldt County.[10] Ranching also stimulated other, related businesses like tanneries, creameries, and woolen mills.

The "opening" of the west was slower in some areas than in others. In the Klamath and Siskiyou mountains, the first homesteaders lived largely off the local wildlife—black-tail and mule deer, rabbits, salmon and trout. Gradually they established small farms in Butte, Shasta, Pleasant, and other valleys, and on benches along the rivers, but the lack of good roads or other means of transport largely cut them off from outside markets. The rugged landscape and lack of developed transportation systems kept the agricultural industry small and local, with subsistence crops like grains, potatoes, and livestock the primary commodities. Small orchards sprang up as well.[11] Without good roads, however, produce could not be transported very far. Cattle (and to a lesser degree, sheep) became a primary agricultural product, for the simple fact that they could literally walk themselves to market (Beckham 2006:83).

In the upper Sacramento Valley, farming and ranching were already well established by the Homesteading era: the 300,000 acres of rancho lands in Butte, Tehama, and Shasta Counties had been under cultivation and grazing for nearly two decades. For example, White (2015:15) notes that John Bidwell had "shift[ed] his focus to agriculture and merchandise to provision the growing immigrant population of California" during the Gold Rush, and that by 1857, Bidwell "had 350 acres under cultivation, supporting a diverse array of tree and row crops (The California Farmer 1857). His ranching and farming enterprises grew and diversified steadily through 1868." The lands along the Sacramento River comprised some of the most fertile ground in the world, and by the late nineteenth century had been planted in fruit and nut orchards, grape vines, and fields of strawberries.[12] Several small agricultural communities sprang up along the river, including the Saron Fruit Colony (formerly Jelly's Farm) and the Bend Colony. Today the valley remains one of the prime agricultural regions in the world.

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[10] Paterson et al. (1978:44) cite the S. B. Fountain Papers (n.d.) as listing the Russ holdings at 50,000 acres; Irvine (1915:471) lists them at 250,000 acres. The Fountain Papers may be referring to an earlier period and/or only a part of the vast Russ family enterprise.

[11] Remnants of some of these early orchards can still be seen; see, for example, BLM (2006).

[12] Additional information on regional agriculture can be found in Smith (1997), who provides a discussion of historic-era livestock ranching in western Tehama County, and in Bevill and Nilsson (2001), who summarize the agricultural history of western Shasta County.

The Environmental Effects of Agriculture

Eventually farming and ranching (particularly overgrazing) would contribute to dramatic changes in grassland plant species in many areas (e.g., Keter 1989, 1990), and the fenced-range system increasingly cut off the Native inhabitants from their traditional hunting and gathering grounds. As with mining and logging, the scale of environmental change brought on by Euro-American agriculture in northern California was immeasurable. Within a few generations, native plants were largely replaced by grains, orchards, and row crops—even by introduced weed species such as star thistle, Russian thistle, and "wild" oat. Plowing of open prairie lands and clearing of trees for farming left only remnants of native grasslands and gallery forests.

Grazing took its toll as well: in his *Early California Reminiscences*, John Bidwell (cited in White 2015:14) wrote that it was "not easy to conceive and understand the change in the condition of the country caused by the extensive pasture of horses and cattle on these [upper Sacramento Valley] plains." Even greater changes were to follow, however, with the development of large-scale water management systems in the early twentieth century (see ahead to *Transportation and Water Development*, page 148). By the early twentieth century, federal land management agencies would begin to regulate grazing and other activities on public lands, but by that time much environmental damage had already been done.

NATIVE RESISTANCE AND THE INDIAN WARS

The Homestead Act and the resulting flood of settlers to northwestern California worsened an already grim reality for the Indian peoples living here. Almost as soon as the first explorers had entered the region, tensions arose between them and the Native populations. There is little information on these early encounters from the Native point of view (one exception being Norton 1979, cited by Keter [1990]), but it is clear from the diaries of some traders and explorers, cited above under that heading, that they considered the "Indians" to be troublesome, at best. As is typical when two such disparate cultures meet (and vie for the same territory), curiosity developed into suspicion, suspicion into animosity, and animosity into violence.

The period between 1853 and 1865 was particularly violent: "The massacres and upheaval of the 1850s are referred to by many Indian people as the Holocaust (Tushingham 2013:25). Multiple massacres of Native people took place across northwestern California, including the 1859–1860 "Mendocino War" that resulted in the deaths of hundreds of Yuki and other Indian people in the Round Valley vicinity (Baumgardner 2006; Carranco and Beard 1981); the 1860 massacre of nearly an entire Wyot village on Tuluwat (Gunther) Island in Humboldt Bay (Tiley and Tushingham 2011); the near-annihilation of almost the entire Sinkyone tribe at Needle Rock on the Mendocino Coast (Margolin 1981); and equally tragic events at Burnt Ranch on the Trinity River, Bloody Island in Clear Lake, and countless other locations. In the words of one California author:

> Supported by a community fearful of the "Indian menace" and greedy for Indian land, legitimized by newspapers that extolled the "manifest destiny" of the white race, groups of men throughout northwestern California formed "volunteer armies" that swooped down upon Indian villages, killing men, women and children indiscriminately. After such raids the men—often a ragtag troupe of unemployed miners—would present expense vouchers to the state and federal governments for actions against "hostile Indians." In 1851 and 1852 California authorized over $1 million for such excursions. It was nothing short of subsidized murder [Margolin 1981:165–166].

As Adkins notes, the "core of the conflicts" was the fact that the two cultures "held a wholly different approach to resource use" (2007:72): [w]arfare, a severe reduction in population, and confinement to reservations removed the Indians as an obstacle to the process of Euro-American settlement. The way was opened for the unbridled development of the resources of northwestern California…" Miners and loggers were indifferent to the erosion and subsequent siltation of fishing streams, settlers and ranchers felt that they "owned" the land that had formerly been open to all, and increasingly fenced Native people off from their traditional hunting, fishing, and gathering grounds. Retaliations by Native people raised panic among whites, who lobbied for protection from the military. As a result, no fewer than 13 US military forts were established in northwestern California between 1850 and 1865 (Table 2). The first three forts were established in the interior (Siskiyou, Shasta, and Tehama Counties), with the rest in the North Coast Ranges and Klamath Mountains. The US Army and (during the Civil War) the California Volunteers, often assisted by local ranchers and settlers, "launched incessant attacks from these camps, driving Indians from their exposed villages and forcing them to take refuge higher in the mountains" (Wee 1980:50).

Table 2. Military Forts in the Planning Area.

NAME	REGION (LOCATION)	DATES
Fort Jones	Upper Klamath (Central Siskiyou County)	1850–1858
Fort Reading	Upper Sacramento Valley (Anderson)	1852–1867
Fort Vose	Upper Sacramento Valley (Nome Lackee Indian Reservation, Tehama County)	1855–1858
Fort Ter Waw	North Coast Ranges (Del Norte County)	1857–1862
Fort Gaston	Klamath Mountains/High North Coast Ranges (Hoopa Valley Indian Reservation)	1858–1892
Fort Seward	Klamath Mountains/High North Coast Ranges (Eel River)	1861–1862
Fort Baker	North Coast Ranges/Klamath Mountains (Humboldt County)	1862–1865
Fort Wright	Klamath Mountains/High North Coast Ranges (Round Valley)	1862–1866
Fort Anderson	North Coast Ranges (Redwood Creek)	1862–1866
Camp Lincoln	North Coast Ranges (Del Norte County)	1862–1869
Camp Grant	North Coast Ranges (Weott)	1863–1865
Fort Iaqua	North Coast Ranges (Humboldt County)	1863–1866
Fort Humboldt	North Coast Ranges (Eureka)	1863–1867

Keter (1990:2) provides an example of this forced exodus, during what he calls the Refuge Period in the North Fork Eel River Basin, from 1854 to 1864—a period when "nearly the entire aboriginal population of the region either died of disease [or] were killed, sold into indentured servitude, or removed to reservations." Unique among scholarly works about this era, Keter's study also looks at the "relatively rapid, irreversible, and significant changes to the environment" that have occurred since (and in large part because of) the land-use practices and attitudes of the Euro-Americans who occupied the area—in particular the ways that livestock overgrazing depleted the native perennial bunchgrasses and forbs and caused general deterioration of the native vegetation (1990:16–21).

Another very interesting aspect of Keter's study is his discussion of the archaeological signature of refuge sites. This topic has been explored in other regions as well, including the North Coast Ranges (Tamez 1981), the American Southwest (LeBlanc 1999), and northeastern California (Waechter 2002). LeBlanc's "social conflict" model states that sudden, major shifts in settlement, especially from open and easily accessible habitats to remote or hidden places with more difficult access, likely reflects mounting inter-group hostilities. Waechter (2002:62) explains that, "[d]uring periods of population/resource imbalance, social and ethnic conflicts are almost inevitable—particularly when the imbalance is caused by an influx of new people into an already occupied area." The archaeological signatures of refuge can include habitation sites in remote and inaccessible locations, unusually large caches of weaponry, and living areas that are obscured behind screens of rock and/or vegetation and invisible from a distance (but with a good outward line of sight). Where such sites include historic-era artifacts, including obsidian with hydration readings of less than 1.0 micron, it is entirely possible that they were occupied by Native people escaping the US Army, volunteer militia, or hostile settlers (see above under *Prehistoric and Ethnohistoric Archaeology Contact Period*).

While there were murders and other atrocities on both sides, it is clear from the diaries, letters, and histories written by Euro-Americans that many of them considered the Native people to be less than fully human. This attitude persisted for two hundred years, partly as a rationalization, no doubt, for the annihilation of thousands of Native people and the theft of their lands. The bigotry is clear, even in so-called scholarly writings, in such phrases as "the prowling and treacherous Indians" and "savages" (Bledsoe 1881:8–9). As recently as 1957, Hotchkiss wrote about "tribes of the most primitive types of Indians whose menacing tactics plagued the white man from the earliest time of discovery" (1957:6). Little wonder that many Native people today still feel animosity toward Euro-Americans.

THE EXTRACTION ECONOMY

In the second half of the nineteenth century, the "wholly different approach to resource use" (Adkins 2007:72) that characterized European and Euro-American activities in California would change not only the economic landscape but the physical one as well. At the risk of resurrecting the myth of the "noble savage," it is fair to say that Native peoples tended to view the land and its resources as things to be used but also respected and left unspoiled. Non-natives, on the other hand, came from a very different tradition. Adkins (2007:12) expresses it this way: "The Euro-American world view held that the natural resources in the region were commodities available for exploitation within a free market system. By the 1850s, this non-indigenous world view had reached every corner of California and the West." For our study region, these "commodities" were primarily gold and other minerals, timber, agricultural land, and—necessary to all—water.

Gold and Copper Mining

Since gold was the first commodity to see large-scale extraction in northwestern California, let us begin there. We have already described the various discoveries across the region in 1848–1849, and the subsequent tidal wave of immigration. What followed this initial period of discovery were demographic, environmental, and technological transformations on an unprecedented scale.

Changing Demographics

Beginning in 1848, the relatively small population of mostly Native Americans, Mexican nationals, and a few Europeans and Euro-Americans in northern California was besieged by gold seekers and adventurers. Native people who had managed to survive the original onslaught of foreigners now faced overwhelming odds, and—ironically—rancho owners like Johann Sutter and John Bidwell found themselves having to defend their property rights against squatters. The demographics of California transformed virtually overnight.

Census records for the Gold Rush period in the planning area are, unfortunately, limited and incomplete (Table 3). Only four of the counties in the planning area had been established by the time of the 1850 federal census, and even in those four counties, the numbers almost certainly do not include Native Americans or Asians. The data are useful, then, only in revealing the dramatic increase in European and Euro-American population during the first two full decades after the gold discovery. From 1850 to 1860, the four counties for which we have census data increased in non-native population by at least 68%; in Mendocino County it was nearly 100%.

Surprisingly, the following decade (1860–1870) saw a *decrease* in population in six of the nine counties. While the populations of the Coast Range counties continued to increase, every other region experienced a loss in European/Euro-American inhabitants—most notably Trinity County, which lost more than a third of its white population. The six counties with a loss in population are also the ones that were most directly and intensively impacted by the Gold Rush. This suggests that the census data reflect the

Table 3. US Census Data, 1850–1870.

COUNTY	INCORPORATION DATE	JUNE 1, 1850	JUNE 1, 1860	10-YEAR INCREASE	JUNE 1, 1870	10-YEAR INCREASE
Butte	1850	3,574	12,106	70.5%	11,403	-5.8%
Mendocino [a]	1850	55	3,967	98.6%	7,545	90.2%
Shasta [a]	1850	378	4,360	91.3%	4,173	-4.3%
Trinity	1850	1,635	5,125	68.1%	3,213	-37.3%
Klamath	1851 (abolished 1875)	n/a	1,803	-	1,686	-6.5%
Siskiyou [a]	1852	n/a	7,629	-	6,848	-10.2%
Humboldt	1853	n/a	2,694	-	6,140	128.0%
Tehama	1856	n/a	4,044	-	3,587	-11.3%
Del Norte	1857	n/a	1,993	-	2,022	1.4%
County Totals	-	5,642	43,721	87.1%	46,617	6.6%
State of California	1850	92,597	379,994	75.6%	560,247	47.4%

Notes: Census data from this period generally do not include Native Americans or Asians (Chinese). [a] Portions of these counties are outside the planning area, including a large part of Mendocino County.

large numbers of would-be miners who failed to strike it rich and moved on to "greener pastures" (sometimes literally) in places like Humboldt and Mendocino Counties.

County census records provide lists of individuals by name and place of birth. The 1850 census for Shasta County, for instance, lists 378 individuals (189 males, 7 females, and 182 with no gender indicated), with an average age of 29.[13] Nearly 86% of them had come from other US states, including all but one of the females (she was from Ireland, a 30-year-old woman traveling with two small boys). Ten of the 378 were children under the age of 16, all of them traveling with adults of the same surname.

Judging by the names and birthplaces listed, there were no Asians included in the 1850 census, and quite possibly none in the county (Table 4). More than 96% were from the US, Britain, or western Europe. By 1870, however, Chinese immigrants made up more than 14% of the population of Shasta County. A more-detailed look at the 1870 census shows the breakdown of numbers by race, as identified by the individual (or perhaps by the census taker; Table 5), by age (Table 6), and by place of birth (Table 7). By this time more than 40% of the US citizens had been born in California, nearly all of them under the age of 16. These data show that, while the size and diversity of the population had increased between 1850 and 1870, whites of European ancestry still made up well over 80% of the non-native inhabitants. By far the largest of the other non-native groups were the Chinese.[14]

[13] Available on-line at http://us-census.org/pub/usgenweb/census/ca/shasta/1850/index.txt

[14] Pierson (2008:32), citing Smith 1995, reports that the 1852 census "shows the number of Chinese in Shasta County to be 3,000." However, our search of the on-line database for the 1852 census showed 36 Chinese males and no females. The reason for the discrepancy is unclear, but given that only 104 Chinese were recorded in neighboring Tehama County in 1860 (Reed 1980:5), the 3,000 may be an over-estimate.

Table 4. 1850 and 1870 Censes of Shasta County by Nationality

Place of Birth	1850 Census		1870 Census	
	Count	%	Count	%
US	319	84.4	2,751	71.1
British Isles	33	8.7	251	6.5
Western Europe	12	3.2	192	5.0
Central/Eastern Europe	-	-	54	1.4
Scandinavia	4	1.1	9	0.2
Canada	3	0.8	37	1.0
Latin America	-	-	9	0.2
China	-	-	553	14.3
Australia	2	0.5	3	0.1
Unknown	5	1.3	8	0.2
Totals	**378**	**100.0**	**3,867**	**100.0**

Note: Non-native inhabitants only.

Table 5. 1870 Census of Shasta County by Gender and Race.

Race	Females	Males	Totals	% of Total
Black	2	6	8	0.2
Chinese	5	549	554	14.3
Indian	8	9	17	0.4
Mulatto	14	15	29	0.7
White	1,232	2,025	3,257	84.2
Unknown	1	1	2	0.1
Totals	**1,262**	**2,605**	**3,867**	**100.0**

Table 6. 1870 Census of Shasta County by Gender and Age.

Age	Females	Males
Children (birth-16)	685	786
Young Adults (17–30)	249	551
Adults (31–50)	263	1,024
Older Adults (51–70)	58	233
Elderly (>70)	7	11
Total	**1,262**	**2,605**

Table 7. 1870 Census of Shasta County by Gender and Nationality.

PLACE OF BIRTH	FEMALES	MALES	TOTALS	% OF TOTAL
US (outside California)	567	1,076	1,643	42.5
California	543	565	1,108	28.7
China	4	549	553	14.3
British Isles	82	169	251	6.5
Western Europe	43	149	192	5.0
Central Europe	10	43	53	1.4
Canada	6	31	37	1.0
Latin America	2	7	9	0.2
Scandinavia	-	9	9	0.2
Australia	2	1	3	0.1
Eastern Europe	-	1	1	0.0
Unknown	3	5	8	0.2
Totals	**1,262**	**2,605**	**3,867**	**100.0**
% of Total	**32.6**	**67.4**	**-**	**-**

The Overseas Chinese in Northern California

Chinese sojourners began to arrive in the "Gold Mountain" almost immediately after the first discoveries, mostly from southern China (Table 8). According to the 1852 California census, by that year there were 20,391 individuals who gave their birthplace as China. The immigrants proved to be hard and steady workers for the most part, and thousands were hired to build the California to Utah section of the first transcontinental railroad; many of the railroad workers then turned to mining once the railroad was completed in 1869; others went on to build other railroads, like the Oregon & California north from Sacramento.

Table 8. Timeline of Chinese Immigration and Exclusion.

1848	Gold is discovered at Sutter's Mill in El Dorado County, California; many Chinese arrive to mine for gold.
1850	A Foreign Miners' tax mainly targets Chinese and Mexican miners.
1852	There are approximately 25,000 Chinese in America.
1854	Chinese are banned from giving testimony in court.
1862	The Chinese Consolidated Benevolent Association is formed.
1865	The Central Pacific Railroad recruits Chinese workers, ultimately employing about 15,000.
1869	The first transcontinental railroad is completed; many Chinese workers shift to mining.
1870	California passes a law against the importation of Chinese and Japanese women for prostitution.
1871	Eighteen Chinese are killed in anti-Chinese violence in Los Angeles.
1873	"Panic of 1873": the start of a major economic downturn that lasts through the decade; is blamed on corrupt railroad companies.
1877	Anti-Chinese violence erupts in Chico, California.
1878	The Court rules Chinese ineligible for naturalized citizenship.
1880	There are approximately 106,000 Chinese in America; California passes anti-miscegenation law (no interracial marriage).
1882	The Chinese Exclusion Act prohibits Chinese immigration; the next year, annual Chinese immigration drops from 40,000 to 23.

Note: Adapted from the Stanford History Education Group (http://sheg.stanford.edu/upload/Lessons/Unit%206_Gilded%20Age/Chinese%20Immigration%20and%20Exclusion%20Lesson%20Plan.pdf)

A great deal has been written about the Overseas Chinese and their role in the California Gold Rush (as well as the Western Pacific Railroad and the development of California overall). Particularly good discussions for the planning area are provided by Reed (1980), Tordoff and Seldner (1987), Tordoff and Maniery (1986, 1989), Kelly and McAleer (1986), Hitchcock (1998), Hamusek-McGann et al. (1999), Maniery and Millett (2008), Leland et al. (2015), and various studies done by Sonoma State University for the Lake Oroville project.

The scenario is well known: Overseas Chinese came to California and the West by the thousands to escape poverty and political unrest at home, planning to make their fortunes in the gold fields and then return to China. Like other ethnic groups, they faced discrimination from white miners and settlers, triggered as much by economic greed and the need for scapegoats as by actual racism.[15] Marvin (Waechter and Marvin 2011:26–27) writes that the Chinese were "willing to work long hours for less pay…With such an increase in [the Chinese] population, resentment grew among other groups. Not only were the Chinese able to glean gold from workings that had been abandoned by less patient miners, but they also declined to spend their earnings locally. Instead, they sent it back to their families in China, sending more than $50,000 in gold dust in 1867 alone (Fiorini-Jenner and Hall 2002:66–67)." McDonald (1979:61) notes that in Siskiyou County, "Chinese had come to own a large number of placer mines [that had been abandoned by other miners] by 1870, a situation which alarmed some but pleased…local merchants, stockmen, and farmers who otherwise would have had less business." In another example, a local newspaper reported in 1871 on an "episode of violence between Portuguese and Chinese miners" near Hawkinsville that reportedly "erupted over water rights" (*Yreka Journal* December 6, 1871, cited in LaLande et al. 2015:14).

In retaliation for what they saw as unfair competition, the white miners pressed the government for regulations that would stem the tide of Chinese in the gold fields, including a Foreign Miners Tax, levied in 1850, that was targeted mainly at Asian miners. When the tax proved to be no great deterrent, the government passed the Chinese Exclusion Act of 1882. This act led to a dramatic decrease in Chinese immigrants in California: in April 1853, the *Shasta Courier* newspaper reported that an estimated one thousand Chinese had entered Trinity County in the previous two weeks; most of them began immediately to mine along the Trinity River. By April 1886, the *Trinity Journal* estimated that there were probably only about 40 Chinese in the county, mostly working as cooks and miners.

The archaeology of Overseas Chinese is a productive field of study. In fact, a recent issue of *Historical Archaeology*, the journal of the Society for Historical Archaeology, is devoted entirely to the archaeology of Overseas Chinese railroad workers (SHA 2015). There are a great many period newspaper accounts, census records, mining claims, mercantile inventories, and other documents that provide information on these sojourners, and their archaeological signatures—porcelain "rice" bowls, Chinese Brown-glazed Stoneware storage vessels, *wen* (Chinese coins), gaming pieces, opium paraphernalia, and other artifacts—are much more distinct and recognizable than those of other ethnic groups. Another class of artifacts often found at Overseas Chinese sites are items modified for adaptive reuse, especially in hinterland areas: e.g., tin cans cut, flattened, and punched with nails to make sieves or steamers; wire handles attached to cans to create buckets; *wen* or rounds of cut tin used as wick holders (see examples in Baxter 2004; Kelly and McAleer 1986; Lindström 1993; Lindström and Waechter 2007; and Ritter 1986).

Many of the stone fences, flume/ditch systems, and other features of the cultural landscape have been attributed to the Overseas Chinese. "These particular immigrants were familiar with agricultural irrigation techniques that could easily be adapted to hydraulic engineering for mining…The summer of 1860 witnessed a flurry of flume building by the Chinese" (Kelly and McAleer 1986:5). In hinterland regions of California (including much of the planning area), the landscape is dotted with mining sites, railroad workers' camps,

[15] Kelly and McAleer (1986:7-8) state that "there was not much anti-Chinese activity [in Trinity County] until the early 1870s, when Chinese were said to outnumber adult whites … and when a world-wide depression hit in 1873."

colliers' camps, and other types of sites with Chinese "signatures" that have survived largely because of their remoteness (e.g., Baxter 2004; Lindström and Waechter 2007; Ritter 1986; Vaughan 1985b; Waechter 2013; Woodrum 2009b). Studies of these resources can provide valuable insights into nineteenth-century cultural conflict, acculturation, frontier consumerism, and a host of other research topics.

One particularly detailed investigation of Chinese (and general) gold mining in the Shasta/Tehama region is Tordoff's (with Seldner 1987) history and archaeology of the Cottonwood Mining District. The authors use archival research and archaeological investigations at 13 sites/loci to compare Euro-American and Chinese mining practices in the district, their different adaptations, and interactions between the two very different ethnic groups. They identify "at least five overlapping periods of mining development" in the area (1987:227):

- Euro-American exploration and mining (1849–1850)
- Euro-American mining and development of ditch systems, possibly using Chinese laborers (1850s–1860s)
- Euro-American mining and increasing Chinese mining, with many whites switching to other pursuits (1860s–1870s),
- Predominantly Chinese mining (1870s–1880s+)[16]
- Reworking of streams by American dredging companies (1900s).

One point Tordoff makes is that ethnic tensions between the two groups never reached the levels seen in other regions: "…heavily capitalized, White-owned company mining, such as that which occurred in the Mother Lode and Trinity regions, never developed [in the Cottonwood district], and thus, neither did the hostility which frequently accompanied large company mining and Chinese labor" (1987:47). This might explain the dominance of Chinese mining here in the 1870s–1880s, when anti-Chinese sentiments was on the rise in other areas. Interestingly, Kelly and McAleer (1986:10) report less racial friction in Trinity County also, with Chinese miners being given equal rights with Euro-American miners and eventually filing their own claims "to what turned out to be some of the better river areas to mine." Clearly, the relationships between the Overseas Chinese and the non-Chinese in nineteenth-century California were complex and variable, as human interactions tend to be, and should not be over-simplified.

Beyond Gold

We should point out that mining in the planning area included more than just gold and silver. Zinc, copper, even platinum were mined in various places. Copper mining, in particular, was an important economic activity:

> During the 1862 rush, miners found that the ore contained other valuable metals, including silver. However, the discovery that copper was also present would have the greatest influence on the area's future development. Copper ore was mined beginning in 1862 in the same area as the Bully Hill gold discoveries. Production was limited because the ore had to be shipped overseas to be processed by smelters in Wales. However, continued exploration revealed an enormous copper belt stretching in an arc for 30 miles through the mountains north of Redding [the Shasta copper-zinc belt]. It became apparent that mines in this area could be very profitable with construction of smelters near the mines. In the 1890s, several large mining companies established operations in the copper belt, expanding the mines and building stamp mills and smelters. Copper producers benefited

[16] This might have been due in part to completion of the transcontinental railroad, which had employed thousands of Chinese laborers who were now in need of work.

from the growing use of electricity, which created an expanding market for copper [Beason and Wee in Byrd et al. 2008:30].

Kett (1947) describes one of these copper mining areas: Iron Mountain, 12 miles northwest of the town of Redding. He notes that "in the early [eighteen-]sixties William Magee…in association with Charles Camden, secured the property as an iron mine" (1947:108). The Historical Archaeological Research Design (HARD) research group identifies Iron Mountain and several other important copper mines in the planning area counties: the Afterthought, Balaklala, Bully Hill, Hornet, Keystone, Rising Star, Shasta King, and Sutro mines in Shasta County; the Big Bend mine in Butte County; the Blue Ledge and Gray Eagle mines in Siskiyou County; and the Island Mountain mine in Trinity County (Caltrans 2008:23). They report that the Iron Mountain Mine "accounted for 42 percent of the state's total production," with fully 54% from Shasta County overall (2008:24). The BLM site record database lists several other, presumably smaller copper mines as well, along with associated ditches, roads, and other features: Lawson Butte (CA-030-1658), Sheep Springs (CA-030-1659), Quartz Hill (CA-030-0161), and possibly the Lemurian Mine (CA-030-1471). Zinc was produced as a by-product of the copper mines.

Clark (1970) describes "copper booms" during the Civil War and again during World Wars I and II, including copper mining in Butte County and in the Shasta copper-zinc belt surrounding what is now Shasta Lake. The West Shasta district and the East Shasta district produced large quantities of copper and zinc ore from the 1890s to about 1920. Kristofors (1973:12) describes the copper belt of Shasta County as "a horseshoe[-]shaped belt" roughly 30 miles long and up to four miles wide, encompassing the towns of Redding, Anderson, and Cottonwood, as well as the Shasta Lake vicinity. In nearby Trinity County, the Island Mountain sulfide deposit, discovered in 1897, yielded nine million pounds of copper between 1915 and 1930 (as well as 144,000 ounces of silver and 8,600 ounces of gold). In addition, small amounts of platinum were mined in Humboldt, Del Norte, and Butte Counties and on the Klamath River (Clark 1970:37, 140, 178, 180). Hislop and Hughes (2007:59) list 10 mines in Tehama County that produced chromium, copper, or both.

Kristofors (1973) summarizes the history of copper mining and smelting in Shasta County between 1896 and 1919, a period when the county "developed into one of the major copper mining regions of the United States, producing nearly 620 million pounds of copper (1973:3). He also describes the environmental damage caused by those activities. Poisonous fumes released by the smelters degraded nearby agricultural lands and forests, leading to what Kristofors calls "one of the earliest cases of federal intervention in a conservation crisis" (1973:xi) when the government forced two of the smelters to cease their operations (see also Bloom 2010).

The Environmental Effects of Mining

As Kristofors and others have shown, mining had (and has) an enormous impact on the physical environment, everything from scattered prospect pits to huge tailings fields to the washing away of entire hillsides with hydraulic monitors (Figure 15). The fact that every type of mining and its resulting features are still visible on the landscape illustrates the duration of these impacts. Adkins (2007) provides a particularly detailed (and damning) picture of the environmental effects of mining along the Trinity River, where siltation and debris destroyed fish runs, disrupted transportation, and increased flooding problems, and how mining in general "rapidly and extensively disrupted the ecosystem of the region" (2007:100). The same was true in all regions where mining took place on a large scale (see, for example, Kristofors 1973).

Placer mining, perhaps the most innocuous method, still caused lasting damage: miners literally moved streambeds, redirecting them into ditches, and removed, sifted, and redeposited the stream gravels looking for the free gold. "Booming," where water was dammed up and then released all at once, cut huge channels into the hillsides. Hard-rock or lode mining left adits, tunnels, shafts, and waste rock in its wake. The most destructive method, however, was hydraulic mining, followed by large-scale dredging.

Hydraulic Mining Scars ▲

Tailings Piles of Ohio Flat ▲

Figure 15. Environmental Effects of Mining.

The cavalier attitude of nineteenth century whites toward these environmental degradations is reflected in an 1853 article in the San Francisco *Daily Alta California* newspaper that describes a new method of mining (hydraulicking) as being "as novel as it is efficient":

> The column of water thus produced [from the hydraulic monitor] ranges from twenty to one hundred feet according to the height of the hill…[S]uch is the immense power of the water as it escapes from the pipe, that no alluvial deposit can resist the force…The toughest clay dissolves like wax, thus disintegrating much fine gold…The excellence of the plan and the wonderful celerity with which the work progresses must be seen to be appreciated…Then witness the operation of the new appliance: the hydraulic apparatus is brought in contact with the debris…which melts like ice under a midsummer sun, and lo! in much less time than it requires to describe the operation, the huge mass is released from its diluvian home and comes tumbling down into the space below…The reduction of manual labor [is] at least two-thirds…[*Daily Alta California*, June 7, 1853].

Despite the "efficiency" of the method, hydraulic mining played a major role in the "conflict that erupted in the Sacramento Valley in the 1880s among mining, farming, and navigation interests" (Billington et al. 2005:313). Although large-scale hydraulic mining was severely curtailed by the Sawyer Decision in 1884, it continued to be employed in Siskiyou and other northwestern counties by impounding the tailings in dams and operating only in specific seasons.

It is hard from our modern vantage point to understand this attitude. It may be that these people assumed the earth would soon heal itself from these assaults, or that they simply did not care; what is clear is that they believed the economic gain was worth the environmental price. This attitude is by no means extinct in the world today.

The Technology of Gold Mining

Detailed descriptions of regional mining history and technological evolution can be found in several sources, including Bailey (2008), Caltrans (2008), Jones et al. (1981), Selverston et al. (2005, 2011), Tordoff (2013), and Waechter and Marvin (2011). Selverston et al. (2011:Chapter 3) describe the evolution of mining from simple placering using pick, shovel, and pan, to ground sluicing, drift mining, lode mining, hydraulicking, and mechanized dredging (Appendix F of that document also provides a useful glossary of gold mining terminology).[17] Those authors also provide a detailed description of the various forms of gold-bearing placers and gravels.

Similarly, McDonald (1979:62–63) describes the "influence of technological, economic, and social developments" reflected in the gold mining industry on the Klamath National Forest, including the Scott and middle/upper Klamath Rivers: first individual labor and low capital investment (surface placers), then, as the easily accessible gravels played out, somewhat more labor-intensive mining of buried placers and load deposits involving water-conveyance systems (dams, ditches and flumes) that caused some miners to pool their resources. Hydraulic mining required large investments in equipment, such as flumes, pipes, giants, and sluices; dredging and hard-rock mining were also expensive, and soon the lone miner became essentially a thing of the past. These developments paralleled the overall trends in gold mining throughout northwestern California in the second half of the nineteenth century.

Tordoff (2013), Marvin (Waechter and Marvin 2011), Selverston et al. (2011), and others also identify the types of archaeological resources left on the landscape by these various technologies. A slightly

[17] However, Maniery and Millet (2008:7), citing Williams [1930], report that it was mostly Euro-Americans who participated in the "evolving extraction technology." Chinese miners reportedly continued to use cradles or rockers throughout the nineteenth century.

abridged version of Marvin's discussion is presented here, with additions. While her discussion is specific to western Siskiyou County and the Klamath region, the technologies were applied throughout the gold mining regions of California.

Placer Mining (1849–1930s)

Placer mining was the initial extraction method used in northwestern California. Granitic rock, quartz lodes, and the contact zones were washed, eroded, and naturally milled, and the native gold concentrated in former and present streams and gravel beds. It was this "freed" or placer gold that attracted the Gold Rush miners. Typical tools included the pan or *batea*, a cradle or rocker, a sluice box, a long tom, or a combination of these. Miners would literally move the streambeds, removing gravels, sifting them, and re-depositing them, all the while storing water in check dams and redirecting the streams into ditches. Typical archaeological remains of placer mining include stacks of sifted gravels and water-rounded cobbles, sometimes in combination with check dams, ditches, channels, and sluice scars. Early mining operations also might include arrastras: circular, animal-driven crushers for breaking down the ore.

River Mining (1850s–1870s)

By the early 1850s, river mining employed water wheels and wing dams constructed to turn the rivers and work their beds, in addition to the long toms or sluices. Vast piles of waste rock were left along the riverine areas as miners employed derricks and booms to remove the heavy rocks from the auriferous sands, which were then sluiced to remove the gold.

Drift Mining (1850s–1900s)

Some miners found placers by digging, often to bedrock, in the old riverbeds. "Coyoting," a technique that was typical of hard-rock mining, was sometimes used in drift mining as well. With this method, the miner would dig a shaft to the pay dirt and then "drift" into the streak from a mine adit. Drift mines, which involved sinking shafts or excavating horizontal adits into the gravel terraces, was an early method of reaching the gold-bearing gravels in the ancient riverbeds. Gravels were extracted from shafts with windlasses or small headframes, while adits (mine entrances) defined horizontal workings, as did ore cars and tracks.

Hard-rock (Lode) Mining (1850s-present)

Hard-rock mining for gold began in 1850s but was never as rich or productive in the planning area as in the Mother Lode of the Sierran foothills. Although this method of exploration is largely a subsurface operation involving prospecting for gold-bearing quartz veins, it did leave many surface remains. Technological developments in mining and milling of ore were necessary to make the working of the lode deposits profitable: air drills, pumps, rock crushers (stamps), vanners, and the like. Because of the relatively greater investment needed for this technology, it usually involved several miners or a mining company. The most recognizable archaeological remains of hard-rock mining are adits, shafts, and tailings aprons; in some cases, mill structures or foundations, stamp mills, ore cart rails, or timbers from headframes or adit shoring also survive.

Ground Sluicing and Booming (1850s–1900s)

Ground sluicing and booming, early hydraulic methods of washing soils by gravity down a hill to pan or sluice the remains at the bottom, was common in the second half of the nineteenth century. These types of mining activities also required large amounts of water delivered through ditches and flumes. In ground sluicing, the ditch water was turned down the hillside to wash the dirt into the sluices at the lower elevations. Booming involved building a reservoir, letting it fill up, then cutting the dam and allowing the water to rush downhill, cutting great channels 10 or more feet deep into the hillsides. The reservoirs and ditches from these technologies are still visible in many places on the landscape today, although these same features can also represent other types of mining. Earthen sluice traces and stacked-rock sluice supports can also be found, though these tend to be more subtle and harder to identify (Figure 16).

Hydraulic Mining (1870s–1930s)

By the 1870s, hydraulic mining was the most popular and productive form of mining the benches and terraces along rivers and their tributaries. Miles of ditches, flumes, and reservoirs were constructed to bring water to the mines and power the monitors that cut away the banks to recover the gold in long sluices. Working day and night (with pitch torches), first white and later Chinese miners cut away miles of riverbanks (Figure 17).

Hydraulic mining had actually begun in the Mother Lode in the 1850s, when Anthony Chabot attached a wooden nozzle to a canvas hose and washed ancient river gravels. Over the next 20 years, miners improved upon Chabot's design, developing the "little Giant" that would be used for more than 100 years thereafter. The Giant, or monitor, required vast amounts of gravity-fed water at high head to spray on the ancient river gravels. Torrents of water would melt away boulders, trees, gravel, and dirt, all mixed with gold. This technique, always the most successful method of extracting placer gold, reached its peak in the 1880s and 1890s, when miles of ditches, flumes, reservoirs, tunnels, and pipelines were constructed to supply water to the operations. Hydraulic mining, with its sheer hillsides and large open pits, created the dramatic landscapes seen today along many rivers and creeks in the mining regions of northern California.

Dredging (1890s–1950s)

By the 1890s, dredge mining was finding success in Montana and New Zealand and word had spread to California. Selverston et al. (2011:3–21) describe the process this way:

> The gold dredge that evolved in California consisted of a barge that contained the machinery to excavate, process, and discharge gravels from gold-bearing deposits. The dredge floated in the river itself, or as it worked its way away from the river, in its own traveling pond. The excavation of the gravels was accomplished with a continuous chain of large iron buckets, not unlike a huge chainsaw blade, lowered from one end of the barge. It scooped material from the bottom of the pond and its bank and conveyed it onto the barge, where it was dropped into a mechanized sluicing device for gold recovery. The processed tailings were taken off the barge from the rear, by a long conveyer to be deposited on the opposite bank of the pond in large arc-shaped tailings piles. The earliest versions of these bucket-line dredges used steam power; electrical power soon took over, followed later by power from internal combustion engines.[18]

Tordoff (2013:45–61) defines and illustrates two types of dredging: bucket-line (described above) and dragline. She describes bucket-line dredging as "mining on a fantastic scale" (2014:45), and notes that the first *wooden* dredge used anywhere in the world was operated on the upper Trinity River. The dredge tailings are now inundated by Trinity Lake. Dragline dredging involved a smaller, more portable dredge (sometimes called a "doodlebug") and was used during the Great Depression. The most tell-tale sign of dredge mining on the landscape today are tailings, sometimes quite extensive, either in "high, arcing piles of rock…strung out in long lines…that double back on themselves" (Tordoff 2013:73), low, straight rows, or (for dragline dredging) in isolated or clustered conical piles.

[18] Newland et al. (2011) report on their evaluation of a 5,000-acre dredge field at Oroville (CA-BUT-465H).

Earthen Sluice Trace ▲

Rock Sluice Support ▲

Figure 16. Earthen Sluices and Rock Sluice Supports.

Late 1890s ▲

Photo Courtesy of University of California, Davis
Department of Special Collections

Today ▲

Figure 17. Hydraulic Mining at the Huey Hill Placer Mine Siskiyou County.

Mining Districts in the Planning Area

Several major mining districts developed in the planning area during the nineteenth century, and archaeological surveys in these districts have recorded associated resources ranging from scattered prospect pits and small tailings piles to huge complexes of mine workings, support facilities (blacksmith shops, powder houses, etc.), workers' housing, hydraulic cuts, waste rock, and extensive ditch/reservoir systems. Clark (1970:13) lists three "Principal Gold Districts" within our area: Oroville and Magalia in Butte County, and French Gulch in Shasta and Trinity Counties. He also describes dozens of "areas within [the primary districts] that, in the past, have been themselves loosely called "districts" (1970:185). Table 9 lists all of the "areas" and "districts" shown on Clark's Plate 1 and on our Figure 14 that fall into the current planning area. Relatively few of these, however, fall within lands currently managed by BLM.

Shasta and Trinity Counties

Clark's Klamath Mountains Province takes in portions of all of our regions except the Southern Cascade Foothills and Sierra Nevada. However, the vast majority of BLM-managed lands within this province are concentrated in east-central Trinity and west-central Shasta Counties, between the North Fork Trinity River and Shasta Lake. Within this zone is one of Clark's "Principal Gold Districts" (French Gulch), as well as several other major mining areas: Shasta, Redding, Whiskeytown, Weaverville (which includes the famous LaGrange hydraulic mine), and many more. Within the French Gulch district were two principal lode (hard-rock) mines: the Brown Bear, which produced more than $15 million in gold; and the Gladstone, at $6.9 million (Clark 1970:Table 7). It also includes the Washington, the first lode mine every worked in Shasta County. According to Clark, the French Gulch district has been the most productive source of lode-gold in the Klamath Mountain Province.

The largest and best-known of the hydraulic mines in the Trinity region (and one of the largest in California) was the LaGrange Mine, located in Oregon Gulch just west of Weaverville. It was said to have produced $3,500,000 in gold between 1893 and 1918 (Wee and Costello 2001:12). To head-off prospective lawsuits over its dumping of tailings and other debris, the LaGrange Hydraulic Mining Company actually purchased a "right-of-way" stretching four and half miles down Oregon Gulch to the Trinity River, where they could legally discharge detritus from their hydraulic operations. This area included the town of Oregon Gulch, which "was eventually covered with debris to an estimated depth of four to five hundred feet" (Adkins 2007:171). Costello and Wee (2000) and Wee and Costello (2001) have prepared an in-depth historical context and evaluation reports for the LeGrange Mine Historic District and Oregon Gulch. The mine has been determined eligible for listing on the National Register, and it is a California State Historical Landmark (No. 778). It seems somewhat ironic that, in the 1930s, the State Highway Commission used hydraulic giants from the abandoned LaGrange Mine to cut a right-of-way through Oregon Mountain for State Route 20 (now State Highway 299), washing more than 10 million cubic yards of material into the open pit of the mine (Wee and Costello 2001:17).

In the last decades of the nineteenth century, mining remained a primary economic activity in most of northwestern California. When hydraulic mining was outlawed in the Mother Lode mines by the 1884 Sawyer decision, because of the tons of debris it sent down into the Central Valley waterways, many hydraulic operations moved into "the state's isolated northwestern counties, whose westward-flowing rivers and drainages were exempt from the ban" (Bailey 2008:6–7).[19] By 1898, there were 327 hydraulic mines "working or claimed" in Trinity County (Adkins 2007:171); the LaGrange would continue operating for another 20 years. Overall, mining along the Trinity River "helped create and sustain the county's

[19] Adkins (2007:149-155) gives a detailed account of the "intricate legislative and legal battles" that led up to the Sawyer Decision.

Table 9. Primary Mining Districts in the Planning Area (from Clark 1970, with additions).

DISTRICT	COUNTY	PRINCIPAL TYPE(S)[a]	PRIMARY PERIOD(S) OF OPERATION[a]	NOTES/RELATED STUDIES
SIERRA NEVADA PROVINCE				
Bangor-Wyandotte	Butte	Placer, Drift, Hydraulic	1850s–1890s	-
Bidwell Bar	Butte	Placer	1848–1850s	-
Butte Creek	Butte	Placer, Drift, Hydraulic, Dredge	1850s–1920s	-
Cherokee	Butte	Hydraulic, Diamonds	-	-
Clipper Mills	Butte/Yuba	Drift, Hydraulic	-	-
Concow	Butte	Placer, Lode	-	-
Forbestown	Butte	Placer	1848–1900s	-
Honcut	Butte	Dredge	-	-
Hurleton	Butte	-	-	-
Inskip	Butte	Lode	ca. 1900s	-
Kimshew	Butte	Drift, Hydraulic	-	-
Magalia	Butte	Placer, Lode	ca. 1850–1890s	-
Merrimac	Butte	Placer, Lode	"During and after Gold Rush"; 1930s+	-
Mooreville Ridge	Butte/Plumas	Hydraulic	-	-
Mooris Ravine	Butte	Placer, Lode	ca. 1849–1916	-
Oroville	Butte	Dredge, shallow placer	1848–1863, 1893–1916[b]	Newland et al. (2011); Praetzellis et al. (2006); Selverston et al. (2005, 2011)
Polk Springs	Tehama	-	-	-
Yankee Hill	Butte	Placer, Lode	ca. 1849–1900s, 1933–1942	-
KLAMATH MOUNTAINS PROVINCE (INCLUDES SHASTA/TRINITY REGION)				
Backbone	Shasta	-	1886–1913	-
Bully Choop	Trinity	Lode	late 1880s-early 1900s	-
Callahan	Siskiyou	Placer, Bucket-line dredge	-	-
Cecilville	Siskiyou	Placer, Lode	-	3,000–5,000 Chinese miners reportedly worked the Salmon River "by means of flumes and wing dams" (Clark 1970:134).
Centerville	Shasta	Lode	-	-
Clear Creek	Shasta	Placer	-	-

Table 9. Primary Mining Districts in the Planning Area (from Clark 1970, with additions) *continued*.

DISTRICT	COUNTY	PRINCIPAL TYPE(S)[a]	PRIMARY PERIOD(S) OF OPERATION[a]	NOTES/RELATED STUDIES
KLAMATH MOUNTAINS PROVINCE (INCLUDES SHASTA/TRINITY REGION) continued				
Coffee Creek	Trinity	Placer, Lode, Dragline dredge	-	-
Cottage Grove	Siskiyou	-	-	Site of very early mining camp on the Klamath River near its junction with the Salmon (Waechter and Marvin 2011:17).
Cottonwood	Siskiyou	Placer, Lode	-	-
Cottonwood	Shasta	Placer, Dredge	-	-
Deadwood	Siskiyou	Placer, Lode, Dredge	-	-
Deadwood	Shasta	Placer, Lode	-	-
Dedrick-Canyon Creek	Trinity	Lode, Hydraulic	1880s–1930s	-
Dillon Creek	Siskiyou	Placer, Drift	"Gold Rush"; 1953–1960	-
Dog Creek	Shasta	Placer, Lode	"Gold Rush"; 1890s–1900s	-
Dorleska	Trinity	Lode	1890s and later	-
Forks of Salmon	Siskiyou	Placer	1849 and later	-
French Gulch	Shasta/Trinity	Placer, Lode	1849-ca. 1914	Includes first quartz (lode) mine worked in Shasta County (Washington Mine).
Gas Point	Shasta	-	-	-
Gazelle	Siskiyou	Lode	1880s–ca. 1907	-
Gilta	Siskiyou	Placer, Lode	mostly pre-1900	-
Gottville	Siskiyou	Placer	-	-
Hamburg	Siskiyou	Placer	ca. 1852–1860[c]	Operations included construction of wingdams, derricks, sluices, and Chinese pumps (Waechter and Marvin 2011:33).
Harrison Gulch	Shasta	Placer, Lode	1896–1914	-
Helena-East Fork	Trinity	Placer, Lode	-	-
Hoopa	Humboldt	Placer, Lode	-	Copper/Gold district; some of the gold recovered as a by-product of copper mining.
Hornbrook	Siskiyou	Placer	-	-
Humbug	Siskiyou	Lode, Dredge	-	-
Igo-Ono	Shasta	Placer, Hydraulic, Drift, Dredge	ca. 1851–1890; 1933–1959	See Ritter (1986).

Table 9. Primary Mining Districts in the Planning Area (from Clark 1970, with additions) *continued*.

DISTRICT	COUNTY	PRINCIPAL TYPE(S)[a]	PRIMARY PERIOD(S) OF OPERATION[a]	NOTES/RELATED STUDIES
KLAMATH MOUNTAINS PROVINCE (INCLUDES SHASTA/TRINITY REGION) continued				
Indian Creek	Siskiyou	Placer, Hydraulic	ca. 1848 and later	Also included Gray Eagle copper mine (Waechter and Marvin 2011:24).
Jelly (Ferry)	Tehama	Placer, Dredge	-	Chinese miners used ground sluicing to mine the gold-bearing gravels.
Knownothing	Siskiyou	Placer	-	-
Liberty	Siskiyou	Placer, Lode	1850s–1910	Also known as the Black Bear district.
Minersville	Trinity	Placer, Lode	-	-
Monumental	Del Norte	Lode	ca. 1900 and later	-
New River-Denny	Trinity	Placer, Lode	1849 and later; 1930s	-
Oak Bar	Siskiyou	-	-	-
Old Diggings	Shasta	Hydraulic, Lode	"Gold Rush"; 1904–1919; 1930s	Also known as the Buckeye district.
Orleans	Humboldt	Placer, Hydraulic	ca. 1849-early 1900s; 1930s	-
Oro Fino	Siskiyou	Placer, Lode	"Gold Rush" and later; 1930s–1940s	-
Platina	Shasta	Placer	-	-
Redding	Shasta	Placer, Lode, Dredge	1848 and later; 1930s	Originally "Reading"
Sawyers Bar	Siskiyou	Placer	-	-
Scotts Bar	Siskiyou	Placer, Hydraulic, Lode	1850 and later	-
Seiad	Siskiyou	Hydraulic, Dredge	-	Also included several chromite mines (Waechter and Marvin 2011:24).
Shasta-Whiskeytown	Shasta	Placer, Dragline Dredge	1849 and later; 1930s	Hamusek-McGann et al. (1999): study of 18 historic-era mines in the Whiskeytown area. Bevill and Nilsson (2001): historical overview of Whiskeytown-Shasta-Trinity NRA.
Smith River	Del Norte	Placer, Hydraulic	1850s–1870s	Chrome also mined here during WWI and WWII.
Snowden	Siskiyou	Placer	-	-
Somes Bar	Siskiyou	Placer	-	-
Stuart Fork	Trinity	-	-	-

Table 9. Primary Mining Districts in the Planning Area (from Clark 1970, with additions) *continued*.

DISTRICT	COUNTY	PRINCIPAL TYPE(S)[a]	PRIMARY PERIOD(S) OF OPERATION[a]	NOTES/RELATED STUDIES
KLAMATH MOUNTAINS PROVINCE (INCLUDES SHASTA/TRINITY REGION) continued				
Weaverville	Trinity	Placer, Hydraulic, Dragline Dredge	1848–1942	Includes the La Grange Mine (see text). Costello and Wee (2000), Wee and Costello (2001).
Trinity River	Trinity, Humboldt	-	-	Adkins (2007); Bailey (2008); Tordoff (2013)
Big Bar	-	-	-	-
(Fool's) Paradise	-	Placer, Lode	-	-
Burnt Ranch	-	-	-	-
Carrville	-	Placer, Lode, Dredge	-	-
Cottonwood Creek	-	-	-	-
Dodge	-	Placer	-	-
Douglas City	-	Placer	-	-
Eastman Gulch	-	Placer, Lode	-	-
Happy Camp	-	Dredge	-	-
Hayfork	-	Hydraulic, Dragline Dredge	-	-
Indian Creek	-	-	-	-
Junction City	-	Hydraulic, Dredge	-	-
Lewiston	-	Placer	1850s-ca. 1900	Also known by other names, including Ohio Flat. Kelly and McAleer (1986)
Poker Flat	-	Placer	-	Name possibly derived from "Polka Flat," reflecting large percentage of German miners.
Salyer	-	-	-	-
Shasta Copper/ Zinc Belt	-	Lode	1850s–1950s	Gold, silver, copper, and zinc mined here. Includes West Shasta and East Shasta districts, the latter partially inundated by Shasta Lake.
Trinity Center	Trinity	Placer, Dredge	-	-
Yreka	Siskiyou	Placer	-	Also known as the Hawkinsville district.

Table 9. Primary Mining Districts in the Planning Area (from Clark 1970, with additions) *continued*.

District	County	Principal Type(s)[a]	Primary Period(s) of Operation[a]	Notes/Related Studies
Coast Ranges Province				
Smith River	Del Norte	Placer, Hydraulic	1850s–1870s	-
Crescent City	Del Norte	Placer	1850s and later	Small-scale operations to recover gold and some platinum from black sand deposits on beaches
Monumental	Del Norte	Lode	ca. 1900 and later	-
Island Mountain	Trinity	Lode	1915 and later	Sulfide deposits mined for copper, silver, and gold
Orick	Humboldt	Placer	1852–1880s	Small-scale operations to recover gold and some platinum from black sand deposits on beaches

Notes: [a] Information from Clark (1970) unless otherwise noted; [b] From Selverston et al. (2011); [c] From Marvin (Waechter and Marvin 2011).

economic base [and] reflected significant advances in mining technology over time: from pan and waterwheels, to hydraulics, and finally to dredges" (Bailey 2008:7).

The Shasta/Trinity area encompasses perhaps the most thoroughly studied of all historic mining districts in the planning area. Costello and Wee (2000) and Wee and Costello (2001) have produced in-depth studies of the Oregon Mountain Summit and LaGrange Mine historic properties and archaeological remains in Lower Oregon Gulch; Bevill and Nilsson (2001) and Hamusek-McGann et al. (1999) have researched historical mining in the Whiskeytown area; Kelly and McAleer (1986) carried out archaeological investigations at one site in the Lewiston/Ohio Flat district; Ritter (1986) has done a study of a Chinese mining venture near Igo; Sundahl and Ritter (1997) report on excavations at two multi-component sites that include evidence of Chinese occupation; Vaughan and Ritter (1992) discuss one of the most important gold mining districts in Shasta County (Clear Creek), as well as Chinese miners in the region, types of mining technology used, and early settlements; and Tordoff (with Seldner 1987) writes about the history and archaeology of the Cottonwood Mining District south/southwest of Redding, predominately a placer mining area with limited hydraulicking. Valuable historical studies of mining along the Trinity River have been done by Adkins (2007), Bailey (2008), Rich (2014), and Tordoff (2013). Additional information on gold mining in the region is available from single-site investigations by LaLande et al. (2015); Vaughan (1986); and Vaughan and Ritter (1992).

The Mother Lode

Although the planning area does not extend into the heart of the "Mother Lode" as it is typically defined, Selverston et al. (2011:3–5) point out that "there are lode deposits throughout the Sierra Nevada in addition to the interconnected Mother Lode, including some in eastern Butte County."[20] Some of the most recent (and most thorough) historical overviews of gold mining in California can be found in a series of reports by Sonoma State University on the archaeology of Lake Oroville (see, in particular, Selverston et al. 2005, 2011; Walker and Phil 2015). These studies rely heavily on primary sources, including Gold Rush diaries and historic maps, to describe the early history of eastern Butte County.

Among the most productive of the northern lode-mining districts in Butte County were the areas around Forbestown, Yankee Hill, and Magalia near what is now Lake Oroville (see Figure 14). However, lode mining was not the main activity, at least in the vicinity of the reservoir: of the 292 sites with gold mining property types within the Lake Oroville FERC boundary, Selverston et al. (2011:Table 3.2-197) identified 97 sites with placer mining remains but only 12 with lode mining features.

BLM-managed lands in Butte County are mostly concentrated along Butte and Big Chico Creeks and the West Branch, Middle Fork, and South Fork of the Feather River. Important mining districts in these areas included Butte Creek (on Butte Creek), Magalia, Bidwell Bar, Yankee Hill, Cherokee, and Forbestown. Clark (1970) describes these districts in detail; the following are brief summaries of that text.

Butte Creek was primarily a dredging area that extended for nearly 12 miles along the creek, between Chico and Centerville. Clark (1970:32) reports that there was some placer, hydraulic, and drift mining as well, in the early years, but by the beginning of the twentieth century the creek gravels were being "worked with primitive power shovels and washing plants." Selverston et al. (2011:3-43 to 3-44) cite several archaeological studies of the Butte Creek area, including Elliot's 1995 thesis on BUT-854/H, a mining camp that has been listed on the National Register (period of significance 1850–1874); and another mining camp, BUT-1106/H, investigated under an agreement between BLM and California State University, Chico (Kraft 1998; Ritter 1989).

[20] According to these authors, the "prevailing definition" of the Mother Lode includes a 120-mile-long area between Mariposa and northern El Dorado County. We question this definition, as it appears to omit the major lode-mining zones in Placer and Nevada Counties.

The Magalia district, 15 miles northeast of Chico, was "extensively mined during and after the gold rush [sic]" and was "one of the most productive placer mining districts in the state," with much of the gold coming from drift mines (Clark 1970:88). The major drift mines were the Emma, Indian Springs, Magalia, Pershbaker, and Royal mines. The Magalia district also produced the 54-pound "Willard nugget" in 1859.

Bidwell Bar, one of the earliest of California's Gold Rush settlements, was named for John Bidwell's second discovery of gold on the Feather River in 1848. According to Clark, however, "the gravels were exhausted in a few years and the miners moved elsewhere" (1970:30). It now lies inundated beneath the waters of Lake Oroville.

The extensive Yankee Hill mining district saw both placer and lode mining. Like many areas, Chinese miners reworked the "exhausted" placers after the white miners had moved on. Within the district, the Surcease mine was worked "on a major scale" in the 1890s–1900s, yielding more than $1 million in gold, and the Big Bend mine produced copper during the Second World War (Clark 1970:131).

The output of the Cherokee district, supposedly named for a "party of Cherokee Indians who migrated here in the 1850s to mine gold" (Clark 1970:36), came mostly from its single large hydraulic mine of the same name. The Cherokee mine produced about $15 million during the course of its operations, some of it in the form of diamonds recovered from the gold-bearing gravels.

Forbestown is 15 miles due east of Oroville. Placer mining during the Gold Rush yielded "huge amounts of gold" from the South Fork Feather River (Clark 1970:49). One major mine within the district was the Gold Bank, which operated "on a major scale" from 1888 to 1904. Clark (1970:49) tells us that moderate mining activity continued here through the 1930s.

Logging and Lumbering

In nineteenth- and early twentieth-century California, mining, logging, and settlement went hand-in-hand. Mining—particularly lode mining—required vast quantities of wood for timber shoring, headframes, steam power, and building construction. In his description of travels through the region in the late 1850s, Isaac Cox remarked that "every mining camp along the Trinity River had its own sawmill" (Adkins 2007:98). Much of the lumber was used to build flumes in the river canyon, to carry water to the placers and to power hydraulic monitors. One local Trinity lumberman, Franklin Buck, estimated in the summer of 1856 that he had sold more than 100,000 board feet of lumber to the mines (Adkins 2007:99). Wooden flumes were also constructed to move logs from the timber stands to the mills, as with the historic Chico Flume, the Empire Flume, and the Blue Ridge Flume in the Shasta/Tehama region (Hutchinson 1956; Smith 1992; Woodrum 2009b).

Gradually the scale and intensity of logging in all forested areas of northwestern California evolved from water-powered sawmills and oxen to transport the logs to the mills, to steam-driven sawmills, steam donkeys, and logging railroads. The remains of these activities can still be seen in many locations, in the form of narrow-gauge railroad segments, donkey sleds, boilers, work camps, and other archaeological sites and features.

The markets also expanded, from local mining interests and residents to "far-off destinations such as San Francisco, Hawaii, Australia, and the Philippines" (Adkins 2007:132). The spread of settlement meant an increased demand for wood as well, to build cabins, corrals, stores, and other structures. Both of these activities stimulated the local lumber industries throughout the north state. Small sawmills arose to supply the local areas, especially in more remote areas that could not easily access larger markets, while large lumber operations served major towns and regions.

Logging the Redwoods

Redwood lumbering in the North Coast Ranges began in the 1850s and quickly became one of the most important economic activities, especially in Humboldt and northern Mendocino Counties. The first sawmills sprang up along Humboldt Bay in 1850, and though many failed within a year, by 1860 Humboldt had become the second-ranking county in California in the production of lumber, sawing 30,000,000 board feet annually. The June 6, 1861 edition of the *Alta California* reported that "[l]umbering is the main occupation and source of employment" in the Humboldt Bay region. According to Irvine (1915:113), lumber companies cut nearly six *billion* board feet of redwood lumber between 1889 and 1913. Most of the lumber was shipped to the San Francisco market (Bearss 1969). Redwood lumbering created perhaps the first millionaires in Humboldt County, including Canadian lumberman William Carson, whose 1884 Victorian mansion—built almost entirely of redwood—still stands in the town of Eureka.

Not only redwoods were logged, however. As the local industry expanded, lumber companies also cut stands of Port Orford cedar, Douglas-fir, tanoak, and several species of pine. In the early years, horse-drawn carts carried the logs to the edge of Humboldt Bay (Carranco and Sorensen 1988); eventually they were replaced by machinery, as the lumber companies built the first railroads in California. By 1854–1855 there were already 20 miles of these railways in Humboldt County, and more were constructed as the closer timber stands were cut over and the lumber companies had to go farther afield. Several studies within the mill town of Falk, near Eureka, provide insight into the daily lives of workers in the local lumber industry in the late nineteenth and early twentieth centuries (Bryant and Rich 2011; Heald 2002; Rich and Roscoe 2009).

Logging the Interior

In other regions, particularly the dense timber stands of the Klamath Mountains and High North Coast Ranges, logging was and is an economic mainstay. Although Adkins (2007:201) says that logging and milling did not occur on an industrial scale in the Trinity River Basin until after World War II, the County Assessor's Reports of County Statistics list 18 water-powered sawmills in Trinity County by 1858. Sawmills were established along the Klamath, Scott, Salmon, and Trinity Rivers and their larger tributaries; Belden (1997) identifies a total of 44 sawmills in Trinity County alone. Most were run by water power or steam, and later by gas-powered engines. In the early years logs were moved downriver to the sawmills or hauled out by high-wheeled wagons and teams of oxen or horses. Early-on, sawmills often were mobile, self-contained features that were moved to new locations when all the merchantable trees in an area had been cut down. Rivers or draft animals were used to transport the logs to the mills. The work crews typically consisted of a cook, several choppers, a few sawyers, and additional workers to peel and ring the trees after they were felled. Logging camps were set up, and might include shanties for housing workers, a cookhouse, a storehouse, a repair shop, and a barn for the animal teams.

Some of the earliest logging in the planning area, however, took place in the upper Sacramento Valley: Bevill and Nilsson report that the "first recorded incident of logging in present-day Shasta County occurred in 1844," in the vicinity of what is now the town of Cottonwood (Bevill and Nelson 2001:127). The logs were rafted downstream to Johann Sutter's fort at New Helvetia (Sacramento). The lumber industry did not really take off, however, until the Gold Rush triggered an immense need for flumes, dams, mine timbers, mills, cabins, and other wooden structures. Smith (1997:47) tells us that the first lumber mill in Tehama County was built in ca. 1851, on the Sacramento River above Mill Creek. In Shasta County, there were at least eight sawmills by 1852—"all but one located in the Horsetown and Whiskeytown mining districts" (Bevill and Nilsson 2001:128). The lack of good roads, however, limited the amount of lumbering to the hills on either side of the Sacramento Valley. The forested mountains east of Redding and Red Bluff were not logged to any great degree until the mid-1860s, and areas to the north not until the early 1870s. The construction of the California & Oregon Railroad to Redding in 1872 and on to Oregon in the early 1880s provided an easier way to move lumber to market and expanded local operations (Bevill and Nilsson 2001:131).

Railroad Logging

Railroad logging in California's timberlands has been the subject of books, magazine articles, historical society publications, tourist attractions, and historical/archaeological studies. These railroads began as a way to access remote regions that had no developed road systems, and expanded to reach increasingly distant timber stands. This created a need for remote camps for the workers and a system for transporting the logs. Logging railroads served both purposes, moving portable camp structures ("skid shacks") into the woods and logs back out to the mills. Railroads were expensive to build, however, and railroad logging systems "required a larger and more highly skilled workforce and more capital outlay" (Caltrans 2013:96).

Miller (2014) describes several of the logging railroads in the North Coast region, including a two-mile-long rail system from Union (Arcata) to Humboldt Bay that was later incorporated into the Arcata and Mad River Railroad; the McKay & Company Railroad; and the short-line Freshwater Railroad. The latter was eventually acquired by the Pacific Lumber Company and operated into the 1940s. Borden (1958) presents a history of the Oregon & Eureka Railroad, which operated for only nine years (1903–1911). Carranco and Sorensen (1988) provide a detailed discussion of railroad logging in Humboldt County from 1854 to the 1930s, when rubber-tired vehicles took over the job of transporting logs from the forest to the mills.

Many logging railroad systems were active in other regions as well, including those operated by the LaMoine Lumber and Trading Company in Shasta County (Vaughan 1985a), the Red River Lumber Company in Shasta and Lassen Counties (Maniery and Baker 1997); the McCloud River Lumber Company in Siskiyou County (Elliott 1990; Vaughan 1985b); the Butte & Plumas Railway Co. (Robertson 1998); and others. On the Klamath National Forest alone, 15 different railroad logging systems were in operation in the late nineteenth and early twentieth centuries, with another 11 on the Shasta-Trinity (Tamez et al. 1988:76–78). Many others operated just to the south, in the Sierra Nevada timber zones.

Tamez et al. (1988) identified four primary research domains for railroad logging in California: environment, technology, economics, and society and culture. Their "Contextual History for Railroad Logging in California" was prepared as part of a Programmatic Agreement between the US Forest Service Region 5 (California), the State Office of Historic Preservation, and the Advisory Council on Historic Preservation, for the treatment of railroad logging systems on National Forest lands. Several studies followed from that research design, including those by Elliott (1990) and Vaughan (1985a, 1985b). More recently, a historical context and archaeological research design for work camps, including logging and lumber camps, has been published by the HARD research group (Caltrans 2013). That publication presents contextual background, property types, and research themes for railroad logging camps, and borrows Conners' (1990) ranking system for determining the integrity of archaeological remains associated with those camps.

MARITIME ACTIVITIES

Although limited geographically, maritime activities have been important on the North Coast since the beginning of the historic period in northwestern California. These have included early explorations (see that section, above), economic pursuits, military undertakings, and boating/lifesaving operations. The Humboldt coast, in particular, has a long history of commercial fishing and canneries, shipping of lumber and other commodities, and lighthouse facilities. Commercial fishing (of salmon in particular) began in the 1860s and continues to be a major part of the local economy today.

Fishing and Whaling

The salmon fishery and canning industry on the North Coast are well known. What is less commonly known, however, is that whaling was also a busy industry along the California coast throughout the second half of the nineteenth century (Bertão 2006; Caltrans 2013; Warrin 2007)." Before 1850, the coastal whaling industry took precedence, followed by the state's salmon fisheries. California's early whaling and fishing industries were dependent on the exportation of their products" (Caltrans 2013:128). As on the East Coast, the principal product was whale oil. According to Bertão (2006), most of the whalers on the California coast were Portuguese from the Azores.

Obviously, most of this activity took place offshore, but the whaling industry also created facilities on land:

> In cities, whalers often lived in boardinghouses, but in rural areas along the California coast they created their own housing by erecting cabins and outbuildings (Bertão 2006:14–16)…Shore whalers built their facilities in sheltered harbors, atop bluffs, using the beach below to anchor the whales. Whaling companies generally operated out of a single strategic building used to store supplies, to hold meetings, and to serve as a hospital, if needed. Married whalers usually secured their own quarters or built their own dwellings. When whaling operations shut down, buildings were often dismantled and relocated to another site (Bertão 2006:27–29). In some whaling camps, whalers cultivated small gardens and raised animals for food [Caltrans 2013:129].

Caltrans (2013:Table 4) lists three known whaling stations within the planning area counties: Whaler Island in Crescent City Harbor, operating from 1885 to 1895; Trinidad Bay, used for an unknown period beginning in 1861; and Buhne Point in Humboldt Bay, from 1855 to an unknown end-date. According to Warrin (2007), the whaling industry continued sporadically in California until 1972. To our knowledge, no whaling- or fishing-related sites have been identified on BLM-managed lands in the planning area.

Shipping

As early as the 1850s, Humboldt Bay developed a small export lumber industry (Paterson et al. 1978:15). The lack of a good road system meant that sawmills had to be close to the bay for ease of shipment of finished redwood lumber from the Humboldt and Mendocino coasts to San Francisco. Paterson et al. (1978) report that, at the turn of the twentieth century, there were 50 lumber ports along "the redwood coast," served by a fleet of lumber schooners that anchored in Humboldt Bay. These ships were "the main link to the outside world" until the construction of a railroad between Eureka and San Francisco in 1914. Even then, shipping remained a primary mode of transport for the local redwood industry: in 1915 Irvine reported that "[a]t this time redwood shingles can be shipped from Humboldt Bay to Chicago on a sixty cent rate and to New York and Boston via the Isthmus of a sixty-seven and a half cent rate…" (Irvine 1915:119).

In addition to redwood, these ports processed and shipped bark from the tanoak or tanbark oak tree, a common understory species in redwood forests. The bark, rich in tannins, was used to tan leather goods, and by the late nineteenth century the harvesting and shipping of tanbark was a major economic activity along the North Coast. Irvine (1915:120) tells us that "the quality of tan bark found in this county is the very highest," and that "thousands of cords of tan bark have been shipped out of the county, and there are still many thousands of cords to be gathered." The industry continued to thrive into the first decades of the twentieth century, when the loss of large tanoak trees caused it to decline.

Aids to Navigation

To aid in shipping and navigation in general, various entities and individuals built lighthouses along the California coast. Within the planning area, these include the Battery Point Light at Crescent City (1856–1982), the Cape Mendocino Light (1868–1970s, subsequently dismantled and reassembled at Mal Coombs Park in Shelter Cove), the Punta Gorda Light (1912–1951), the Point St. George Reef Light (1982–1975), the Humboldt Harbor Light (North Spit, 1856–1892; abandoned and replaced by the Table Bluff Light), the Table Bluff Light (1892–1961), and the Trinidad Head Light (1871-present; Figures 18 and 19).

The Humboldt Harbor Light once stood on the North Spit of Humboldt Bay behind the Coast Guard Station. It was abandoned in 1892 in favor of a higher lighthouse on Table Bluff. The older lighthouse collapsed in 1933, but foundation ruins remain. These ruins were recorded by BLM archaeologists in 1983 as site HUM-662H. Test excavations were conducted here, but the results have not yet been written up. The recovered artifacts are curated at the BLM office in Arcata. The site was determined ineligible for the National Register, because it lacked integrity (Pfilf 1995). The Table Bluff Light was constructed on a promontory south of the bay, above the South Jetty. Grangaard (2002:9) reports that the nearby town of Table Bluff once contained "a hotel (built by Van Aerman in 1852), a saloon, blacksmith shop, livery stable, general store, schoolhouse, dance hall, grange, church, six homes, and a post office established in 1861." The lighthouse was deactivated in 1961; as of 2014, all that remained were the foundations. The lighthouse was determined ineligible in 2011 for lack of integrity (Munson 2014).

Table 10 summarizes the detailed descriptions and photographs available on the US Coast Guard website. (That site does not provide detailed information on the Humboldt Harbor Light.)

INFRASTRUCTURE DEVELOPMENT: TRANSPORTATION, UTILITIES/COMMUNICATION, AND WATER DEVELOPMENT

These two themes are presented in this separate section because they relate to virtually all of the other themes, events, and trends that make up the history of northwestern California. They tended to be means to an end, whether that end was immigration, access to mining areas, linkages between settlements, transport of goods, or water to support all of these (and other) elements.

Transportation Systems

Transportation features and systems are critical to the development of any region: without them, people and products cannot move efficiently. Foot and pack trails, ocean and river corridors, wagon/stage roads, and railroads literally opened California up to the miners, settlers, merchants, and companies that would guide the development of the state through the end of the nineteenth century. The result was a maze of travel corridors, some of which survive today as modernized routes, while others exist only as faint linear traces…if at all.

Ocean and River Routes

The earliest of these transportation systems were the ocean routes used by European explorers and fur trappers, as described earlier. These continued to be important as shipping routes and for carrying the many thousands of gold miners who arrived at Yerba Buena (San Francisco), Eureka, and other ports on their way to the inland mines. With the exception of these ports (and later, lighthouse stations), ocean travel obviously left no archaeological remains on the landscape.

River travel soon became an important way of moving commercial goods and passengers, especially on the Sacramento. Before the era of hydraulic mining, which silted up many of the waterways between the Sierra Nevada and the San Francisco Bay, ships (and salmon) moved easily along the river to inland ports at places like New Helvetia (Sacramento), Tehama, and Reeds Creek Landing (Red Bluff; Smith 1997; Wilson 1998). Wilson reports that "From 1850 onward, freight and passengers were moved by wood[-]fired steam[-]powered paddle craft, and in later years by coal[-]fired steam, upriver as far as conditions would permit. From these river transport termini, wagon roads led on to the North" (1998:8).

Smith (1997:14) tells us that "[r]iver navigation was the lifeblood of Red Bluff in the early years," when "[t]he gold mining districts to the north desperately needed a point of supply nearer than San Francisco or Sacramento." Steamboats began arriving at Red Bluff in 1852, and the town soon became a

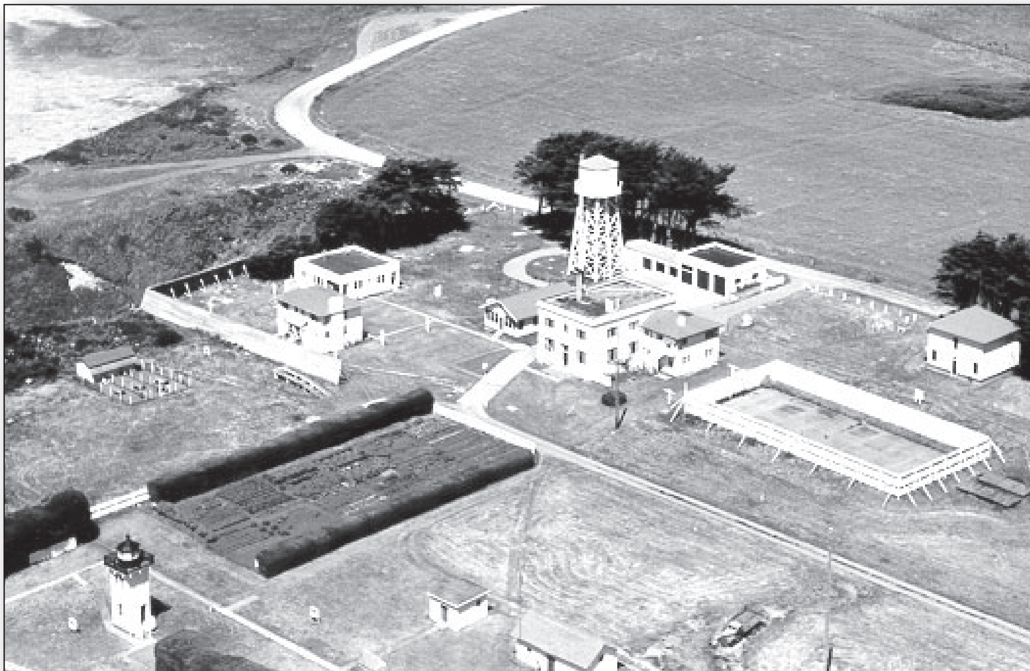

Figure 18. Table Bluff and Cape Mendocino Light Stations.

Figure 19. Punta Gorda and Trinidad Head Light Stations.

Table 10. Lights and Lighthouses on BLM-Administered Lands in the Planning Area.

Name	Original Location	Years of Operation	Materials	Tower Shape	Original Lens	Historical Notes
Humboldt Harbor Light	North Spit, Humboldt Harbor	1856–1892	Brick	Round on rectangular house	Fourth order lens	Abandoned in favor of higher lighthouse on Table Bluff. Only ruins remain.
Table Bluff Light	Table Bluff, Humboldt Bay	1892–1961	Wood	Square	Fourth order lens from Humboldt Bay relocated to Table Bluff	Replaced Humboldt Harbor Light. Only ruins remain. Sometimes called Humboldt Bay Light Station and confused with Humboldt Harbor Light Station.
Punta Gorda Light	12 mi. south of Cape Mendocino, Humboldt Co.	1911–1951	Reinforced concrete	Square	Fourth-order Bulls Eye	Included two-story lighthouse, concrete oil house, wooden fog-signal building, blacksmith/carpenter shop, three sheds, barn. Currently (2016) subject to condition assessment by BLM..
Old Cape Mendocino Light	Cape Mendocino, Humboldt Co.	1868–1970s	Concrete, cast iron	16-sided pyramidal	First-order Fresnel, moved to Humboldt Co. fairgrounds 1950	43-foot tower one of the highest in the US at 422 ft above sea level; lighthouse structure dismantled and moved to Shelter Cove in 1998.
Trinidad Head Light	Trinidad Harbor, Humboldt Co.	1866–present	Stone, brick	Square pyramidal	Fourth-order Fresnel	Originally included small two-story lighthouse, single Victorian residence, small barn, bell house. Housing and barn razed by US Coast Guard in 1960s; replica Memorial Lighthouse stands in Trinidad, with original lens.

thriving community supported in part by the river trade. The importance of river transport was reflected in the large number of ferry landings up and down the Sacramento. Smith also notes, however, that the Sacramento River was not navigable year-round "because of the dangers of snags, sand bars, and the insufficient summer depths of the river" (1997:14). During those times, people and supplies had to move by pack mule or wagon along the many trails that ran along both sides of the Sacramento River. Nevertheless, steamboats continued to "ply the waters of the Sacramento" as late as 1937 (Smith 1997:15).

Pack Trails and Wagon/Stage Roads

The many foot and pack trails, often based on Native trails, that brought the first trappers and explorers into the north state include various routes of and connectors to the Oregon-California emigrant trail.[21] There have been several archaeological and historical studies done on these early trails, among them the Yreka Trail (Sullivan et al. 2005), the Siskiyou Trail (Tveskov et al. 2001), and the Old Sacramento Trail (Ritter 2009). These trails often had various routes and were known by various names; Beaton and Wee (in Byrd et al. 2008:34–35) note the following:

> One early route, the California Trail or the Old Sacramento Trail, followed the Sacramento River and crossed the mountains north of the present site of Redding. It was used by the trapper Michel LaFramboise in 1832. A segment of the Siskiyou Trail carried Hudson's Bay trappers between Oregon and the San Francisco Bay along the west side of the Sacramento River. This route began as a trapper's trail before becoming a pack trail, wagon road and coach road…
>
> Hopeful settlers and miners poured into the study area along the California-Oregon Trail between 1840 and 1860. Once travelers reached Oregon, they had three trails to choose from to reach California, all of which passed through the upper Sacramento River Valley. The Eastern Route followed the Pit River to Cottonwood Creek and to Red Bluff. The Western Route reached Shasta from the west, and the Central Route followed the west bank of the Sacramento River through the valley.

Brock (2000), Helfrich (1984), and others provide information and locations of trail markers placed by Emigrant Trails West along the Lassen, Applegate, and Nobles Trails, as well as the Truckee River and Carson River routes of the Oregon-California Trail. These and other early trails provided the main avenues of travel for emigrants entering northern California and southern Oregon in the 1840s–1860s, until the completion of the first transcontinental railroad in 1869. Many of these early trails subsequently developed into commercial or freight roads.

One early emigrant trail is a tantalizing mystery. The so-called "Lost" or "Forgotten Emigrant Trail" is mentioned in local historian Myrtle McNamar's 1952 narrative *Way Back When* (now out of print). As cited in a draft report by Deborah Tibbetts, on file at BLM's Redding office, McNamar describes the trail this way:

> …[M]any miles could be shed [from the Nobles Pass route] by following the Lassen Trail to the head of Deer Creek, thence over a new trail through the north eastern [sic] part of Tehama County, via Child's Meadows, Morgan Springs and the Mineral section to the head of South Battle Creek, thence down [the] south side of South Battle Creek Canyon to the Apple ranch on Paines (Paynes) Creek; this being almost as of Highway 36 [Tibbetts 2016:17].

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[21] This trails is variously known as the Overland Emigrant Trail, The Overland Trail, the California-Oregon Trail, the Old Oregon Trail, and other names. It includes several California State Historical Landmark designations.

Based on the results of archaeological research by BLM's Redding office in 2012 and 2015, Tibbetts theorizes that a portion of the "Forgotten Emigrant Road" is now incorporated into Spring Branch Road, running parallel to (and south of) Battle Creek.

In the early days, roads were often built by individuals who then charged toll for their use. River crossings (ferries) were also privately owned and operated; one local example is Jelly's Ferry, established in 1857 by early settler Andrew Jelly. The ferry "served stage coaches running between Sacramento and Shasta, as well as teamsters, lumber handlers from area mills, sheep drivers, and local travelers trying to reach Red Bluff. The ferry operated for nearly 100 years before it was replaced by a steel-truss bridge in 1950" (Beason and Wee in Byrd et al. 2008:32). Jelly's Ferry Road connected Shingletown, Fort Reading, Red Bluff and Shasta; a segment of the road was incorporated into the county road system in 1860. Another early ferry crossing on the Sacramento was begun by Pierson B. Reading and purchased in 1868 by William Ball, just south of Ash Creek. Ball ferried freight wagons, livestock, and stagecoaches until 1897, when a bridge was constructed nearby. Today Balls Ferry Road runs parallel to the river east of the town of Anderson.

The expanding system of wagon roads served as the main transportation routes for most of the planning area, later augmented (or sometimes superseded) by rail lines. Mail and passengers also traveled these early roads by stage coach. An 1866 broadside printed by the Oregon Stage Line boasted an "Overland Mail Route to California…Through in Six Days to Sacramento [from Portland]…Fare Through, Fifty Dollars" (Figure 20).[22] Today many of the early routes are overprinted by modern paved roads, for the simple fact that it was easier and less costly to improve existing roads than to build new ones.

On the North Coast, where shipping was of major importance, terrestrial transportation arteries were much slower to develop: it was not until 1876 that an overland road was constructed between Eureka in Humboldt County and Ukiah in Mendocino County. Small settlements sprang up along the route, and agricultural products (along with other goods) now moved more easily between the two areas. Smaller wagon roads were constructed to link the main route with more isolated settlements on the coast and in the interior. However, it was not until the early twentieth century that major routes (notably the Northwestern Pacific Railroad to Humboldt Bay in 1914 and the Redwood Highway in the 1920s) would open up the North Coast to the rest of California and to Oregon.

The development of terrestrial transportation systems was vital to the rugged and remote inland regions as well. For the first two decades after the gold discoveries, people and supplies had to travel along slow and circuitous routes on foot or using pack trains, river boats, and wagons. In 1871, a 105-mile-long wagon road was opened to connect Yreka—a "center of commerce in the northern interior of California" (Beckham 2006:114)—to Fort Klamath in southern Oregon. The Topsy Road, as it was known, was a primary freight route through the region for three decades, and by 1900 several stage stops had been established: Ager, Bloomingcamp, Beswick, and State Line Ranch in California; and Way Station/Ranch, Topsy, and Chase Station in Oregon. A 2,500-foot-long segment of Topsy Road has been recorded under the BLM site number CA-030-2027. (There are no way stations in the site record database; presumably these have not been formally recorded.)

Another important early route in the planning area was the Shasta-Yreka Road/Turnpike (CA-030-0187/SHA-2806H), a "historic Gold Rush and post-Gold Rush road system [that] stretched for about 100 miles, linking the old historic mining towns of Shasta and Yreka" (Woodrum 2009a:2). The feature has been determined eligible for listing on the National Register (Ritter 2009). In her historical overview of the road, Woodrum notes that, "[i]n the early days of settlement in Shasta County…the town of Shasta was geographically isolated from northern destinations by rough terrain, hostile Indians, winter snow and

[22]From the California State Parks website at http://www.parks.ca.gov/pages/22491/files/shasta_1866%20overland%20mail%20route_oregon%20line.jpg).

Figure 20. Shasta Overland Mail Route Broadside.

spring flood, and a paucity of roads to other major settlements…" (2009a:2). In the early 1850s, it was "four or five days of hard travel" to cover the 100 miles from Shasta to Yreka. Nevertheless, period newspapers "chronicled a steady flow of mule packers, settlers, gold seekers, traders and merchants, and other travelers" between the two county seats (Woodrum 2009a:3). The road segment recorded as CA-030-0187/SHA-2806H appears to have been part of a stage route from Shasta that connected to the Oregon-California Trail on its way to Yreka (Woodrum 2009a13).

The Middle Creek Road (CA-030-1079; SHA-2667H) was constructed by the citizens of Shasta in the early 1880s to connect the town with the new California & Oregon Railroad line along the Sacramento River (Woodrum 2011). The road was an attempt by the citizens to make up for the fact that the railroad had bypassed their town. It partly followed the "road to Red Bluff" and then turned northeast to parallel the north bank of Middle Creek (Woodrum 2011:48). Woodrum also notes that portions of the road have been obliterated by Highway 299 West and Iron Mountain Road. Even so, Ritter (2011) identified intact segments with a variety of artifacts: horse and mule shoes, tack, wagon parts, rock retaining walls, and even personal items.

Table 11, while certainly not exhaustive, lists many of the more important trails and wagon roads in the planning area, and all roads that appear in the BLM site database. Route names changed over time, and often the same route was given more than one name; names used on the table are taken from reports and site records provided by BLM. The "Earliest Known Date" listed on the table is also somewhat arbitrary in many cases, as trails often developed into wagon roads over time, with no clear-cut date of "construction." In other cases the dates indicate the earliest known map showing the route. Many other early (unnamed) routes were also used to connect mining areas, ranches, and towns, but it is not feasible to identify them all.

Public Railroads

As we have noted, lumber companies built the first railroads in northern California, beginning in the early 1850s; the logging railroads in Humboldt County appear to have been the first. But these systems were limited to the transport of work crews and lumber for specific companies. The first true passenger and freight lines open to public travel were slower in coming:

> …[O]nly a few local railroads began to serve central California's mining areas, where stage company operations soon displayed transportation superiority to those of any other state. Excellent Concord stage coaches could be transported to California about as easily as mud wagons that offered more common services in other states. But heavy locomotives and iron for railroads and their tracks could be imported only with great difficulty. So attention focused almost entirely upon California demands for a transcontinental railroad that would make local lines practical as well [Robertson 1998:5].

Once the transcontinental railroad arrived, those "local lines" began to proliferate: as of June 30, 1876, California already had 18 standard-gauge and nine narrow-gauge railroads (Robertson 1998:17). At first, these were concentrated in the more heavily populated areas of southern California, the San Francisco Bay Area, and the Central Valley. Table 12 lists the historic systems operating in the planning area.

Orsi (2005) provides an extremely detailed discussion of the history of the Southern Pacific, one of the largest and most important railroads in the American West. Over a period of 80 years, the Southern Pacific would gradually purchase, consolidate, and expand many predecessor lines (including the Central Pacific) in the West and Southwest. By the 1920s, the company had constructed or purchased mainlines up and down the length of California, including the Northwestern Pacific from San Francisco to Humboldt Bay (completed in 1914) and a line from Marysville to Redding that on 1874 maps is labeled as the Oregon Division of the Central Pacific Railroad.

Table 11. Major Historic-Era Trails and Wagon Roads in the Planning Area.

Name	BLM or Primary No.	Region(s)	Earliest Known Date	Notes/Other Designations	References
Shasta-Yreka Road/Turnpike	CA-030-0187	Upper Klamath/ Sacramento Valley	pre-1860	Sometimes labeled as a branch of the Old Sacramento River Road and Oregon-California Trail.	Ritter (2009)
Humboldt Wagon Road	CA-030-0272	Upper Sacramento Valley/ Southern Cascades/ Sierra Nevada Foothills	1863	Chico & Humboldt Wagon Road; road houses built at Ten Mile House, Fourteen Mile House, Forest Ranch.	BLM site record
Old Shasta Road	CA-030-0551	Upper Sacramento Valley	ca. 1851	Shasta Wagon Road, Redding & Shasta Wagon Road; Highway 299W	Woodrum (2011)
Shasta to Red Bluff Road	CA-030-0576	Upper Sacramento Valley	1851	Red Bluff Road; connected Shasta to Middletown, Horsetown, Cottonwood, and Red Bluff	Woodrum (2011); BLM site record
Balls Ferry/Shingletown/ Ft. Reading Road Complex	CA-030-0635	Upper Sacramento Valley/ Southern Cascade Foothills	1861	-	BLM site record
Haight Brothers Cattle Trail	CA-030-0710	Upper Klamath	1860s	Haight Brothers Road, Martin's Trail	BLM site record
Yreka Trail	CA-030-0878	Upper Klamath	1833	South Emigrant Trail, Siskiyou Trail, Pitt River Road; reportedly traveled by early trapper and explorer John Work	Sullivan et al. (2005); BLM site record
Pitts River Road	CA-030-0879	Upper Klamath	1850s	Yreka-Fall City Road	BLM site record
Middle Creek Road	CA-030-1079	Upper Sacramento Valley	1884	-	Ritter (2011)
Bull Hill Road	CA-030-1121	Southern Cascades/ Sierra Nevada Foothills	1872	-	BLM site record
Jelly to Inks Creek Road	CA-030-1149	Upper Sacramento Valley	1857	-	BLM site record; Byrd et al. (2008)
Road to Junction City	CA-030-1181	Upper Sacramento Valley and Klamath Mtns/High No. Coast Ranges	1882	Main road from Weaverville to Junction City	BLM site record; Colby (1982)
Democrat Gulch Road	CA-030-1190	Upper Sacramento Valley and Klamath Mtns/High No. Coast Ranges	1911	-	BLM site record
Whitmore's Road	CA-030-1197	Klamath Mtns/High North Coast Ranges	1881	-	BLM site record

Table 11. Major Historic-Era Trails and Wagon Roads in the Planning Area *continued*.

Name	BLM or Primary No.	Region(s)	Earliest Known Date	Notes/Other Designations	References
Road from Weaverville to Steiner Flat	CA-030-1224	Upper Sacramento Valley and Klamath Mtns/High No. Coast Ranges	1913	-	BLM site record
Stony Gulch Road	CA-030-1234	Upper Sacramento Valley	-	-	BLM site record
Lewiston Turnpike	CA-030-1236	Upper Sacramento Valley and Klamath Mtns/High No. Coast Ranges	1858	Tower House to Weaverville	-
Turtle Creek Road	CA-030-1297	Southern Cascade Foothills	-	-	BLM site record
Benson Mine Road	CA-030-1347	Upper Sacramento Valley	1920s	-	BLM site record
Road to Old Shasta	CA-030-1399	Upper Sacramento Valley	1853	Wagon road between Old Shasta and nearby mining areas; segment of Sacramento River Road	BLM site record
Upper Coram Road	CA-030-1407	Upper Sacramento Valley	-	-	BLM site record
Southeast Eastman Sled Road	CA-030-1492	Klamath Mtns/High North Coast Ranges	-	-	BLM site record
Old Highway 299	CA-030-1498	Upper Sacramento Valley	-	Abandoned segments	BLM site record
East Fork Road	CA-030-1513	Upper Sacramento Valley	-	-	BLM site record
Coram Road North	CA-030-1720	Upper Sacramento Valley	-	-	BLM site record
Copley Trail	CA-030-1722	Upper Sacramento Valley	1884	Pack and foot trail, later used to access copper mines in the mountains northwest of Keswick	BLM site record
Texas Location Road	CA-030-1762	Upper Sacramento Valley	-	-	BLM site record
Belle Mill Road	CA-030-1864	Southern Cascade Foothills	pre-1860	Hogback Road	Woodrum (2009b); BLM site record
Camden Toll Road	CA-030-1891	Upper Sacramento Valley	1852/1861[a]	Created from a 1849 packer's trail; partly overprinted by Old State Highway/ Highway 299W	Colby (1982); Smith (2008); Woodrum (2011)
Denny Historic Road	CA-030-1973	Southern Cascade Foothills	-	Possible segment of Tehama Wagon Road	BLM site record
Shasta-Weaverville Road	CA-030-1986	Upper Sacramento Valley and Klamath Mtns/High No. Coast Ranges	1857–1858	Buckhorn Toll Road, Lowden's Toll Road; mostly overprinted by State Route 20	BLM site record

Table 11. Major Historic-Era Trails and Wagon Roads in the Planning Area *continued*.

NAME	BLM OR PRIMARY NO.	REGION(S)	EARLIEST KNOWN DATE	NOTES/OTHER DESIGNATIONS	REFERENCES
Ponderosa Way	CA-030-1987	Sierra Nevada	1933–1935	Ponderosa Truck Trail, built as a fuelbreak by CCC enrollees	BLM site record
Topsy Road	CA-030-2027	Upper Klamath	1871	Topsy Grade, Topsy Wagon Road; section of Yreka-Fort Klamath Wagon Road	BLM (2003); Newland and Walker (2015)
Utah Construction Company Road; OR-A156H	P-04-002548	Sierra Nevada	-	-	BLM site record
Fort Gaston Trail	P-12-001191	Coast Ranges	1850?	Arcata to Hoopa Trail	BLM site record
Tan Bark Road	P-23-003299	Coast Ranges	Late 1880s	Old Government Trail	BLM site record
North Fork Trail	P-53-001766	Klamath Mountains/High North Coast Range	1850s?	"One of the earliest historic routes in Trinity County"; replaced by Hobo Gulch Rd. in 1930s	BLM site record
Oregon-California Trail	-	All except North Coast	1840s	California Trail, Overland Emigrant Trail, California Historical Landmark #799	NPS (2015); OCTA (2016); Wilson (1998)
Beckwourth Trail	-	Sierra Nevada	1851	Sparks, NV to Marysville, CA	Hammond and Hammond (1994); Morgan and Mitchell (2011)
Lassen Trail	-	Southern Cascades/ Upper Sacramento Valley	1848	Lassen Cut-Off	Colby (1982)
Nobles Trail	-	Southern Cascades/ Upper Sacramento Valley	1852	Overprinted by portions of Highway 44	Lassen County Office of Education; Colby (1982); Vaughan (1994)
Siskiyou Trail	-	Upper Klamath	1840s–1850s	Portion of Oregon-California Trail	Tveskov et al. (2001)
Crescent City to Trinidad Wagon Road	-	Coast Ranges	1894	First north-south road on the northern California coastline	Bearss (1969); Redwood National Park site record database
Lockhart Wagon Road	-	Upper Klamath/ Sacramento Valley	1855	Yreka to Red Bluff section of old emigrant trail	Colby (1982)
Yreka Road	-	Upper Klamath/ Sacramento Valley	1859	Trinity Road	Woodrum (2009a)
Old Sacramento Road	-	Upper Klamath/ Sacramento Valley	1861	Lower Soda Springs and Pit River Road, Red Bluff-Yreka Road	Woodrum (2009a)

Table 11. Major Historic-Era Trails and Wagon Roads in the Planning Area *continued*.

NAME	BLM OR PRIMARY NO.	REGION(S)	EARLIEST KNOWN DATE	NOTES/OTHER DESIGNATIONS	REFERENCES
Sacramento River Trail	-	Upper Klamath/ Sacramento Valley	1830s	Early trail first mapped by Hudson's Bay Co. trappers	Woodrum (2009a)
Marysville-Shasta Road	-	Upper Sacramento Valley	1849	Early stage road accessing Bidwell's ranch	White (2015)
Flat Creek Road	-	Upper Sacramento Valley	1861	West bank of Sacramento River from Waugh's Ferry to Spring Creek	Woodrum (2009a, 2011)
"Lost/Forgotten Emigrant Trail"	-	Upper Sacramento Valley	1872	Spring Branch Road? State Route 36	Ritter personal communication, (2016); McNamar (1952; in Tibbetts 2016 draft)
Waugh's Ferry Road	-	Upper Sacramento Valley	pre-1884	Led east from near the town of Shasta, crossing the river at Waugh's Ferry	Woodrum (2011)
Tehama County Wagon Road	-	Upper Sacramento Valley	1863	Part of "Forgotten Emigrant Trail"?	Tibbetts (2016 draft)
Buckhorn Toll Road	-	Upper Sacramento Valley and Klamath Mtns/High No. Coast Ranges	1907	Alternate route to Weaverville	Colby (1982)
Powellton/Humbug Road	-	-	-	-	-

Note: [a] Colby (1982) and Woodrum (2011) state that this road was constructed/finished by Charles Camden in 1861; Smith (2008), however, reports that it was built by Levi Tower in 1852 and purchased by Charles Camden in 1861.

Table 12. Historic Railroads in the Planning Area (adapted from Robertson 1998, with additions).

NAME[a]	DATES OF OPERATION	TYPE	NOTES
Arcata & Mad River Railroad Company	1881–1983	Common carrier, lumber	-
Bucksport & Elk River Railroad/Railway Co.	1885–1953	Common carrier, lumber	Name changed in 1932
Butte & Plumas Railway Co.	1901–1940	Logging	-
Butte County Railroad Co.	1903–1915	Common carrier, lumber	-
California & Northern Railway Co.	1901–1904	Common carrier, lumber	Sold to San Francisco & Northwestern Railway Co. in 1904
California & Oregon Railroad Co.	1869–1870	Common carrier, mining, agriculture	Operated for only a few months before being consolidated into the CPRR in 1870
California Redwood Co.	1883–1901	Logging	-
California, Shasta, & Eastern Railway Co.	1913–1926	Common carrier, lumber	-
Central Pacific Railroad (CPRR)	1899–1959	Common carrier	Existed both earlier and later under different names
Colusa & Hamilton Railroad Co.	1913–1917	Common carrier, agriculture	-
Eel River & Eureka Railroad Co.	1884–1903	Common carrier, logging	-
Feather River Railway Co.	1940–1966	Common carrier, lumber	-
Fruit Growers Supply Co.	1913–1953	Logging	-
Glen Blair Redwood Co.	1903–1928	Logging	-
Humboldt Northern Railway Co.	1905–1958	Logging	-
Iron Mountain Railway Co.	1896–1924	Common carrier, mining	-
Klamath Lake Railroad Co.	1903–1913	Common carrier, lumber	-
Long-Bell Lumber Co.	1926–1955	Logging	-
McLoud River Railroad Co.	1897–1992	Common carrier, logging	Still operating (as of 1998) as McLoud Railway Co.
Northern California Railway Co.	1860–1898	Common carrier	Began as California Northern Railroad Co. in 1860; consolidated into Southern Pacific Railroad 1898
Northern Redwood Lumber Co.	1903–1956	Logging	Widened to standard gauge in 1925
Northwest Pacific Railroad Co.	1888–1992	Common carrier, lumber	Began as San Francisco & North Pacific Railway Co., became Northwest Pacific Railroad in 1907; merged with SPRR in 1992

Table 12. Historic Railroads in the Planning Area (adapted from Robertson 1998, with additions) *continued*.

NAME[a]	DATES OF OPERATION	TYPE	NOTES
Oregon & Eureka Railroad Co.	1875–1911	Lumber	Oregon & Eureka Railroad Co. (began as Humboldt & Mad River Railroad in 1875, then Humboldt Bay & Trinidad Railroad, then Eureka & Klamath River Railroad; merged into Northwestern Pacific Railroad in 1911)
Pacific Lumber Co.	1869–1977	Common carrier, logging	-
Sacramento Northern Railway	1889–1987	Common carrier	Began as Marysville & Yuba Street Railroad Co. in 1889, went through many different reorganizations—Shasta Southern, Northern Electric, etc.—became Sacramento Northern Railway in 1921, operated until 1987 and then merged into UPRailroad
Sierra Lumber Co.	1875–1907	Logging	Began as Sierra Flume & Lumber Co.
Yreka Western Railroad Co.	1888-	Common carrier, mining, lumber	Began as Yreka Railroad Co., still in operation as of 1995

Note: [a] Railroad lines changed names often as new corporations were formed and one line merged with another (see Notes).

Southern Pacific also had a hand in other aspects of California's growth. The "Big Four" who owned the Southern Pacific Railroad adhered to the "Homestead Principal," which posited that public lands in the West should be used to encourage small-farm settlement. Shortly after he was elected governor of California, Leland Stanford "agitated on behalf of setters' rights to public lands" (Orsi 2005:58). His support helped to influence the US Congress to pass the Homestead Act of 1862. The company was also instrumental in the outlawing of hydraulic mining in California, in support of the farmers and ranchers who shipped their produce and livestock on the railroad—and whose prosperity had a direct impact on the railroad's success (Orsi 2005:54–55). Ironically, Southern Pacific used this same destructive technology a few years later, "to speed and reduce the cost of constructing its Siskiyou line connecting the state to Oregon" (Orsi 2005:210). The Siskiyou line, opened in 1887, ran for 95 miles between the towns of Ashland and Weed. Today it operates as the Central Oregon & Pacific Railroad, between Weed and Eugene.

Historic railroads in the planning area site database include the Magalia and Skyway segments of the Butte County Railway (CA-030-0885 and CA-030-0886), a segment of the Feather Falls Railway through Oregon Gulch (CA-030-1348), and the Shasta Segment of the Sacramento River Railroad/Oregon & California Railroad (CA-030-1763).

Utilities/Communication

The first electrified communication system in California was the telegraph. The first lines were constructed by small local companies beginning in 1853, to connect towns within the state. Soon there were several eastern companies vying with each other to build lines across the country and connect with the West. In 1860 the US Congress passed the Pacific Telegraph Act, authorizing the Secretary of the Treasury to accept bids for construction of a transcontinental line. The Western Union Telegraph Company won by default when the other bidders dropped out.

In California, Western Union consolidated the small local companies into the California State Telegraph Company, and construction began on an interstate line. By 1861 "isolated California, whose only means of communication with the outside, hitherto, had been the slow, hazardous journey over the plains, across the Isthmus or around the Horn, was in close communication with the eastern coast" (Bates 1914:181). Bates reports several "amusing incidents" as the public encountered the new system:

> Some curious spectators thought that the messages were being carried over the wire and tried to catch glimpses of them as they were being carried along. Others believed the wire was hollow and the messages were being carried by an enchanted spirit. The Indians saw that the poles made a cross and conceived the idea that the Yankees were fencing in the country with crosses to keep the devil out [1914:182–183]

In 1866 Western Union purchased a controlling interest in the California State Telegraph Company, and all of the lines in California became part of Western Union's Pacific Division. "Lines were extended in every direction following the railroad, and it was not long before the state became a net-work of telegraph lines" (Bates 1914:185). Western Union dominated the industry from the 1860s onward, using the railroads to establish their lines. A mutual relationship developed, as railroad companies provided a "protected" route for telegraph lines and offices. In turn, Western Union provided free messaging to promote safe travel and avoid collisions (Lindström et al. 2007:67). The relationship was sometimes a rocky one, however, as telegraph and railway companies fought over such issues as the definition and use of "public domain" versus private property. As the twentieth century began, more and more railroads began to construct their own lines. As telephones became more popular, small companies began to construction their own systems to replace the earlier telegraph lines.

The US Forest Service began installing telephone lines in the western forests in 1910. Coats (ca. 1978) describes these early systems as "single-wire grounded circuit" lines strung between trees, to serve rangers, logging operators, local residents, and "fire control cooperators." In the 1930s and early 1940s, the CCC constructed two-wire lines on federal lands, but by the 1950s, most of the telephone lines had been torn down or sold to private companies. Today they are sometimes visible as small white porcelain insulators embedded in trees, some with segments of heavy-gauge wire still attached.

Only a few communications lines have been recorded on BLM lands in the planning area. Quite often old lines have been upgraded and modernized, and are not easily recognizable as historic features except where they are depicted on old maps. Among the known historic lines are the "Weaver Road and telegraph line" recorded as site CA-030-1336; a segment of the Paynes Creek Telephone Line (CA-030-0368); an "older telephone line" running along Forbestown Road (CA-030-1929); and portions of two other (unnamed) lines recorded as CA-030-0842 and CA-030-0952.

Water Development

The site record database for the planning area includes 173 sites with water-related features or components. Of these, more than 71% appear to be related to mining, and nearly all of those are ditches. The remainder include water-supply features tied to residences or settlements, dams or culverts along old roadways, logging flumes/chutes, and at least one ditch that supplied water for hydroelectric power.

Water for Mining

Essentially every type of mining requires some amount of water, for washing, sluicing, booming, cooling, or supplying the hydraulic monitors (see *The Technology of Gold Mining*, page 132). Placer mining, by definition, involved an on-site water supply, but most other methods required that water be transported via ditches, flumes, and pipelines. In particular, hydraulic mining used vast amounts of water to expose the ancient gold-bearing gravels and wash them down into the sluices. This water had to be delivered at high "head" (pressure), which often meant storing it in reservoirs from which it could be released all at once and gravity-fed down to the monitors. Coleman (1952:94) estimated that, "at the zenith of hydraulic mining," the total combined length of mining ditches in the California gold regions "had reached 8,000 miles." These water-supply systems are represented today by many miles of ditches (some abandoned, others repurposed), collapsed flumes, and small dams/reservoirs.

Water for Settlement/Agriculture

The first non-native settlers built their homes and towns along rivers and streams, or at active springs. As the populations grew, however, and needed more water for both human consumption and for farms and ranches, more-distance sources had to be tapped. Wells were drilled, springs were developed, and water was transported through ditch/flume systems and pipelines—often abandoned mining features. It is difficult in many cases to determine the exact origins of these ditches (mining, agriculture, other), particularly those that have been modified for re-use. Larger systems often appear on period maps, but smaller ones usually do not. The attributions of these ditches typically are based on associations with other types of features, or on historic-era maps that depict the systems.

Water for Logging

Logging in the nineteenth and early twentieth centuries often involved wooden flumes and chutes that delivered the lumber from the mountain mills, downslope to where they could be floated down a river or loaded onto waiting wagons or rail cars. Remnants of these features, either three-sided box flumes or two-sided "V"-flumes, are sometimes found on the landscape, along with deep, wide linear earthen channels or stacked-rock support features. Large mill ponds are sometimes found as well, where the logs were stored while awaiting the saw. Very few logging-related water features have been identified and recorded in the

Project Area; those that have include the Empire Flume (one section recorded as BLM site CA-030-0474) and the Blue Ridge Flume, sections of which have been recorded under various site numbers. Both of these systems were constructed in the Shasta/Tehama area in the early 1870s. Smith (1992:3) reproduces Hutchinson's (1956) map of major lumber flume systems feeding down to the Sacramento River near Red Bluff and Los Molinos, and down Big Chico Creek to the town of Chico.

Water for Hydroelectric Power

The water systems built by miners and (to a lesser degree) loggers would propel northern California to the forefront of water-powered generation of electricity. As Clark (1970:2) has noted, "a number of the old ditches, flumes, and reservoirs that once supplied water to the hydraulic mines now are parts of hydroelectric and irrigation systems" of California. Another mining invention would also become important to the hydroelectric industry: "The prime mover most widely applied in California" was the "Pelton or free jet tangential impulse wheel" (Reynolds and Scott 1980:7).

These systems, coupled with the steep mountain topography, made hydroelectricity an obvious choice for the state. The waters of the Sierra, for example, fall quite steeply down the west slope, making it possible "to build not one but sometimes as many as six generating plants on one stream" (Coleman 1952:92). The Coast Ranges, on the other hand, have relatively flat gradients and erratic streamflow, making hydroelectric power generation much more difficult [Reynolds and Scott 1980:8). Electrical power for coastal towns like Eureka was provided by steam-powered generators as recently as the 1950s (Coleman 1952).

The Sierran plants would produce "energy that was to transform arid and semiarid lands into bountiful sources of agricultural wealth" and "give to industry and commerce the means of production in regions where the high cost of coal fuel had retarded growth" (Coleman 1952:102). By 1900, California had 25 hydroelectric plants, including the Yreka plant, built in 1895, and Centerville, built in 1898 (Reynolds and Scott 1980:16). By 1910, both Redding and Red Bluff had small electric lighting plants.

One important early system was built on Battle Creek and its tributaries, on the line between Shasta and Tehama counties. Its first plant, Volta, was constructed in 1901 (Reynolds and Scott 1980; also see Kellawan 2012). Additional plants would include South (1910), Inskip (1910), and Coleman (1911). Spurred by the dramatic increase in copper mining in the Shasta District around 1890–1900, the Battle Creek system was built by the Keswick Power Company (subsequently renamed the Northern California Power Company) to supply cheap energy to the Shasta mines and smelters. It continues in operation today, with many upgrades, by the Pacific Gas & Electric Company, providing hydroelectric power to portions of northern California.

The earliest operations lacked the ability to transmit power over great distances and were typically small operations that generated power for local areas. Later developments in power transmission would greatly expand the industry, and are reflected in the many power lines that crisscross California today. In addition to these lines, archaeological features associated with hydroelectric power in the planning area include the Miocene Canal and flume (CA-030-0191), built during the Gold rush and later converted for power generation; the Table Mountain Hydroelectric Dam test adit (CA-030-1146), possibly constructed to test bedrock integrity in preparation for the proposed Iron Canyon Dam; the "alleged" South Battle Creek hydroelectric construction camp (CA-030-1947); and the Upper and Lower Centerville Canal (CA-030-1765), built in 1875–1907 between the Centerville Head Dam and the Centerville Powerhouse.

THE NEW CENTURY

The first half of the twentieth century was perhaps the most extreme period of cultural, political, and economic upheaval in US history: two world wars, a great economic depression, widespread epidemics of polio and influenza, a failed experiment in the prohibition of alcohol that triggered the rise of organized crime, and a successful movement to finally give women the right to vote. In northwestern California, national and global events would lead to a major shift in the economy, particularly associated with mining.

Mining in the Twentieth Century

The first decades of the twentieth century saw a continuation of mining as a major economic force in the planning area, particularly in Shasta, Trinity, and Butte cCounties. At the turn-of-the-century, the first successful bucket-line dredging began on the lower Feather River near Oroville: "Gold dredging soon became a major industry that continued for more than 65 years" (Clark 1970:7). Major advances were made in lode mining, as well:

> These changes enabled many more lode deposits, especially large but low-grade accumulations, to be profitably worked. The improvement of air drills, explosives, and pumps, and the introduction of electric power lowered mining costs greatly. The introduction of rock crushers, increase in size of stamp mills, and new concentrating devices, such as vanners, lowered milling costs. Cyanidation was introduced in 1896 and soon replaced the chlorination processes [Clark 1970:7].

Clark also tells us that "[t]he lost, high-grade Tightner vein was rediscovered at Alleghany in Sierra County" in 1904, causing a revival of gold mining in the Alleghany district that continued until 1965; he also reports that Alleghany was "the last district in the state where gold mining was the chief industry" (1970:7). World War I caused a decrease in gold production (though it also triggered a boom in the mining of copper and other important metals). Gold mining then went through a hiatus, only to be revived once again by the stock market crash in 1929.

The Great Depression

It was during the Great Depression that a large number of mining claims in northwestern California were taken up, when many unemployed miners and other workers returned to abandoned mine sites and dredger operations to eke out a living. Clark (1970:xi) says that "[d]uring the depression years of the 1930s, gold output in the state was nearly as high as it had been during the gold rush." Vaughan (1994:12) states that "20,000 depression[-era] miners came to the mountains throughout California, attempting to eke out a living…" and leading to "serious social problems" in the rural areas whose populations suddenly swelled by as much as 200%. Miller (1998) provides a public-level narrative of the daily lives of the Depression-era miners on the "Western mining frontier," as well as the political and economic climate of the times.

Unlike the Gold Rush, however, the 1930s claims were worked not just by male miners, but by families who saw an opportunity to survive by making a living reworking the placers of the nineteenth-century miners. Building cabins and homes in the hydraulicked and placered-out areas, they also planted orchards and gardens and raised livestock to supplement their mining activities. These Depression-era mining sites are often marked by abandoned orchard trees, household refuse, and 1920s–1930s-era artifacts. Several sites from this era have been recorded in the planning area, though additional research will be needed to connect them with twentieth-century mining. One example with both Depression-era artifacts and mining remains is the Ryan Site (SHA-2430/H/CA-030-0433) on Olney Creek, just northwest of Redding. Another is SHA-2399/H/CA-030-0520, the subject of Ritter et al.'s (2014) investigations of a small, rural hamlet in Rattlesnake Gulch, just southwest of Redding. The archaeology and history of this multi-ethnic "neighborhood" of miners, farmers, and their households provide an intimate look at the social and economic lifeways of the larger Redding vicinity during the first deaces of the twentieth century.

The new influx of miners created more competition for local jobs, strains on county services, and issues for federal land managers. According to Winthrop and Chambers, about a third of these small claims were located on public lands managed by the US Forest Service (1988:13); many more were located on lands administered by the BLM. The 1930s brought other far-reaching changes to the mountainous areas of northwestern California, as well. Many mills were closed as timber markets dwindled. By 1935 the railroads had been essentially replaced by trucks as transport for the struggling timber industry. Much of the abandoned timber lands were acquired by the Forest Service, which still manages these lands today.

In addition to the these small claims, federal lands also became prime locations for "hobo camps" and "Hoovervilles"—family camps set up by those seeking employment in the construction of dams and other federal work projects, and those who simply could not afford to live anywhere else. Some of these homes were built by workers who stayed on after the construction projects were completed. BLM razed a number of these houses in Shasta County in the 1960s, but foundations and cultivars still remain (Rocca 1993, 1995; Ritter, personal communication, September 2016).

Despite these hardships, northwestern California fared relatively well during the economic hard times between the two World Wars. In their study of the Depression era in western Siskiyou County, for example, Winthrop and Chambers (1988:1) attribute the survival of such rural areas to "a stable and enduring self-sufficient economy" somewhat removed from the larger cash economy, and to the continued dependence on gold mining (and, according to oral histories collected by the Klamath National Forest, on various other enterprises: "[o]thers engaged in bootlegging; there were lots of stills throughout the mountains, and the law often looked the other way" [Vaughan 1994:16]). Many others found part-time work as Forest Service fire-fighters, or joined the Civilian Conservation Corps.

The interviews with long-time local residents smack more of nostalgia than of deprivation, as the interviewees recalled a simpler time when being poor was just "a way of life." Loneliness and fear, which Winthrop and Chambers call "two national themes of the Depression Era," seem to have been less prevalent in these more self-sufficient regions than elsewhere in the country. Those "national themes" would be all but forgotten, however, when America found itself drawn into another world war.

Wartime Activities

The First and Second World Wars affected northern California in a number of ways. During World War I, enlistments were not particularly high: military records in the National Archives indicate that there were 157 draft rolls in the state during World War I, of which only 13 were for counties in the planning area, compared to 37 just in the city of Los Angeles. [23] Even so, many of the local men had special skills that made them particularly desirable. The July 13, 1917 issue of the *Red Bluff Daily News* ran this article (reproduced in part):

> FORESTRY REGIMENT TO FRANCE ABOUT READY TO ASSEMBLE IN SAN FRANCISCO…Fifty more loggers and lumber men are needed at once from California. Men applying immediately to the district forester's office, San Francisco, either in person or by letter, or to forest supervisors at Los Angeles, Oriental, Escondido, Placerville, Bishop, Yreka, Red Bluff, Alturas, King City, Quincy, Santa Barbara, Bakersfield, Sisson, Northfork, Sonora, Nevada City, Weaverville, Calif., and Gardnerville, Nevada, have a splendid chance of being enlisted for immediate service in the French forests. Woodsmen who are skillful choppers, fellers, buckers, swampers, cordwood cutters, log loaders, log rollers, carriage men and teamsters are the classes wanted…The regiment will convert available timber behind the battle lines in France into railroad ties, trench timbers, mine props, bridge timbers, lumber, and cordwood needed in the military operations of the British Army.

In addition to men with forestry skills, planning area counties offered important metal and mineral deposits. While many of the gold mines saw decreased activity during the war, or were shut down entirely,

[23] https://www.archives.gov/research/military/ww1/draft-registration/california.html

the copper belts of Shasta and Butte Counties experienced a boom period (Clark 1970). However, only one resource in the BLM database can be tied definitively to the era of the First World War: the Humboldt Bay lifesaving station (Coast Guard Station Humboldt Bay), built in 1936 to replace an older station, "figured prominently" in the rescue of "the 27-man crew of the Navy submarine H-3 on December 14, 1916," and the "safe removal of 421 enlisted men and 17 officers from the doomed USS Milwaukee on January 12, 1917" (Van Kirk 1977:3).

A few more sites can be linked to World War II. By the time the US entered the war in 1942, long-range submarines and bombers had changed the face of war and increased the chances of attack on the American mainland—particularly along the coastlines. Coastal areas of California, Oregon, and Washington were thought to be particularly vulnerable to enemy attack:

> Soldiers from west coast Army posts…were rushed to various points along the coast to prepare defenses against an invasion. California's beaches were strung with miles upon miles of barbed wire. Coastal cities were blacked out and citizens sandbagged their homes and businesses [California State Military Department 2016].

Volunteer lookouts were posted all along the coastline, and defensive facilities were established. The Clarke Museum in Eureka, Humboldt County, has posted this description of the situation:

> …A network of 55 air raid warning posts, staffed 24 hours a day by civilian volunteers, was established to provide an early warning system for the community. Each post was equipped with state-of-the-art airplane detection instruments and a direct telephone line to any army command post. Upon detection of an air raid threat an alarm would be sounded throughout the county.
>
> …Due to the close proximity to the Pacific, blackouts in coastal communities such as Ferndale, Eureka, Samoa, and Trinidad were seen as a crucial step to avoid air attacks along the Humboldt coastline [Clarke Museum 2016].

One rare survival of the defensive facilities established during the way is located in Redwood National Park: the Klamath River early-warning radar station (Radar Station B-71). The station was operated by members of the Army Air Corps who were quartered at the nearby town of Klamath (NPS 2016). This was the northernmost of 22 radar stations built along the Pacific Coast during the Second World War. In addition, at least three wartime resources have been recorded on BLM-managed lands in the planning area: a World War II radio receiver that was placed at the former location of the Humboldt Harbor Lighthouse, ammunition bunkers at the Samoa Dunes, and the Humboldt Bay Coast Guard station, which was "involved in beach patrols" during the war (Van Kirk 1977:3).

The Second World War, like the first, also had an economic impact on the planning area. The 1942 War Production Board Limitation Order L-208 ordered all non-essential gold mines to cease production, to conserve equipment and manpower for the war effort. As a result, "[g]old mining was curtailed during World War II and has not recovered since…Alleghany [in southwestern Sierra County] was the only town in California after World War II where gold mining was the principal segment of the economy" (Clark 1970:xi, 21). Some mining resumed in the planning area after the war, including the Dillon Creek and Igo-Ono districts and in the Shasta zinc-copper belt, but never on a scale anything like what occurred in the nineteenth century.

Federal Land Management

Federal management of public lands in California began less than 60 years after its annexation by the United States, beginning with the first Forest Reserves—including the Shasta Forest Reserve—in 1905 (US Forest Service 2016). Recognizing the timber, grazing, mineral, water, and other valuable resources on those lands, the US Congress called for federal management of public lands in the west, a shift from the earlier policy of encouraging private settlement. New regulations covered the use of these lands, in an attempt to balance the various extractive enterprises with conservation, environmental protection, and recreation.

A critical aspect of this new management philosophy, particularly the laying-out of Forest Reserves and other public lands, was the establishment of accurate land boundaries. The General Land Office (GLO), first created in 1812 as part of the Treasury Department, had been instrumental in the defining of ownership boundaries for homesteads, mining patents, railroad patents, and other interests beginning with California statehood (and continuing to this day). The GLO also served as a clearinghouse for all land records. In 1946, the US Grazing Service and the General Land Office merged to form the Bureau of Land Management, which continues to maintain the historical GLO plats and survey data (White 1982).

The California redwoods were among the first natural resources in the north state to draw the attention of preservationists. From an estimated 2,000,000 million acres of old-growth redwood forest in 1850, unrestricted clear-cutting had removed nearly 90% by the middle of the twentieth century. The Save the Redwoods League, founded in 1918, lobbied for preservation of what remained. The US Congress and the California State Park Commission (now the Department of Parks and Recreation) established multiple National and State Parks in Humboldt and Del Norte Counties for cooperative forest management and stabilization of soils, wildlife, and watersheds.

Management of other forests also fell (and continues to fall) partly under the jurisdiction of the federal government in California, mostly under the purview of the US Forest Service but also, to a lesser extent, under BLM. Logging has been particularly important to the local economies of the Klamath and Trinity regions. This continuum of activity has created an archaeological record of the technological and procedural changes in the logging and lumbering industry over a period of 150 years.

Federal land- and resource-management agencies quickly became a key element in the economic and political life of the region. Ranger stations were established, staffed with rangers, trail crews, and dispatchers, employing men who could no longer make a living by mining. The Forest Service put in telephone lines, kept roads and trails open, fought wildfires, issued grazing permits, and began reforestation projects (Fiorini-Jenner and Hall 2002:100–104). After World War I the local presence of federal agencies increased, as the government designed and implemented policies and regulations relating to the protection of natural resources. Firefighting became a primary focus, and protection of the forest's timber resources was paramount.

The BLM was not established until 1946, with the merger of the General Land Office and the Grazing Service. The agency was designed to fill a very specific need:

> Rather than offering land that could be divided up into farm-size units and claimed by hardy yeomen, the West presented vast areas of land, characterized by elevation, ruggedness, and aridity, that were not at all suited to farming. The long-range outcome was a vast domain of otherwise unwanted land that stayed in the ownership and under the management of the federal government…The greatest share of that land is now the responsibility of the BLM [Limerick 2016].[24]

One key function of the BLM and other federal agencies was (and is) management of grazing lands and allotments. The unregulated grazing that took place prior to passage of the 1934 Taylor Grazing Act caused damage to soils, plants, and water sources, causing erosion and other problems (BLM 2016). Water projects, foraging surveys, fencing, and permitting were implemented to alleviate these issues. Another important element of BLM land management in northwestern California is public recreation, particularly at places like the Whiskeytown National Recreation Area, the Sacramento River Bend Outstanding Natural Area, the South Spit of Humboldt Bay, and the Samoa Dunes Recreation Area.

[24] A very detailed history of the agency and its multiple-use mission is presented by Muhn and Stuart (1988).

Modern Hydroelectric Development

By the end of the nineteenth century, "the fever of hydroelectric development was sweeping California" (Coleman 1952:212). Within a few decades, electrical power was increasingly in demand in the state, and power company engineers began looking to the hydroelectric generation possibilities of the Sierra Nevada and Cascade mountain ranges, where mining had already shown it to be feasible on a smaller scale. Passage of the Newlands Reclamation Act in 1902 provided federal funds for the construction of dams, reservoirs, and canals in the West. These features were designed to provide irrigation water, but they also created additional opportunities for hydroelectric development.

One of the earliest such development in the planning area was the North Mountain Power Company operation near Junction City, built in 1904. The system included ditches, flumes, and siphons to transport water from Canyon Creek to a powerhouse on the Trinity River below Junction City; upon its completion the company "began selling electricity to Eureka and other communities on the coast" (Adkins 2007:271). Adkins also says that the North Mountain Power Company supplied most of the electricity in northwestern California until Pacific Gas and Electric (PG&E) purchased the company in 1919 (interestingly, Coleman (1952) does not mention the company at all, at least by that name). Archaeological resource P-53-001413, the Junction City Water Ditch, apparently carried water used to generate power for the town of Junction City. It is possible that the ditch is associated with the North Mountain operations.

Very soon, the federal government began to withdraw potential hydroelectric development sites, to "prevent speculation and the inevitable inefficiency, inadequate funding, and poor planning of most private hydroelectric projects" (Adkins 2007:272). Under the Federal Water Power Act of 1920, a Federal Power Commission was created to issue licenses for the construction, operation, and maintenance of dams, reservoirs, powerhouses, and related features. The following year, the USGS began surveying potential hydroelectric dam and reservoir sites across the country. Some of the first federally funded archaeological surveys would follow: the River Basin Surveys (1945–1964) directed by the Smithsonian Institution.

Hydroelectric power generation has become a vital activity in the planning area, with federal (Bureau of Reclamation) power plants at Shasta, Keswick, Trinity, Spring Creek, French Gulch, and Lewiston (BOR 2016a); and a complex network of dams, tunnels, canals, and plants operated by PG&E on the major rivers and their tributaries. Relevant studies of these resources include Coleman (1952), Reynolds and Scott (1980), Billington et al. (2005), Adkins (2007), Byrd et al. (2008), and Kellawan (2012). In particular, Billington et al. and Montgomery and Clawson (1946) provide detailed histories of the Central Valley Project and one of its key features: Shasta (originally Kennett) Dam. In 1990, the California State Office of Historic Preservation determined Shasta Dam and its power plant eligible for the National Register. According to their website, Reclamation is nominating the Central Valley Project to the National Register as a Multiple Property Listing (BOR 2016b).

HISTORICAL RESEARCH ISSUES (by Sharon Waechter)

Our review of existing studies and historical sources has identified a number of important events, developments, and periods in the non-native history of the planning area, from the early landings by Spanish and English mariners along the north coast to the end of World War II and the beginnings of the modern era. This context, together with the numbers and types of resources known to exist on BLM-administered lands in northwestern California, have been used to recognize the following research themes:

- Early Exploration and Colonization
- Maritime Activities
- Early Infrastructure Development:
    - Transportation
    - Communication
    - Water Development
- The Extraction Economy
- The Overseas Chinese in Northern California
- Settlement and Agriculture
- Native Resistance and the Indian Wars
- The New Century:
    - The World Wars
    - The Great Depression
    - Power/Hydroelectric Development
    - Federal Land and Resources Management

As we will discuss in a later section, the themes most commonly reflected in the existing BLM site database are Mining, Infrastructure, and Settlement/Agriculture. The research issues that follow are intended to include all of the themes, but with an emphasis on these three.

RESEARCH ISSUES

Historical archaeologists differ widely in their identification of research issues. In some cases these are simple, straight-forward questions about the nature of a site: How old is it? Who lived here? What were they doing? At the other end of the spectrum are ambitious and often unrealistic queries into much larger issues: What can this site tell us about the degree of ethnic acculturation in nineteenth-century California mining operations? How were laborers at this early twentieth-century logging operation affected by the rise of unions?

Both levels of inquiry are important. However, as Carmosino (1998:10) has argued, it is necessary to answer certain site-specific questions before moving on to higher-level theoretical issues: "These specific questions address site function, chronology, gender, ethnicity, and economics. When these limited sets of data are combined, they have the potential to contribute to a number of theories regarding the social, cultural, economic, and technological aspects of a…community." The HARD research group (Caltrans 2010:140) puts it another way:

> The hypothetico-deductive model may be useful to establish baseline information about an archaeological site. Using this method, one can ask and expect answers to practical, lower-order questions about a property's structure, content, and condition…Important sites also contain information about the historical conditions that created them[,] because they are, to varying degrees, local manifestations of forces that affected society at large.

"Baseline" Information

Selverston et al. (2011:3-47–3-55) define several site-specific questions: *Where* (resource location), *When* and *for How Long* (period[s] of use), *What* (the activity that produced the site), *How* (how the activity operated), and *Who* (the group[s] or individual[s] responsible for generating the archaeological record at the site). These questions must be addressed before we can consider the larger issue of how a particular resource fits into the overall historical context of a region, and whether it adds significantly to our understanding of local, regional, or national history. If the evaluation of a site reveals that it does not contain the necessary data to address these first-order questions, then the site is very unlikely to be National Register-eligible.

Where are the resources distributed across the landscape? Are site locations tied to transportation routes, access to towns and markets, distribution of economically important resources such as gold, timber, or grazing lands? What can site distribution tell us about the land-use practices? Can we identify specific characteristics to predict where similar sites and cultural landscapes will be found?

When and for how long were the sites used or occupied? From the historical context of a region, we can identify periods of significance for various property types. For example, the three periods of significance for mining in the study area were ca. 1849 to 1863 (Initial Mining Boom), ca. 1895–1920 (Copper Mining Era), and ca. 1930–1939 (Depression-Era Mining Resurgence). Mining sites that fall into these periods are more likely to have historical significance than those that do not. Length of occupation or use is also important to consider, especially where a site has been occupied for a very long time and the associated remains have been hopelessly mixed: this will limit the site's potential to provide meaningful information on a specific period or a particular inhabitant.

What activities took place at the sites? This question speaks to site function, and allows us to identify the property type. Many sites exhibit multiple activities—e.g., a homestead may also contain water-development features, and a mine site often includes habitation features. To get a true picture of site function, all of the primary activities must be identified.

How did the primary activities operate? At mining and other extraction sites, the question of "how" typically relates to the methods used for extraction, processing, and transportation of the product to market. At homesteads, work camps, and towns, there are also issues of how families or groups obtained food, acquired shelter, interacted with their neighbors, disposed of refuse, and the like. Technological innovation, adaptation, and implementation are critical themes in many historical archaeological studies.

Who was responsible for the activities reflected in the archaeological record? While a property may contain important information on technology, chronology, and patterns of distribution, it takes on added significance if we can identify the corporate, ethnic, gender, age, and/or socio-economic profiles of the people who lived or worked there: the ways these people used or adapted their traditional skills and knowledge to suit the situation; the divisions of labor according to class, race, gender, or age; the types of interaction between occupants; and the degree of connectedness to outside markets and the larger society.

"Higher-order" Questions

When a site is evaluated and found not to contain data for addressing even the "baseline" questions, it is usually found to be ineligible for the National Register. On the other hand, where sites contain data that reflect their period(s) of occupation, activities, and associations, it may be appropriate to investigate higher-order research questions, through data recovery excavations, oral history interviews, and/or in-depth archival research (see, for example, Ritter et al. 2014). While such questions will need to be tailored to the site being investigated, we offer here a list of research domains broadly applicable to the types of historic-era resources known to exist on BLM lands in the planning area. Additional issues may well be identified in future studies, as our knowledge base increases and the information gaps become more apparent. Some of the following is adapted from the HARD publications (Caltrans 2007, 2008, 2010, 2013), each of which takes into account many of the more important studies and research topics for historical archaeological research in California. Other sources are cited in the text.

Technology, Innovation, and Adaptation

This theme covers issues of technology (tools, equipment, construction methods) used by miners and mining companies, lumber companies and loggers, railroad workers, homesteaders, farmers and ranchers, and other groups who lived and worked in northwestern California during the historic period. As a rural or frontier region, much of the planning area in the nineteenth century would have experienced some lag in the introduction of new technologies; this isolation may be reflected in the modification or adaptation of existing technologies to meet changing local conditions, or the local development of new technologies. It is also possible that different cultural or ethnic groups modified or adapted their traditional tools and methods to the new environment.

Mining Technology

Mining technology can be divided into the categories of (1) exploration, (2) extraction, and (3) processing. These are reflected in features such as prospect pits; mine shafts, adits, and tunnels; tramways and trails; tailings and other waste debris; ponds and ditches; and ore-processing facilities (stamp mills, ball mills, arrastras, etc.). Mining technologies used in California in the mid-nineteenth century often depended on the miners' places of origin, as different countries and regions had their own forms of extraction and processing. Related to this issue is the adaptation of traditional techniques to a new environment—as, for example, with the Overseas Chinese and their reported use of traditional stacked-rock building techniques in the construction of mining ditch benches, wing and coffer dams, and even dwellings made of rearranged tailings.

Mining technology also changed over time, as the "easy" gold was exhausted and more intensive (and more expensive) technologies became necessary to extract the gold. Often during gold mining, other valuable metals and minerals were discovered—silver, copper, platinum, chromium, etc. —and new technologies might be developed to capture these, as well. Archival research, particularly in company files, can be used to compare the documentary evidence with the archaeological record. To address this issue, however, sites must contain relatively intact, recognizable features, tools, and equipment that reflect the technologies being used and the ways these may have differed over time or between companies (or regions).

(Railroad) Logging and Lumbering Technology

Much has been written about the tools, equipment, and construction methods used by nineteenth and early twentieth-century lumbering and railroad-logging operations in the West, both scholarly works and public-level narratives (e.g., Belden 1997; Berry 1917; Carranco and Sorensen 1988; Hutchinson 1956; Myrick 1962; Ormsby 1972; Raymond 1917; Robertson 1998; Tamez et al. 1988; Wilson 1908). Archaeological remains of these operations are relatively common in the wooded areas of northern California, as skid trails, traction engine roads, railroad grades, chutes and flumes, fields of high-cut stumps, mills, abandoned work camps, and many other features. Archival research can often identify the particular lumber companies that built and used these systems, and the technologies involved.

Much of the written information, however, is based on the “ideal” rather than the “real.” As Mackey et al. (1997:2.5-17) have noted, there is often a significant difference between historical documentation and archaeological remains: “the literature is largely prescriptive in nature, describing how an author thinks a railroad grade [for example] should be constructed. The literature deals mainly with idealized methods. Archaeological data provide the only way to determine how these features actually were built.” Often the actual technologies used were adaptations to on-the-ground conditions that made the “ideal” methods untenable. The same can be said about sawmills, work camps, and other kinds of sites associated with logging and lumbering. The archaeological sites and features associated with these activities could provide information on the actual technologies used, and the extent to which they deviated from accepted standards of the day.

The Technologies of Infrastructure Development

The development of a region typically begins with the development of a transportation system to carry people and goods into and out of the area. The planning area includes pack trails, wagon/stage roads, railroads, and automobile roads dating from the earliest non-native settlement to the present. Such routes have the potential to contribute to issues of technology and adaptation if they were constructed using innovative or extraordinary methods as, for example, construction of the first railroads through the most rugged mountainous areas of northwestern California. For sites to contribute to this theme, they must include surviving features (trestles, retaining walls, tunnels, etc.) that reflect new or unique technologies, or adaptations to specific local conditions, that deviated from the norm for the era. Early routes that have been largely modernized and overprinted by modern roads or grades probably will not retain sufficient integrity to be found eligible for the National Register under any criteria—with the likely exception of outstanding properties like the Overland Emigrant National Historic Trail (i.e., the Oregon-California Trail).

Communications and utility lines, like roads and railroad grades, have very often been upgraded and modernized, leaving few historic elements; in other cases they have been dismantled and the construction materials used elsewhere. Even where old lines were simply abandoned in place, they are not likely to provide much in the way of important information on technology or adaptation. One exception, though outside the planning area, is the world’s first successful long-distance telephone line (California Historical Landmark No. 247) on San Juan Ridge in Nevada County. Though little remains of this line except its route, it is important for its association with early infrastructure development in the state (Criterion A).

Water-supply features and systems reflect one of the key infrastructure developments in northern California. These include some of the earliest and most extensive mining ditches and flumes, as well as hydroelectric features (dams and storage reservoirs, penstocks, power-generation plants, etc.) that are among the first in the nation. Both types of features might be found eligible for the National Register under Criterion A, for their association with two of the most important developments in California’s history; in addition, where these features and systems retain evidence of historic-era technologies or technological development, they could also be eligible under Criterion C and/or Criterion D.

Agricultural Technology

The Caltrans (2007:100, 191) publication on agricultural properties tells us that “[b]y the 1860s, California had become the proving ground for new technology.” California farmers, as part of “an immigrant population not bound by established patterns,” adopted new equipment and techniques long before Midwestern farmers. In the period from the 1880s to the early 1900s, “technological advances abounded in agriculture,” and there was “rapid adaptation by California farmers of [these] new technologies” (Caltrans 2007:100–101). Many casual observers have seen evidence of this rapid adaptation, in the form of outdated, abandoned farm equipment littering many farmsteads.

Most of this rapid acceptance of new technology took place in the rich agricultural regions of the state, like the Sacramento and San Joaquin Valleys. "Whether or not this rapid mechanization held true for farmers who operated on marginal lands or…in some of the state's less accessible areas, such as the Sierra Nevada region [or] the Siskiyou Mountains…remains unclear" (Caltrans 2007:101). Archaeological and archival research on farms, orchards, dairies, and ranches in the planning area may help to answer the question of whether technological advances in agriculture affected these other areas to the same extent, or if farmers in such marginal" or less accessible areas were slower to give up traditional methods (e.g., horse-drawn equipment versus combine harvesters). Cost certainly would have been a factor, as small, remote farming operations probably could not easily afford the newest technologies. This might be reflected in the agricultural operations during periods of economic hardship, such as the crash of 1873, the panic of 1893, and the Great Depression of the 1930s.

Economic Strategies

This topic explores the decisions made by miners, homesteaders, farmers, and others about how to meet the needs of basic subsistence, produce income, and support a household or commercial operation. These decisions are often reflected in the archaeological record through settlement patterns, changing land use, and—most directly—consumer goods.

"Consumer behavior" involves the procurement, use, and discard of material goods. Food containers, dishware, medicine bottles, butchered animal bone, broken tools, lost clothing fasteners, and other remains are common constituents at historic-era archaeological sites, making this one of the easiest research issues to address. The study of consumer goods can provide information on foodways, socio-economic status, access to markets, population demographics, ethnicity, and, in work environments, company policy and competition for labor (Franzen 1992; Henry 1991). In addition to the contents of these refuse deposits, it is important to note their locations on the landscape; disposal patterns can speak to issues of sanitation and hygiene within a town, work camp, or household.

Henry (1991:6) argues that "consumption is one of the more important ways of signifying membership in a group, particularly in class, status, and ethnic groups," but that there also will be "variability in the group life-style as expressed by its [individual] members." An individual's age, sex, level of education, health, and personality can influence his or her consumer choices at least as much as the class or ethnic group to which he or she belongs. The choices these individuals make, and the geographic, ethnic, social, and labor environments within which they make them, can provide valuable insights into the forces that guide some aspects of human behavior.

Consumer behavior in late nineteenth- and early-twentieth-century rural America was also influenced by larger market forces. For example, Shoup (1983), in his analysis of historic properties in Redwood National Park, discusses the degree of outside influence (economic and otherwise) on "self-sufficient," "dependent," and "metropolitan" communities. The HARD research team (Caltrans 2007:186), in another example, describes how "cash stores and mass marketing" came to replace traditional bartering systems, and the way that advertising and cheaper consumer goods promoted " 'the continuous disposal of old things,' rather than their reuse, repair, or resale as valuable recyclable materials." Under the right conditions, this movement should be reflected in refuse disposal patterns of households and communities. The record may also reflect the effects of modernization on consumer behavior, as new technologies (electricity, home appliances, etc.) became available, and as improved roads provided greater access to these technologies.

Refuse deposits are the most common and visible representative of consumer behavior, particularly in rural areas. They are often evaluated under the *QIVA + R* criteria: there must be sufficient *quantity* of materials, the deposit must retain *integrity* of form and location, there must be a *variety* of artifacts, and there must be proven *association* with "an individual household, an ethnic or socio-economic group, or a specific activity or property use" (Caltrans 2008:168–169; Costello 1999); in addition, the refuse must have a certain degree of *rarity*: "remains linked to household types or activities that are uncommon. Because they are scarce, they may have importance even in cases where they otherwise fail to meet other thresholds of importance (McIlroy and Praetzellis 1997:277)" (Caltrans 2008:168–169). "Rarity" speaks to the issue of "redundancy"; that is, when a site contains only redundant types of data—data that have been collected from, or are known to exist at, many other sites in the area—it loses a good deal of its data potential.

Household Composition and Lifeways

The HARD team (Caltrans 2007:193) notes that "[h]ouseholds constitute the smallest residential units that can usually be discerned in archaeological analysis." They define a household as a group of people "sharing domestic activities such as consumption and production," either a single individual, a nuclear family, an extended family, or unrelated individuals sharing living quarters. Urban households can be compared with those in rural areas, cities compared with small towns, farm households with miners' cabins, immigrant households with Euro-American ones. Households headed by women, households containing multiple generations of a family, bachelor households, wealthy households or impoverished ones—all can provide particular insights into the lifeways of their residents, including waste disposal practices, sanitation, health and hygiene, and similar factors. This topic is also closely linked with those of Economic Strategies and Consumer Behavior. Households, as typically "single-component" sites, often can provide a clearer picture of historic life than can a larger community, where refuse and other remains reflect the behaviors and activities of multiple families, classes, ethnic groups, and other entities.

Immigration and Cultural Adaptation

This topic is particularly relevant in an area like northern California, where immigrants from all over the world found themselves in sudden and close proximity during the Gold Rush. Indeed, the HARD group (Caltrans 2008:126–140) provides an extensive overview of Native Americans, Chinese, Europeans, North Americans, and Latin Americans in the California mines, along with a series of research questions about links to the homeland, ethnic markers, organization of space, degree of isolation between ethnic groups, ethnically distinct mining methods and technologies, and other aspects of immigrant life. This issue is closely linked with Ethnicity, which we discuss below under Socio-Cultural Dynamics.

Socio-Cultural Dynamics

This theme covers such issues as social stratification, cultural interaction, gender, and ethnicity. Sites that were occupied by heterogeneous populations—for example, mining camps, towns, and company work camps—hold the greatest potential for investigating these issues. For example, Hardesty (1994:36–37) argues that large-scale management and coordination of workers at corporate mines and mills "encourages the development of a standardized and highly structured set of social relationships" that are reflected in distinctive living conditions among the workers. Larger camps, as well as towns and other longer-term settlements, typically had "higher proportions of families [versus single males, and] generally developed a wider array of amenities, social activities, and institutions" (Caltrans 2013:17). Old townsites and work camps scattered throughout the planning area have the potential to address various research questions under this topic.

Gender

Gender studies have, until the last few decades, been somewhat rare in California archaeology, despite the fact that women were often present at nineteenth-century sites: "Women also became part of the workforce, usually in the cookhouse, although other jobs mentioned include seamstress, laundress, and even driving a team of horses pulling logs" (Franzen 1992:92). Women were also notably present in the early gold fields, where they often worked as miners (Caltrans 2008:71–72). In her thesis on of Victorian culture at Old Forbestown in southeastern Butte County, Carmosino (1998:86) notes that "by 1880 twenty-five percent of the population were women." Of these, one in five was employed: one hotel keeper, several teachers, and a few who took in boarders. Where there are women, often there are children as well: the 1880 census listed 160 children in Forbestown. Women would take on additional employment over time, as postmistresses, milliners, druggists, nurses, laundresses, cooks, and other workers.

Women are often considered to have had a "civilizing" effect on frontier life, bringing such Victorian values as cleanliness, thrift, sexual restraint, and abstinence from alcohol. The stereotype of the Western mining camp or frontier town is one of gambling, drunken brawls, prostitution, and a general disregard for legal or social standards. A review of period newspapers often supports this view. The degree to which women were able—or even willing—to bring "morality" to these situations might be evaluated through archaeological and archival research into the early settlements in the planning area.

Ethnicity

Another important aspect of social and cultural organization is ethnicity. The on-line Oxford Dictionary defines this sometimes vague term as "of or relating to a population subgroup (within a larger or dominant national or cultural group) with a common national or cultural tradition." The question for archaeologists, posed more than 30 years ago by Robert Schuyler (1980:viii), is this: "Is ethnicity… recognizable in the archaeological record?"

If we use the Oxford Dictionary definition, the answer appears to be…"somewhat." Franklin and Fesler (1999:3), using a very different and more complex definition, caution that we must be careful not to equate so-called "ethnic markers" with ethnicity. Nevertheless, certain features and artifact assemblages allow us to conclude—probably correctly in most cases—that a particular site was occupied by people from a particular ethnic population. Most archaeological research into ethnicity has tended to focus on certain more "visible" groups, including Africans/African-Americans and (in the West) the Overseas Chinese. Many "Chinese" sites have been investigated in northern California, especially in the gold mining districts of the Sierra Nevada and the Shasta-Trinity region, for the simple reason that they are relatively easy to recognize.

As recent scholars have argued, however, it is important that archaeologists avoid stereotyping the groups we study, and interpreting the record within the framework of those stereotypes. Voss and Allen, for example, point out that "the population of nineteenth-century Chinese immigrants to the United States…was multifaceted and internally diverse" (2008:12). We lose the opportunity to explore this diversity when we paint all Overseas Chinese (or other groups) with the same broad brush. If we hope to interpret the archaeological record of ethnicity, it is not enough simply to record sites and artifacts; it is critical that we also investigate the archival evidence (period newspapers, census records, company records, photographs, etc.) and, wherever possible, consult with individuals or organizations with intimate knowledge of the populations we hope to study.

Dynamics of Labor

America in the late nineteenth and early twentieth centuries saw major changes in working conditions, wages, and stratification of the labor force, especially as individual ventures were largely replaced by corporate ones. How a labor force was organized depended on such factors as company policies; the ethnic, gender, and social make-up of the workforce; the technology used by the laborers; and the presence or absence (and influence) of unions, guilds, or other labor organizations.

Praetzellis and Praetzellis (1993:iii) offer a model for "the study of the social environment of rural industry," noting that social control of workers by their employers in rural work camps depended in part on the size of the operation. Camps run by large companies tended to be ruled bureaucratically, with less concern for workers' needs and desires; smaller operators, on the other hand, were more idiosyncratic in their management styles, but in general "the environment was paternal, rather than institutional" (Praetzellis and Praetzellis 1993:iii).

Another critical factor was the ways in which labor was organized within the different ethnic groups. Chinese and Japanese workers tended to work within a system of contractors (the Chinese Six Companies, the Japanese *keiyaku-nin*), intermediaries who "arranged the work, negotiated wages, and often arranged living and supply for their workers, and took a slice of their wages" (HARD 2007:17). There also were appreciable differences between the working lives of "'Native or old-time immigrant laborers, who are boarded by the employers in the camps, or who individually prepare their own meals," and the 'Foreigners' or newly arrived immigrants who "'organized into their own boarding gang on a cooperative basis, having their own cook, who prepares the meals according to their national customs and tastes' (Higbie 2003:106)" (HARD 2007:17).

Historical archaeologists are also interested in how the information in the archaeological record compares with existing ideas about working-class culture in late nineteenth and early twentieth-century America. Stereotypes about frontier work camps "obscure the fact that many workers retained family and ethnic ties, certain elements of traditional material culture, and a propensity to take collective action to secure some of their desires" (Franzen 1992:94). It is difficult to form an accurate picture of the rural workforce: the jobs were seasonal and temporary, the workers themselves were transient and moved from job to job or even industry to industry, and individual workers often were not included in census or other records—particularly if they were recent immigrants. Despite their lack of visibility, however, these transient and usually low-paid workers had a huge impact on the economic and social development of the West.

Summary

In this section we have identified several important research themes, and provided two levels of research issues: "baseline" questions about the *where*, *when* and *for how long*, *what*, *how*, and *who* of an archaeological site; and "higher-order" questions of society and culture, economics, and technology. In the next section we identify various historical property types under each theme, and the likelihood that each property type can address the research questions.

HISTORIC-ERA PROPERTY TYPES

Each historical theme is represented by several different property types. As the HARD research team has noted, "[t]hese property types do not exist in isolation, but must be identified and interpreted within their functional and historical context" (Caltrans 2008:81). Those researchers go on to explain that "site significance increases with the size, complexity, visibility, and focus" of the property types that are present. A single mining feature (adit, prospect pit, ditch segment) will have less significance than a group of related features; on the other hand, a cluster of features that are not related in function or time—e.g., a nineteenth-century mine that has been overprinted by a twentieth-century quarry operation—may lack sufficient focus or integrity to be considered eligible for the National Register.

The resource types identified here are based on the existing BLM site database and on other kinds of resources that, judging by the historical context, are likely to be found during future inventories. All themes are represented, but the discussion focuses on those themes that are most common in the site database (i.e., Mining, Infrastructure, and Settlement/Agriculture).

Exploration and Colonization

These earliest of non-native sites survive only rarely and typically are identified through archival research. Most often they are remnants of very early (pre-Gold Rush) trails, adobes, or features associated with Mexican-era ranchos. In the planning area, only a few surviving pre-Gold Rush resources have been documented, among them the "Sacramento River Trail," reportedly mapped by Hudson's Bay Company trappers in the 1830s (Woodrum 2009a); portions of the Yreka Trail, said to have been used by John Work in 1833 (Maloney 1945, cited in site record for CA-030-0878); and remains associated with John Bidwell's adobe and rancho (White 2015). Any surviving resources from this period that have integrity to their period of significance are likely to be eligible for the National Register, because they date to an era for which we have very little archaeological information.

Maritime Activities

Terrestrial properties directly related to maritime activities can include landings/harbors, jetties/breakwaters, lighthouses, lifesaving stations, fish canneries, whaling stations, abandoned or repurposed ships, and military facilities. Ten maritime-related resources appear in the BLM site database, all of them (not surprisingly) in the Coast Ranges region. All of these can be considered important for their associations with California's maritime history; however, their potential eligibility will depend on whether they retain integrity to their period(s) of significance.

Early Infrastructure Development

A vital element in the exploration, settlement, and development of the planning area were the transportation corridors, water supply systems, communications links, and power generation facilities that were established there. Transportation and water features represent the next-highest number of recorded resources in the planning area, though still well behind those related to mining (Table 13). In and of themselves, these types of properties may not provide a great deal of information, beyond their locations, methods of construction, but the artifact assemblages that may survive along these features—particularly early roads and trails—can provide important insights into the consumer behaviors, disposal practices, and other aspects of life and culture during the period of use (see, for example, Barnes et a. 2004). Also important are the residential properties (waystations, construction camps) that may be associated with infrastructure development.

Table 13. Infrastructure Property Types.

SUB-THEME	ARCHAEOLOGICAL REMAINS
Transportation	Pack/foot trails, wagon/stage roads, railroads, ferry crossings, bridges, culverts, waystations
Water Development	Ditches, flumes, dams, storage reservoirs, pipelines, cisterns, wells, siphons, control gates
Communication	Early mail routes, telegraph/telephone lines (poles/towers, wire, insulators)
Power Generation/Transmission	Dams, reservoirs, power plants, transmission lines, substations, towers, insulators, transformers, penstocks/pipelines

The Extraction Economy: Mining and Logging

Mining Property Types

These property types reflect the technologies described earlier: placer/river mining, hard-rock (lode) mining, hydraulic mining (including ground sluicing and booming), and dredging (Table 14). They include three main aspects of all mining technology: exploration, extraction, and processing. The categories are adapted from the HARD research group (Caltrans 2008); detailed definitions and illustrations can be found in that publication.

Table 14. Mining Property Types.

ACTIVITY	TECHNOLOGY	ARCHAEOLOGICAL REMAINS
Exploration	Hand	Prospect pits, "coyotes," claim markers
	Mechanical	Trenches
Extraction	Placer Mining	Tailings, cutbanks/channels, drifts, check dams, ditches, sluice scars
	Hard Rock (Lode) Mining	Pits, cross-cuts, surface vein workings; shafts, adits, tunnels, inclines; headframes and shoring; rails and ore carts; waste rock piles
	Hydraulic Mining	Major erosion features, reservoirs/dams, ditch/flume systems, earthen or stacked-rock sluice supports
	Dredging	Large tailings fields
Processing	Small-scale/manual	Arrastras, "Chili mills"
	Industrial	Stamp mills, mill tailings, Pelton wheels, smelters
Ancillary activities	-	Dwellings, roads/trails, refuse deposits, other features directly associated with mining remains

Note: Adapted from Caltrans (2008) and Waechter and Marvin (2011).

Several of these property types from the same period or operation often exist together at a single site, forming a *mining complex*: for example, the Salt Creek Mine (CA-030-0002) south of Shasta Lake, the Grass Valley Creek Historic Placer Mine (CA-030-0006) near Lewiston, the Clear Gulch Mine (CA-030-0027) just north of Junction City, the Banner mine and mill site (CA-030-0345) northeast of Oroville, and many others.

Logging and Lumbering Property Types

Historic-era logging and lumbering in northern California left the remains of sawmills (sometimes with associated "mill towns,"), transportation features (traction engine roads, railroads), flumes and chutes, work camps, even fields of high-cut stumps (see, for example, Lindström and Waechter 1996). The fact that these remains make up less than 2% of the recorded resources in the BLM database probably reflects, in part, the difficulties of logging in the very rugged terrain, the vast treeless areas of the Sacramento Valley, and perhaps the fact that later logging has often obliterated the earlier features. The logging/lumbering properties that have been recorded are mostly segments of logging railroad, remains associated with major log flumes (e.g., the Blue Ridge and the Empire), and sites identified through archival research. Some investigations have also been carried out at "mill towns," such as the town of Falk, just south of Eureka (Rich and Roscoe 2009).

The Overseas Chinese

This category is called out separately because of its special research potential. As we have noted in the historical context discussion, the archaeology of the Overseas Chinese has become a major topic for archaeologists in California and elsewhere. Many of the property types under this heading are the same as those identified for other themes, with the additional criterion that they contain "ethnic markers" or other indications of Overseas Chinese occupation. Some resources are presumed to be Chinese because of their names (i.e., "Chinese Ditch"—CA-030-1188; "Canyon Creek China Cabin—CA-030-0450); others are identified as such in the archival record. For the most part, however, these properties have been recorded as Chinese because of the artifacts present: porcelain "rice" bowls, *jian you* ware, opium-smoking paraphernalia, Chinese *wen* (coins), etc. Low, horseshoe-shaped hearths, two- and three-chambered stoves made of brick or stacked stone, and other stacked-rock features are often presumed to be of Overseas Chinese origin as well (e.g., Lindström and Waechter 2007).

Settlement and Agriculture

These two themes often overlap, since one of the primary goals of settlement in northwestern California was the raising of crops and livestock. Two important overviews and research designs from the HARD research group are relevant here: *Townsites* (Caltrans 2010) and *Agriculture* (Caltrans 2007). The HARD group (Caltrans 2007:145–170) identifies "three broad functional classifications" of agricultural property types: ranches, farms, and multi-use properties. Within these they define various subcategories (cattle ranch, sheep ranch, dairy, poultry farm, etc.). Because archaeological remains often cannot be identified that precisely, we use the more-general categories of livestock ranches, farms, and orchards (Table 15). Settlement property types used here include townsites (clusters of dwellings and public facilities) and homesteads (individual dwellings and associated features). Important examples of these property types in the planning area include sites like the Andrew Jelly farm and homestead (CA-030-0410) on the Sacramento River near Table Mountain, William Perry's farm and orchard (CA-030-1770) between the Sacramento River and Paynes Creek, an apple orchard (CA-030-1309) associated with the historic Lowden Ranch near Lewiston (BLM 2006), and Carmosino's (2000) study of the Mud Valley Ranch in Trinity County. Property types associated with settlement and agriculture have perhaps the greatest potential for addressing the topics of household composition and lifeways, economic strategies, and consumer behavior.

Table 15. Settlement and Agriculture Property Types.

PROPERTY TYPES	SUB-THEME	ARCHAEOLOGICAL REMAINS
Townsites[a]	Infrastructure	Waste disposal facilities, water supply systems, power generation and transmission features, levees, roads, bridges, public buildings or spaces
	Residential	House remains, yards, privies, wells, gardens, outbuildings, refuse
	Commerical	Shops, open-air markets, offices, associated waste facilities and refuse
	Industrial	Factories, storage yards, disposal features, refuse
Homesteads		Dwellings, privies, wells, yards, gardens, outbuildings, animal pens, ornamental plantings
Farms and Orchards		Fields, fence lines, stone walls, irrigation features, trees
Ranches		Ranch houses, line shacks, fence lines, corrals, loading chutes, scaling stations

Note: [a] Adapted from Caltrans (2010).

Native Resistance and the Indian Wars

Although there is ample documentation of Native resistance to being forced from their territories and cut off from necessary resources, and of harsh reprisals by settlers and militia, few archaeological remains in the planning area have been linked to these events. One exception is the Fort Gaston Trail (HUM-1896), which connected Forts Humboldt, Curtis, Anderson, and Gaston ca. 1850–1865, and the locations of the actual forts (Fort Humboldt, for example, is now a State Park, and an adobe house has survived at Fort Gaston; there are no standing structures at Fort Reading). Known refuge sites in the planning area include Ishi's camp in Deer Creek Canyon, and Forks of Butte near Forest Ranch (BUT-854/CA-030-0400; Elliott 1995). Any such resources that might be recorded in the future would certainly be significant, both to archaeologists and to living Native peoples.

Some archaeological work has been done, however, at a few of the military forts from this period. Archaeologists Trudy Vaughan and Dr. Eric Ritter both carried out investigations at Fort Reading, although no reports are available as yet (E. Ritter, personal communication with the author, July 2016). They uncovered structure foundations, scattered artifacts, burials, a segment of the Nobles Trail, and an underlying prehistoric deposit. As with refuge sites, remains of these military forts and any ancillary features are likely to be highly significant.

The New Century

We consider several property types together here, even though they often had different functions, because they represent California's (and the nation's) transition into a very different world order. The Conservation Movement and the founding of the first Forest Reserves, the Reclamation Act, the Women's Suffrage Movement, the Progressive Era, all reflected a sea change in American social, economic, and political attitudes. Activists fought for improved working conditions, regulations governing child labor, scientific management of natural resources, assimilation (or restriction) of immigrants, and an end to political corruption. The era of unchecked extraction of natural resources for economic gain gave way to more responsible land use, due in large part to increased government regulation.

Property types from this era tend to be highly recognizable, due to better preservation, more abundant and familiar artifacts, and a profusion of documentary information. In particular, features and facilities constructed by government entities (e.g., wartime signal stations, dams, bridges, CCC camps) will be well documented with maps, drawings, plans, and reports. In these cases the resources may be most significant under National Register Criteria A (important events) or C (engineering or artistic merit), assuming they retain sufficient integrity. Many of these sites may also provide important information on socio-cultural dynamics, where groups of dissimilar individuals—such as CCC enrollees—were thrown together; and on economic strategies, where (for example) Depression-era families and individuals faced serious hardship.

One important example of a CCC project in the planning area is the Ponderosa Way, constructed between 1933 and 1937 as a fuelbrake to protect local residents and upland timber areas from wildfires (Ritter 2014). It is reported to be the largest CCC project ever constructed, 687 miles long from Kings County to Shasta County. In addition to the route itself, the resource includes bridges, stone culverts, and rock retaining walls, as well as secondary roads and their infrastructure. Site BUT-1693H/CA-030-1987 is a recorded segment of the route on BLM-administered lands. The Ponderosa Way is eligible for listing on the National Register of Historic Places "in its original configuration[,] where present[,] under Criterion A whereby they are associated with the American Depression and the CCC program[;] and Criterion C[,] with distinctive engineering features including roads, culverts, retaining walls and drains, and bridges that retain integrity" (Ritter 2014:3).

Summary

The research themes and issues identified here are intended to focus on the primary types of historic-era archaeological resources known (or presumed) to be present in the planning area. The research issues reflect current work by historical archaeologists in California, and particularly the research designs that have been developed by the Caltrans-sponsored HARD research teams. We expect that, as data gaps are identified and filled, and new paradigms emerge, these research issues will evolve and change; however, for the present, the issues discussed here should guide archaeological evaluations at historic-era sites on BLM-administered lands in the planning area.

CONTEMPORARY CULTURE (by Sharon Waechter)

Cultural resources involve more than just archaeological sites or historic structures. Federal mandates published in the Antiquities Act, the National Historic Preservation Act, the Native American Graves Protection and Repatriation Act, and numerous other regulations are intended to guide the preservation, use, and management of all types of heritage resources. These can be tangible places—a rock art site, for example, or an abandoned mine—or they can be places with less-tangible spiritual or traditional values that are nonetheless important to living people. Additionally, history is not a finite concept with a beginning and an end—which is why the 50-year "cut-off" for defining a historical resource under Section 106 continues to extend forward each year. The land uses occurring today, and the people responsible for them, will become the history of tomorrow. Accordingly, this section provides an overview of the contemporary cultural setting of the planning area, including both Native American and non-Native populations.

CONTEMPORARY NATIVE AMERICAN GROUPS AND LAND USES

Traditional Cultural Properties, Landscapes, and Use Areas

National Park Service Bulletin 38 (Parker and King 1998) defines traditional cultural properties (TCPs) as properties that have played a significant role in a community's "historically rooted beliefs, customs, and practices," such as a location where spiritual practitioners have traditionally gone to perform their ceremonies, or the historical residence of an esteemed leader. Often these places are sacred to the community, who feel strongly that their locations should remain confidential. This makes these places difficult to identify and protect; it is important that local Native people are consulted in the management of such resources.

More recently, the Advisory Council on Historic Preservation launched a "Native American traditional cultural landscapes initiative," broadening the definition of a TCP to include properties that do not fall under the National Register categories of "sites, districts, buildings, structures, or objects":

> There is no single defining feature or set of features that comprise a traditional cultural landscape. Such places could be comprised of natural features such as mountains, caves, plateaus, and outcroppings; water courses and bodies such as rivers, streams, lakes, bays, and inlets; views and view sheds from them, including the overlook or similar locations; vegetation that contributes to its significance; and manmade features including archaeological sites; buildings and structures; circulation features such as trails; land use patterns; evidence of cultural traditions, such as petroglyphs and evidence of burial practices; and markers or monuments, such as cairns, sleeping circles, and geoglyphs [National Park Service website].[25]

Like TCPs, traditional cultural landscapes are not readily apparent to those who are not members of the traditional community—including most archaeologists. In order to identify and protect such properties, it is critical that cultural resources managers consult with the community in question, whether Native American or another group. The same is true of traditional use areas; for example, locations where Native women have traditionally gathered basketry plants or families have gone for generations to collect pine nuts.

It is also important to recognize that "tradition for Native Americans is dynamic: that tradition changes in response to conditions of history and social context" (Theodoratus 1984:iii). This dynamic is difficult for most non-Native people to understand or appreciate, especially when Native religious practices "are vastly different in many ways from the Christian traditions of the majority of American society" (Theodoratus 1984:iv). One

[25] http://www.achp.gov/docs/landscapes%20q%20&%20a%207-11-12.pdf

example of this difference is in the identification of spiritual places. Many Native people see natural places—mountains, caves, springs—as "imbued with spiritual power," even when there are no visible markers to identify them as such (Mt. Shasta and Mt. Lassen are two obvious examples). In addition, the spiritual power of a place is diminished when the surrounding environment is altered. These are concepts foreign to the modern Christian viewpoint, and difficult for many land managers to understand. Such differing viewpoints have caused extreme polarization, and continue to create conflict between Native people and federal land managers.[26] The situation is made even more difficult for land managers who are willing to recognize and protect spiritual places, because Native people are understandably reluctant to identify them. Theodoratus' 1984 study, and others like it, is a critical step toward resolving some of these issues.

Many traditional cultural properties have been identified in ethnographic studies that involved reviews of historical and anthropological documents and "consultation with Native American leaders and religious practitioners" (Theodoratus 1984:iii). Locations of such places are usually kept confidential, because of their special spiritual values to Native people.

Current Land Uses

According to the website http://www.courts.ca.gov/3066.htm, there are currently 109 federally recognized Indian tribes in California and 78 entities petitioning for recognition, nearly 100 separate reservations or Rancherias, and "a number of individual Indian trust allotments." As of March 2016, tribal groups in the planning area that had been formally recognized by the federal government and the State of California included the following:

- Bear River Band of the Rohnerville Rancheria
- Berry Creek Rancheria
- Big Lagoon Rancheria
- Blue Lake Rancheria
- Cachil Dehe Band of Wintun Indians of the Colusa Rancheria
- Cahto Indian Tribe of the Laytonville Rancheria
- Cher-Ae Heights Indian Community of the Trinidad Rancheria
- Confederated Tribes of Siletz Indians
- Elk Valley Rancheria
- Enterprise Rancheria of Maidu Indians of California
- Greenville Rancheria
- Grindstone Rancheria of Wintun-Wailaki
- Hoopa Valley Tribe
- Karuk Tribe
- Klamath Tribes
- Mechoopda Indian Tribe of Chico Rancheria
- Modoc Tribe of Oklahoma
- Mooretown Rancheria of Maidu Indians of California
- Paskenta Band of Nomlaki Indians of California

[26] One well-publicized example of such a conflict was the Gasket-Orleans or "G-O" Road (Theodoratus 1984; Theodoratus and Blount 1983). The court found in favor of the Native people, but the decision was later overturned in favor of the Forest Service.

- Pit River Tribe (XL Ranch, Big Bend, Burney, Likely, Lookout, Montgomery Creek, Roaring Creek Rancherias)
- Quartz Valley Indian Community of the Quartz Valley Reservation of California
- Redding Rancheria
- Resighini Rancheria
- Round Valley Indian Tribes, Round Valley Reservation
- Sherwood Valley Rancheria of Pomo Indians of California
- Tolowa Dee-ni' Nation
- Wiyot Tribe
- Yurok Tribe of the Yurok Reservation

These and other Native American communities in the planning area take a keen interest in the protection of TCPs (including archaeological resources) and use areas, and of their rights of access to these places. Many tribes maintain a cultural committee that focuses on these issues for the benefit of the larger community. For more than a century, these people had little or no power to voice their concerns. While there were exceptions, it was only in the 1970s, at the birth of the modern environmental movement, that local, state, and federal agencies began to consult with Native groups on a regular basis.

Understandably, many Native people are even more concerned with pressing issues like unemployment, health care, and access to higher education for their youth. The growth of Indian Gaming under the 1998 Tribal Government Gaming and Self-Sufficiency Act has provided many tribes—though certainly not all—with a major means of self-employment and economic advancement for the first time in generations. It has also led to inter-tribal and intra-tribal conflict, as gaming tribes struggle to balance traditional values and family loyalties with the politics of affluence.

As of March 2016, there were "Indian casinos" at Smith River, Elk Valley, Trinidad, Hoopa, Blue Lake, Bear River, Branscomb (near Laytonville), Corning, Redding, and Burney. New casinos open regularly. Typically the "gaming tribes" use the proceeds to supply income, housing, roads, schools, health-care facilities and other services to their members, and sometimes to the larger community as well. Still, many non-gaming tribes continue to suffer from poverty and lack of social services. Several organizations have been formed to address this problem. For example, the Northern California Indian Development Council (NCIDC), headquartered in Eureka, is a private, nonprofit corporation providing education, community health and wellness, employment training, and other services to some 14,000–15,000 clients statewide, with a focus on Del Norte, Humboldt, Siskiyou, and Trinity Counties:

> NCIDC was established in 1976 to research, develop and administer social and economic development programs designed to meet the needs of Indian and Native American Communities; to provide support and technical assistance for the development of such programs, and the conservation and preservation of historic and archeological sites and resources [http://ncidc.org/about-ncidc].

Other examples include the federal Indian Health Service (IHS), the California Indian Health Program, California Indian Legal Services, local institutions like the Redding Rancheria Indian Health Services, and Native American Studies programs at Humboldt State University and other California universities and colleges. Some tribes are also supporting language schools and other facilities to carry on traditional tribal culture.

NON-NATIVE LAND USES AND USER GROUPS

Essentially all of the land uses discussed in earlier sections of this document—maritime activities, logging, mining, agriculture, infrastructure development, hydroelectric power development, federal land management, recreation—continue today. Only exploration and settlement have waned, as modern highways and communications have linked virtually every corner of the north state. The emphasis has shifted somewhat, with more individuals employed in agriculture, land management, and recreation (including Indian gaming) than in mining, but the extraction economy is nevertheless alive and well in northwestern California.

Resource Extraction

The National Mining Administration reported in 2012 that mining in California provided direct employment to 22,820 people, including the mining of various metals, minerals, and fuels.[27] The great majority of this employment came through companies; very few miners today are self-employed, especially compared to the nineteenth century. Today the environmental and permitting restrictions on mining have made it more complex and expensive, but also much less damaging to the natural environment. (One indication of this is the fact that the State Mining and Geology Board falls under the Department of Conservation.) The BLM manages mining and minerals on public lands under their jurisdiction, through its Mining Law Administration Program, and continues to operate under the General Mining Law of 1872, as amended (30 U.S.C. §§ 22-54 and §§ 611-615).

Logging is also an important economic activity in the planning area today; however, the lands with most of the merchantable timber tend to fall under the management of the US Forest Service. Forestry is a relatively small part of BLM's land management activities in the region.

Ranching and Farming

Agriculture is still an important land use in northwestern California today, although "cultivation" has taken on a new connotation over the last several decades. While ranching and dairying in the region began with the first Mexican ranchos and have occupied multiple generations of ranching families, the "marijuana (*Cannabis sativa*) economy" has been an economic boon, especially in the "Emerald Triangle" of Humboldt, Trinity, and Mendocino Counties, in the late twentieth and early twenty-first centuries. Until 2015, with the passage of several state laws involving the legalization of medical marijuana, the industry was completely "underground"; today this one sector of the industry is conspicuous and regulated.

The growth of marijuana on public lands has been a management issue for BLM, the Forest Service, and other agencies in northwestern California. Although the cultivation itself is relatively benign, illicit growers have often set dangerous traps to ward off intruders, creating a safety hazard for government employees and the public. Their operations have introduced biocides and herbicides to the local streams, and their trash litters the landscape. There have also been conflicts between ranchers and land-management agencies like BLM, in large part because of the environmental degradation that can come from over-grazing, and the feeling on the part of ranchers that the federal government and its permitting process are too invasive. Some progress has been made: recently, groups like the California Cattlemen's Association have begun to stress "greener and more efficient beef production," arguing that "environmental stewardship and best practices for green farming go hand-in-hand with managing a successful and long-term family business" (http://www.calcattlemen.org/cattle_101/cattle_and_the_environment.aspx). However, both ranching and marijuana cultivation continue to create land-use conflicts for the BLM.

[27] http://www.nma.org/pdf/states/econ/ca.pdf

Recreation

Public recreation is an important land use in the planning area. Recreation areas administered by BLM include (among others) the Sacramento River Bend Outstanding Natural Area, the Sacramento River Rail Trail (a National Recreation Trail), the Trinity River Wild and Scenic Area, the Forks of Butte Recreation Area, and the Chappie-Shasta OHV Area (Redding Field Office); and the Lacks Creek Management Area, Samoa Dunes OHV Area, and Mike Thompson Wildlife Area on the South Spit of Humboldt Bay (Arcata Field Office). Special Recreation Permits are issued for commercial use, competitive events, organized group events, or use of a designated special area. BLM also administers several wilderness tracts that provide opportunities for "unconfined" recreation, including the Ishi, Yolla Bolly-Middle Eel, South Fork Eel River, and Elkhorn Ridge wilderness areas. The Yuki Wilderness is co-managed by BLM and the Mendocino National Forest.

Some of these recreation areas—notably the Sacramento River Bend Outstanding Natural Area—are known to contain significant cultural resources (historic properties) and have been the subject of archaeological and historical studies in the past. Recreation use, and particularly OHV use, can be very detrimental to these resources.

CULTURAL RESOURCES SYNTHESIS (by William Hildebrandt and Sharon Waechter)

The 15,000 years or more that human beings have occupied the New World are typically divided by scholars into "prehistory" and "history." To some degree this makes sense, because the period between about AD 1650 and 1850 saw an abrupt and wholesale takeover of already-occupied lands by a completely different group of people—a kind of population nonconformity separating two very different cultural traditions. In this synthesis, however, we attempt to view the human history of northwestern California as a continuum, focusing less on ethnicity and more on changing patterns of human settlement, resource use, technology, and socio-cultural development. We begin with the first known human occupation of California.

The First Inhabitants

The first evidence of people in the planning area is a limited number of Clovis projectile points lightly scattered across a wide range of environmental settings. These distinctive fluted weapons date to between 13,400 and 12,800 cal BP in the American Southwest and western Great Plains, where they were used to hunt now extinct Pleistocene megafauna. All of the California artifacts are undated isolated surface finds, so we must assume that they are of a similar age, or somewhat later if the people migrated out to California from a more eastern point of origin. Many researchers think that the ancestors of the Clovis people originated in Asia and entered North American by crossing the Bering Sea land bridge and traveling south through a series of gaps in the continental glaciers that existed at that time.

The next archaeological pattern is commonly assigned to the Paleoarchaic Period. It is characterized by Great Basin Stemmed projectile points, highly formalized dome-shaped tools used for a variety of tasks, and a lack of milling equipment. Sites of this age are often concentrated around the shores of old pluvial lakes, many of which are now dry. This is certainly the case within the current study area, where significant numbers of stemmed points are found only in Butte Valley along the ancient shores of Meiss Lake. This archaeological pattern has traditionally been thought to post-date Clovis and the extinction of the Pleistocene megafauna, and probably dates between 12,800 and 7800 cal BP. Due to the dominant presence of projectile points and the absence of milling gear, most researchers think large-game hunting remained a primary focus of their subsistence economy.

This sequence of events has recently come under question because of a building body of evidence from south-central Oregon (not far from our study area) showing that Great Basin Stemmed projectile points might actually pre-date Clovis, and represent the first colonists of North America. These findings, combined with new discoveries of great antiquity on southern California's Channel Islands, have led to the hypothesis that people making Great Basin Stemmed points migrated down the coast and spread eastward into the interior populating much of the American West. Clovis is now thought to have been a later, independent cultural development that essentially died out with the Pleistocene megafauna, while the Great Basin Stemmed cultures continued forward for thousands of years.

Our study area currently has little to offer regarding the age of Great Basin Stemmed projectile points and associated materials, as no radiocarbon dates have been obtained with these artifacts. We can say, however, that there are few or no Great Basin Stemmed points west of the Sierra-Cascade ranges, which provides little support for the hypothesis that people traveled down the coast and moved into the interior—at least in northern California. If such a migration did occur, the people may have chosen a different route—like the Columbia River, where the terrain was more conducive to travel.

So what is the post-Clovis archaeological record for the western part of the study area if it is not represented by Great Basin Stemmed projectile points? The answer is the Borax Lake Pattern. It is represented by Borax Lake Wide-stemmed points and a much wider variety of tools, including the first use of milling gear (handstones and millingslabs). These sites are found throughout the North Coast Ranges and the headwaters of the Sacramento River, but nowhere else. Unlike previous periods, we have dated its artifact assemblages with radiocarbon and obsidian hydration. Obsidian hydration age estimates from the Clear Lake Basin and surrounding areas indicate an age range between about 10,000 and 6300 call BP, while radiocarbon dates of about 8000 cal BP have been obtained from two sites farther north. But even with the 10,000 cal BP age estimate for the Borax Lake Pattern, there remains a large gap between it and the end of Clovis at about 12,800 cal BP (or somewhat later, given the time lag for reaching California). Filling this gap remains an important research issue in the study of northern California prehistory.

Major Environmental Shifts and Human Adaptations

After about 7800 cal BP, adaptive variability began to take place across the study area, especially between the Upper Klamath zone (with its strong ties to the Great Basin, which were maintained throughout prehistory), and areas to the west. Within the Upper Klamath Zone, radical changes took place because most of the pluvial lakes had dried by this time, and the eruption of Mt. Mazama (now Crater Lake) devastated much of central Oregon, perhaps pushing people into northeastern California. The new culture that developed was characterized by a higher degree of settlement stability (house floors are commonly found), and it appears that atlatl technology was introduced for the first time, represented by the highly distinctive Northern Side-notched projectile point. This was also the time when bowl mortars and pestles were first used, but not for acorns, because these artifacts are only found in sites well east of California's oak groves.

The Borax Lake Pattern continued forward in the west, until about 5700 cal BP. Sites from this period are largely found in upland habitats, and appear to reflect a subsistence-settlement system geared toward a high degree of residential mobility. For the period after 5700 cal BP, archaeological visibility improves significantly, with relatively strong evidence for occupation in all parts of the study area. Squaw Creek Contracting-stemmed points were introduced in the upper Sacramento River and the Klamath Mountain/North Coast Ranges, and several other comparable forms like the Bucks Lake Stemmed and Martis series emerged in the northern Sierra Nevada. Although populations appear to have been expanding into a wider range of habitats, settlement systems seem to have remained mobile (moving people to the resources, rather than resources to the people), and the reliance on stored resources was minor compared to what would come later.

By about 4000 cal BP, another pulse of changes occurred, providing some of the first hints of the lifeways that would eventually dominate, especially those dependent on the intensive harvest and storage of acorns and salmon. This new economic focus did not develop all at once, however. Instead, it appears to have been a sequential process, beginning first with a more intensive use and storage of acorns (and only a casual use of salmon), and later with the complete acorn-salmon complex observed at historic contact. It has been hypothesized that this time lag between acorns and salmon occurred because acorns are a *back-loaded* resource—the initial collection and storage of them are relatively cheap and easy, and only get expensive later on when the nuts need to be processed for consumption (i.e., ground, leached, and cooked). So when people who traditionally practiced a relatively flexible, mobile settlement system began to experiment with higher levels of storage, creating multiple, low-cost caches of acorns meant minimal risk, because if they needed to be abandoned, the loss would be minimal. Salmon, in contrast, is a *front-loaded* resource. They are more difficult to acquire than acorns and, more importantly, they must be smoked/dried for storage right way. Once this expensive upfront work is completed, there is little effort required during the later consumption side of the process. But because of this upfront expense, salmon caches were much more valuable than acorn caches, and tended to tie people down in a much more significant way—something that people did not chose to do until many generations later (see below).

We can see the acorn-first situation in many places, including settlements along the Smith and Mattole rivers, and along much of the Sacramento River and adjacent tributaries. All of these places produced charred acorns and bowl mortar and pestle technology, but little fish bone or sophisticated fishing technology. Sometime after 1500 cal BP, however, the riverine-focused economies began to take hold, many of which have been associated with the arrival of new ethnolinguistic groups. Speakers of Wintuan languages (Wintu and Nomlaki) settled in the Sacramento Valley, bringing with them the bow and arrow (and the distinctive Tuluwat Barbed projectile point) and advanced fishing technology, including use of large communally built weirs. This was also the case in northwest California with the arrival of Algic speakers (Yurok and Wiyot), and later by speakers of Athapaskan languages like the Tolowa, Hupa-Chilula, and several others in Humboldt, Trinity, and Mendocino Counties (Nongatl, Mattole, Sinkyone, Lassik, Wailaki, and Cato).

Most of these groups were fully committed to the storage of both acorns and salmon, and this commitment to the front-loaded salmon led to higher levels of residential stability. Archaeological excavations in the Sacramento Valley and North Coast Ranges document the rise of this more village-based lifeway through the discovery of the remains of well-built houses, sweat lodges, elaborate artifact assemblages, and formal cemetery areas.

Regional Diversification

Regional economic diversity became more apparent now, marked in part by the more intensive use of coastal resources. This was especially the case north of Cape Mendocino, where people used large oceangoing canoes to hunt seals and sea lions on distant offshore rocks and islands. This new development is represented archaeologically by the presence of large stone harpoon tips and the butchered remains of Stellar sea lions and northern fur seals. The importance of sea lion hunting can also be seen on a spiritual level, this reflected by a shrine composed of 1,000 seal lion skulls placed on a small offshore rock near Trinidad. Construction of the oceangoing dugouts was an expensive proposition and could only be accomplished by rich individuals with the resources to hire out much of the work. This differentiation of wealth in the community can be seen archaeologically by major inter-personal differences in the distribution of valuables (e.g., obsidian blades, shell beads) buried with the dead.

Speakers of Maiduan languages (Konkow and Chico Maidu) are thought to have arrived in the Sierra Nevada and adjacent lowlands at about 1100 cal BP, adding to the regional diversity. People living on the Sacramento River made the full commitment to the acorn-salmon economy and formed large permanent villages supported by stored resources. People living in the hills began using bedrock mortars, and the large number and dispersed distribution of these features could reflect the private, family ownership of certain oak groves and the milling facilities used to process the crop. This is also the time when hopper (basket) mortars and pestles replace bowl mortars and pestles over much of the study area. Why this technology was considered superior to the original one is a mystery, and this remains an important research question for the region.

Throughout much of California, obsidian was a valuable commodity due to its beauty and superior tool-making qualities. Large obsidian quarries on the Medicine Lake Highlands and at the Borax Lake sources were the main suppliers of high-quality stone for much of the study area, especially places lacking good local tool stones. Based on obsidian hydration data collected from the quarry areas, and from outlying archaeological sites where the material was consumed, it appears that the peak period of production and inter-regional exchange occurred between about 4000 and 1000 cal BP. After that time, the system appears to have collapsed, with people shifting to the use of local, often inferior stone. Why this occurred is uncertain, but it could reflect a reduction in the demand for high quality stone due to the introduction of the bow and arrow, which required much less material than the older atlatl and dart technology, as well as a greater focus on fishing, which required little or no stone at all. It has also been suggested that with increased population packing and higher degrees of territoriality, inter-group relationships may have soured in many places, where neighbors became enemies rather than trading partners. The major drought associated with the MCA (1150–600 cal BP) may have contributed to the friction as well, as competition over a dwindling resource base intensified.

Population Growth, Inter-group Conflict, and the Emergence of Trade

A review of the ethnographic literature shows that inter-groups conflict was quite real, with numerous examples of violent interactions. It seems likely that the long history of population replacement outlined above created some of this conflict, especially among people being pushed out of their original homelands. Speakers of the oldest languages like the Yuki, Chimariko, and Yana were being pushed into smaller, more marginal habitats, and viewed many of their neighbors as mortal enemies. The severe nature of these relationships is reflected by a limited number of burial populations where violent injuries appear on many of the people. One of these populations located in Wintu territory showed that more than 60% of the men aged between 20 and 30 suffered trauma (some lethal, some non-lethal)—more than three times the frequency among women in the same age group.

Despite the decline of the inter-regional obsidian trade network, and the high levels of inter-group violence, an active trade network of a variety of other commodities occurred during periods of peace. Although most of these items do not preserve in the archaeological record, one of the main items of exchange, shell beads, do preserve and act as a proxy measure of this activity. Between about 5000 and 400 BP, *Olivella* shell beads were actively traded throughout central California, especially within the San Francisco Bay area, the lower Sacramento River, and the upper San Joaquin. For some unknown reason, this trade system extended north to the southern margins of our study area, where the flow of beads decreased significantly. South of this transitional area, it is not uncommon to have tens of thousands of *Olivella* beads at a single site, and thousands of specimens interred with a single individual—while only handfuls of beads are usually found at sites to the north.

After about 400 cal BP, however, a completely new system developed, focused on clam disk beads along with a variety of other beads and ornaments. Based on ethnographic accounts we know that clam disk beads were used as money, and they are found in large numbers all the way up to the northern Sacramento Valley and into adjacent parts of the study area as well. Similar to the *Olivella* beads, however, they are not equally distributed across the land, as the vast majority are found among the more wealthy communities along the major river valleys and less so among people living in hinterland areas (e.g., the hill country in Yana territory).

Native American Religious Practices

Although its beginnings are murky, the spiritual side of life is also evidenced by the ancient archaeological record. Ancient petroglyphs with cupules and grooves and a variety of other abstract elements, are widely distributed across the North Coast Ranges, Sierra Nevada, and southern Cascades Many researchers think that they were associated with Hokan-speaking populations and were no longer produced after the arrival of more recent ethnolinguistic groups, except in certain places where Hokan speakers were not replaced (e.g., parts of Pomo and Karuk lands). More recent rock art traditions, both petroglyphs and pictographs, include representational elements (e.g., humans, animals, foot prints) but these are relatively rare, except to the northeast in Lava Beds National Monument, where high densities of decorated panels are found along the old shores of Tule Lake.

Rock features linked to religious activities were created deep in antiquity, and some are still produced today by people following traditional practices. Most are found in northeastern and northwestern California, where they are used to obtain power and to gain wisdom to help overcome periods of grief and hardship encountered during one's life. The archaeological manifestations of these activities take many forms—single rock placements, multiple rock placements, larger rock mounds, U-shaped prayer seats—and are often found at higher elevations within the viewsheds of important mountain peaks. They continue to have spiritual value for contemporary Native people, because the features form tight connections with their ancestors, allowing them to walk in their footsteps and see the landscape as they saw it—particularly in those places where the landscape has remained relatively unaltered. This level of spirituality and respect can be felt at other kinds of archaeological sites as well, and by other members of the community. It follows, therefore, that the desire to better understand and protect this rich archaeological record is a worthy goal indeed.

The Second Migration

Religion, along with technological innovation, would also be an element of a new and much larger wave of migration into California that began in the late eighteenth century—one that would increase both the human population and the level of socio-cultural diversity (not to mention inter-group conflict) on an unprecedented scale. Although the early Franciscan padres who founded the first Spanish missions in southern and central California no doubt were motivated by their religious zeal, this was simply one element of the Spanish Crown's plan to expand its New World territories.

Within a few decades, however, Spain faced competition from the Russians, British, and Euro-Americans, beginning with fur trappers and explorers on the coast and in the northern interior. Only 35 years after the founding of the first Alta California mission, San Diego de Alcalá, the Russians founded Colony Ross on the Sonoma County coast; a scant three years after the founding of the last mission, San Francisco de Solano, trapper Jedediah Strong Smith reached northern California by land. The next three decades would bring the greatest social, political, and environmental upheaval in the human history of the future state.

One wonders how the Native Californians perceived these events, whether they had any inkling of what the changes would mean to them and to their descendants. Milliken (1995:Preface) has done an outstanding job of documenting the experiences of the Native people around San Francisco Bay "at the time of the European invasion," examining what he calls "the process of missionization and its consequences." Perhaps more than any other current scholar, Dr. Milliken has attempted to understand the social, environmental, and political contexts within which the Native people decided to "attach themselves" to one of the local Spanish missions. He argues that these people "struggled with those [mixed] feelings [of hatred and admiration] in a terrible, internally destructive attempt to cope with changes that were beyond their control," and that even those who rejected the new order eventually capitulated, "because of changes in their tribal lands, disease, depopulation, and the accompanying collapse of intergroup alliances."

The same can no doubt be said for Native people in northern California. Although no missions or presidios were ever founded in the planning area, the newly introduced diseases that swept through the populations, the takeover of their traditional lands and resources, and the heinous attempt by many Whites to capture or murder them, created in the Native people the same "struggle to cope with changes that were beyond their control." In the period 1850 to 1867, the US government built forts and sent troops to subdue the indigenous groups (and to protect them from vigilante groups), escalating the situation into full-scale "Indian Wars." Some of these groups finally chose to accept the inevitable, eventually finding work at local ranches, selling their traditional crafts in towns, or otherwise "assimilating" into the new culture. Others—like the famous Ishi and the "Mill Creeks"—held out until the very end, until there was essentially no place for them to go except onto a reservation or into the new social order.

A New Philosophy of Land and Resource Use

This process was greatly accelerated by the discovery of gold in the Sierra Nevada and the Shasta/Trinity region, followed immediately by California statehood. The Gold Rush was about much more than just mining: it changed the social, political, technological, and physical landscapes of northern California in profound ways. Seemingly overnight, the population changed from mostly Native Americans and Hispanics to overwhelmingly white Europeans and Euro-Americans. Other groups—notably the Overseas Chinese—would arrive in large numbers as well, and would face prejudice and hostility from the white majority. Gold mining along the Klamath, Trinity, and Feather Rivers, and mining for gold, silver, and copper in the Shasta/Trinity region, disrupted what might otherwise have been a gradual, organic migration of newcomers to the West Coast. Instead the region experienced a "growth spurt" that caused tremendous strain on both the Native peoples and the natural environment.

The strain on the environment was exacerbated by the newcomers' philosophy of land-use. Unlike the Native populations, who used the land and its resources in a more respectful way, the Euro-American immigrants practiced an "extraction economy" that valued short-term economic gain over long-term conservation and management. Extensive cutting of old-growth forests, massive erosion and sedimentation caused by hydraulic mining, plowing up of native grasslands for cultivation, over-grazing of sheep and cattle, damming of rivers and streams to supply water for mining and irrigation, hunting of whales off the north coast: the extraction economy imperiled the natural environment to a degree that would not be moderated until the advent of the conservation movement in the early twentieth century.

Even while they were despoiling the natural environment, however, the Euro-Americans were developing new technologies (e.g., the hydraulic monitor, the Dolbeer steam donkey) and building an infrastructure that would—for better or worse—connect northwestern California to the outside world. Roads, railroads, communications, power generation, and other systems brought progress and development to the new economy. These developments, along with the passage of protective legislation like the Sawyer Decision of 1884, the Antiquities Act of 1906, and the Taylor Grazing Act of 1934, would bring California into the modern age.

Coming of Age

Of course, the "modern age" has not always been prosperous or peaceful. The first half of the twentieth century was perhaps the most difficult period in US history, with two World Wars, the Great Depression, Prohibition, and deadly epidemics of influenza and polio. Much of the planning area, being rural and remote (and relatively self-sufficient), suffered less hardship than other parts of the country, although the coastal areas had to contend with the threat of invasion during both wars and the deplorable mass incarceration of people of Japanese ancestry during the second.

On the positive side, the period 1900–1945 also saw a great deal of modernization (telephones, electrification, automobiles, aircraft, paved roads, etc.). It was also the beginning of the conservation movement and federal land management, both of which put an end to widespread mass destruction of the physical and cultural landscapes in California and elsewhere across the nation. The extraction economy lives on, but it is now tempered by the recognition that restraint and mitigation are necessary to sustain a productive environment and protect our cultural heritage. With that recognition has come the concept of "multiple use" of public lands, and the ability of Native peoples to have a voice in the conservation and management of their TCPs.

MANAGEMENT CLASSIFICATION, MANAGEMENT OPTIONS, AND RESEARCH DIRECTIONS (by Jerome King and Sharon Waechter)

This section begins the management-focused part of the document. While previous sections provide contextual information for the entire planning area, this section focuses specifically on the known cultural resources on lands currently managed by BLM. We lay out the types of cultural resources known in the planning area, their likely significance, and the BLM use categories to which they can be assigned. We then discuss the applicability of these resource types to the research issues presented earlier, as a general guide for making future management decisions regarding cultural resources.

KNOWN CULTURAL RESOURCES ON BLM LANDS

As of July 2016, there are 1,650 formally recorded cultural resources on BLM-managed lands within the NCIP planning area (Table 16). These include 1,289 archaeological sites; 325 isolated finds; 23 buildings/structures/objects (e.g., buildings, bridges); five National Register districts, some comprising resources recorded separately as archaeological sites; one proposed district; two TCPs/traditional use areas; and five resources with site numbers and map locations but lacking any other documentation. As summarized further below, however, only a small percentage of BLM-managed land has been surveyed for cultural resources.

Table 16. Recorded Cultural Resources on BLM-Managed Lands.

RESOURCE TYPE	AGE	ARCATA	REDDING	TOTAL
Archaeological site	Prehistoric	49	355	404
Archaeological site	Multi-component	11	102	113
Archaeological site	Historic-era	15	751	766
Archaeological site	Unknown	-	6	6
Isolate	Prehistoric	2	179	181
Isolate	Multi-component	-	8	8
Isolate	Historic-era	1	125	126
Isolate	Unknown/modern	-	10	10
Building, structure, or object	Historic-era	6	17	23
National Register district	Prehistoric	-	1	1
National Register district	Historic-era	2	2	4
Proposed district	Historic-era	-	1	1
TCP/traditional use area	-	-	2	2
Unknown	-		5	5
Total		86	1,564	1,650
Total w/prehistoric component		64	646	710
Total w/historic-era component		33	1,004	1,037

NATIONAL REGISTER ELIGIBILITY

The primary metric by which cultural resources on federal lands are evaluated for significance is whether they are listed on, or considered eligible for listing on, the National Register. Resources that have been determined eligible are referred to under the law as "historic properties." Only a few historic properties on BLM-managed land in the planning area have actually been listed on the National Register, but many others have been evaluated and determined eligible for listing, with formal concurrence by the California State Office of Historic Preservation. Still more resources have had eligibility recommendations made by surveyors, but do not have formal concurrence for those determinations from the State Office of Historic Preservation. For resources that have not been evaluated for their National Register eligibility, the lead federal agency is responsible for such evaluations whenever a federal undertaking may have an effect on those resources.

The National Register eligibility criteria (36 CFR 60.4) state, in part, that "the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, materials, workmanship, feeling, and association, and

(A) That are associated with events that have made a significant contribution to the broad patterns of our history; or

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

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

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

Prehistoric sites are most commonly evaluated with respect to Criterion D. Because prehistoric sites can rarely be associated with specific events or persons, Criteria A and B usually do not apply (although some contact-period sites in the planning area can indeed be associated with recorded historical events; Criterion A may also arguably apply to "events" broadly considered, such as the peopling of the New World). Criterion C typically only applies to prehistoric sites with architectural elements or other features, such as rock art, that can be considered from a stylistic or artistic standpoint. Accordingly, the following discussion focuses on Criterion D. Under this criterion, sites are considered important if they have yielded, or have the potential to yield:

> important information about some aspect of prehistory or history, including events, processes, institutions, design, construction, settlement, migration, ideals, beliefs, lifeways, and other facets of the development or maintenance of cultural systems…Any consideration of a property's eligibility under Criterion D must address (1) whether the property has information to contribute to our understanding of history or prehistory and (2) whether that information is important [NPS 1982:28].

Thus, the information contained in a prehistoric site is important under Criterion D if it can be used to address pertinent research issues. The *Prehistoric Research Issues* section lays out ten major research topics, including *Controlling Chronology*, *Identifying the First Colonizers of Northern California*, *The Origins of Acorn/Salmon Exploitation*, *The Evolution of Milling Tools*, *Inter-Regional Exchange*, *Rock Art*, *Historical Linguistics and Population Replacements*, *Pyrodiversity as a Land-Management Strategy*, *Native American Rock Features and the Spiritual World*, and *Native Responses to Contact*. In the *Prehistoric Site Typology* section below, we tie these research issues to a simple classification of prehistoric site types, laying out which site types can be expected to address which research issues.

In contrast, historic-era sites and features are often considered for eligibility under all four criteria, not just Criterion D. Sites typically are evaluated against a matrix of themes and periods of significance, and these are specific to geographic locations and historical contexts. As an example, the theme of Maritime Activities will be applicable to the North Coast Ranges but much less so to the inland regions, and there is more than one period of significance for those activities: they will be highly significant during the early exploration and Gold Rush periods and again during World Wars I and II, but less significant in the era in-between. To be eligible under Criteria A, B, or C, a property must retain integrity to the period(s) of significance, but even sites with compromised integrity can be eligible under Criterion D, if they retain some information potential.

BLM USE CATEGORIES

BLM Manual 8110 lays out a series of use categories to which cultural resources can be assigned, either individually or as part of a class, during the land-use planning process. Cultural resources can be assigned to multiple uses, or reassigned from one use to another. The following descriptions of use categories are excerpted from the manual:

- **Scientific Use.** This category applies to any cultural property determined to be available for consideration as the subject of scientific or historical study at the present time, using currently available research techniques. Study includes methods that would result in the property's physical alteration or destruction. This category applies almost entirely to prehistoric and historic archaeological properties, where the method of use is generally archaeological excavation, controlled surface collection, and/or controlled recordation (data recovery). Recommendations to allocate individual properties to this use must be based on documentation of the kinds of data the property is thought to contain and the data's importance for pursuing specified research topics. Properties in this category need not be conserved in the face of a research or data recovery (mitigation) proposal that would make adequate and appropriate use of the property's research importance…
- **Conservation for Future Use.** This category is reserved for any unusual cultural property which, because of scarcity, a research potential that surpasses the current state of the art, singular historic importance, cultural importance, architectural interest, or comparable reasons, is not currently available for consideration as the subject of scientific or historical study that would result in its physical alteration. A cultural property included in this category is deemed worthy of segregation from all other land or resource uses, including cultural resource uses, that would threaten the maintenance of its present condition or setting, as pertinent, and will remain in this use category until specified provisions are met in the future.
- **Traditional Use.** This category is to be applied to any cultural resource known to be perceived by a specified social and/or cultural group as important in maintaining the cultural identity, heritage, or well- being of the group. Cultural properties assigned to this category are to be managed in ways that recognize the importance ascribed to them and seek to accommodate their continuing traditional use.
- **Public Use.** This category may be applied to any cultural property found to be appropriate for use as an interpretive exhibit in place, or for related educational and recreational uses by members of the general public. The category may also be applied to buildings suitable for continued use or adaptive use, for example as staff housing or administrative facilities at a visitor contact or interpretive site, or as shelter along a cross-country ski trail.
- **Experimental Use.** This category may be applied to a cultural property judged well-suited for controlled experimental study, to be conducted by BLM or others concerned with the techniques of managing cultural properties, which would result in the property's alteration, possibly including loss of integrity and destruction of physical elements…Experimental study should aim toward understanding the kinds and rates of natural or human-caused deterioration, testing the effectiveness of protection measures, or developing new research or interpretation methods and similar kinds of practical management information. It should not be applied to cultural properties with strong research potential, traditional cultural importance, or good public use potential, if it would significantly diminish those uses.

- **Discharged from Management.** This category is assigned to cultural properties that have no remaining identifiable use. Most often these are prehistoric and historic archaeological properties, such as small surface scatters of artifacts or debris, whose limited research potential is effectively exhausted as soon as they have been documented. Also, more complex archaeological properties that have had their salient information collected and preserved through mitigation or research may be discharged from management, as should cultural properties destroyed by any natural event or human activity.

MANAGEMENT CLASSIFICATIONS AND ELIGIBILITY CONSIDERATIONS FOR PREHISTORIC RESOURCES

The simple prehistoric site typology presented here provides a means of characterizing a site's constituents, its likely ability to address the research issues presented above, and hence its likely National Register eligibility. While other, less-common resource types could undoubtedly be defined in the planning area, this typology should cover the great majority.

The typology is based only on artifact and feature constituents, and does not consider environmental setting, depositional context (e.g., open-air vs. shelter), co-occurrences with other sites, or site size. There are four primary types (*Lithic Scatter*, *Milling Station*, *Simple Habitation*, and *Complex Habitation*), and three ancillary types (*Quarry*, *Rock Art*, *Rock Feature*). Where a particular site meets the criteria for both a primary and an ancillary site type, the primary type is modified accordingly (e.g., "Simple Habitation/Quarry," "Complex Habitation/Rock Art"). The ability of each site type to address each of the research issues, and hence its likely National Register eligibility is summarized in Table 17. The table also lists applicable BLM use categories for each type.

Isolated artifacts are not included in the typology. They have very limited information potential beyond their recordation; thus, they can be considered categorically ineligible to the National Register and should be discharged from further management once recordation is complete. However, isolated features, such as bedrock millingslicks, rock art panels, and hunting blinds, are all treated as sites for the purposes of this typology, regardless of how they were originally recorded in the field.

Lithic Scatters

These sites contain only flaked stone debitage and/or tools. They are typically small and shallow, representing only short-term occupations during which lithic tools were manufactured or repaired. The ability of these sites to address the research issues listed above is generally limited, unless they contain obsidian suitable for addressing the *Exchange* issue, or specific projectile point types suitable for addressing the *Colonization of Northern California* issue. They are most appropriately assigned to Scientific use, and can typically be discharged from management after documentation and testing have realized their data potential, or demonstrated the lack thereof. A widely-used programmatic approach to realizing the data potential of sparse lithic scatters is outlined in the CARIDAP treatment program developed by the California Office of Historic Preservation (Jackson et al. 1988).

Table 17. Prehistoric Resource Types, Likely National Register Eligibility, and Applicable BLM Use Categories.

Research Issue	Lithic Scatter	Milling Station	Habitation		Quarry	Rock Art	Rock Feature
			Simple	Complex			
Chronological Controls	-	-	+	+	-	-	-
Colonization of Northern California	+[a]	-	+[a]	+[a]	+[a]	-	-
Origin of Acorn/Salmon Economies	-	+	+	+	-	-	-
Evolution of Milling Tools	-	+	+	+	-	-	-
Inter-regional Exchange	+[b]	-	+[b]	+[b]	+[b]	-	-
Rock Art	-	-	-	-	-	+	-
Historical Linguistics and Population Replacements	-	-	+	+	-	+	-
Pyrodiversity as Land-use Management	-	+	+	+	-	-	-
Native American Rock Features	-	-	-	-	-	-	+
Overall likely National Register significance	Low	Low	Moderate	High	Low	High[c]	Low
Applicable BLM Use Categories	S	S	S	S, C	S	S, C, P	S, C, T

Notes: [a] With diagnostic projectile points and/or obsidian hydration data; [b] With geochemical sourcing data; [c] Also potentially eligible under Criterion C. S – Scientific; C – Conservation; P – Public; T – Traditional.

Milling Stations

These sites contain bedrock milling features and/or portable milling tools, with little if any other associated prehistoric materials. As the name implies, activities at these sites typically were limited to food processing. While these sites can obviously address the *Evolution of Milling Tools* issue, particularly via starch-grain or plant macrofossil analysis, their data potential is generally limited because it is difficult to establish their age. Despite this low overall data potential, test excavations may sometimes be called for, to confirm the lack of an associated archaeological deposit.

Simple Habitations

These sites, in addition to flaked stone, also contain bedrock or portable milling equipment; and/or a midden deposit; and/or accumulations of dietary remains such as shell or animal bone. Thermal features and scattered fire-cracked rock are also common at these sites, but are not necessary or defining characteristics of the type. These sites were likely occupied by families or small groups of families, rather than the task-oriented groups expected at lithic scatters and milling stations. The presence of dietary remains, particularly plant macrofossils, may be used to address the issue of *Origin of Acorn/Salmon Economies*, as well as *Pyrodiversity*. Many of the dietary remains and thermal features common at these sites are also suitable for dating via radiocarbon. These sites therefore have the potential to address the *Chronology* issue as well, by allowing refinement of projectile point typologies or the age-conversion equations used in obsidian hydration dating. Overall, their potential to yield important information is moderate.

Complex Habitations

These sites contain the constituents of Simple Habitations, but also have unambiguous evidence of residential structures (e.g., house pits or large rock rings). They are typically large, located at prime spots for subsistence resource procurement, and represent major occupation centers. They have the highest data potential in the typology, with the ability to address nearly the full range of research issues discussed above. The presence of residential features and their associated hearths and work areas means that these sites can contain tightly focused, household-specific assemblages, which are extremely valuable for archaeological interpretation. Some Complex Habitations may be identifiable as named ethnographic or contact-period villages; to the extent that these villages are associated with prominent historical events, they could be considered for National Register eligibility under Criterion A as well as Criterion D. Because of their very high data potential, they should be considered for Conservation use where possible, as well as Scientific use.

Rock Art

The rock art in the planning area mostly consists of cupules and petroglyphs (and at least one or two pictograph locations), some in association with other archaeological remains and others in isolation. Obviously, sites of this type can address the *Rock Art* research issue, though (as with milling features) their data potential is limited by the difficulty in dating them directly. Rock art can be dated indirectly via unambiguous associations with dated archaeological assemblages, though such associations can be hard to prove. The overall National Register significance of this site type is high, because, despite the challenges in interpretation under Criterion D, they are also potentially eligible under Criterion C. Rock art sites present a unique management challenge, because they are often highly visible, vulnerable to vandalism, and may have spiritual importance to contemporary Native Americans. BLM should consider assigning these sites to Conservation use, or where public access cannot be limited, to Public use as part of interpretive displays that stress the importance of protecting archaeological resources.

Rock Features

This site type includes cairns, walls, and small rock rings, some interpreted as hunting blinds or storage features, others lacking an obvious function. Some are isolated features, while others are associated with an assemblage. (Larger rock rings interpreted as residential structures are not included here, but rather in the *Complex Habitation* type.) Because of the difficulty in dating these features, they generally have very limited data potential. Few, if any, of the small number of rock features recorded on BLM-managed lands have been identified as the kinds of spiritually significant markers discussed in the *Research Issues* section; however, the documented geographic distribution of the latter (Hildebrandt et al. 2015) suggests that they may well occur on BLM-managed lands. If they can be identified as such, they should be reserved for Traditional use.

Quarries/Prospects

Quarries are sites where raw material was obtained for making stone tools. These can range from small, informal workshops to major obsidian sources exploited over thousands of years of prehistory. However, only the relatively minor Tuscan obsidian source is located within the planning area, and no obsidian quarries have been recorded on BLM-managed lands within it. Rather, the known sites of this type are mostly small chert or basalt quarries, some likely representing single episodes of prospecting or assaying raw material. Without the ability to directly date the material (as can be done with obsidian), or indirectly via association with a dated archaeological assemblage, the ability of these sites to address research issues is limited. Like the Lithic Scatter site type (of which these can be considered a specialized subtype), Quarries can be assigned to Scientific use, and can typically be discharged from management after documentation and testing.

Summary of Known Prehistoric Resources by Type

Table 18 shows the numbers and geographic distribution of the 517 known prehistoric sites on BLM-managed land in the planning area, organized by the typology. A few prehistoric resources are unique or enigmatic, or are insufficiently described in the site record database (e.g., “village”) and cannot be assigned to type.

Table 18. Recorded Prehistoric Resource Types by Zone.

Type	Upper Klamath	Sacramento Valley	Coast Range	Klamath Mountains/ High North Coast Range	Sierra Nevada	Southern Cascade Foothills	Total
Lithic Scatter	51	34	12	23	4	77	201
Milling Station	1	1	-	1	35	3	41
Simple Habitation	16	45	12	11	19	82	185
Complex Habitation	4	7	-	10	12	14	47
Quarry (only)[a]	3	1	-	1	2	2	9
Rock Art (only)[a]	-	1	-	-	3	3	7
Rock Feature (only)[a]	4	-	-	-	-	8	12
Other/no info	1	2	4	6	2	-	15
Total	80	91	28	52	77	189	517
Sites with quarrying	3	1	-	2	2	2	10
Sites with rock art	2	1	-	-	5	5	13
Sites with rock features	5	2	-	-	-	19	26

Note: [a] Ancillary type – additional sites containing these features are tallied under their primary type. Sites listed as Quarry (only) are a subtype of the Lithic Scatter type.

A quick test of the effectiveness of this typology in organizing sites by likely National Register eligibility can be made by tallying previous evaluations/determinations by site type (Table 19). These show very good agreement with the expected eligibilities given in Table 17; only 8% of sites typed as Lithic Scatters were evaluated as eligible, while 100% of Complex Habitations were found eligible. However, this table also serves as a cautionary note, as it shows that a site of any type may ultimately be found eligible for the National Register, and thus that there is no substitute for formal evaluation. The typology is intended only as a planning tool for prioritizing resource management.

Table 19. Existing National Register Evaluations by Prehistoric Site Type.

Type	Eligible	Not Eligible	Total	% Eligible
Lithic scatter	4	46	50	8.0
Milling station	1	2	3	33.3
Simple habitation	18	11	29	62.1
Complex habitation	5	-	5	100.0
Quarry (only)	1	7	8	12.5
Rock art (only)	-	1	1	-
Rock feature (only)	-	4	4	-
Other/no info	-	1	1	-

MANAGEMENT CLASSIFICATIONS AND NATIONAL REGISTER ELIGIBILITY CONSIDERATIONS FOR HISTORIC-ERA RESOURCES

Historic-era resources are more difficult to classify into a few categories, as they cover a much wider range of themes and configurations than do prehistoric resources. Instead, we have assigned them to theme and (in some cases) sub-theme. Table 20 shows the numbers of recorded historic-era archaeological components on BLM-managed lands in the planning area, by research theme. Components are counted, rather than sites, because many sites contain features related to more than one theme: for example, a

Table 20. Historic-Era Components by Theme.

Theme	Zone: Coast Ranges	Zone: Klamath Mountains/ High North Coast Range	Zone: Sacramento Valley	Zone: Sierra Nevada	Zone: Southern Cascade Foothills	Zone: Upper Klamath	Total Theme Designations [a]	Percentage of Total
Exploration/Colonization	-	-	1	-	-	3	**4**	**0.3**
Maritime Activities	10	-	-	-	-	-	**10**	**0.6**
Infrastructure								
Transportation	-	36	51	41	13	15	**156**	**10.0**
Water Development	-	63	70	18	4	16	**141**	**11.0**
Communication	2	2	1	2	1	3	**11**	**0.7**
Extraction Economy								
Mining	-	180	318	47	18	44	**607**	**38.9**
Logging	-	9	3	4	9	-	**25**	**1.6**
Overseas Chinese	-	10	13	4	3	4	**34**	**2.2**
Settlement/Agriculture	26	26	50	11	13	24	**150**	**9.6**
Native Resistance/Indian Wars	6	6	1	4	1	3	**21**	**1.3**
The New Century								
Wartime	6	6	1	4	1	3	**21**	**1.3**
Great Depression	2	-	1	2	2	-	**7**	**0.4**
Hydroelectric Development	-	1	-	4	2	-	**7**	**0.4**
Land/Resources Management	2	-	-	-	-	-	**2**	**0.1**
Indeterminate	18	49	107	25	58	98	**355**	**22.7**

Note: [a] Some resources are counted under more than one theme, so total sites ≠ total theme designations.

homestead that also has evidence of mining activities, or a mining ditch that was later repurposed for irrigation. It is important to note that these component/theme assignments are based on the information provided in the site records, and some of them probably will need to be revised in the future, as each site is investigated more thoroughly. In addition, there are many known resources that have not been formally recorded on BLM-administered lands and so are not included in the site database: for instance, nineteenth-century military forts and segments of early explorers' trails.

Clearly (and not surprisingly) the most numerous components are those related to mining, followed by early infrastructure development and settlement/agriculture. The low percentages of other component types do not necessarily mean they are less significant for our understanding of regional history; rather, it may simply reflect the fact that these types of resources are geographically restricted (i.e., Maritime Activities), more difficult to identify, and/or more likely to have been overprinted by later features. In fact, because of their relative rarity, any survivors may actually have greater significance: an intact segment of a very early exploration route, for example, is almost certainly more significant than a scatter of prospect pits. Themes that are under-represented in the existing site database may reflect data gaps that can help to guide future research.

The periods of historical significance for these themes vary by region. The periods shown in Table 21 are based on major events—e.g., the 1862 Homestead Act, the 1869 completion of the first transcontinental railroad, the Great Depression—or on major activities, as with the period of construction of military forts to subdue (and protect) the Native peoples (1850–1865). The rankings (High—Moderate—Low) refer to the applicability of each period to the listed themes. They are intended as general guidelines rather than hard-and-fast demarcations. The key point is that sites which cannot be assigned to any particular period or linked to any particular event/development probably will have very limited significance.

Table 21. Historical Themes and Periods of Significance.

Theme	Period					
	Pre-1800	1800–1845	1846–1863	1864–1900	1900–1945	Post-1945
Exploration/Colonization	High	High	High/Moderate	Low	Low	Low
Maritime Activities	High	High	High/Moderate	Moderate	High	Low
Early Infrastructure Development	n/a	High	High/Moderate	High/Moderate	High/Moderate	Low
The Extraction Economy	n/a	High	High/Moderate	Moderate	Moderate	Low
Overseas Chinese	n/a	High	High	High	Moderate	Low
Settlement/Agriculture	n/a	High	High	Moderate	Moderate/Low	Low
Native Resistance and the Indian Wars	n/a	High	High	Moderate	Low	Low
The New Century	n/a	n/a	n/a	n/a	High	Moderate/Low
Indeterminate	Low	Low	Low	Low	Low	Low

Consideration Factors

Pre-1800	All very early resources are potentially significant, since the period is not well documented in northern California.
1800–1845	Period of early exploration, fur trappers/traders, Spanish and Mexican ranchos
1846–1863	Statehood, Gold Rush, military forts/Indian wars
1880–1914	Large-scale development of mining and logging technologies, transportation/communication/water systems
1914–1945	Major national and international events: World Wars I and II, Great Depression; development of the Central Valley Project in California
Post-1945	Resources dating to after WWII tend to be very thoroughly documented, lessening the likelihood that they will add to our understanding of local, state, or national history.

Table 22 presents a matrix for determining the potential for a particular resource type to address the research issues discussed earlier. This matrix assumes that the property types retain at least some integrity to their period(s) of significance. The potential for a particular resource type to contribute to the identified research issues is based on several considerations. For instance, rural homesteads and isolated mining camps may well shed light on frontier consumer patterns, where those who are removed from the main supply systems must make consumer choices: what and how much to purchase, for example, and what to supply for themselves through hunting, fishing, or gardening. On the other hand, workers or military personnel living at corporate or government facilities typically are supplied with food and other necessities by their employers, making these sites less valuable for addressing the issue of consumer behavior but perhaps more valuable for studying patterns of socio-cultural interaction.

Table 23 lists the recommended use categories for each property type. Obviously these are broad generalizations and will need to be refined on a site-by-site basis. Historic-era archaeological sites, by definition, do not include intact standing structures (these would be classified as Historic-Architectural or Built-Environment resources), but are at best the collapsed remains of such structures. In most cases the appropriate use of such a resource is for its information potential (Scientific Use). If a particular resource is of exceptional importance—for instance, an intact section of the Oregon-California Trail or a Native American refuge site occupied during the period of the Indian Wars—it may be more appropriate to conserve it for the future (Conservation Use or Traditional Use). Where interpretation or recreation will not adversely affect a resource, the best management purpose may be Public Use. And, where a resource is not likely to provide any information beyond its recordation—for example, an isolated prospect pit or a short segment of abandoned and in-filled ditch—it may be most appropriate to release it from further management altogether, once it has been recorded. These decisions should be made by, or in consultation with, a qualified historical archaeologist.

Table 22. Historic-Era Property Types and Research Potential.

Property Types by Theme	Research Issues				
	Technology and Adaptation	Economic Strategies	Household Composition and Lifeways	Immigration and Cultural Adaptation	Socio-Cultural Dynamics
Exploration and Colonization					
Early trails	Moderate	Moderate/Low	Moderate/Low	High/Moderate	Moderate
Ranchos/Adobes	High	High	High	High	High
Maritime Activities					
Landings/Harbors/Jetties	High	Moderate	Low	Low	Low
Lighthouses and lifesaving stations	High	Moderate	Moderate	Low	Moderate
Fish canneries	High	Moderate	Low	Low	Moderate
Whaling stations	High	Moderate	Moderate	Moderate	Moderate
Military facilities	High	Moderate/Low	Moderate	Low	High
Native Resistance and the Indian Wars					
Military forts	Moderate	Low	Moderate	Low	High
Refuge sites	Moderate/Low	Moderate	Moderate	Low	Moderate
Abandoned rancherias	Low	Moderate	High	Low	High
Early Infrastructure Development					
Roads/trails	Moderate	Low	Low	Low	Low
Railroads (non-logging)	High	Low	Low	Moderate	Moderate
Bridges and ferry crossings	High	Low	Low	Low	Moderate
Waystations	Moderate	High	High	Moderate	High
Water-supply systems (non-mining)	High	Moderate	Low	Low	Low
Utility lines	High	Low	Low	Low	Low
Power plants	High	Moderate	Moderate	Low	Moderate
Construction camps	Moderate	High	High	High/Moderate	High
Mining					
Prospecting/Exploration	Moderate	Moderate	Moderate/Low	Moderate	Moderate
Extraction	High	High	Moderate/Low	Moderate	Moderate
Processing	High	High	Moderate/Low	Moderate	Moderate
Camps	Moderate/Low	High/Moderate	High	Moderate	High
Logging					
Railroads	High	Low	Low	Moderate	Low
Chutes/Flumes	High	Low	Low	Low	Low
Skid roads/Traction engine roads	Moderate	Low	Low	Low	Low
Camps	Moderate	High	High	High/Moderate	High
Overseas Chinese					
Camps	Moderate	High	High	High	Moderate
Mining locations (usually placering)	High	Moderate	Moderate	High/Moderate	High/Moderate
Stacked-rock walls, flume benches, similar features	High	Low	Low	Moderate	Moderate

Table 22. Historic-Era Property Types and Research Potential *continued*.

PROPERTY TYPES BY THEME	RESEARCH ISSUES				
	TECHNOLOGY AND ADAPTATION	ECONOMIC STRATEGIES	HOUSEHOLD COMPOSITION AND LIFEWAYS	IMMIGRATION AND CULTURAL ADAPTATION	SOCIO-CULTURAL DYNAMICS
SETTLEMENT AND AGRICULTURE					
Townsites	Moderate	High/Moderate	High	High	High
Homesteads	Moderate	High	High	Moderate/Low	Moderate
Farms/Orchards/Ranches	High	High	High	Moderate	High/Moderate
THE NEW CENTURY					
Wartime features/facilities	High	Low	Moderate/Low	Moderate/Low	High
Depression-era mining/habitation sites	High	High	High	Moderate/Low	High
CCC and WPA features/facilities	High	Moderate/Low	High/Moderate	Low	High
Power/Hydroelectric Development	High	Moderate/Low	Low	Low	Low
Federal Land/Resources Management	High/Moderate	Low	Low	Low	Moderate

Table 23. Historic-Era Property Types and Use Categories.

PROPERTY TYPES BY THEME	USE CATEGORIES					
	SCIENTIFIC USE	CONSERVATION FOR FUTURE USE	TRADITIONAL USE	PUBLIC USE/ INTERPRETATION	EXPERIMENTAL USE	RELEASE FROM MANAGEMENT (AFTER FULL DOCUMENTATION)
EXPLORATION AND COLONIZATION						
Early trails	-	+	-	+	-	-
Ranchos/Adobes	-	+	-	+	-	-
MARITIME ACTIVITIES						
Landings/Harbors/Jetties	-	-	-	-	-	+
Lighthouses and lifesaving stations	+	+	-	+	-	-
Fish canneries	+	-	-	-	-	-
Whaling stations	+	-	-	-	-	-
Military facilities	+	-	-	+	-	-
NATIVE RESISTANCE AND THE INDIAN WARS						
Military forts	+	+	-	+	-	-
Refuge sites	-	-	+	-	-	-
Abandoned rancherias	-	-	+	+	-	-
EARLY INFRASTRUCTURE DEVELOPMENT						
Roads/trails	-	-	-	+	-	+
Railroads (non-logging)	+	-	-	+	-	-
Bridges and ferry crossings	-	-	-	-	-	+
Waystations	+	-	-	-	-	-
Water-supply systems (non-mining)	-	-	-	-	-	+
Utility lines	-	-	-	-	-	+
Power plants	+	-	-	-	-	-
Construction camps	+	-	-	-	-	-

Table 23. Historic-Era Property Types and Use Categories *continued*.

PROPERTY TYPES BY THEME	USE CATEGORIES					
	SCIENTIFIC USE	CONSERVATION FOR FUTURE USE	TRADITIONAL USE	PUBLIC USE/ INTERPRETATION	EXPERIMENTAL USE	RELEASE FROM MANAGEMENT (AFTER FULL DOCUMENTATION)
MINING						
Prospecting/Exploration	-	-	-	-	-	+
Extraction	+	-	-	-	-	-
Processing	+	-	-	-	-	-
Camps	+	-	-	-	-	-
LOGGING						
Railroads	+	-	-	+	-	-
Chutes/Flumes	-	-	-	-	-	+
Skid roads/Traction engine roads	-	-	-	-	-	+
Camps	+	-	-	-	-	-
OVERSEAS CHINESE						
Camps	+	-	-	-	-	-
Mining locations (usually placering)	+	-	-	-	-	-
Stacked-rock walls, flume benches, similar features	-	-	-	-	-	+
SETTLEMENT AND AGRICULTURE						
Townsites	+	-	-	+	-	-
Homesteads	+	-	-	-	-	-
Farms/Orchards/Ranches	+	-	-	-	-	-
THE NEW CENTURY						
Wartime features/facilities	+	-	-	+	-	-
Depression-era mining/habitation sites	+	-	-	-	-	-
CCC and WPA features/facilities	+	-	-	+	-	-
Federal Land/Resources Management	-	-	-	+	-	-
Hydroelectric Development	+	-	-	-	-	+

TRADITIONAL CULTURAL PROPERTIES, LANDSCAPES, AND USE AREAS

Unlike other cultural resource types, TCPs, landscapes, and use areas are generally not discoverable by cultural resources professionals other than via consultation with local traditional communities, which should be a routine part of BLM's land-use planning. The only two such resources in the current inventory were identified by Native American informants. BLM should consider reserving these, and any others that may be identified in the future, for Traditional use.

FUTURE INVENTORY STRATEGY (by Jerome King)

This section addresses one of the primary goals of this study, which is

> to provide cultural resource specialists and managers with an informed basis for understanding the study area in terms of…the potential for and probable consequences of conflict between the known kinds of cultural resources and the various types of land and resource uses that are likely to be proposed in the study area or already exist [BLM Manual 8110].

To meet this goal, we present a set of GIS-based sensitivity maps for the planning area, which identify areas of high potential for cultural resources. We then use these maps to identify gaps in inventory coverage of those areas. Because prehistoric and historic-era resources present substantially different challenges for sensitivity modeling, we provide separate sensitivity maps for each. . We conclude this section with a brief discussion of current BLM land uses and their geographic distribution relative to high-sensitivity BLM-managed lands.

PREHISTORIC SENSITIVITY MODELS

Here we present a set of two prehistoric sensitivity models, one for surface sensitivity and one for subsurface (buried-site) sensitivity, both based on the recently developed models for Caltrans District 2 by Meyer et al. (2013). We begin with some theoretical background on sensitivity modeling, then turn to detailed methods and results for each of the two models.

Theoretical Concerns

The sensitivity of a landscape for prehistoric archaeological sites is typically estimated using environmental data that approximate its subsistence potential for prehistoric foragers. For example, proximity to water plays a primary role in most sensitivity models, not only because water is a basic requirement for survival, but also because it is often correlated with the presence of a range of subsistence resources. Similarly, characteristics such as soil type, vegetative cover, and landform type are all commonly used in sensitivity modeling, because they can serve as proxies for the types and quantities of subsistence resources to be found in a given area, and hence overall attractiveness for occupation. Some models also consider the energetic costs of moving between areas where different types of subsistence resources are concentrated, the likely travel paths taken between them, and hence the location of trails and other sites along these travel paths.

These approaches assume that prehistoric settlement systems were based primarily around subsistence pursuits, and thus may fail to take account of social, political, and religious/ideological factors that also undoubtedly shaped prehistoric settlement and use. Without some theoretical basis on which to make predictions about these aspects of prehistoric land use, however, one cannot incorporate them into a sensitivity model.

There are also practical limitations to sensitivity modeling. One of the primary limitations is the range of environmental data that are available. Many datasets of great potential relevance to archaeological site patterning have not been fully developed (e.g., the distribution of workable toolstone sources). Others may not be accurate enough to use at the desired map scale, or may reflect modern rather than prehistoric conditions (e.g., vegetative cover). However, even imperfect or incomplete environmental datasets may still contribute to a statistically robust sensitivity model. Conversely, a sensitivity model need not incorporate every single potentially relevant environmental dataset in order to be statistically robust.

Sensitivity modeling in archaeology can take both inductive and deductive approaches. Inductive models are basically exploratory, seeking correlations between known archaeological site locations and environmental data (King and Young 2006; King et al. 2004). Deductive models, by contrast, build expectations about site patterning from first principles, and treat the observed archaeological record as a test case, sometimes performing surveys specifically to test a completed model (e.g., Zeanah 1996). The basis for building a deductive model's expectations may come from simple common-sense considerations, or from theoretical constructs such as optimal foraging. In practice, since deductive models often use an iterative or 'fine-tuning' methodology, the difference between inductive and deductive approaches is not always clear-cut.

Whether using the known record at the initial stage of model-building or as a test, it is important that sampling bias be controlled. While some studies have the luxury of using purely random-sample survey data in support of model-building (e.g., McGuire and King 2011), in most cases the available archaeological survey coverage is decidedly non-random with respect to the environmental variables being tested. If this bias is not controlled, there is a risk that the completed model will end up largely reflecting the distribution of surveyed areas rather than that of sites. Controlling for survey coverage is a simple matter of restricting the 'training' or testing of the model to surveyed areas. However, in practice survey coverage data can be much harder to come by than site location data.

Ultimately, the success of a sensitivity model can be judged by whether it shows significant differences between the observed site densities in each sensitivity class. No sensitivity model will successfully predict the location of every single site, no matter how many environmental variables are included in it. Some less-common site types may simply reflect a unique mode of land use that no model can adequately capture. Nonetheless, a sensitivity model should have value for research and planning as long as it shows statistically significant trends in site densities. Sensitivity models created in support of cultural resources management goals, such as this one, should also show significant differences between sensitivity ranks in terms of their likely management significance. That is, given that certain site types are more likely to rise to significance than others, the model should quantify the distribution of likely significant site types by sensitivity class.

Surface Sensitivity Model: Methods

As a starting point for the current study, we used the sensitivity model recently developed as part of a geoarchaeological study of Caltrans District 2, covering much of the current planning area (Meyer et al. 2013; also see Meyer et al. 2011). The District 2 model was developed in an inductive fashion, exploring the predictive power of a wide range of environmental datasets, including topography (elevation, slope, aspect, landform curvature, metabolic travel cost); hydrography (distance to water, distance to confluence, stream order); climate (effective temperature, length of growth season, precipitation); lithic sources; and modern vegetation type. Continuous variables, such as distance to water, were tested to determine the best 'breaks' along which to divide them into categorical themes. Also, spatial correlations between different themes were explored, with the goal of reducing redundancy. The model was tested against a dataset of known prehistoric site locations compiled from various sources, including Caltrans' internal cultural resources database, and data compiled for the 2004 Surprise/Eagle Lake/Alturas Class I Overview (King et al. 2004). While several thousand site locations were available for model testing, these were not accompanied by survey-coverage information, making it impossible to correct for potential sampling bias.

Ultimately, five environmental themes were selected for inclusion in the District 2 model: distance to perennial water, as mapped by the National Hydrography Dataset (USGS 2016a) and modified to remove man-made features and to include prehistoric lake extents; distance to perennial stream confluence; elevation; slope; and landform curvature (rate of change in slope). Topographic data were generated from the National Elevation Dataset (USGS 2016b). The other themes were rejected as lacking strong predictive power, or being strongly spatially correlated with the ones that were ultimately selected. Each of the five selected themes was scored according to its observed correlation with known site locations (Table 24). These themes and their associated scores were then combined in the GIS to produce a single layer with

Table 24. Predictive Themes and Scores for the Caltrans District 2 Prehistoric Sensitivity Model.

Environmental Factor	Very High	High	Moderate	Low	Very Low
Distance to Water (meters)	<100 (+3)	100–200 (+2)	200–400 (+1)	400–800 (-2)	>800 (-3)
Elevation (meters)	<1200 (+2)	1200–1600 (+1)	1,600–2,000 (0)	2,000–2,500 (-1)	>2,500 (-2)
Slope (degrees)	0.5 to 4 (+2)	4–9 (+1)	<0.5; 9–14 (0)	14–19 (-1)	>19 (-2)
Distance to Confluence (meters)	0–100 (+2)	100–200 (+1)	200–400 (0)	400–800 (-1)	>800 (-2)
Landform Curvature	Slightly convex or Slightly concave (1)	Flat (0)	Concave (0)	Convex (0)	Very convex or Very concave (-1)
Combined score range for class	5 to 10	1 to 4	0	-1 to -4	-5 to -10

overall sensitivity scores ranging from -10 to 10; these combined scores were then grouped into five sensitivity classes, from Very Low to Very High (Table 24). The reader is referred to Meyer et al. (2013) for a much more detailed discussion of the model's construction.

For the current study, we used the District 2 model as originally formulated, except that (1) the modeled area was expanded to include the current planning area, by extending it into Humboldt, Del Norte, and southern Butte counties; (2) the combined surface sensitivity scores were subjected to a low-pass filter to smooth boundaries between zones and reduce the occurrence of 'island' cells in the completed model; and (3) standing bodies of water were excluded from the model due to the lack of topographic information. The overall result was substantially similar to the original District 2 model, but with less 'noise.'

Surface Sensitivity Model: Results and Test

Figure 21 shows the completed sensitivity model. (This overview figure is meant to illustrate general geographic trends only, and should not be used for project planning; the accompanying GIS layer shows a great deal more detail.) Table 25 shows the distribution of model classes both within the planning area as a whole and on BLM-managed lands. The distribution of model classes within the larger planning area is quite similar to that of BLM-managed lands, although BLM manages a smaller percentage of Very High sensitivity lands.

Table 25. Distribution of Classes in the Surface Prehistoric Sensitivity Model.

Class	Planning Area (square miles)	% of total	BLM Lands (square miles)	% of total
Not modeled	141.7	0.6	3.2	0.5
Very low	3,051.6	13.5	97.2	16.0
Low	11,505.2	50.9	329.9	54.4
Moderate	4,470.0	19.8	104.4	17.2
High	2,836.9	12.6	62.3	10.3
Very high	586.0	2.6	9.5	1.6
Total	**22,591.4**	**-**	**606.5**	**-**

Unlike the District 2 study, we are able to test the completed model with survey-controlled prehistoric site location data, generated as part of the data-compilation element of this study. This allows us to quantify the observed site densities within each rank, both for prehistoric sites generally and for specific site types that are more likely to present management concerns.

Controlling for survey bias is a simple matter of confining the model test to previously surveyed areas, and the sites within them. While overall quality of past surveys may vary dramatically, we attempt to minimize potential bias by excluding all surveys identified as informal reconnaissance, those not on current BLM-managed lands, and all those conducted before 1990. (The 1990 cutoff date is an arbitrarily chosen point after which our sample of surveys can be reasonably assumed to be similar in terms of quality of coverage and site documentation. Many additional surveys lying outside current BLM lands and/or prior to 1990 could no doubt have been included, but doing this would have required a case-by-case evaluation of which surveys should be included in the test. In any case, the test is reasonably robust without them. Nothing is implied here about the adequacy of these surveys; see the *Analysis of High-Priority Areas for Inventory* discussion below, page 231.)

The surveyed areas used for the test are well-distributed geographically, and reasonably extensive, covering about 64.3 square miles of BLM land (Figure 22). All model classes are well-represented in the test dataset.

Our test sample of site locations is restricted to prehistoric sites falling within these surveyed areas. Isolated finds are excluded. Each site is rendered as a center point, regardless of its overall size, and is deemed to fall within the sensitivity class where that center point is located. While some larger sites may span multiple sensitivity zones, the center point value serves as a reasonable approximation. In total, there are 272 sites in the sample. (It should be noted that there is some overlap between these data and the exploratory site-location dataset used to construct the original District 2 sensitivity model.)

The null-hypothesis assumption of the test is that sites are randomly distributed with respect to the model classes, and thus are present in numbers directly proportional to the surveyed area of each model class. These *expected* frequencies per class are compared to the *observed* numbers of sites within each class. The degree of deviation from the expected value for each class is expressed using standardized residuals (McGuire and King 2011), which at this sample size are roughly comparable to z-scores. A successful test, then, would ideally show highly negative values (-2 or less) for the lowest-sensitivity classes, and highly positive values (2 or more) for the highest-sensitivity classes.

Table 26 shows the test results, with standardized residuals and observed site densities for each class. In general, the model performs well. Considering prehistoric sites as a whole, observed site densities range from 1.3 sites per surveyed square mile in the Very Low class, to 8.2 sites per square mile in the Very High class. Both the standardized residuals and site density figures show, however, that there is no real observed difference between the Low and Moderate sensitivity classes, suggesting that the model might potentially be improved by revisiting how the source themes are grouped. But, if the sample is limited to sites that are most likely to rise to National Register eligibility, we see results that provide better confirmation of the model, and suggest that the classes do not need adjusting. Overall, sites typed as Simple or Complex Habitations are the most likely to rise to National Register significance (see the *Management Classification* section, page 195). Considering just those types, the model shows the expected overall trends in site densities and standardized residuals (Table 26).

Because the site densities within each class are based on real-world observations, these figures can be extrapolated to a given planned project area to produce an overall quantitative estimate of the numbers of sites likely to be observed in that area. It should be cautioned that the model should not be used for clearance, and is not a substitute for survey; as the table shows, some sites are present even in areas mapped as Very Low sensitivity.

Figure 21. Surface Sensitivity Model.

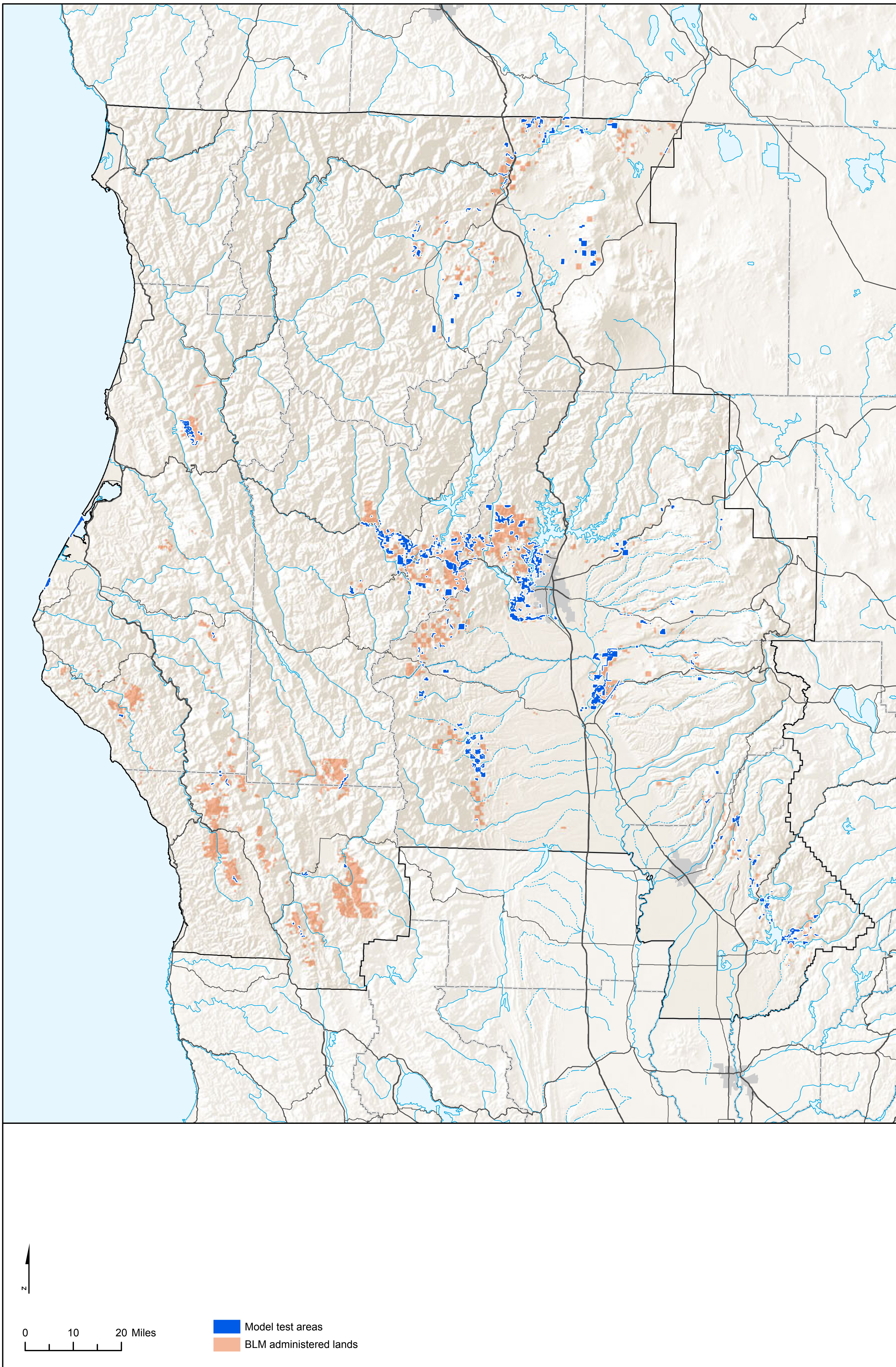

Figure 22. Surveyed Lands Used in Model Tests.

Table 26. Prehistoric Surface Sensitivity Model Test Results.

Class	Surveyed BLM Land (square miles)	% of Total	Prehistoric sites			Habitations only		
			Site count	Standardized residual	Density (sites/square mile)	Site Count	Standardized Residual	Density (sites/square mile)
Very low	8.8	13.7	11	-4.3	1.2	4	-2.9	0.5
Low	32.5	50.5	131	-0.5	4.0	45	-1.6	1.4
Moderate	10.9	16.9	42	-0.6	3.9	18	-0.2	1.7
High	9.3	14.5	65	4.1	7.0	33	4.1	3.5
Very high	2.8	4.4	23	3.2	8.2	13	3.6	4.6
Total	**64.3**	**-**	**272**	**-**	**4.2**	**113**	**-**	**1.8**

Subsurface Sensitivity Model: Methods

The District 2 study also included a sensitivity assessment for subsurface (buried) cultural resources. This was produced by modifying the sensitivity scores in the surface sensitivity model with a subsurface-potential scaling factor. This scaling factor was produced via a detailed study of digital soil-survey data, including both high-resolution SSURGO soil surveys and lower-resolution STATSGO data (NRCS 2015a, 2015b; see Meyer et al. 2013 for a wealth of information on compilation methods).

The reasoning behind the scaling factor was based on the stability of land surfaces and the relative amount of time (within the overall span of human occupation) that those land surfaces would have been available for use. Land surfaces that were stable through part of the Holocene and subsequently covered by deposition of a younger landform would have potential for intact buried deposits. In contrast, present-day land surfaces that have been stable since before the beginning of human occupation would have little or no potential for intact buried deposits, because any cultural material deposited on those landforms would still be at the surface. The potential of more recent landforms to contain subsurface deposits would vary according to the relative amount of time that the now-buried landforms beneath them were exposed and available for occupation. Thus, the most recent landforms would have the highest buried-sensitivity scaling factors, except for disturbed contexts.

The final District 2 subsurface sensitivity map was produced by multiplying the surface sensitivity scores by these subsurface-potential scaling factors, and grouping the modified sensitivity scores into five classes, similar to the surface model.

For this study, we used the District 2 subsurface model as originally formulated, except that we extended the soil-age map to encompass the entire current planning area (Figure 23); used a newly adjusted set of scaling factors for landform age (Table 27; Meyer 2016); and combined it with the slightly revised surface model described above.

Table 27. Subsurface Sensitivity Scaling Factors.

SURFACE LANDFORM AGE CLASS	AGE (CAL BP)	SCALAR VALUE (MEYER 2016)
Artificial Cut/Fill	-	4.5
Historic-Modern (Channel)	-	3.0
Historic-Modern	-	5.5
Recent Holocene	600–100	9.9
Latest Holocene	2200–1150	9.2
Late Holocene	4200–2200	8.4
Middle Holocene	8200–4200	7.0
Early Holocene	11,700–8200	4.1
Latest Pleistocene/Younger Dryas	12,900–11,700	1.6
Terminal Pleistocene	25,000–12,900	0.1
Older Pleistocene or earlier	>12,900	0.0

Subsurface Sensitivity Model: Results

Figure 24 shows the completed sensitivity model. (Again, as with the surface sensitivity model, this figure is meant to show general geographic trends only; project planners should use the accompanying GIS data). Table 28 shows the distribution of sensitivity classes within the planning area and BLM-managed lands. In the planning area as a whole, the percentage of areas classed as High or Very High sensitivity is low; on BLM lands, it is vanishingly low, no doubt due to the fact that BLM manages few of the valley-bottom settings that score highly in this model. However, it should not be concluded that there are no subsurface archaeological deposits anywhere on BLM land. Particularly in the upland areas mapped via lower-resolution STATSGO data, there may be small, unmapped depositional settings within larger areas mapped as low or moderate sensitivity. Thus, the model should not be used for clearance. Despite these cautions, the model can give land managers a general sense of the potential for buried prehistoric deposits, when a planned undertaking will involve deep ground disturbance.

Table 28. Distribution of Classes in the Subsurface Sensitivity Model.

VALUE	PLANNING AREA (SQUARE MILES)	% OF TOTAL	BLM MANAGED LANDS (SQUARE MILES)	% OF TOTAL
Not modeled	154.9	0.7	3.6	0.6
Very low	20,109.5	89.0	580.7	95.7
Low	1,765.3	7.8	20.7	3.4
Moderate	354.4	1.6	0.8	0.1
High	198.3	0.9	0.7	0.1
Very high	9.1	-	-	-
Total	**22,591.4**	**-**	**606.5**	**-**

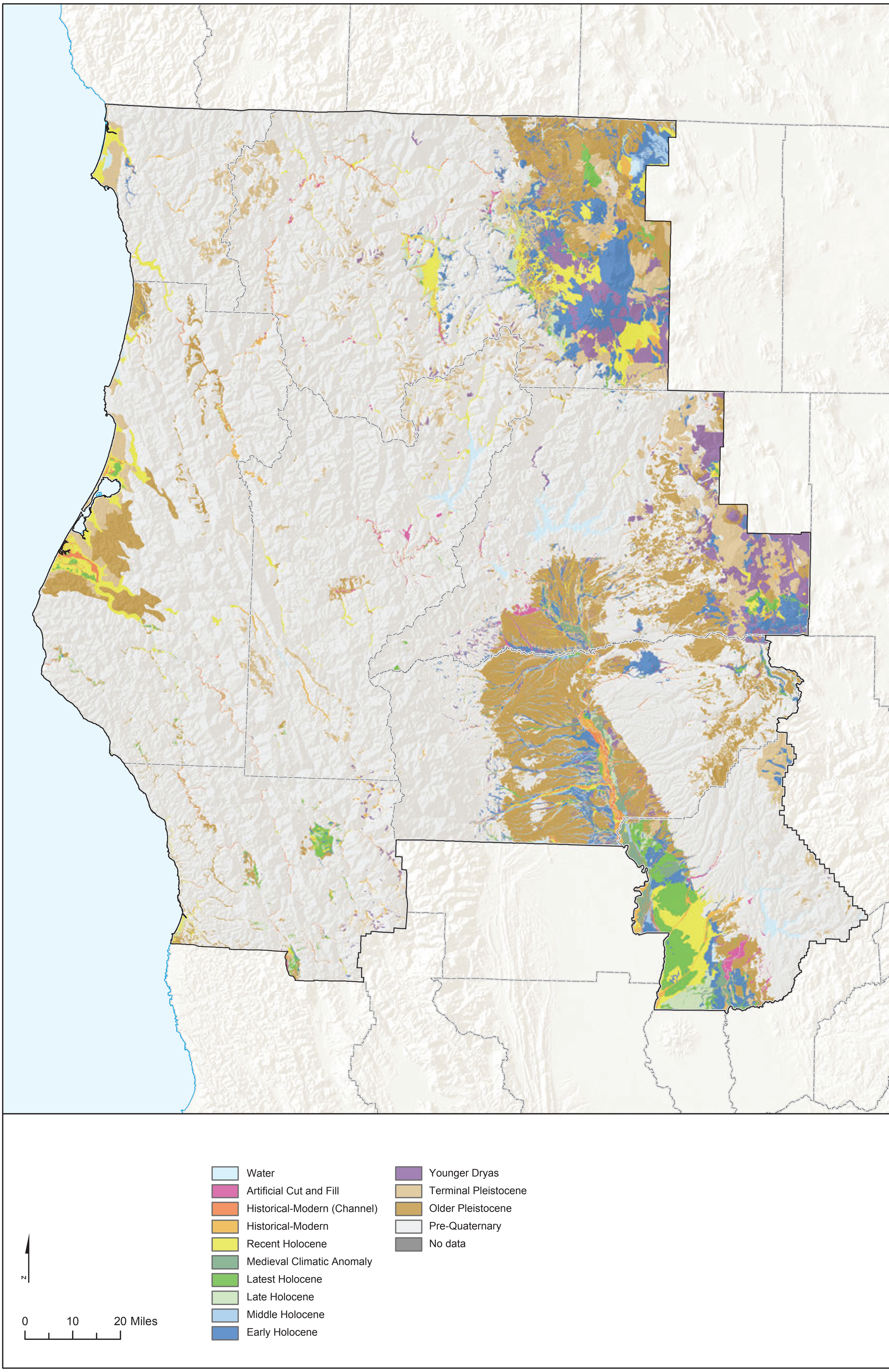

Figure 23. Landform Ages.

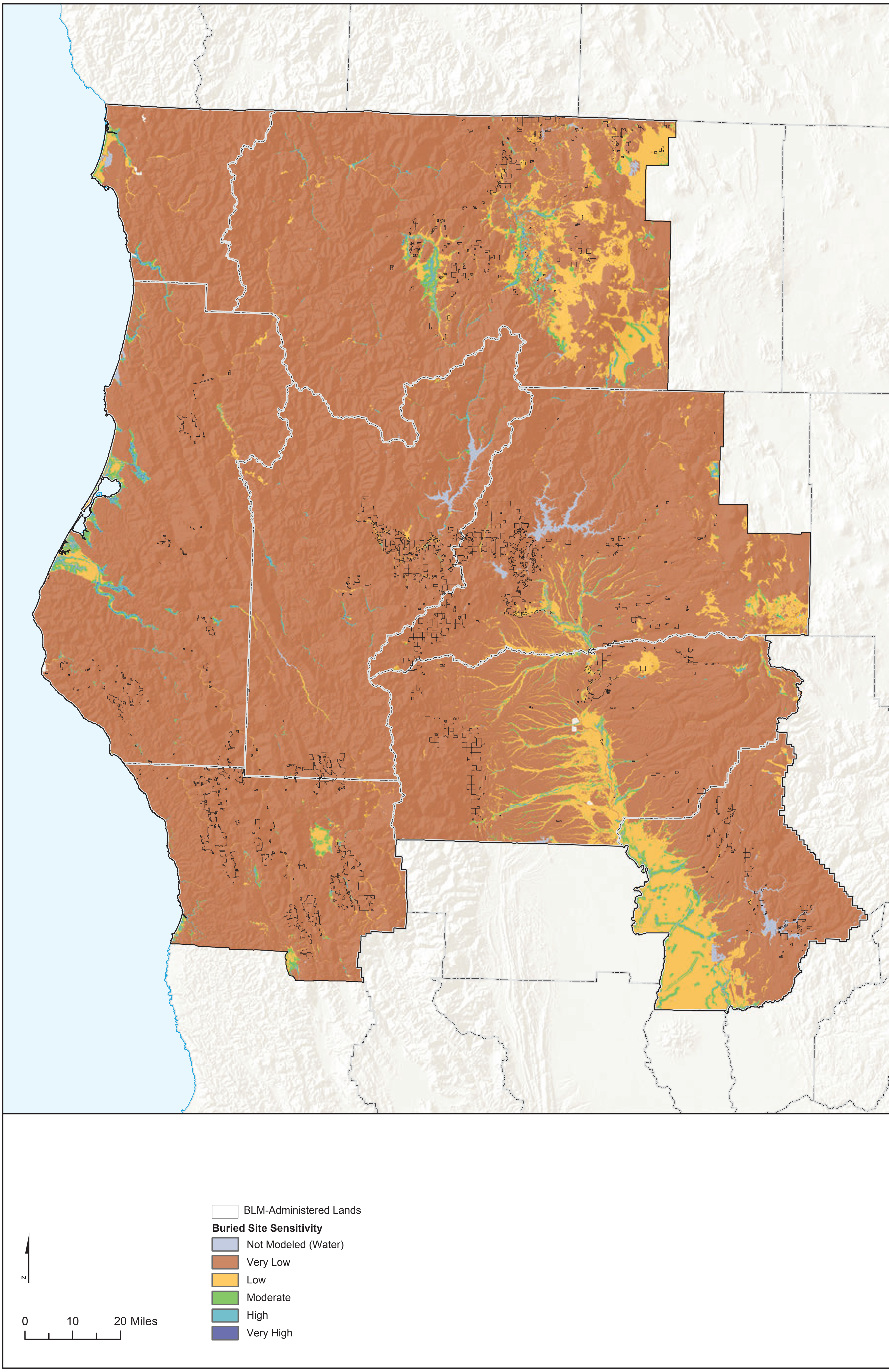

Figure 24. Subsurface Sensitivity Model.

HISTORIC-ERA SENSITIVITY ASSESSMENT

Creating sensitivity maps for historic-era resources is substantially more difficult than for prehistoric sites, because of the much wider range of activities represented, and the fact that these activities were often driven by factors other than subsistence potential, as they largely are for prehistoric sites. Further, while archaeologists' decisions about the significance of prehistoric sites usually involves a straightforward consideration of research potential, the same cannot be said of historic-era sites; a much wider range of considerations about integrity, associated historical people and events, and periods of significance comes into play. Because of these complications, a quantitative model like that proposed for prehistoric sites cannot be offered for historical resources. Instead, we undertake a general, non-quantitative assessment of historic-era site potential, assembled by creating thematic maps for the major historical themes developed above, and then combining these into a single overall map depicting the general potential for historic-era archaeological resources.

Historic-era Sensitivity Assessment: Methods

While many different sources of information, such as historical maps and land records, could in principle be used to predict the location of historic-era archaeological sites, our study was necessarily limited to sources that could be readily obtained in a digital format for the entire planning area. We focused on five major historical themes: Exploration/Colonization, Transportation, Mining, Settlement and Agriculture, and Maritime Activities.

For the Exploration theme, we used the mapped alignments of the various branches of the California Trail (including the Yreka Trail), as mapped by the National Park Service (NPS 2015), and buffered this to one kilometer (Figure 25). Of course, we recognize that early explorers used many different trails throughout northwestern California, but concrete data on the locations of these trails are lacking.

Data are more available for later transportation routes, many of which have no doubt obscured the earlier explorers' trails. We have created a map of major roads as shown on a 1948 official state road map (California Department of Public Works 1948). This was done by using an existing GIS layer depicting present-day roads, and subtracting post-1948 improvements such as Interstate 5 and the rerouting of roads around more recent reservoirs such as Lake Oroville (Figure 25). Some now-disused roads also required digitizing to complete the layer. Undoubtedly the model could be improved by including the other routes listed in the historical context section, but these could not be plotted accurately without a prohibitively detailed and time-consuming compilation of historical maps. The finished layer for roads and trails was buffered to one kilometer. We also obtained a railroad layer and buffered this to one kilometer as well (Figure 25).

For the Mining theme, we used the 505 named mine locations from the Geographic Names Information System (GNIS) database (USGS 2016c), which lists place names on topographic maps. These data are stored as points and do not accurately show the extent of larger features. We also used more than 4,000 mine locations from the Topographically Occurring Mine Symbols (TOMS) dataset, which depicts mines, tailings, prospects, and other mining-related features shown on topographic maps (California Department of Conservation 2016). Unlike the GNIS data, larger features in the TOMS data are shown as polygons; many are redundant with the GNIS data. For named mines and mine features, we used a buffer of one kilometer; for unnamed prospects and tailings, we used a buffer of 500 meters (Figure 26).

For the Settlement and Agriculture theme, we used the 660 points for "populated places" listed in the GNIS data, and buffered these to one kilometer. (Not all of these were necessarily historic in age, but again, detailed examination of each location against historical maps would have been an unreasonably time-consuming effort.) Also from GNIS, we used another 725 points, including all buildings or locales identified as "historical," as well as all ranches, homesteads, and "places," and buffered these to 500 meters. We also digitized the footprint of urbanized areas for larger cities such as Eureka, Chico, Oroville, Redding, and Yreka, as depicted on historical USGS quads circa 1945, and buffered these to one kilometer (Figure 27).

Finally, for the Maritime theme, we included the few GNIS points for lighthouses, and buffered these to one kilometer (Figure 27).

To create the sensitivity model, we combined the available data related to these historical themes into a single layer. Because this assessment is based on highly generalized data, we did not designate any area as low sensitivity, only as elevated above a baseline "normal" level. Areas within the buffer of a single historical theme were designated as High sensitivity, while those falling within the buffer of two or more themes were designated as Very High sensitivity. As with the prehistoric sensitivity models, we removed water bodies from the assessment because the source datasets are incomplete for these areas.

Historic-era Sensitivity Assessment: Results

The completed sensitivity assessment is shown in Figure 28, and the distribution of sensitivity classes is shown in Table 29. As with the prehistoric models, the distribution of sensitivity classes on BLM-managed lands largely mirrors that of the planning area as a whole. Also, as with the prehistoric models, it should be cautioned that this is a general assessment for planning purposes, and not a substitute for detailed research and field survey. Historical research into a given project area is likely to reveal a wealth of detail that is not reflected in this simple assessment. Unlike prehistoric resources, historic-era sites can often be predicted with prefield archival research, especially using older USGS topographic maps that indicate locations of individuals' houses, fields, fences, and the like. Such research can be used to refine the sensitivity model on a project-by-project basis.

Table 29. Distribution of Classes in Historic-Era Sensitivity Assessment

Class	Planning Area (square miles)	% of Total	BLM Lands (square miles)	% of Total
Not modeled	141.7	0.6	3.2	0.5
Normal	18,087.9	80.1	475.4	78.4
High	3,547.0	15.7	107.1	17.7
Very high	814.8	3.6	20.8	3.4
Total	**22,591.4**	**-**	**606.5**	**-**

Nonetheless, a simple test of the model using existing survey data suggests that it is effective at identifying high-sensitivity areas. For this test, we use the same survey data selected for the prehistoric model test; i.e., post-1990 surveys on BLM-managed lands. Because of the very large extent or linear nature of many historic-era sites, we use overall combined site area rather than site counts as the metric for this test. As with the prehistoric model test, isolates are excluded. As Table 30 shows, of the 65.4 square miles in the test survey area, roughly 3.4 square miles is covered by recorded historic-era sites, or 5.3% of the test survey area, which is a remarkably high figure. The observed densities behave as expected, ranging from 2.7% of the Normal sensitivity class to 12.4% of the Very High sensitivity class.

Figure 25. Source Data for the Exploration and Transportation/Infrastructure Themes.

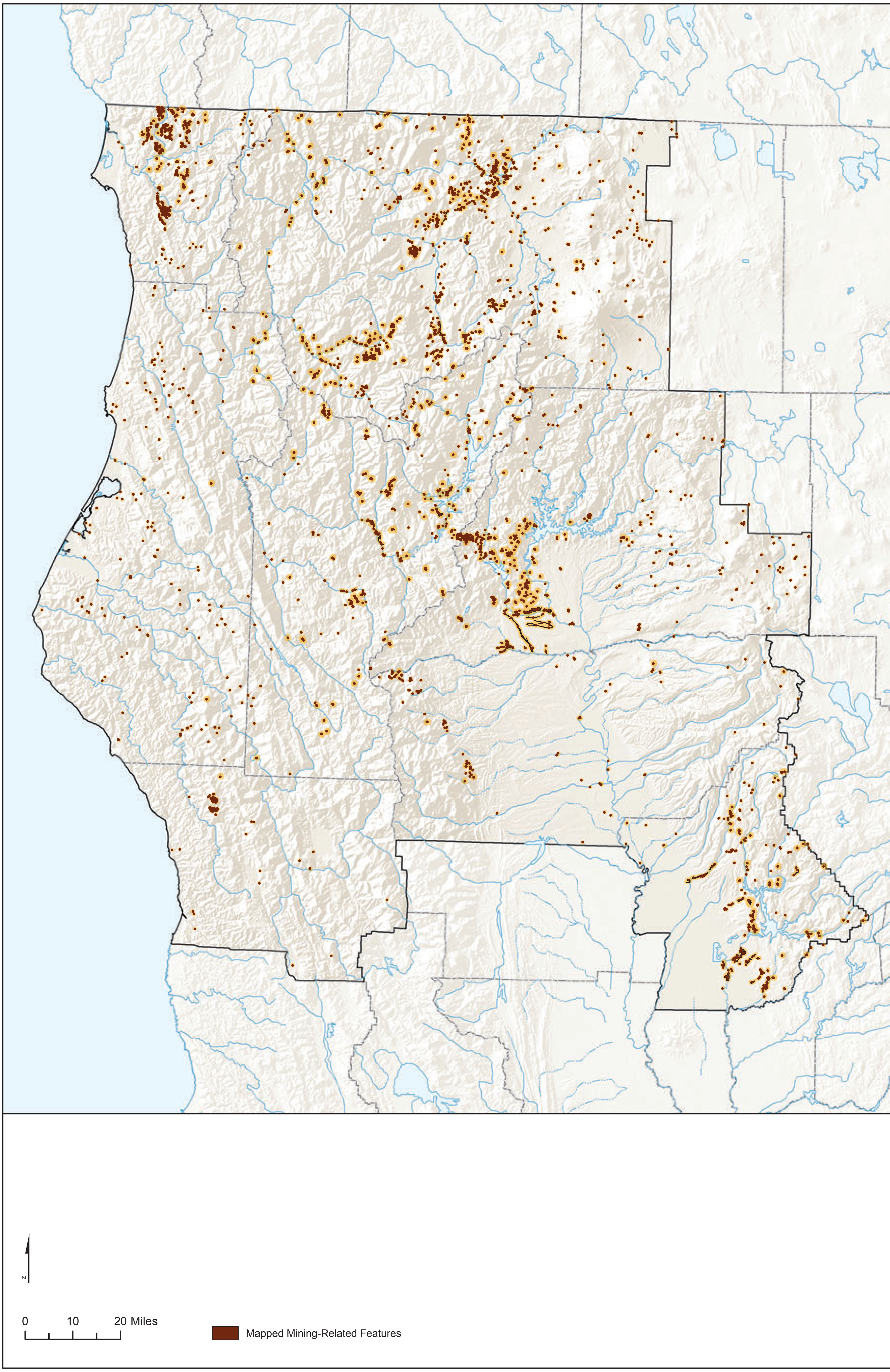

Figure 26. Source Data for the Mining Theme.

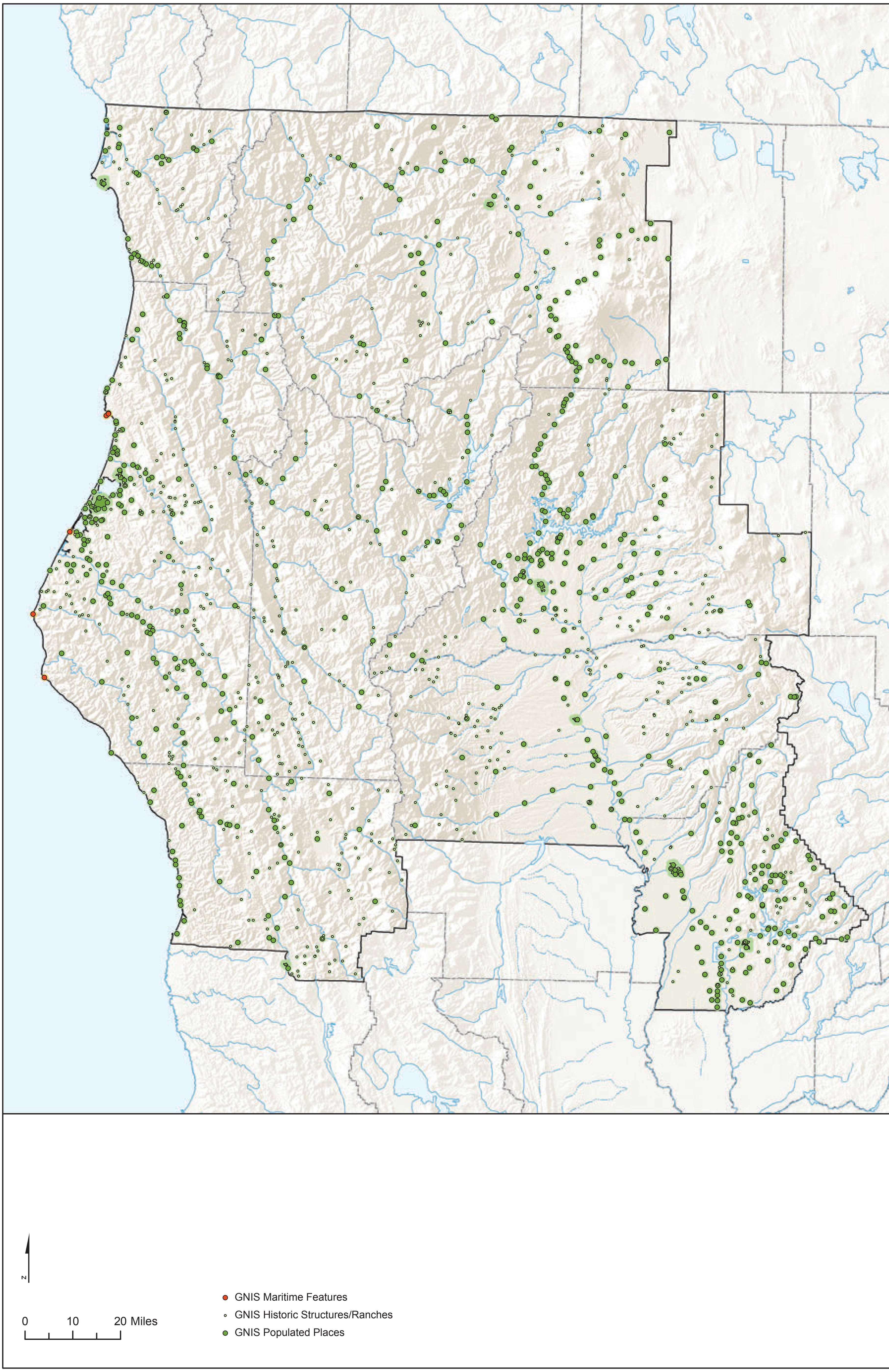

Figure 27. Source Data for the Settlement/Agriculture and Maritime Themes.

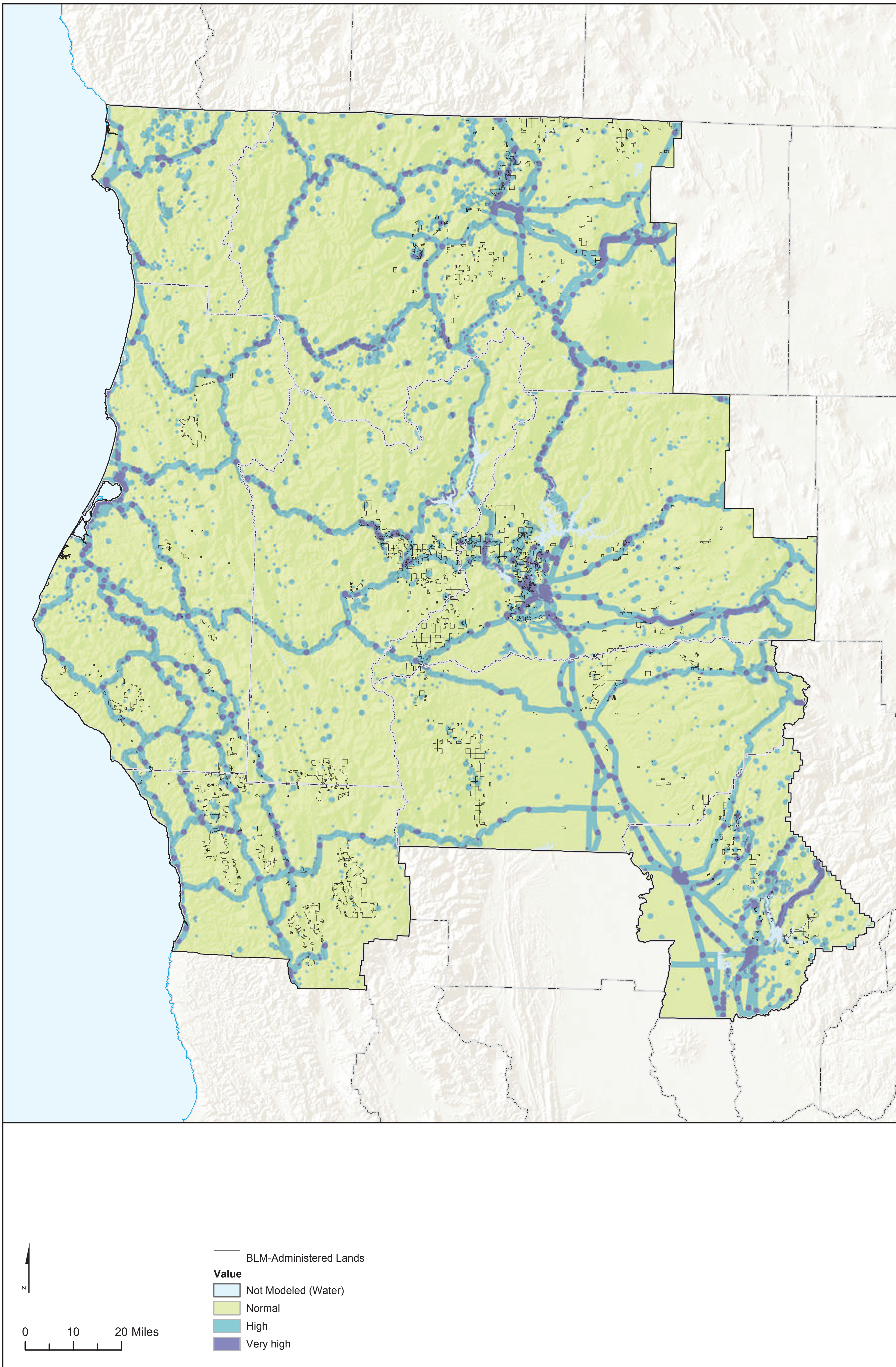

Figure 28. Historic-Era Sensitivity Assessment.

Table 30. Test of Historic-Era Sensitivity Assessment.

CLASS	SURVEYED BLM LAND (SQUARE MILES)	% OF TOTAL	HISTORIC SITE AREA (SQUARE MILES)	% OF TOTAL	DENSITY (% SITE)
Normal	42.3	65.7	1.1	33.4	2.7%
High	17.1	26.7	1.6	48.2	9.6%
Very high	5.0	7.9	0.6	18.4	12.4%
Total	**64.3**	**-**	**3.4**	**-**	**5.3%**

ANALYSIS OF HIGH-PRIORITY AREAS FOR INVENTORY

The sensitivity analyses presented here provide a simple means of identifying areas within a given project planning area with the highest sensitivity for cultural resources. In a GIS environment, BLM staff can inspect the project area for previous surveys and previously recorded cultural resources. The adequacy of any previous surveys should be considered, as discussed further below. For areas that lack adequate survey, the sensitivity models provide a means of prioritizing new field survey. Also, when comparing different planned project alternatives, it is possible to calculate the average overall sensitivity rank for different alternatives.

Further, because the surface prehistoric sensitivity model has quantitative site-density estimates for each class, it is possible to calculate an estimated number of prehistoric sites expected in a project area. This is done by first finding the overall area of each model class within the project area and then multiplying these areas by the site-density estimates presented in Table 26 above. Table 31 shows a sample prehistoric site-density projection using these density figures, using the boundaries of the Lacks Creek Area of Critical Environmental Concern (ACEC) as a hypothetical project area. The table shows the analysis both for prehistoric sites as a whole, and for just those site types most likely to be National Register eligible (i.e., Simple and Complex Habitations; see *Management Classification*, page 195). The projected overall site total is about 52, and the total for likely eligible sites is about 22. Of course, there are many additional environmental and social factors not considered in the model that undoubtedly had effects on prehistoric settlement patterns, so it is expected that actual findings could vary from these projections, both in this sample area and elsewhere. But, this approach can provide a good first approximation.

Table 31. Estimating Prehistoric Site Densities in a Sample Project Area.

CLASS	PROJECT AREA (SQUARE MILES)	ALL SITES		HABITATIONS ONLY	
		MODEL DENSITY (SITES/SQUARE MILE)	PROJECTED SITE COUNTS	MODEL DENSITY (SITES/SQUARE MILE)	PROJECTED SITE COUNTS
Very low	0.5	1.2	0.7	0.5	0.3
Low	6.1	4.0	24.2	1.4	8.5
Moderate	2.4	3.9	9.4	1.7	4.1
High	2.3	7.0	16.4	3.5	8.2
Very high	0.1	8.2	1.2	4.6	0.7
Total	**11.5**		**51.9**		**21.7**

Under Section 110 of the National Historic Preservation Act, BLM has a general responsibility to inventory cultural resources on the lands it manages, whether or not they are subject to effects from planned land uses. As opportunities to conduct these types of inventories arise, BLM may wish to prioritize areas that have the highest sensitivity for cultural resources, using the sensitivity models presented here. While there are many potential ways of prioritizing survey efforts, we provide a sample analysis (Figure 29). This analysis identifies BLM-managed lands that are (1) classified in the prehistoric or historic-era models as having High or Very High sensitivity; (2) never systematically surveyed; and (3) situated in contiguous blocks of more than 320 acres (0.5 square miles).

As Figure 29 shows, the suggested survey areas for prehistoric and historic-era resources differ, because they are based on different sensitivity assessments. For prehistoric resources, the largest of the suggested survey areas are in the Bend area; in the Lacks Creek drainage; along the North Fork of the Eel River near Bald Mountain; along Elk Creek south of Round Valley; and along Grass Valley Creek in the Whiskeytown area. For historic-era resources, the suggested survey areas are much larger because the sensitivity assessment is more general, but the largest areas are concentrated in the mining district between Redding and Weaverville, and in northern Shasta Valley between Yreka and Hornbrook.

BLM may wish to adjust some of the factors going into this analysis. One of the most important of these is the potential addition of a threshold date, beyond which a survey would no longer be considered adequate by current standards, and thus should be considered for resurvey. For this analysis, we considered any previous systematic survey as adequate. However, the advent of GPS technology, and evolving recording standards, have undoubtedly rendered some older surveys obsolete. On the other hand, it is unreasonable to dismiss the value of these older surveys categorically. Ultimately, it will be for BLM and its cooperating agencies to decide which existing surveys are considered adequate, and what threshold date is appropriate, if any. Appendix B provides the necessary data for BLM to adjust these analyses according to various threshold dates, if desired.

Table 32 shows the amount and distribution of existing survey coverage on BLM-managed land by sensitivity model class, showing all known surveys as well as two arbitrarily selected threshold dates (1990 and 2000). Depending on the threshold date selected (if any), between 5 and 17% of BLM-managed lands can be considered to be adequately inventoried. Of the 104.1 total square miles of inventory, 65.9 square miles (63% of total survey coverage) was completed in 1990 or later, and 29.3 square miles was completed in 2000 or later (28% of total coverage). Regardless of the cutoff date selected, however, the trends in the distribution of survey coverage are similar. Existing survey coverage is disproportionately located in the higher-sensitivity zones of both the prehistoric and historic-era models. This does not indicate sampling bias in the models, because we controlled for it during their formulation. Most likely, this trend is due to the fact that that the sensitivity models comport well with archaeologists' common-sense in-field decisions about which kinds of landforms are worthy of targeted survey. Whatever the cause, the data indicate that BLM has so far done a good job of prioritizing its survey efforts.

IDENTIFYING CONFLICTS WITH EXISTING AND PLANNED LAND USES

Finally, we briefly compare the assessed sensitivity of BLM-managed lands against existing and anticipated land uses, with a view to identifying potential conflicts with those uses. Since the upcoming Resources Management Plan may substantially revise BLM's land-use plans, this discussion necessarily remains general in nature. Several of the major existing land uses are considered here.

Preservation/Special Management Status. Many of the most culturally sensitive BLM-managed lands are already afforded official recognition in the land-use planning process by designation as Areas of Critical Environmental Concern (ACECs). These include the Bend, Swasey, and Forks of Butte ACECs in the Redding Field Office area, and the Lacks Creek and Manila Dunes ACECs in the Arcata Field Office area (Figure 30). The approximately 85 square miles of BLM-managed lands designated as ACECs includes a disproportionate amount of high-sensitivity land, at least according to the prehistoric model (Table 33). This provides additional support for preserving these ACEC designations in future land-use planning.

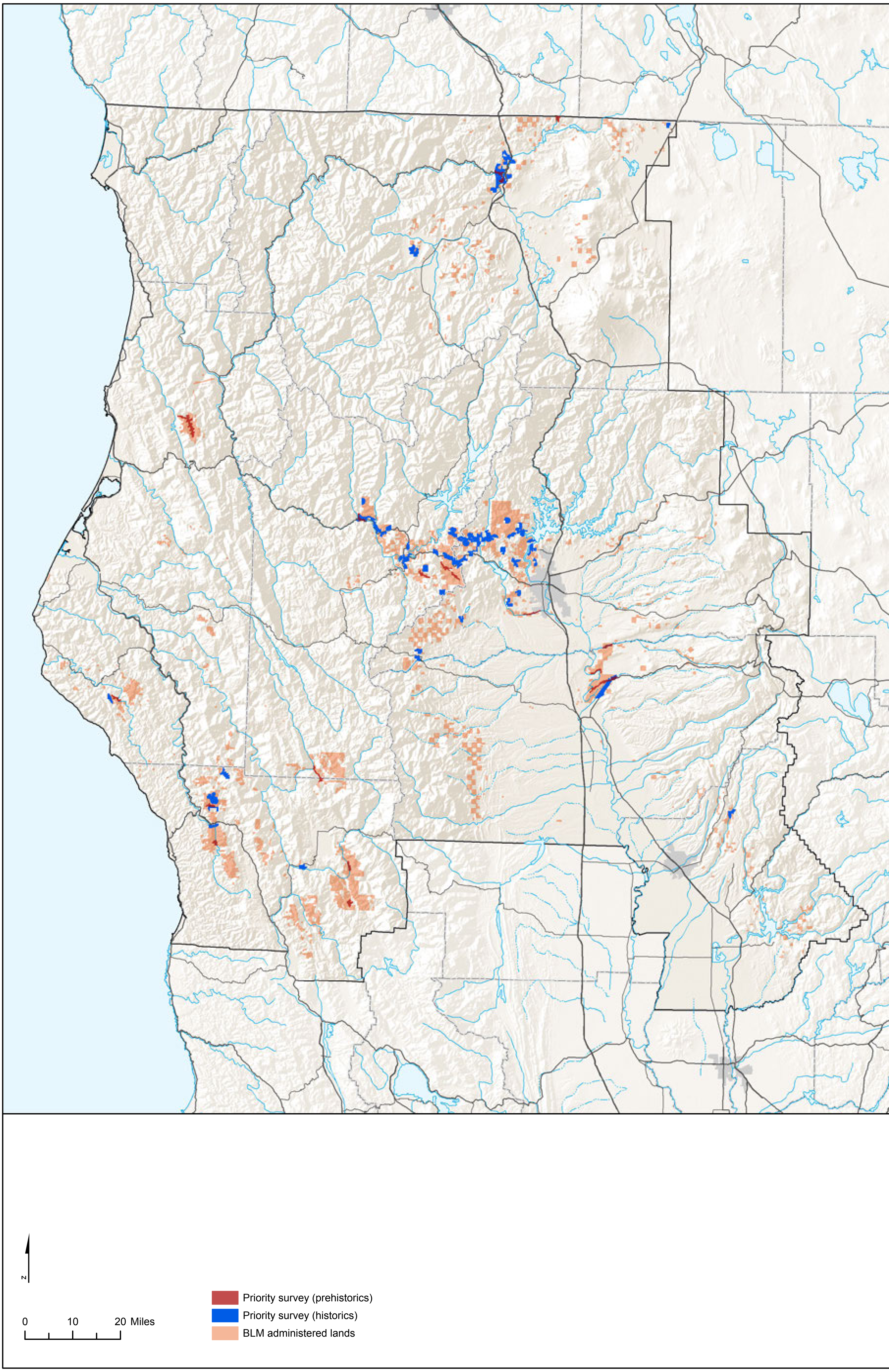

Figure 29. Suggested High-Priority Areas for Inventory.

Figure 30. Areas of Critical Environmental Concern.

Table 32. Proportions of BLM-Managed Lands Surveyed by Sensitivity Model Class.

	All surveys 1975-2015		Surveys 1990–2015		Surveys 2000–2015		Total BLM Land (square miles)
	Total Survey (square miles)	% of Zone Surveyed	Total Survey (square miles)	% of Zone Surveyed	Total Survey (square miles)	% of Zone Surveyed	
Prehistoric Sensitivity Class							
Not modeled	1.5	47.2	1.5	47.1	1.4	44.0	3.2
Very low	14.0	14.4	8.8	9.1	2.4	2.5	97.2
Low	50.8	15.4	32.5	9.8	13.3	4.0	329.9
Moderate	18.5	17.7	10.9	10.4	4.9	4.7	104.4
High	15.0	24.1	9.3	15.0	5.1	8.3	62.3
Very high	4.3	45.0	2.8	29.6	2.1	21.9	9.5
Total	**104.1**	**17.2**	**65.9**	**10.9**	**29.3**	**4.8**	**606.5**
Historic-era Sensitivity Class							
Not modeled	1.5	47.2	1.5	47.1	1.4	44.0	3.2
Normal	72.8	15.3	42.3	8.9	15.5	3.3	475.4
High	23.1	21.5	17.1	15.9	9.1	8.5	107.1
Very high	6.7	32.3	5.0	24.1	3.3	15.6	20.8
Total	**104.1**	**17.2**	**65.9**	**10.9**	**29.3**	**4.8**	**606.5**

Table 33. Distribution of Sensitivity Model Classes within Areas of Critical Environmental Concern.

Value	BLM Lands (square miles)	% of Total	ACECs (square miles)	% of total
Prehistoric Sensitivity Class				
Not modeled	3.2	0.5	0.1	0.1
Very low	97.2	16.0	4.6	5.4
Low	329.9	54.4	45.3	53.2
Moderate	104.4	17.2	19.1	22.4
High	62.3	10.3	13.7	16.1
Very high	9.5	1.6	2.4	2.9
Total	**606.5**	**-**	**85.2**	**-**
Historic-era Sensitivity Class				
Not modeled	3.2	0.5	0.1	0.1
Normal	475.4	78.4	71.5	83.8
High	107.1	17.7	12.1	14.2
Very high	20.8	3.4	1.6	1.9
Total	**606.5**	**-**	**85.2**	**-**

Land Exchanges/Conveyances/Disposals. Historically, BLM has had a policy of disposing of or exchanging isolated parcels to consolidate its managed lands into contiguous blocks. When land passes out of federal management, however, compliance with Section 106 of the National Historic Preservation Act is required just as if it were subject to a project undertaking. When considering future disposals or exchanges, BLM may wish to consider withholding selected parcels that are highly sensitive for known or suspected cultural resources, as an alternative to potentially costly Section 106 compliance, and to dedicate these parcels to preservation.

Recreation. Dispersed recreation (hunting, fishing, backcountry hiking) is expected to have generally limited impacts on cultural resources. Higher-traffic recreation in specially designated areas such the Trinity Wild and Scenic River or the Bend Outstanding Natural Area present a somewhat higher risk to cultural resources simply as a consequence of their higher visibility. Construction of hiking or vehicle trails in more heavily-visited areas may involve some potential direct impacts to cultural resources, but most can likely be avoided by changes to the project design; the bigger risk to cultural resources is the increased visibility and access afforded to cultural resources by these improvements, rendering them vulnerable to vandalism and illicit artifact collection. Where appropriate, BLM should consider dedicating some higher-visibility cultural resources in heavily visited areas to public use, as an opportunity to educate the public about the value of preserving these resources.

BLM also operates off-highway vehicle areas, including the Chappie-Shasta and Samoa Dunes areas. These obviously present a much higher potential risk to cultural resources than other forms of recreation, particularly "open" areas where vehicles are not restricted to existing trails. BLM may wish to prioritize survey in higher-sensitivity parts of these recreation areas.

Resource Extraction. Mining and timber operations can also have significant effects on cultural resources. In addition, mining claims often include areas where mining took place historically, threatening the integrity of any historic-era remains. BLM should continue its policy of conducting cultural resources surveys before permitting these activities. In practice, however, many of these extraction operations are in rough terrain that prevents systematic survey and complete coverage. Getting adequate survey coverage of a given parcel has usually been a matter of professional judgement. BLM may wish to use the sensitivity models provided here as a guide for designing a more systematic approach to survey coverage: for example, requiring that surveys must include complete, systematic Class III coverage of all lands classed as High or Very High sensitivity. For operations that include deep ground disturbance, the subsurface sensitivity model should also be consulted. BLM may wish to require archaeological monitoring of ground-disturbing operations in areas with High or Very High subsurface sensitivity.

Grazing. There are 40 grazing allotments in the planning area, covering about 88 square miles of BLM-managed land. The sensitivity models show that these allotments contain proportionally less high-sensitivity land than BLM-managed lands as a whole (Table 34). Despite this overall trend, there are some high-sensitivity lands within these allotments. Livestock grazing can have significant effects on cultural resources when animals are concentrated near watering troughs, watercourses, or shaded areas (Halford 1999). BLM may wish to consider prioritizing survey of higher-sensitivity areas of these allotments, and/or placing restrictions on certain types of activities on high-sensitivity lands.

Table 34. Distribution of Sensitivity Model Classes within Grazing Allotments.

VALUE	BLM LANDS (SQUARE MILES)	% OF TOTAL	GRAZING ALLOTMENTS (SQUARE MILES)	% OF TOTAL
PREHISTORIC SENSITIVITY CLASS				
Not modeled	3.2	0.5	-	-
Very low	97.2	16.0	19.7	22.3
Low	329.9	54.4	49.1	55.7
Moderate	104.4	17.2	11.5	13.1
High	62.3	10.3	7.0	8.0
Very high	9.5	1.6	0.8	0.9
Total	**606.5**	**-**	**88.2**	**-**
HISTORIC-ERA SENSITIVITY CLASS				
Not modeled	3.2	0.5	-	-
Normal	475.4	78.4	78.2	88.6
High	107.1	17.7	8.9	10.1
Very high	20.8	3.4	1.1	1.2
Total	**606.5**	**-**	**88.2**	**-**

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ABOUT THE AUTHORS

Jerome King has worked as a professional archaeologist since 1991, and has worked with Far Western since 1999. He is a principal with the company as well as co-director of its GIS program. He has directed a wide range of survey and excavation projects throughout California and the western Great Basin. His work has been published in *American Antiquity*, the *American Museum of Natural History Anthropological Papers*, the *Journal of Archaeological Science*, the *Journal of California and Great Basin Anthropology*, and other outlets. As a GIS specialist, he has completed a number of landscape-level archaeological sensitivity modeling studies, sample survey designs, and large-scale cultural resources data-acquisition and maintenance projects.

William Hildebrandt is an authority on northern California prehistory. Since completing his 1981 dissertation work in Humboldt and Del Norte counties, he has directed multiple large-scale excavation projects throughout northern California. He is co-author of the book *Life on the River: The Archaeology of a Native American Culture* (2008, Heyday Books), which has been used as a supplemental reader at colleges and universities throughout California. He also authored the chapter on northwest California in *California Prehistory: Colonization, Culture, and Complexity* (2007, AltaMira Press), which is currently the primary textbook for California prehistory. He has published over sixty other articles or book chapters in many important outlets, including the *Smithsonian Institution*, *University of California Press*, *University of Utah Press*, *University of California Archaeological Research Facility*, *Center for Archaeological Research at Davis*, *American Antiquity*, *Journal of Anthropological Anthropology*, and the *Journal of California and Great Basin Anthropology*.

Sharon Waechter has been a professional archaeologist since 1979, working for the Forest Service (Mendocino and Eldorado National Forests); the Bureau of Land Management (Arcata Resource Area, Ukiah District); the Anthropological Studies Center at Sonoma State University; and since 1991 as a field director, principal investigator, and report editor at Far Western. While she has experience in areas throughout California and western Nevada, Ms. Waechter's areas of particular interest and expertise are the history and archaeology of northern California. She has many years' experience in archaeological survey and excavation, Native American and agency consultation, project sensitivity and impacts assessments, management plans, and public outreach/interpretation.

APPENDIX A

ANNOTATED BIBLIOGRAPHY OF CULTURAL RESOURCES DOCUMENTS

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Thesis	Adkins, Richard	2007	The Destruction of the Trinity River, California (1848-1964)	Ph.D. Dissertation, University of Oklahoma	KM	History	Timeline of the destruction of the Trinity River by mining and logging.	
Report	Allen, Wesley	2009	Archaeological Site Impact Assessment of the Effect of Fire Suppression Activities on CA-SHA-4473, Near Redding, Shasta County, California	Anthropological Studies Center, Sonoma State University	SV	Prehistory	Post-wildfire assessment of CA-SHA-4473, a hunting camp. Analytical studies: Obsidian hydration and sourcing, lithic analysis and faunal analysis.	
Report	Ames, Mike and Richard Edwards	1974	Historic Site Inventory of Butte County: A Field Work Project	Report prepared for Bureau of Land Management, Redding, California.	SN	History	Inventory of historic sites in Butte County.	
Book	Andrews, Ralph W.	1958	Redwood Classic: Panorama of a Century	Superior Publishing Company, Seattle, Washington	CR	History	Collection of historical photos, public-level narrative.	
Report	Angeloff, Nick	2000	A Cultural Resources Inventory of the South Spit of Humboldt Bay, Humboldt County, California	Bureau of Land Management, Arcata, California	CR	Prehistory, History	Archaeological inventory of the south spit of the Humboldt Bay, with limited test excavations. Sites not formally recorded or mapped.	
Report	Bailey, Jim	2008	The Other California Gold: Trinity County Placer Mining, 1848-1962	Technical Service Center, US Bureau of Reclamation	KM	History	Documentation of the California gold rush in Trinity and Siskiyou counties.	
Article	Baker, Ethel	1967	The Cave at Kingsley Cove	Wagon Wheels 17(1):36-39	SV	Prehistory, History	Evidence of the massacres at Kingsley Cave. The area was used by Yahi or Mill Creek Indians as winter camp east of Red Bluff.	
Report	Baker, Suzanne	1984	Archaeological Investigations in the Tower House District, Whiskeytown Unit of the Whiskeytown-Shasta-Trinity National Recreation Area, Shasta County, California	Archaeological Consultants, Oakland, California	SV	Prehistory	Evaluation at CA-SHA-192 (Camden House/Soo'-Yeh-Choo-Pus) and investigations at the Tower House District, Whiskeytown-Shasta-Trinity National Recreation Area (CA-SHA-193, CA-SHA-194, CA-SHA-195, CA-SHA-196, CA-SHA-479). Analytical studies: Soil analysis, historic artifact assemblage, obsidian sourcing and hydration, lithic analysis. Research issues: Site chronology; Regional chronology; Cultural affinities; Artifact manufacturing; Dietary information; Trade relationships.	
Report	Baker, Suzanne	1990	Archaeological Excavations at CA-SHA-479 and CA-SHA-195, Whiskeytown Unit, Whiskeytown-Shasta-Trinity National Recreation Area, Shasta County, California	Archaeological/ Historical Consultants, Oakland, California	SV	Prehistory	Evaluation of CA-SHA-479 and CA-SHA-195. Analytical studies: Obsidian sourcing and hydration, lithic analysis, fauna remains, floral material, soil analysis. Research issues: Chronology; Subsistence, settlement, and seasonality; Lithic technology; Exchange relationships; Populations/cultural affiliation.	
Article	Barnes, James J., Eric W. Ritter, and Barbara Woodrum	2003	'We Weren't White Trash': Rural Modernization and Family Life along Northern California's Rattlesnake Gulch, 1910-1935	Proceedings from the Society for California Archaeology annual meeting 16:199-207	SV	History	Examination of a 20th century homestead, CA-SHA-2399/H, regarding work, gender roles, child rearing and consumer behavior.	CA-030-0520

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Article	Barnes, James J., Eric W. Ritter, Richard Silva, Tammy Sullivan, John Hitchcock, Richard Jenkins, and Claude Singleton	2004	Making Inroads: A Progress Report on an Archaeological and Historical Study of the Yreka Trail	Proceedings from the Society for California Archaeology annual meeting 17:77-84	UK	History	Study of the Yreka Trail/Pitt River Road.	
Book	Basgall, Mark E., and William R. Hildebrandt (eds)	1989	Prehistory of the Sacramento River Canyon, Shasta County, California: Excavations at CA-Sha-1176, Sha-1175, Sha-1169, Sha-476	Center for Archaeological Research at Davis	SV	Prehistory	Data recovery at four sites along the Sacramento River canyon, Shasta County (CA-SHA-1176, CA-SHA-1175, CA-SHA-1169, CA-SHA-476). Analytical studies: Projectile point analysis, flaked stone analysis, ground stone analysis, faunal and floral remains, radiocarbon dating, dendrochronology, obsidian hydration and sourcing. Research issues: Cultural chronology; Subsistence and Settlement; Group organization; Ethnicity and population movements.	
Report	Bauman, James	N.D.	The Harrington Collection of Indian Place names in North Central California	Center for Applied Linguistics, Washington, DC	UK	Prehistory, Ethnography	Ethnography based on Indian Place names.	
Book	Baumgardner, Frank H., III	2006	Killing for Land in Early California: Indian Blood at Round Valley: Founding the Nome Cult Indian Farm	Algora Publications, New York	KM	History	Discussion of the Round Valley wars with a focus on Nome Cult Farm in northwestern Mendocino County.	
Book	Baumhoff, Martin A.	1957	An Introduction to Yana Archaeology	Reports of the University of California Archaeological Survey 40. University of California, Berkeley	SCF	Prehistory	Excavation of Payne Cave and overview of Yana archaeology. Analytical studies: Lithic analysis, shell bead analysis, organic artifacts (basketry, matting, cordage, braid, buckskin), burial remains, historic artifact assemblage. Research issues: Proposed sequence in Yana Archaeology (Kingsley Complex, Mill Creek Complex).	
Article	Baumhoff, Martin A.	1958	California Athabaskan Groups	In University of California Anthropological Records 16:157-233	CR, KM	Ethnography	Ethnography of Athabaskan people	
Article	Baumhoff, Martin A.	1980	The Evolution of Pomo Society	Journal of California and Great Basin Anthropology 2(2):175-185	CR	Prehistory	Summary of archaeological findings from the Warm Springs Dam Project, with special emphasis placed on the arrival of Pomoan speakers to the area, and the age and function of North Coast Ranges rock art.	
Article	Baumhoff, Martin A.	1985	North Coast Range Point Types	Center for Archaeological Research at Davis 8:172-215	CR	Prehistory	Synthesis of North Coast Range Point Types	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Chapter	Bean, Lowell J., and Dorothea Theodoratus	1978	Western Pomo and Northeastern Pomo	In California, edited by Robert F. Heizer, pp. 180-189. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	CR	Ethnography	Western Pomo and Northeastern Pomo.	
Book	Bearss, Edwin C.	1969	History Basic Data, Redwood National Park, Del Norte and Humboldt Counties, California	National Park Service	CR	History	History of Redwood National Park including synthesis of the Yurok, Tolowa and Chilula culture and historic-era exploration and establishment.	
Report	Beckham, Stephen Dow	2006	Historical Landscape Overview of the Upper Klamath River Canyon of Oregon and California	Bureau of Land Management, Redding, California	KM	History	Overview of early exploration, pioneer settlement, transportation, logging and lumbering, public works projects, and tourism/recreation along the canyon in far northern Siskiyou County. Much detail about local families and ranches. No archaeological element.	
Report	Belden, George	1997	Trinity County Sawmills	Belden Forestry	KM	History	Trinity County sawmills. Report includes records of 44 sawmills.	
Article	Benson, Arlene and Floyd Buckskin	1992	Achomawi Jumping Rocks and the Concept of the Test	American Indian Rock Art 15: 31-38	UK	Prehistory	Discussion of cupules or natural depressions known by the Achomawi as jumping rocks.	
Report	Berrien, Gay	1990	Valdor Prison Road Camp	Big Bear Ranger District	KM	History	Draft report of the Burnt Ranch Prison Road Camp. Details on camp life, inmates, and structure/building descriptions.	
Article	Bevill, Russell	2004	Obsidian Hydration: The Squaw Creek Site Revisited	Proceedings from the Society for California Archaeology annual meeting 17:133-138	SCF	Prehistory	Excavations at the Squaw Creek Site (CA-SHA-475) focusing on obsidian hydration data.	
Report	Bevill, Russell and Elena Nilsson	1996	Archaeological Investigations at CA-SHA-559, Whiskeytown-Shasta-Trinity National Recreation Area, Shasta County, California	Mountain Anthropological Research	SV	Prehistory	Evaluation of CA-SHA-559.	
Report	Bevill, Russell and Elena Nilsson	1999	The Archaeology of The Tower House Site, CA-SHA-192/479/H, Shasta County, California	Dames & Moore, Inc., Chico, California	SV	Prehistory, History	Evaluation of the Tower House Site (CA-SHA-192/479/H). Analytical studies: Obsidian sourcing and hydration, lithic macrobotanical, fauna sediment and historic artifact assemblage. Research issues: Chronology; Site function; Settlement and subsistence; Lithic procurement, technology and exchange; historic occupation.	

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Bevill, Russell and Elena Nilsson	2001	Cultural Resources Overview of the Whiskeytown Unit, Whiskeytown-Shasta-Trinity National Recreation Area, Shasta County, California	Mountain Anthropological Research and URS Corporation, Chico, California	SV	Prehistory, History	Synthesis of cultural resources and archaeological investigations of the Whiskeytown Unit, Whiskeytown-Shasta-Trinity National Forest. Discusses cultural frameworks/sequence for the prehistoric northern California and Whiskeytown unit area; Native American history and contemporary Indian culture; Early Historic exploration; Mining; Non-mining economics (Lumber, ranching); Government; and Historic cultural resources.	
Report	Bevill, Russell, Kathleen Hull, and Elena Nilsson	1996	Archaeological Investigations at CA-TEH-563 and FS 05-06-51-40	Mountain Archaeological Research and Dames & Moore	SCF	Prehistory	Evaluation of CA-TEH-563 and FS 05-06-51-40, both habitation sites. Analytical studies: Radiocarbon analysis, obsidian hydration and sourcing, lithic analysis, faunal analysis, macrobotanical analysis, sediment and stratigraphic analysis. Research Issues: Cultural chronology; Lithic technology; Settlement patterns; Cultural affiliations; Subsistence orientations; Cultural processes; Population growth.	
Report	Bickel, Polly	1979	A Study of Cultural Resources in Redwood National Park	National Park Service	CR	Prehistory	): Cultural resources overview for Redwood National Park, emphasizing the history of research and development of synchronic settlement pattern models and site typologies.	
Report	Billington, David P., Donald C. Jackson, and Martin V. Melosi	2005	The History of Large Federal Dams: Palling, Design, And Construction in the Era of Big Dams	Bureau of Reclamation, Denver, Colorado	SV	History	The history of federal involvement in dam construction. Chapter 7 focuses on the Shasta Dam and northern California dams.	
Book	Bledsoe, Anthony	1881	History of Del Norte County, California with a Business Directory and Traveler's Guide	Wyman & Co.	CR	History	History of Del Norte County.	
Book	Bleyhl, Norris	1978	Indian-White Relationships in Northern California between 1840 & 1920 in the Congressional Serial Set of United States Public Documents	Merriam Library Special Collections, California State University, Chico	SN, SV	Prehistory, History	Publication of the Bleyhl Collection at CSU Chico and research of the Indian-White relationship in Northern California.	
Book	Bloom, Khaled	2010	Murder of a Landscape: The California Farmer-Smelter War 1897-1916	Western Land and Water Series, University of Oklahoma Press, Norman	SV	History	Study of the farmer-smelter dispute over two decades in Shasta County and protests against the Mountain Copper Company of Great Britain	
Report	Blount, Clinton, Shelly Davis-King, and Randall Milliken	2008	Native American Geography, History, Traditional Resources, and Contemporary Communities and Concerns	Far Western Anthropological Research Group, Inc., Davis, California	SN, SV	Prehistory, History, Ethnography	Native American culture overview. Discusses linguistic distribution and Native American ethnogeography (Miwok, Nisenan, Northern Nisenan/Maidu, Northwest Maidu, Nomlaki, Patwin, Pomoan, Washoe, Yana), traditional lifeways, historic period and events.	
Book	Borden, Stanley T.	1958	The Western Railroader for the Western Railfan: Oregon and Eureka Railroad	Northwestern Pacific	CR	History	Historic railroad line Oregon and Eureka railroad.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Bouey, Paul D., Eric Wohlgemuth, and Dwight D. Simons	1993	Cultural Resources Test Excavations, Sacramento Systems Evaluation, Phase II, Butte and Sutter Counties, California	Far Western Anthropological Research Group, Inc., Davis, California	SV	Prehistory	Evaluation of CA-BUT-1123 and CA-SUT-17. Analytical studies: Lithic analysis, shell bead analysis, faunal analysis, obsidian sourcing and hydration, macrobotanical analysis, historic artifact assemblage. Research issues: Chronology, Settlement Systems, Subsistence Strategies, Intergroup Interaction.	
Report	Boynton, Michael J.	1973	Interim Progress Report for the Archaeological Salvage of the Hedge Creek Site 4-SIS-S5, Siskiyou County, California	Department of Anthropology, California State University, Chico	SV	Prehistory	Interim progress report for salvage excavation of the Hedge Creek site (4-SIS-S5), habitation site. Brief, no analyses.	
Report	Bramlette, Allen G., and David A. Fredrickson	1979	An Archaeological Study of CA-HUM-405 at the Mattole River Bridge, Humboldt County, California	Sonoma State University	CR	Prehistory	Evaluation of CA-HUM-405, Mattole River Bridge. Summary discussion of artifacts recovered. (also listed in Part II as S-001663)	CA-HUM-0405
Book	Breschini, G. S. and T. Haversat, ed.	1986	Symposium: A New Look at Some Old Sites	Coyote Press Archives of California Prehistory 6		Prehistory	A series of papers by senior archaeologists focusing on classic excavations from the past.	
Chapter	Bright, W.	1978	Karok	In California, edited by Robert F. Heizer, pp. 289-305. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	CR, KM	Ethnography	Discussion of the Karok culture.	
Book	Brott, Clark W.	1982	Moon Lee One: Life in Old Chinatown, Weaverville, California	Great Basin Foundation	KM	History	A data recovery report for a portion of the historic Chinatown in Weaverville, Trinity County.	
Paper	Brott, Clark W., and J. D. Dotta	1978	New Problems and Hypotheses in Dealing with Archaeolithic Traditions: Evidence from the Southern Cascades	Paper presented at the 12th annual meeting of the Society for California Archaeology	SCF	Prehistory	Society of California Archaeology annual meeting paper presentation on the Late Pleistocene-early Holocene transition in the Southern Cascades region.	
Thesis	Broughton, Jack M.	1988	Archaeological Patterns of Prehistoric Fish Exploitation in the Sacramento Valley	M.A. Thesis, California State University, Chico	SV	Prehistory	Analyses faunal remains from Sacramento Valley sites and finds that salmon does not get important until reaching the northern reaches of the river where becomes smaller on more conducive for weir construction. Also finds that smaller fish become more important late in time, indicating a broadening of the diet breadth.	
Report	Brown, G. Chester	1916	Mines and Mineral Resources of Siskiyou County	Report XIV of the State Mineralogist, California State Mining Bureau, San Francisco	UK	History	Inventory of mines, types, and owners within Siskiyou county.	
Report	Bryant, Jeff, and William Rich	2011	Archaeological Investigations at Locus 12 (“Bachelor Cabin”), Elk River Mill and Lumber Company’s Townsite of Falk, Headwaters Forest Reserve, USDI Bureau of Land Management, Humboldt County, California	Cultural Resources Facility, Humboldt State University	CR	History	Excavation of the Bachelor Cabin Site. Includes architectural analysis. Research issues: Work environment; Economic exchange; Food; Ethnicity; Gender and feminism; Politics; Religion; Social policy; Technological change; Environmental change; Sanitation and water access; Building methods.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Bureau of Land Management	2006	A Study of Select Historic Orchards of Trinity County	Bureau of Land Management, Redding, California	KM	History	Collaborative agreement between BLM and Northern California Resource Center on Trinity County historic orchards. Significant historic orchards associated with Gold Rush and post-Gold Rush era.	
Book	Burrill, Richard L.	2011	Ishi's Untold Story in His First World: A Biography of the Last of His Band of Yahi Indians in North America	The Anthro Company, Red Bluff, California	SCF		Biography of Ishi, the Yahi Indian	
Report	Byrd, Brian F., Paul Brandy, William R. Hildebrandt, Stephen Wee, Mark Beason, and Toni Webb	2008	Cultural Resources Alternatives Assessment for the Shasta Lake Water Resources Investigation, Shasta and Tehama Counties, California	Far Western Anthropological Research Group, Inc., Davis, California	SV	Prehistory, History	Prehistoric and historic-era sensitivity analysis for Shasta Lake. Research issues: Prehistoric- Timing and origins of sedentism; Resource intensification; Wintu regional expansion; Socio-spatial structure; Wintu society from 1930. Historic- Exploration; Early settlement; mining; lumber; ranching; transportation; National Forest; Recreation; Hydroelectric.	
Thesis	Carmosino, Penni L.	1998	Victorian Culture and Women at CA-BUT-1298H, Forbestown, California	California State University, Chico	SN	History	Master's thesis on the history, archaeology, and demographics (class divisions, gender, and ethnicity) of the 19th century mining town of (Old) Forbestown in southeastern Butte County.	CA-030-0595
Report	Carmosino, Penni L.	2000	Historical Archaeology at the Mud Valley Ranch, Trinity County, California	Cultural Resources Publications: Historical Archaeology, Bureau of Land Management, Redding, California	KM	History	-	
Book	Carranco, Lynwood and Estle Beard	1981	Genocide and Vendetta: The Round Valley Wars in Northern California	University of Oklahoma Press	KM	History	Discusses the history of the genocide of the native inhabitants of Humboldt and Mendocino Counties and early settlers.	
Book	Carranco, Lynwood and Henry L. Sorensen	1988	Steam in the Redwoods	Caxton Printers Ltd.	CR	History	Historical overview focused on the redwood industry and railroad logging in northwestern California, primarily Del Norte, Humboldt, and Mendocino Counties.	
Report	Cassidy, Julie K.	1992	Explaining Lithic Assemblage Differences in the Medicine Lake Highlands, Siskiyou County, California	U.S. Forest Service	UK	Prehistory	Examination of obsidian sources and archaeological sites located in the Medicine Lake Highlands. Analytical studies: Obsidian hydration and sourcing, lithic analysis. Research issues: Ethnic affiliations; Mobility strategy.	
Report	Cassidy, Julie K., D. Elliott, and E. Sundahl	1994	Archaeological Test Excavations at the Prehistoric Component of CA-SHA-1961/H, Pollard Flat, Shasta County, California	Shasta-Trinity National Forest, Redding, California	SV	Prehistory	Evaluation of CA-SHA-1961/H, the Getchell site. Analytical studies: Lithic analysis, blood residue analysis, obsidian hydration. Research issues: Chronology that resolve or refute Basgall and Hildebrandt (1989); Archaeological assemblage reflecting adaptations in the upper Sacramento River Canyon; Archaeological assemblage reflecting cultural chronology or subsistence patterns.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Book	Cazier, Lola	N.D.	Surveys and Surveyors of Public Domain 1785-1975	Bureau of Land Management, US Government Printing Office, Washington DC	CR, KM, UK, SCF, SN, SV	History	The history of surveying and surveyors across the United States, on public lands (1785-1975).	
Chapter	Chartkoff, Joseph L.	1989	Exchange, Subsistence, and Sedentism along the Middle Klamath River	In Research in Economic Anthropology 11:285-303, edited by Barry L. Isaac, JAI Press Inc., New London, Connecticut	KM	Prehistory	Argues that the Middle Klamath archaeological record is all late prehistoric, and that earlier occupations did not occur due to the lack of obsidian exchange in this lithic-poor environment.	
Article	Chartkoff, Joseph L.	1991	The Collord Site (CA-SIS-S15): A Proto-Karok Village at Happy Camp	Proceedings from the Society for California Archaeology annual meeting 4:23-43	KM	Prehistory	Site assemblage of CA-SIS-S15 (Collord Site).	
Article	Chartkoff, Joseph L.	2004	Calories and Construction: Ecology of Extraction Strategies on the Lower Klamath River	Proceedings from the Society for California Archaeology annual meeting 17:23-26	KM	Prehistory, Ethnography	Fish dam strategy on the Lower Klamath.	
Article	Chartkoff, Joseph L.	2010	The Finch Site and the Root Site: A Comparison of Riverine Adaptations by Late-Period Hunter-Gatherers in California and Michigan	Proceedings from the Society for California Archaeology annual meeting	SV	Prehistory	Comparison of two riverine sites: 4-BUT-12 in western Butte County and 20-IN-2 in southern Michigan.	
Article	Chartkoff, Joseph L.	2014	Prayer Seats on the Mountains: A Focus on the Archaeology of Religious and Ritual Features in Sites	Proceedings from the Society for California Archaeology annual meeting 28:22-25	KM	Prehistory, Ethnography	Discussion of Yurok ritual sites in the Siskiyou Mountains.	
Article	Chartkoff, Joseph L.	2015	One-Room Schoolhouses in the Eel River Delta: A Source for Information about Certain Early Historic Cultural Patterns in Humboldt County	Proceedings from the Society for California Archaeology annual meeting 29:148-151	CR	History	Focus on historic-era schoolhouses near the village of Ferndale on the Eel River delta.	
Article	Chartkoff, Joseph L. and Kerry K. Chartkoff	1975	Late Period Settlement of the Middle Klamath River in Northwest California	American Antiquity 40(2):172-179	KM	Prehistory	A study on the settlement pattern of 160 prehistoric habitation sites along the Klamath River.	
Report	Chartkoff, Joseph L. and Kerry K. Chartkoff	1976	Excavations at the Patrick Site	Department of Anthropology, Michigan State University	SV	Prehistory	Excavation at the Patrick Site (4-BUT-1), riverine habitation, by University of California, Los Angeles and California State University, Chico. Village site with over 40 housepit (surface depressions) and subsurface structures. "Chico Complex" assemblage. Contains artifact descriptions. Research Issues: Trade, Subsistence; Time and Space.	
Book	Clark, William B.	1970	Gold Districts of California	Bulletin 193, California Division of Mines and Geology, Sacramento, California	CR, KM, SN, SV	History	California Gold Districts including the Sierra Nevada , Klamath Mountains, Cascade Range, Basin Ranges, Mojave Desert, Transverse and Peninsular Ranges, Modoc Plateau, and Coastal Ranges provinces.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Cleland, James H., Frank Bayham, Russell Bevill, James C. Chatters, James H. Cleland, Sandra Flint, Mark R. Hale, Steven Heipel, Michael S. Kelly, Alison MacDougal, Janet L. McVickar, Elena Nilsson, and W.G. Spaulding	1995	Prehistory of the Middle Pit River, Northeastern, California: Archaeological Investigations at Lake Britton, Pit 3, 4 and 5 Project	KEA Environmental, Inc., San Diego, California	SCF	Prehistory	Evaluation of CA-SHA-436, CA-SHA-337, CA-SHA-1417, CA-SHA-375, CA-SHA-395, CA-SHA-396, CA-SHA-1474, CA-SHA-1464 at Lake Britton. Analytical studies: Lithic analysis, radiocarbon data, obsidian sourcing and hydration, ceramics, shell, bone and glass beads, faunal analysis, shellfish analysis, protein residue analysis, plant remains. Research issues: Intensification; Mobility; Population; Paleoenvironmental reconstruction; Cultural Chronology; Subsistence and Settlement; Demography; Social interaction/migration; Cultural contact and acculturation.	
Report	Clewett, S.E, William Dreyer, Makoto Kowta, Eric W. Ritter, Elaine Sundahl, K.D. Tyree	1990	Archaeological Investigations in the Upper Sacramento Valley	Bureau of Land Management, California State University, Chico, Shasta-Trinity National Forest, and Shasta College	SV	Prehistory	Draft report of the Flat Creek Site (CA-SHA-1588/CA-030-0202). Analytical studies: Historic artifact assemblage, lithic analysis, macrobotanical analysis, faunal analysis. Research issues: Taxonomic concerns by A. Farber (1985), and the focus on inadvisable applications of the Fredrickson classification scheme (1973) in the Redding area.	CA-030-0202
Report	Clewett, S.E. and Elaine Sundahl	1978	The Archaeology of Shake Cabin, FS 05-14-59-41, Shasta County, California	Shasta College Archaeology Laboratory, Redding, California	SV	History	Shake Cabin site (FS 05-14-59-41), two historic structures with a possible prehistoric component. Discusses historic artifact assemblage, obsidian artifact descriptions. Research Issues: Historic function and Relationship to the Lamont Lumber and Trading Co.	
Report	Clewett, S.E. and Elaine Sundahl	1979	Zeigler Springs Archaeological Research, A High Elevation Site in Trinity County, California	Shasta College Archaeology Laboratory, Redding, California	KM	Prehistory	Zeigler Springs Site (FS 05-14-54-45), lithic scatter. Analytical studies: Lithic analysis (limited). Research Issues: Ascertain whether or not any of the cultural level remained within the landing area, to define the extent and integrity of surface cultural materials, to identify the location of the original site, to determine the cultural affiliation, the functional classification of the site, and to place the site chronologically in northern California prehistory.	
Report	Clewett, S.E. and Elaine Sundahl	1981	The Archaeological Investigation of Eagle Court, A Partial Mitigation of CA-SHA-266, Redding, California	Shasta College Archaeology Laboratory, Redding, California	SV	Prehistory	Mitigation at CA-SHA-266. Analytical studies: Obsidian sourcing and hydration, radiocarbon data, burials, artifact assemblage (including lithic and shell beads).	
Report	Clewett, S.E. and Elaine Sundahl	1982	Archaeological Testing for the Hartnell Avenue Extension Project, Redding	Shasta College Archaeology Laboratory, Redding, California	SV	Prehistory	Testing at CA-SHA-992, CA-SHA-993, and CA-SHA-995. Analytical studies: Obsidian sourcing and hydration, radiocarbon data, lithic analysis.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Clewett, S.E. and Elaine Sundahl	1982	Clikapudi Archaeological District 1981 Field Research	Shasta College Archaeology Laboratory, Redding, California	SV	Prehistory	Testing at Clikapudi District: CA-SHA-228 (F.S. 05-14-58-114), CA-SHA-229 (F.S. 05-14-58-114), CA-SHA-230 (F.S. 05-14-58-116), CA-SHA-231 (F.S. 05-14-58-117), CA-SHA-232 (F.S. 05-14-58-118). Analytical studies: Obsidian hydration, radiocarbon data, and lithic analysis. Research issues: Relationship between the differing milling/grinding industries and the implications which might be applied to northern California prehistory.	
Report	Clewett, S.E. and Elaine Sundahl	1983	Archaeological Excavations at Squaw Creek, Shasta County	Shasta College Archaeology Laboratory, Redding, California	SCF	Prehistory	Evaluation of CA-SHA-475 on Squaw Creek. Analytical studies: Lithic analysis, radiocarbon data, obsidian hydration. Research issues: Cultural components; Reconstruction of Culture History; Determination of socio-economic patterns; Explanation of Cultural change at this site.	
Report	Clewett, S.E. and Elaine Sundahl	1985	Archaeological Investigations at Sugar Pine Canyon, Shasta County	Shasta College Archaeology Laboratory, Redding, California	SCF	Prehistory	Evaluation of CA-SHA-1483, -1484, -1485 along Sugar Pine Canyon. Analytical studies: Lithic analysis, obsidian hydration and sourcing. Research issues: Chronology; Cultural identification; Site function; Tuscan obsidian source.	
Report	Clewett, S.E., E. Spencer, and F. Teach	1982	The Archaeological Investigation of CA-SHA-900, The Benton Tract, Redding	Shasta College Cultural Resource Center, Redding, California	SV	Prehistory	Mitigation at CA-SHA-900. Analytical studies: Artifact assemblage (lithic analysis). Research issues: Chronology of the hilltop Benton Tract sites. Examines metavolcanic tools and late prehistoric quarrying.	
Report	Colby, Howard	1982	A Century of Transportation in Shasta County, 1821-1920. Occasional Publication No. 7	Association for Northern California Records and Research	SCF, SV	History	Overview of transportation in Shasta county. Discusses early roads and ferries, stage operations, freight transport, water transport, lumber and later roads, and railroads.	
Article	Colligan, Kaely R., Adrian R. Whitaker, and William R. Hildebrandt	2015	Where the Pavement Ends: An Assessment of the Near Absence of Haliotis rufescens in the Archaeological Record on Alta California's North Coast	California Archaeology 7(1):33-57	CR	Prehistory	Assessment of the lack of red abalone in the archaeological record north of San Francisco. Research issues: Experimental archaeology; Return rates; Sea otter competition; Lack of boat based foraging; Terrestrial resources.	
Book	Colman, Lois	1972	Tailings of Butte Creek Canyon 1833-1971: A History of Big Butte and Little Butte Canyons	Centerville Recreation and Historical Association	SV	History	The history of Big and Little Butte Creek areas 1833-1971	
Thesis	Connolly, Thomas James	1986	Cultural Stability and Change in the Prehistory of Southwest Oregon and Northern California	Ph.D. Dissertation, University of Oregon, Eugene, Oregon	CR, KM	Prehistory	Develops a comprehensive settlement chronology for southwest Oregon and compares it to northwest California.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Cook, Roger A.	1979	Summary Report of Archaeological Test Excavations at CA-SIS-342 on 02-SIS-97 P.M. 41.5 to 42.3	California Department of Transportation, Sacramento, California	UK	Prehistory	Test excavations at CA-SIS-342. Analytical studies: Artifact analysis, and Faunal and shell remains. Research Issues: Areal extend of the site; Defining depth and formation of the site; Identification of activities at the site; Defining cultural significant within prehistory.	
Report	Costello, Julia G. and Stephen R. Wee	2000	Oregon Mountain Summit and La Grange Mine Historic Properties: Supplemental Archaeological Survey Report, Historic Study Report, and Historic Resources Evaluation Report for the Curve Correction Project, State Route 299, near Weaverville, Trinity County	Far Western Anthropological Research Group, Inc., Davis, California	KM	History	Evaluation of the La Grange Mine Historic District and Oregon Mountain Summit. Research objective focuses on the potential of mining sites.	CA-030-1401, CA-030-1402, CA-030-1403, CA-030-1405, CA-030-1891, CA-030-2023, CA-030-2024, CA-030-2025, P-53-001565, P-53-001570
Book	Coy, Owen	1929	The Humboldt Bay Region, 1850-1875: A study in the American Colonization of California	State Historical Association, Los Angeles, California	CR	History	Historical background of the Humboldt Bay region (1850-1875).	
Report	Daniels, Brian Isaac	2006	Shasta Nation TCP Study	PacifiCorp, Portland, Oregon	KM, UK	Ethnography	Assessment of the significance of Shasta cultural resources (TCPs/SCRs). Research Issues (Klamath Drainage): Habitation (pre-contact, post-contact); Hunting; Fishing; Gathering; Spirituality/Ceremonialism. This report contains oral histories and interviews.	
Report	Darcangelo, Michael, William Hildebrandt, and Adelina Asan	2015	Data Recovery Excavations at CA-TEH-1262/H for the Bowman Road Bridge Replacement Project	Far Western Anthropological Research Group, Inc., Davis, California	SV	Prehistory	Evaluation of CA-TEH-1262/H. Analytical studies: Obsidian sourcing and hydration, radiocarbon data, human remains, lithic analysis, archaeobotanical, fauna and shellfish analysis. Research issues: Land-use chronology; Subsistence-Settlement pattern change; Inter-regional exchange.	
Thesis	Deal, Krista C.	1987	The Archaeology of the Cana Highway Site, CA-BUT-288, Butte County, California	M.A. Thesis, California State University, Chico	SV	Prehistory, History	Master's thesis analyzing the assemblage at CA-BUT-288, the Cana Highway site northwest of Chico. Analytical studies: Lithic analysis, faunal remains, bone artifacts, historic artifacts. Research issues: Chronology; Subsistence strategy.	
Report	Delacorte, Michael G.	2007	Status and Research Assessment of the CA-BUT-84 Archaeological Collection	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory	Research assessment of CA-BUT-84. Recommendations for further studies of archaeological collection.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Delacorte, Michael G.	2009	Archaeological Assessment of Two Prehistoric Sites (CA-BUT-218 and CA-BUT-2422) at Loafer Creek, Butte County, California	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory, History	Assessment of CA-BUT-218 and CA-BUT-2422 at Lake Oroville. Analytical studies: Lithic analysis, faunal and floral remains, mussel shell analysis, human tooth, obsidian hydration and sourcing, historic artifacts. Research Issues: Chronology; Settlement Patterns and Interaction Spheres; Subsistence Intensification and Climate Change; Social Evolution and Complexity.	
Report	Delacorte, Michael G.	2009	Archaeological Assessment and Prehistoric Site Evaluations at the Bloomer Point, Knoll, and Group Campgrounds	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory	Evaluation of CA-BUT-2992 and CA-BUT-549 at Lake Oroville. Natural Setting; Paleoenvironment; Cultural Context (early Holocene, Middle Holocene, Mesilla Complex, Bidwell Complex, Sweetwater Complex, Oroville Complex). Analytical studies: Flaked stone analysis, faunal and floral remains, bedrock features, obsidian hydration and sourcing. Research Issues: Chronology; Settlement Patterns and Interaction Spheres; Subsistence Intensification and Climate Change; Social Evolution and Complexity.	
Report	Delacorte, Michael G.	2012	Archaeological Assessment of CA-BUT-162 at Bloomer Ravine, Butte County, California	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory, History	Assessment of CA-BUT-162 at the North Fork of the Feather River drainage. Analytical studies: Lithic analysis, faunal and floral remains, mussel shell analysis, bedrock features, obsidian hydration and sourcing, radiocarbon dating, historic artifacts. Research Issues: Chronology; Settlement Patterns and Interaction Spheres; Subsistence Intensification and Climate Change; Social Evolution and Complexity.	
Report	Delacorte, Michael G.	2014	Archaeological Assessment of CA-BUT-3135 at the Bidwell Canyon Boat Ramp, Lake Oroville, Butte County, California	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory	Assessment of CA-BUT-3135 at Lake Oroville. Analytical studies: Lithic analysis and obsidian hydration and sourcing. Research Issues: Chronology; Settlement Patterns and Interaction Spheres; Subsistence Intensification and Climate Change; Social Evolution and Complexity.	
Report	Delacorte, Michael G.	2014	Archaeological Assessment of Two Prehistoric Sites (CA-BUT-2512 and CA-BUT-2608) at Loafer Drainage, Butte County, California	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory, History	Assessment of CA-BUT-2512 and CA-BUT-2608 at the Loafer drainage, Lake Oroville. Analytical studies: Lithic analysis, bedrock features, faunal analysis, obsidian hydration and sourcing, historic artifacts. Research Issues: Chronology; Settlement Patterns and Interaction Spheres; Subsistence Intensification and Climate Change; Social Evolution and Complexity.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Delacorte, Michael G.	2014	Archaeological Assessment of Two Prehistoric Sites (CA-BUT-198/H, CA-BUT-383/H) West of Kennedy Ravine, Butte County, California	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory, History	Assessment of two sites, CA-BUT-198/H and CA-BUT-383/H, at Lake Oroville. Analytical studies: Lithic analysis, faunal and floral remains, bedrock features, obsidian hydration and sourcing, radiocarbon dating, bead analysis, historic artifacts. Research Issues: Chronology; Settlement Patterns and Interaction Spheres; Subsistence Intensification and Climate Change; Social Evolution and Complexity.	
Report	Delacorte, Michael G.	2015	Data Recovery Investigations at CA-BUT-362/H, Locus A-B, Lake Oroville, Butte County, California	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory, History	Data recovery at CA-BUT-362/H at Lake Oroville. Analytical studies: Lithic analysis, faunal and floral remains, obsidian hydration and sourcing, radiocarbon dating, bead analysis, historic artifacts. Research Issues: Chronology; Settlement Patterns and Interaction Spheres; Subsistence Intensification and Climate Change; Social Evolution and Complexity.	
Report	Delacorte, Michael G.	2015	Archaeological Assessment of CA-BUT-2282, CA-BUT-2285, and CA-BUT-2535 on the Western Shore of Lake Oroville, Butte County, California	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory, History	Assessment of CA-BUT-2282, CA-BUT-2285, and CA-BUT-2535 at Lake Oroville. Analytical studies: Lithic analysis, floral remains, bedrock features, obsidian hydration and sourcing, historic artifacts. Research Issues: Chronology; Settlement Patterns and Interaction Spheres; Subsistence Intensification and Climate Change; Social Evolution and Complexity.	
Report	Delacorte, Michael G., and Kenneth R. Bethard	2015	Archaeological Assessment of the Prehistoric Component at CA-BUT-199/H at the Craig Saddle Campground, Butte County, California	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory, History	Assessment of CA-BUT-199/H at Lake Oroville. Analytical studies: Lithic analysis, faunal and floral remains, mussel shell analysis, obsidian hydration and sourcing, historic artifacts. Research Issues: Chronology; Settlement Patterns and Interaction Spheres; Subsistence Intensification and Climate Change; Social Evolution and Complexity.	
Report	Delacorte, Michael G., and Mark E. Basgall	2006	Archaeological Assessment of Seven Prehistoric Loci at CA-BUT-362/H at McCabe Creek, Butte County, California	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory	Assessment of CA-BUT-362/H. Analytical studies: Lithic analysis, obsidian sourcing and hydration, faunal remains, paleobotanical remains, Research issues: Chronology; Settlement patterns; Subsistence and climate change; Social evolution.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Delacorte, Michael G., Kenneth R. Bethard, William L. Norton, Bridget R. Wall, David W. Glover, and Michelle D. Noble	2012	Archaeological Assessment of Thirteen Class 6 Sites at Lake Oroville, Butte County, California	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory	Assessment of 13 sites at Lake Oroville: CA-BUT-362/H, CA-BUT-2216, CA-BUT-2281, CA-BUT-2317, CA-BUT-2321, CA-BUT-2406, CA-BUT-2409, CA-BUT-2433, CA-BUT-2437, CA-BUT-2444, CA-BUT-2485, CA-BUT-2991. Analytical studies: Lithic analysis, faunal and floral remains, bedrock features, obsidian hydration and sourcing. Research Issues: Chronology; Settlement Patterns and Interaction Spheres; Subsistence Intensification and Climate Change; Social Evolution and Complexity.	P-04-002485
Report	Delacorte, Michael G., William E. Larson, and Kenneth R. Bethard	2014	Archaeological Assessment of Three Sites (CA-BUT-328/H, CA-BUT-522, CA-BUT-2528/H) near the Enterprise Boat Ramp, Lake Oroville, Butte County, California	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory, History	Assessment of three sites, CA-BUT-328/H, CA-BUT-522, and CA-BUT-2528/H, at Lake Oroville. Analytical studies: Lithic analysis, faunal and floral remains, bedrock features, obsidian hydration and sourcing, basalt sourcing, historic artifacts. Research Issues: Chronology; Settlement Patterns and Interaction Spheres; Subsistence Intensification and Climate Change; Social Evolution and Complexity.	
Report	Deur, Douglas	2003	Final Report: Traditional Cultural Properties and Sensitive Resource Study, Klamath Tribes	-	UK	Ethnography	Traditional Cultural Properties (TCP) and Sensitive Resource Study for the Klamath tribe. Includes ethnographic interviews. TCP were identified from among the numerous traditional salmon fishing sites and arguments for NRHP.	
Article	Dillon, B.D. and D.W. Murphy	1994	A Fluted Point from Thomes Creek, Tehama County, California	Tularg Newsletter 7(3):2-6	SV	Prehistory	Discovery of a fluted point from Thomes Creek, Tehama County.	
Report	Dillon, Brian	1994	Historical Background for the De Vilbiss Ranch, Mendocino, California	-	CR	History	Early history of De Vilbiss Ranch and Mendocino County.	
Report	Dittus, Lotus E.	1969	Summary of Excavation: The Ladd Site 4-SHA-222	California State University, Chico	SV	Prehistory	Excavations at the Ladd Site, CA-SHA-222, in Redding. The report is a summary of excavation results and soil observations. Research issues: Shasta Complex.	
Book	Dixon, Roland B.	1902	The Huntington California Expedition—Maidu Myths	Bulletin of the American Museum of Natural History 17.2	SN	Ethnography	Ethnography of Maidu myths.	
Book	Dixon, Roland B.	1905	The Huntington California Expedition—The Northern Maidu	Bulletin of the American Museum of Natural History 17.3	SN	Ethnography	Ethnography of the Northern Maidu.	
Book	Dixon, Roland B.	1907	The Shasta	Bulletin of the American Museum of Natural History	UK	Ethnography	Ethnography of the Shastan tribe.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Docken, Robert, A. Hurtado, M. Lortie, C. Litzinger, P. Howard, and D. Felton	1982	A Cultural Resource Overview for the Mendocino National Forest and the East Lake Planning Unit, BLM, California, Volume II: History	California Archaeological Consultants, Inc., Woodland, California	CR	History	Historical overview presented by events/developments rather than time periods: early land use, transportation, mining, health and "pleasure seekers," government regulation. Presents a predictive model and discussion of historical site types.	
Report	Dondero, Steven B., and Jerald J. Johnson	1988	Cottonwood Creek Project, Shasta and Tehama Counties, California: Dutch Gulch Lake, Excavations at Six Prehistoric Sites	US Army Corps of Engineers, Sacramento, California, and Shasta-Trinity National Forests, Redding, California	SV	Prehistory	Evaluation of CA-SHA-290/H, CA-SHA-291/H, CA-SHA-294, CA-SHA-1144/H, CA-SHA-1158 and CA-TEH-748 at Dutch Gulch Lake. See also Johnson 1988	
Report	Dotta, James	1964	Excavation of 4-SHA-237, the Duncan Ranch, Shasta County, California	-	SV	Prehistory	Salvage archaeology of CA-SHA-237, Duncan Ranch, including 27 burials. Discusses mortuary practices. Analytical studies: Lithic analysis; human remains, burial artifacts (shell pendants, beads, bone tools).	
Report	Dotta, James	N.D.	Report on Shasta 162	-	SV	Prehistory	Salvage archaeology at site "Shasta 162". Report focuses on recovered human burials.	
Report	Dotta, James, and R. Hullinger	1964	The Salvage Archaeology of a Wintu Fishing Station, SHA-207, Shasta County, California	Redding Museum and Art Center, Redding, California	SV	Prehistory	Salvage archaeology of CA-SHA-207, including 46 burials. Analytical studies: Human remains, lithic analysis, faunal analysis, historic artifact assemblage.	
Article	Douglass, Robert G	2006	Transportation Development along the Feather River	Proceedings from the Society for California Archaeology annual meeting 19:83-89	SN	History	Focus on mule packing and ferry crossing historic-era transportation for the Lake Oroville sites on the Big Bend Mule Trail (CA-BUT-1864H) and the Oroville Ferry crossing (CA-BUT-69/H and -584/H).	
Thesis	Dreyer, William R.	1984	Prehistoric Settlement Strategies in a Portion of the Northern Sacramento Valley, California	M.A. Thesis, California State University, Chico	SV	Prehistory	Thesis study on the settlement strategies in the Northern Sacramento Valley. Discusses ethnographic village location analysis, archaeological site location analysis, and artifact and faunal analyses. Research issues: Optimal Foraging theory and Settlement strategies.	
Article	Drucker, P.	1937	The Tolowa and their Southwest Oregon Kin	University of California Publications in American Archaeology and Ethnology 36(4):221-299	CR	Ethnography	Ethnography of the Tolowa tribe.	
Article	DuBois, C.A.	1935	Wintu Ethnography	University of California Publications in American Archaeology and Ethnology 36(1):1-148	KM, SV	Ethnography	Ethnography of the Wintu tribe.	
Thesis	Dugas, Michael	1995	Ethnolinguistic Boundaries at the Maidu Frontier: A Stylistic Analysis of Projectile Points	M.A. Thesis, California State University, Chico	SN	Prehistory, Ethnography	Discussion of ethnolinguistic boundaries at the Maidu Frontier (Maidu and Yana tribes) through projectile point analysis.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Article	Dugas, Michael, Amy Huberland, and Robert Weaver	2014	Yuki Settlement on the Black Butte River Revisited	Proceedings from the Society for California Archaeology annual meeting 28:26-42	KM	Prehistory	Reexamination of the Black Butte River sites which challenge previously held settlement models.	
Book	Dugas, Michael, Diane Watts, Jamie Moore, Jim Johnston, Chris O'Brien, and Wally Woolfenden	2001	Black Rock and Beyond: A Decade of Archaeological Test Excavations in Yahi Territory	Lassen National Forest and Mountain Heritage Associates	SCF	Prehistory	Evaluation of CA-TEH-710, CA-TEH-199, CA-TEH-620, CA-TEH-562, CA-TEH-684, CA-TEH-1767, CA-TEH-1822, CA-TEH-200, CA-TEH-704, CA-TEH-293. Analytical studies: Lithic analysis, Faunal remains, historic artifact assemblages, obsidian sourcing and hydration, radiocarbon data, dental increment analysis, macrobotanical remains, pollen remains. Research issues: Chronology; Settlement and resource acquisition.	
Thesis	Edwards, Robert L.	1966	The Prehistory of the Pui'mak Wintun, Thomes Creek, Tehama County, California	M.A. Thesis, University of California, Davis	SV	Prehistory, History	Thesis study of the Pui'mak Wintun including CA-TEH-256, CA-TEH-261, and CA-TEH-262. Analytical studies: Artifact descriptions, hydrogen-ion analysis. Research issues: Argues a prehistoric chronological model for the northern Sacramento Valley.	
Paper	Edwards, Robert L.	1966	An Archaeological Survey of the Yuki: Etsel-Franciscan Reservoir Region, Mendocino County, California	Unpublished student paper in Department of Anthropology, San Francisco State College	CR	Prehistory	Archaeological inventory of the Etsel-Franciscan Reservoir Region.	
Thesis	Eidsness, Janet P.	1985	Prehistoric Archaeology Within Chimariko Territory, Northwest California	M.A. Thesis, California State University, Sonoma	KM	Prehistory	Synthesis of prehistoric Chimariko territory. Survey and recordation of 118 prehistoric sites, six excavated. Research Issues focus on the development of temporally significant projectile point typology.	
Report	Eidsness, Janet P.	1986	Archaeological Data Recovery at CA-MEN-320/643 for the Proposed Black Butte Bridge, Mendocino National Forest	Cultural Resources Facility, Anthropological Studies Center, Sonoma State University, Rohnert Park, California	KM	Prehistory	Excavation at CA-MEN-320/643 at Black Butte Bridge. Analytical studies: Lithic analysis, obsidian hydration and sourcing, and faunal remains. Research issues: Space/time; Diachronic subsistence/settlement patterns; Interaction/exchange systems.	
Report	Eidsness, Janet P.	1993	Archaeological Investigations at CA-HUM-351/H on Humboldt Bay, California for the Arcata Community Park and Sports Complex	Report on File, Northwest Information Center, Sonoma State University, Rohnert Park, California	CR	Prehistory, History	Investigations at CA-HUM-351/H on Humboldt Bay. Analytical studies: Lithic analysis, obsidian hydration and sourcing, faunal remains, opal analysis, shell remains, shell bead, and historic artifacts. Research issues: Time/Space systematics; Diachronic subsistence/Settlement Pattern Models; Interaction/exchange systems.	
Report	Elliott, Daniel R.	1990	Historical Archaeology at the Tate Creek Logging Camp, CA-SIS-1535H, of the McCloud River Lumber Company, Siskiyou, California	US Department of Agriculture, Forest Service	UK	History	Tate Creek Logging Camp (CA-SIS-1535H/ FS 05-14-61-315). Discusses structure and artifact descriptions, and follows the Regional Railroad Logging Research Design (Tamez et al. 1988) focusing within the social/cultural realm.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Thesis	Elliott, Daniel R.	1995	Foodways and Economic Systems on the Late California Gold Rush Frontier	M.A. Thesis, California State University, Chico	SN	History	"Forks of Butte" (CA-BUT-854/H) a Gold Rush Era settlement from late 1850- early 1860. Discusses the site's historic artifact assemblage. Research Issues: Is the archaeology of Structure 2 consistent with the historic information? What was the range of food and beverage products commercially? What types of food and beverage containers were common for specific products? Supplied food, beverages and other goods to urban populations.	CA-030-0400
Article	Elsasser, A. B.	1981	Notes on Yana Ethnobotany	Journal of California and Great Basin Anthropology 3(1):69-77	SCF	Ethnography	A list of plants collected in Tehama County before 1914 by T.T. Waterman (1914-1918) was discovered at U.C. Berkeley. This was combined with C.H. Merriam (1979) field check list to form a partial summary of plant usages by the Yana.	
Report	Elsasser, Albert B. and Robert F. Heizer	1966	Excavations of Two Northwestern California Coastal Sites.	In Excavation of Two Northwestern California Coastal Sites & The Pistol River Site of Southwest Oregon pp.1-149. University of California Archaeological Survey Reports	CR	Prehistory	Excavation at CA-HUM-118 (Patrick's Point) and CA-HUM-169 (Tsurai). Includes both site reports with artifact inventory and descriptions.	
Report	Emberson, Geri	2000	Ethnographic Overview and Traditional Use Study of American Indian Affiliations Within the Whiskeytown National Recreation Area, California	National Park Service	SV	Ethnography	Ethnographic overview and traditional use study of Whiskeytown National Recreation Area. Literature review, Ethnographic overview and data, historic overview, environmental overview of Klamath, Mountain Province, Cascade Range Province and Central Valley Province. Research Issues: Ethnographic subsistence: Gathering, Hunting, Fishing; Material culture; Trade.	
Thesis	Eugster, Susan E.	1990	Freshwater Mussel Utilization at a Late Prehistoric Period Archaeological Site (CA-BUT-12) in the Northern Sacramento Valley, California	M.A. Thesis, California State University, Chico	SV	Prehistory	-	
Report	Farber, Alfred	1980	Espee Archaeological Test Excavations Near the Crest of the North Coast Ranges, Mendocino County, California	-	CR	Prehistory	-	
Report	Farber, Alfred	1982	Archaeological Data Recovery At Site CA-TEH-962, Mendocino National Forest	-	KM	Prehistory	Data recovery at CA-TEH-962. Analytical studies: Lithic analysis, obsidian hydration and sourcing, pollen analysis. Research issues: Temporal components; Relationship to Nomlaki and Yuki ethnography; Site function; Nomlaki vs Yuki lithic; Subsistence strategies; Trade relationships; Ground stone implications.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Farber, Alfred	1985	Alternative Approaches to the Shasta Complex and Adjacent Expressions: Assemblages, Cultural Ecology, and Taxonomies	Journal of California and Great Basin Anthropology 7(1):1-36	SV	Prehistory		CA-030-0206
Report	Farber, Alfred, and N. Neuenschwander	1983	Archaeological Test Excavation at Prehistoric Site CA-TRI-327, Trinity County, California	-	KM	Prehistory	Test excavations at CA-TRI-327. Analytical studies: Lithic analysis, plant remains, faunal, obsidian hydration and sourcing. Research issues: Regional settlement patterns.	
Report	Farber, Alfred, and N. Neuenschwander	1984	Archaeological Test Excavation at the Fay Hill Site, CA-SHA-1481, Shasta County , California	Professional Archaeological Services, Paradise, California	SV	Prehistory, History	Test excavations at CA-SHA-1481, outside of Redding. Analytical studies: Lithic analysis, beads, historic artifacts, faunal analysis, obsidian hydration and sourcing, radiocarbon data, botanical identification. Research issues: Subsistence; Trade/exchange; Technology; Settlement patterns.	CA-030-0206
Report	Farber, Alfred, Eric W. Ritter, and P. Jensen	1985	Archaeological Data Recovery at site CA-SHA-782, Shasta County, California	Jensen & Associates, Chico, California	SV	Prehistory	Data recovery at the Dotta Site (CA-SHA-782). Analytical studies: Lithic analysis, obsidian hydration and sourcing, faunal (bone and shell remains), human teeth, botanical remains. Research issues: Chronology; technological development; Subsistence and settlement; Trade/exchange; Sociopolitical organization; Religious/ceremonial complexity.	
Article	Farris, Glenn J.	1990	Vigesimal Systems Found in California Indian Languages	Journal of California and Great Basin Anthropology 12(2):173-190	CR, KM, UK, SCF, SN, SV	Ethnography	Farris attempts to define California Languages using vigesimal systems. He splits the examples into Northern and South California, and by tribal regions.	
Report	Fentress, Jeffrey B.	1997	Archaeological Investigations of 15 Prehistoric Sites at Meiss Lake, Butte Valley, California	Klamath National Forest	UK	Prehistory	Investigations at 15 sites at Meiss Lake: CA-SIS-845, CA-SIS-1701, CA-SIS-1703, CA-SIS-1705, CA-SIS-1706, CA-SIS-1708, CA-SIS-1709, CA-SIS-1710, CA-SIS-1711, CA-SIS-1712, CA-SIS-1713, CA-SIS-1714, CA-SIS-1715, CA-SIS-1716, and CA-SIS-1717. Analytical studies: Lithic analysis, obsidian hydration and sourcing, radiocarbon dating, fauna and flora remains. Research issues: Chronology; Lithic technology; Raw material procurement patterns and trade; Site function and land-use.	
Report	Fentress, Jeffrey B.	2002	The Archaeology of Butte Valley, Siskiyou County, California	Ph.D. Dissertation, University of Oregon	UK	Prehistory	A prehistoric sequence of Butte Valley based on data from 48 archaeological sites. Analytical studies: Projectile points, lithic technology, obsidian hydration and sourcing, Research issues: Chronology; lithic technology; raw material procurement; and land use.	
Article	Ferneau, Jennifer A.	1989	Radiocarbon Dates from Sinkyone Wilderness State Park: Variability and Concordance	Proceedings from the Society for California Archaeology annual meeting 2:9-17	CR	Prehistory	Radiocarbon samples from CA-MEN-2139 at Whale Gulch.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Book	Fiorini-Jenner, Gail L., and Monica Jae Hall	2002	Western Siskiyou County, Gold and Dreams	Arcadia Publishing, San Francisco, California	UK	History	History of early settlement in Western Siskiyou County.	
Article	Fitzgerald, Richard T., and Vicki Ozaki	1994	Splish, Splash, and Crash: Geological Implications on the Coastal Archaeological Record of Northwest California	Proceedings from the Society for California Archaeology annual meeting 7:95-103	CR	Prehistory	Geologic setting of the north coast of California and the relationship with the archaeological record.	
Article	Fitzgerald, Richard T., Jr., and William R. Hildebrandt	2002	Will the True Age of the Borax Lake Pattern Please Stand Up? The Archaeology of CA-HUM-573, an Early Holocene Site on the South End of Pilot Ridge, Humboldt County, California	Proceedings from the Society for California Archaeology annual meeting 15:1-7	KM	Prehistory	Radiocarbon data from CA-HUM-573 (Pilot Ridge) providing Early Borax lake pattern dates.	
Report	Flynn, Katherine, and W. Roop	1975	Archaeological Testing of 4-Hum-245 and 4-Hum-246, Pine Ridge, Humboldt County, California: High Altitude Seasonal Camps near Hupa Mountain, Humboldt County	-	KM	Prehistory	Testing at CA-HUM-245 and CA-HUM-246. Research objectives include high altitude seasonal camps and site and tool functionality.	CA-HUM-0245, CA-HUM-0246
Report	Forbes, Kari L.	1990	An Ethnographic Study of the Contemporary Values of the Foothill Konkow, Butte County, California	California State University, Chico	SN	Ethnography	Contemporary values of the Foothill Konkow including environmental background, ethnohistory, and ethnogeography.	
Report	Foster, Amy E.	1982	The Salvage Excavation of a Portion of CA-SHA-501, Shasta County, California	-	SV	Prehistory, History	Excavation results of CA-SHA-501 in Redding. Discusses lithic artifact descriptions, shell remains, bone and bone tools, historic artifacts, human remains. Research issues: The Shasta complex.	
Book	Foster, Daniel G. and John W. Foster	2002	Slakaiya Rock (CA-TRI-1): A Rediscovered Petroglyph Site Near the Eel River, Trinity County, California	-	KM	Prehistory	Examination of CA-TRI-1, Slakaiya Rock, a petroglyph site.	
Article	Foster, John W.	2000	Ajumawi Fish Traps: Harvesting and Managing Suckers in the Springs of the Pit River Drainage	Proceedings from the Society for California Archaeology annual meeting 15:66-93	SCF	Prehistory, Ethnography	Examination of stone fish traps at Big Lake in Shasta County.	
Thesis	Fredrickson, David A.	1973	Early Cultures of the North Coast Ranges	Ph.D. Dissertation, University of California, Davis	CR	Prehistory	Ph.D. dissertation discussing the cultural sequence, specifically the Houx Pattern, in the North Coast Ranges.	
Chapter	Fredrickson, David A.	1984	The North Coastal Region	In California Archaeology, edited by Michael J. Moratto 471-527. Academic Press, New York	CR	Prehistory	Discussion of Northwest Coast, Eel River, and Russian River archaeology. Includes cultural and settlement patterns, language and local sequences.	
Report	Garfinkel, Alan P.	1982	Archaeological Investigations at Hotinakcohata, A Chimariko Village at Cedar Flat, Trinity County, California	California Department of Transportation, Sacramento, California	KM	Prehistory	Evaluation of CA-TRI-438, Cedar Flat also known as Hotinakcohata. Analytical studies: Lithic analysis, historic artifact assemblage, faunal analysis, obsidian sourcing and hydration. Research issues: Chronology; Site function; Obsidian sources.	
Report	Garibaldi, Julie, and William R. Hildebrandt, ed.	2007	Data Compendium for Life on the River—History of the Wintu People as seen from Archaeological Site CA-SHA-1043, Kum Bay Xerel (Shady Oak Village)	Far Western Anthropological Research Group, Inc., Davis, California	SV	Prehistory	Data compendium for a large-scale excavation at CA-SHA-1043, south of Redding.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Chapter	Garth, T. R.	1978	Atsugewi	In California, edited by Robert F. Heizer, pp. 236-243. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	SCF	Ethnography	Discussion of the Atsugewi culture.	
Paper	Gary, Mark and Deborah McLear-Gary	1988	The Keystone Petroglyph Site (CA-MEN-2200)	Paper presented at the 22nd annual meeting of the Society for California Archaeology	CR	Prehistory	Society of California Archaeology annual meeting paper presentation on Mendocino county petroglyph sites including the Keystone Petroglyph site (CA-MEN-2200), the Spyrock Road site (CA-MEN-1912), and the Feliz Creek site (CA-MEN-793).	
Thesis	George, Julia	1981	Faunal Analysis of CA-SHA-266	M.A. thesis, California State University, Chico	SV	Prehistory	Faunal Analysis at CA-SHA-266.	
Article	Gifford, Edward W.	1939	Coast Yuki	Anthropos 34:292-375 (Reprinted: Sacramento Anthropological Society Papers 2, Sacramento State College, 1965)	CR	Ethnography	Ethnography of the Coast Yuki tribe.	
Other	Gifford, Edward W.	1940	Karok Field Notes, Part 2	Department and Museum of Anthropology, University of California, Berkeley. Manuscript #179 on file at Bancroft Library, Berkeley	CR	Ethnography	Ethnographic field notes on the Karok tribe.	
Article	Gifford, Edward W., and Stanislaus Klimek	1939	Culture Element Distribution, IV: Yana	University of California Publications in American Archaeology and Ethnology 37(4):117-254	SCF	Ethnography	Ethnography of the Yana tribe.	
Chapter	Gilreath, Amy J.	2007	Rock Art in the Golden State: Pictographs and Petroglyphs, Portable and Panoramic	In California Prehistory: Colonization, Culture and Complexity pp. 273-288, edited by Terry L. Jones and Kathryn A. Klar. Altamira Press, Blue Ridge Summit, Pennsylvania	KM, UK	Prehistory	Discussion of California rock art through the prehistoric and ethnographic record.	
Thesis	Gleason, Susan Marie	2001	In Search of the Intangible: Geophyte Use and Management Along the Upper Klamath River Canyon	Ph.D. Dissertation, University of California, Riverside	UK	Prehistory	Comprehensive review of geophyte use in southern Oregon and northern California with an emphasis placed on the archaeological signatures of this activity.	
Article	Goddard, Pliny Earle	1903	Life and Culture of the Hupa	American Archaeology and Ethnology 1(1):1–88. Berkeley	CR	Ethnography	Hupa ethnography on the Hoopa Valley Reservation from 1897-1900.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Goetter, Karin L., Mark K. Walker, Makr D. Selverston	2014	Parish Camp Saddle Dam Limekiln and Quarry (CA-BUT-621H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-621H, the Parish Camp Saddle Damn Limekiln and Quarry, located on the West Branch Feather River. The technical report discusses the site history and evaluation of the site, a 19th century quarry and limekiln operation.	
Chapter	Goldschmidt, W.	1978	Nomlaki	In California, edited by Robert F. Heizer, pp. 341-349. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	CR, KM, SV	Ethnography	Ethnography of the Nomlaki people.	
Book	Golla, Victor	2011	California Indian Languages	University of California Press	CR, KM, UK, SCF, SN, SV	Prehistory	Inventory and descriptions of California Indian languages.	
Book	Golomshtok, Eugene	1922	Tehama County Mounds	Phoebe Hearst Museum of Anthropology, Berkeley, California	SV	Prehistory	Brief field notes describing mound sites observed in Tehama County	
Book	Gould, Richard A.	1966	Archaeology of the Point St. George Site and Tolowa Prehistory	University of California Publications in Anthropology	CR	Prehistory	Monograph of field work carried out at Point St. George with Tolowa members.	
Report	Gray, Robert E.	1980	Inventory and Historical Overview of the Railroad Systems in the Mother Lode Sierra Mountain Range, California	California State University, Sacramento	SN, SV	History	Synthesis of California railroad systems of the Mother Lode Sierra Mountain Range. Sacramento Valley Railroad, Nevada County Narrow Gauge, Sierra Railroad, Hetch Hetchy Valley Railroad, Sugar Pine Railroad, Yosemite Shortline, Hetch Hetchy Railroad, Logging Railways etc.	
Thesis	Greenway, Gregory	1982	Projectile Point Variability at Dead Man's Cave, CA-TEH-290, in the Southern Cascade Mountains of Northeastern California	M.A. Thesis, California State University, Sacramento	SCF	Prehistory	Thesis study on CA-TEH-290, Dead Man's Cave. Discusses the statistical analysis of projectile points. Research issues: Projectile point typology; Cultural-temporal complex markers.	
Article	Greenway, Gregory	2004	Seasonality and Site Function at Dead Man's Cave (CA-TEH-290)	Proceedings from the Society for California Archaeology annual meeting 17:123-132	SCF	Prehistory	Focus on dental increment and macro-botanical data of CA-TEH-290 (Dead Man's Cave) rock shelter to describe seasonality and site function within Yahi and Yana settlement and subsistence models.	
Report	Greenway, Marlene L., Beth Elstien, and Eric W. Ritter	2015	The Buckskull site, CA-HUM-718: An Upland Middle Period Chert Processing Camp	Bureau of Land Management, Arcata, California	KM	Prehistory	Evaluation of CA-HUM-718, the Buckskull site, chert processing camp. Analytical studies: Lithic analysis, obsidian hydration and sourcing.	
Report	Greenwood, Roberta, and Laurence Shoup	1984	Archaeological Investigations in the Sacramento River Canyon, Vol. II: Archaeological Testing and Historical Research at CA-SHA-1176	INFOTEC Development, Inc., Hillsdale, California	SV	History	A detailed look at how a community (Dog Creek/Dogtown) developed from mining camp to crossroads/waystation to townsite. Discussion of the development of the Sacramento River Canyon as a transportation route, and of theoretical models of “different types of societies which existed in California during the past 200 years”: Dependency, Self-Sufficiency, and Metropolitan.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Hamusek, Blossom	1988	The Stratigraphy and Archaeology at CA-TEH-1490: A Hunting Camp in Yana Territory, Northern California	Archaeological Research Program, California State University, Chico	SCF	Prehistory	Evaluation of CA-TEH-1490 in Yana Territory. Analytical studies: Stratigraphy, faunal remains, macrobotanical remains, lithic analysis, obsidian sourcing and hydration. Research issues: Areal extend of the site; Stratigraphic integrity; Cultural affiliation and chronology; Population replacement.	
Book	Hamusek, Blossom	1993	Archaeological Investigations at CA-SIS-1608, McCloud Station Site, Siskiyou County, California	CDF Archaeological Reports 8	UK	Prehistory	Evaluation of CA-SIS-1608. Analytical studies: Obsidian sourcing and hydration, lithic analysis, macrobotanical remains, Research issues: Procurement patterns; Obsidian characteristics; Areal extent and depth of the deposit; Site function; Chronology; Buried site potential.	
Report	Hamusek, Blossom	1993	Archaeological Investigations at CA-SIS-1643, CA-SIS-1646, and CA-SIS-1647, Butte Valley Wildlife Area, Siskiyou County, California	Archaeological Research Program, California State University, Chico	UK	Prehistory	Investigations at CA-SIS-1643, CA-SIS-1646, and CA-SIS-1647 in Butte Valley Wildlife Area. Analytical studies are limited to lithic analysis and stratigraphic observations.	
Report	Hamusek, Blossom	1996	A Cultural Resource Survey of the Bend Area, Tehama County, California	Cultural Resources Publications: Archaeology, Bureau of Land Management, Redding, California	SCF	History	Archaeological survey on the west side of the Sacramento River. Sixteen prehistoric sites (CA-TEH-1624, CA-TEH-1625, CA-TEH-1626, CA-TEH-1627, CA-TEH-1628, CA-TEH-1629, CA-TEH-1631, CA-TEH-1632, CA-TEH-1633, CA-TEH-1634, CA-TEH-1635, CA-TEH-1637, CA-TEH-1639, CA-TEH-1640, CA-TEH-1641, and CA-TEH-1642) one historic (CA-TEH-1623H), and three multicomponent sites (CA-TEH-1630/H, CA-TEH-1636/H, and CA-TEH-1638/H). Research issues: Culture history/chronology; Settlement pattern and subsistence strategies; lithic procurement strategies; Historic research.	
Report	Hamusek, Blossom, and Jeff Haney	2001	Archaeological Investigations for A'-chit'-ter-rah'kah - a Portion of CA-SIS-329 along the Klamath River in Siskiyou County, California. Phase II Investigation and Determination of Eligibility	Caltrans, District 2, Redding, California	UK	Prehistory	Excavations at CA-SIS-329. Analytical studies: Artifact analysis, faunal/floral remains, obsidian hydration. Research Issues: Settlement and subsistence systems; Technology; Trade and exchange.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Hamusek, Blossom, Eric W. Ritter, and Julie Burcell	1997	Archaeological Explorations in Shasta Valley, California	Cultural Resources Publications: Archaeology, Bureau of Land Management, Redding, California	UK	Prehistory, History	Inventory of 4,300 acres in eastern Shasta Valley, with surface collections and limited site testing (40 prehistoric, four historic sites). Analytical studies: Projectile point analysis, lithic analysis, obsidian hydration, historic artifacts. Research issues: History and chronology; Settlement, subsistence and economics; Lithic technology and procurement; Exploration and transportation; Livestock management. (also listed in Part II as FY1997-18)	CA-030-0144, CA-030-0242, CA-030-0325, CA-030-0326, CA-030-0328, CA-030-0329, CA-030-0330, CA-030-0331, CA-030-0668, CA-030-0671, CA-030-0672, CA-030-0673, CA-030-0674, CA-030-0675, CA-030-0676, CA-030-0677, CA-030-0678, CA-030-0679, CA-030-0680, CA-030-0681, CA-030-0682, CA-030-0683, CA-030-0684, CA-030-0685, CA-030-0686, CA-030-0689, CA-030-0690, CA-030-0691, CA-030-0692, CA-030-0693, CA-030-0695, CA-030-0696, CA-030-0697, CA-030-0698, CA-030-0699, CA-030-0700, CA-030-0701, CA-030-0702, CA-030-0703, CA-030-0705, CA-030-0707, CA-030-0708, CA-030-0709, CA-030-0711

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Thesis	Hamusek-McGann, Blossom	1993	What X Equals: The Archaeological and Geological Distribution of "Source X" Tuscan Obsidian in Northern California	M.A. Thesis, California State University, Chico	SCF, SV	Prehistory	Comprehensive review of the Tuscan quarry complex, tracing the distribution of natural occurrences of the stone and how it was processed and used by prehistoric peoples.	
Article	Hamusek-McGann, Blossom	1995	The Tuscan Obsidian Source of Northern California: Archaeological Implications and Geochemical Variability	Proceedings from the Society for California Archaeology annual meeting 8:13-32	SCF, SV	Prehistory	Obsidian characterization of the Tuscan obsidian source concluding in two new identifiable geochemical groups.	
Article	Hamusek-McGann, Blossom, Eric Ritter, and Julie Burcell	1998	Living on the Edge: Archaeological Signatures of the Eastern Shasta Valley Foothills, Siskiyou County, California	Proceedings from the Society for California Archaeology annual meeting 11:102-111	UK	Prehistory	A summary of "Archaeological Explorations in Shasta Valley, California" (see).	
Report	Hamusek-McGann, Blossom, Sandra S. Flint, Melinda Peak, and Barry A. Price	1999	Evaluation of 18 Historic Mines in the Whiskeytown Unit, Whiskeytown-Shasta-Trinity National Recreation Area, Shasta County, California	Applied EarthWorks, Inc.	KM	History	National Register evaluations of 18 historic-era mining resources in the Whiskeytown-Shasta-Trinity National Recreation Area near Redding, including the Mount Shasta Mine (CA-SHA-2145H), the Oro Fino Mine (SHA-2139/H), the Monitor Mine (SHA-2704H), the Desmond Mine (SHA-2700H), and the Ganim Mine (SHA-2702H). Multiple resources - ditches and canals, roads, buildings, shafts and adits, etc. - considered as elements of a larger “historical mining landscape.” Recommends consideration of a National Register historic district.	
Book	Hannon, Nan and Richard K. Olmo (eds.)	1990	Living with the Land: The Indians of Southwest Oregon	Proceedings of the 1989 symposium on the Prehistory of Southwest Oregon, Southern Oregon Historical Society		Prehistory	Proceedings of the 1989 symposium on the Prehistory of Southwest Oregon. Contributing authors include Melvin Aikens, Nan Hannon, Joanne Mack, Brian O'Neill, S. Edward Clewett and Elaine Sundahl, Richard Hughes, Thomas Connolly, Richard Pettigrew, Donn Todt, Henry Lewis, Kenneth Liberman, Jeff LaLande, Reg Pullen, Robert Winthrop, Shirley Silver, Betty Hall, Sue Shaffer, George Fence, and Lynn Schonchin.	
Chapter	Hawgood, John A.	1958	The Pattern of Yankee Infiltration in Mexican Alta California, 1821-1846	In Pacific Historical Review 27(1):27-37. University of California Press	CR, KM, UK, SCF, SN	History	Paper evaluating the "Yankee Infiltration" of Alta California during the Mexican republic. Argument for using the term "Yankee infiltration" only for the Gold Rush era, post 1840.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Hayes, John, David A. Fredrickson, and Thomas M. Origer	1985	An Analysis of Redwood National Park Artifacts	Redwood National Park	CR, KM	Prehistory	Study on a series of 28 sites sponsored by the Redwood National Park. Analytical studies: Lithic analysis, obsidian studies. The 28 sites include: HUM-439, HUM-441, HUM-442, HUM-443, HUM-444, HUM-446, HUM-447, HUM-448, HUM-452, HUM-478, HUM-479, HUM-480, HUM-482, HUM-484, HUM-490, HUM-525, HUM-526, HUM-527, HUM-528, HUM-530, HUM-531, HUM-621, HUM-625, HUM-643, HUM-663, HUM-664, HUM-668, and HUM-685.	
Report	Heizer, Robert F., and A.B. Elsasser	1964	Archaeology of HUM-67, the Gunther Island Site in Humboldt Bay, California	University of California Archaeological Survey Reports pp.5-122	CR	Prehistory	Excavations at CA-HUM-67, the Gunther Island Site in Humboldt. Includes inventory of lithic artifacts, baked clay artifacts, bone and antler artifacts, shellfish artifacts, human burial descriptions.	
Book	Heizer, Robert F., and John E. Mills	1952	The Four Ages of Tsurai: a Documentary History of the Indian Village on Trinidad Bay	University of California Press, Berkeley and Los Angeles	KM	Prehistory, History	Prehistoric and historic use of the Trinidad Bay	
Book	Heizer, Robert F., and Theodora Kroeber	1979	Ishi the Last Yahi: A Documentary History	University of California Press. Berkeley & Los Angeles, California	SCF	Ethnography	Documents regarding Ishi and the Yahi Indians.	
Report	Heizer, Robert F., and Thomas R. Hester	1970	Shasta Villages and Territory	California Indian Library Collections	SV	Ethnography	Compilation of 156 Shasta and Karok village sites.	
Report	Hildebrandt, William R,. and Michael J. Darcangelo	2001	Phase II Excavation Report and Determination of Eligibility on CA-SHA-273/275 for the Middle Fork Cottonwood Creek Bridge Replacement Project on State Route 36, Near Platina, Shasta County, CA	Far Western Anthropological Research Group, Inc., Davis, California	SV	Prehistory	Excavation at CA-SHA-273/275 along State Route 36. Analytical studies: Lithic analysis, human remains, faunal and flora remains, obsidian sourcing and hydration, and radiocarbon data. Research issues: Chronological sequence development; Subsistence-settlement pattern change; Inter-regional exchange.	
Thesis	Hildebrandt, William R.	1981	Native Hunting Adaptations on the North Coast of California	Ph.D. Dissertation, University of California, Davis	CR	Prehistory	Dissertation study on hunting adaptations and construction of hunting models for the California north coast. Research issues: Oceangoing canoes; Mammal abundance; Hunting strategies; Social implications; Butchering patterns.	
Article	Hildebrandt, William R.	1984	Late Period Hunting Adaptations on the North Coast of California	Journal of California and Great Basin Anthropology 6(2):189-206	CR	Prehistory	Constructs a model for mammal exploitation and hunting technology/techniques on the California North Coast. Associated site include CA-DNO-11, CA-HUM-129, CA-HUM-118, CA-HUM-175, CA-HUM-176, CA-HUM-177, CA-HUM-277, CA-HUM-279, CA-HUM-281, CA-HUM-182, CA-HUM-184, CA-HUM-186, and CA-HUM-248.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Book	Hildebrandt, William R.	2007	Northwest California: Ancient Lifeways among Forested Mountains, Flowing Rivers, and Rocky Ocean Shores	In California Prehistory: Colonization, Culture and Complexity pp. 83-98, edited by Terry L. Jones and Kathryn A. Klar. Altamira Press, Blue Ridge Summit, Pennsylvania	CR	Ethnography	Synthesis of previous work, cultural patterns and research issues on California's northwest coast.	
Report	Hildebrandt, William R., and James M. Roscoe	2003	Cultural Resources Evaluation Report for Point St. George	Far Western Anthropological Research Group, Inc., Davis, California	CR	Prehistory	Survey results of CA-DNO-11 and CA-DNO-13 at Point St. George.	
Report	Hildebrandt, William R., and John F. Hayes	1983	Archaeological Investigations on Pilot Ridge, Six Rivers National Forest	Anthropological Studies Center, Sonoma State University, and Anthropological Research, San Jose State University	KM	Prehistory	Evaluation of CA-HUM-573, CA-HUM-367, CA-HUM-588, CA-HUM-595/H, CA-HUM-538, CA-HUM-553, CA-HUM-558, CA-HUM-605, CA-HUM-577, CA-HUM-546/H, on Pilot Ridge. Analytical studies: Lithic analysis, obsidian sourcing and hydration, soil analysis. Research issues: Intersite comparisons; Flaked stone manufacture and use patterns; Synthesis (temporal indicators, settlement patterns change).	
Report	Hildebrandt, William R., and John F. Hayes	1984	Archaeological Investigations on South Fork Mountain, Six Rivers and Shasta Trinity National Forests	Far Western Anthropological Research Group, Inc., Davis, California	KM	Prehistory	Data recovery of CA-HUM-678, CA-TRI-262, CA-TRI-240. Analytical studies: Lithic analysis, pollen analysis, obsidian hydration and sourcing, Research issues: Development of projectile point typology; Development of temporally/functionally artifact assemblages; Development of a diachronic subsistence-settlement pattern model; Development of a model of social interaction.	
Article	Hildebrandt, William R., and John F. Hayes	1993	Settlement Pattern Change in the Mountains of Northwest California: A View from Pilot Ridge	In There Grows a Green Tree: Papers in Honor of David A. Fredrickson, Center for Archaeological Research at Davis 11:107-120	KM	Prehistory	Summarizes excavations in the uplands of northwest California and proposes a settlement pattern model focused on the rise of sedentism based on acorn-salmon storage.	
Book	Hildebrandt, William R., and Micheal J. Darcangelo	2008	Life on the River: The Archaeology of an Ancient Native American Culture	Heyday Books	SV	Prehistory	Research summary of archaeological excavations of a Wintu occupation with evidence of the malaria epidemic.	
Chapter	Hildebrandt, William R., and Terry L. Jones	2004	Evolution of Marine Mammal Hunting: A View from the California and Oregon Coasts	In Prehistoric California: Archaeology and the Myth of Paradise, edited by L. M. Raab and Terry L. Jones, pp. 53-72. University of Utah Press, Salt Lake City	CR	Prehistory, Ethnography	Effects of prehistoric anthropomorphic caused seal and sea lion population depletion. (Originally published 1992 in the Journal of Anthropological Archaeology)	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Article	Hildebrandt, William R., and Valerie A. Levulett	1997	Middle Holocene Adaptations on the Northern California Coast: Terrestrial Resource Productivity and its Influence on the Use of Marine Foods	In The Archaeology of the California Coast During the Middle Holocene, J. Erlandson and M. Glassow (eds.), UCLA Institute of Archaeology Perspectives in California Archaeology 4:143-150	CR	Prehistory	Summarizes the middle Holocene archaeological record of northwest California, and proposes a hypothesis explaining why marine-focused economies developed earlier in southern California than they did in the north.	
Chapter	Hildebrandt, William R., and Valerie A. Levulett	2002	Late Holocene Emergence of Marine Focused Economies in Northwest California	In Catalysts to Complexity: Late Holocene Societies of the California Coast, J. Erlandson and T. Jones (eds.), pp. 303-319. Institute of Archaeology Perspectives in California Archaeology 6 , University of California, Los Angeles.	CR	Prehistory	Summarizes the late Holocene archaeological record of northwest California with an emphasis on the rise of maritime adaptations and stratified social organization.	
Report	Hildebrandt, William R., Jennifer Burns, James Roscoe, and Allika Ruby	2009	Report of the 2008 Archaeological Investigations Conducted at Tuluwat (CA-HUM-67/H), Humboldt County, California	Far Western Anthropological Research Group, Inc., Davis, California	CR	Prehistory	Recovery at Tuluwat (CA-HUM-67/H). Data limited to the artifact inventory.	
Report	Hildebrandt, William R., Julia Costello, and Michael Darcangelo	2006	Phase II Archaeological Evaluation of CA-SHA-1513/H, on Buzzard Roost Road, as Part of the Proposed Cedar Creek Bridge Replacement Project (Bridge 06C-238), Shasta County, California	Far Western Anthropological Research Group, Inc., Davis, California	SCF	Prehistory, History	Evaluation of CA-SHA-1513/H at Buzzard Roost Road. Analytical studies: Lithic analysis, faunal analysis, obsidian hydration and sourcing, historic artifacts, historic features. Research issues: Chronological ordering of the deposit; Subsistence-settlement pattern change, Inter-regional exchange.	
Report	Hildebrandt, William R., Michael Darcangelo and Trudy Vaughan	2005	Extended Phase I/Phase II Excavations and Determination of Eligibility on CA-SHA-571/H for the Sacramento River Bridge Replacement Project on Airport Road (Bridge #06C-0008), Near Anderson, Shasta County, California	Far Western Anthropological Research Group, Inc., Davis, California	SV	Prehistory, History	Evaluation of CA-SHA-571/H. Analytical studies: Obsidian sourcing and hydration, radiocarbon data, lithic analysis, flora, fauna and shellfish analysis, historical artifact assemblage. Research issues: Chronology; Subsistence-Settlement Pattern Change; Inter-regional Exchange.	
Report	Hildebrandt, William R., Michael Darcangelo, Mike Meyer, and Julia Costello	2005	Archaeological Evaluation (Phase II) Report for the Prehistoric and Historic-Period Components of Site CA-TEH-1262/H (P-52-001262) for the Proposed Bowman Bridge (#08C-0009) Replacement Project, Tehama County, California	Far Western Anthropological Research Group, Inc., Davis, California	SV	Prehistory, History	Testing at CA-TEH-1262/H. Analytical studies: Flake stone analysis, ground stone analysis, faunal and flora remains, shellfish remains, , human remains, radiocarbon dating, obsidian sourcing and hydration, projectile point chronology, historic-artifact summary. Research issues: Chronology; Subsistence-settlement pattern; Patterns of inter-regional exchange.	
Report	Hildebrandt, William R., Paul M. Brandy, Nathan E. Stevens, and Amy E. Foutch Porras	2015	Rock Features of South-Central Oregon and Northeastern California	Far Western Anthropological Research Group, Inc., Davis, California	UK, SCF	Prehistory	Classification system for rock feature types commonly found in south-central Oregon and northeastern California.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Article	Hill, Christine, and Christopher O'Brien	2003	Zooarchaeology at CA-TEH-984	Proceedings from the Society for California Archaeology annual meeting 16:29-35	SV	Prehistory	Evaluation of zooarchaeological remains from CA-TEH-984 in the Mendocino National Forest.	
Book	Hislop, Donald L. and Benjamin M. Hughes	2007	Tehama County Place Names	-	SV	History	Catalogue of names and places within Tehama County.	
Thesis	Hitchcock, Charles Richard	1998	Oroville, California, 1850-1870: A Study of Diversity in the California Mining Country	Ph.D. Dissertation, University of California, Berkeley	SV	History	Discussion of the "anthropology of the gold rush," including White attitudes toward Indian people and Overseas Chinese, and how these groups maintained their cultural identities while trying to fit into the cultural of the Euro-American majority. Many direct quotations from period newspapers and diaries.	
Report	Holson, John J.	1986	Data Recovery Excavations at CA-MEN-268, CA-MEN-320/643, and CA-MEN-321, Mendocino County, California	Anthropological Studies Center, Sonoma State University	KM	Prehistory, History	Data recovery at CA-MEN-268, CA-MEN-320/643, and CA-MEN-321. Analytical studies: Lithic analysis, obsidian hydration and sourcing, human remains, faunal remains, bead analysis (shell and glass), historic artifacts. Research issues: Space/Time systematics; Settlement/subsistence systems; Interaction/Exchange system.	
Book	Holt, Catharine	1946	Shasta Ethnography	Anthropological Records 3(4). University of California Press	KM, UK	Ethnography	Overview of Shasta ethnography based on Sargent Sambo (a Shasta of the Klamath River and chief) including habitat, material culture, social organization, religion, and conflicts.	
Thesis	Hotchkiss, Helen E.	1957	The Early History of Trinity County, California	M.A. Thesis, University of California	KM	History	History of Trinity County: Exploration of the Trinity Coast, land Expeditions and Gold Mining, History of Weaverville (Political and Social History, Chinese).	
Article	Huberland, Amy	1989	Etsel Ridge Archaeological Project: A Multi-Site Approach to Prehistoric Adaptation in the Middle Eel Uplands	Proceedings from the Society for California Archaeology annual meeting 2:19-34	KM	Prehistory	Settlement and subsistence for Etsel Ridge through obsidian sourcing and hydration data.	
Book	Huberland, Amy and Erin Dwyer	2001	Results of Archaeological Test Excavations at CA-SHA-1486, LaTour Demonstration State Forest	CDF Archaeological Reports 28	SCF	Prehistory	Test excavations at CA-SHA-1486 within LaTour Demonstration State Forest. Analytical studies: Obsidian sourcing and hydration, lithic analysis. Research issues: Chronology; Subsistence and Settlement; Flaked Stone Tool Production and Exchange Patterns.	
Article	Hudson, Travis	1981	To Sea or Not to Sea: Further Notes on the "Oceangoing" Dugouts of North Coastal California	Journal of California and Great Basin Anthropology 3(2):269-282	CR	Prehistory	"Expansive" arguments to Jobson and Hildebrandt (1980) on "oceangoing" canoes of north coast California.	
Article	Hughes, Richard E.	1978	Aspects of Prehistoric Wiyot Exchange and Social Ranking	Journal of California and Great Basin Anthropology 5(1):53-66	CR	Prehistory	Obsidian sourcing at CA-HUM-67 to determine geographic source of the raw material.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Article	Hull, Kathleen L., Elena Nilsson, and Michael S. Kelly	1992	Understanding Yana Prehistory: Application of Multiple Analyses	Proceedings from the Society for California Archaeology annual meeting 5:159-169	SCF	Prehistory	Evaluation of three sites (CA-SHA-1720, CA-SHA-1723, CA-SHA-1752) near the Central and Northern Yana territory boundary. Analytical studies: Lithic analysis, blood residue, radiocarbon data and obsidian hydration.	
Report	Hutchinson, W.H.	1956	California Heritage: A History of Northern California Lumbering	Diamond National Corporation	SCF, SN, SV	History	History of Lumbering in Northern California: Empire Lumber Company, Blue Ridge Flume and Lumber Company, Butte Flume and Lumber Company, Sierra Flume and Lumber Company, Diamond National Corporation.	
Book	Irvine, Leigh H.	1915	History of Humboldt County, California	Historic Record Co., Los Angeles, California	CR, KM	History	History of Humboldt County. Discusses discovery of Northern California and Humboldt Bay, gold mining, interaction with Native Californians, Early 1950's, Organization of Humboldt County, early towns, schools, churches, and the history of the lumber industry.	
Report	Jackson, Robert J., Hannah S. Ballard, and William A. Shapiro	1997	Archaeological Investigations at CA-SHA-2561, Shasta County, California	Pacific Legacy, Inc.	SV	Prehistory	Investigations at CA-SHA-2531, the Goldsborough Gulch Site, a prehistoric site near Platina. Analytical studies: Lithic analysis, obsidian sourcing and hydration, and faunal remains. Research issues: Chronology building; Cultural assemblages; Models for subsistence/settlment and adaptive strategies; Ethnic identity and population movements.	CA-030-1094
Report	Jackson, Robert, and Hannah Ballard	2008	Archaeological Evaluation Report for Prehistoric Components of CA-SHA-4169/H, CA-SHA-4172/H, Buckhorn Grade Improvement Project, Shasta and Trinity Counties, California	Pacific Legacy, Inc.	KM	Prehistory	Evaluation of CA-SHA-4169/H and CA-SHA-4172/H, both prehistoric habitation sites with historic components. Analytical studies: Lithic analysis, faunal analysis, historic artifact assemblage, obsidian hydration and sourcing. Research issues: Migration vs. in-place development; Intensification; Linguistic models; Mobility; Exchange; Cultural interaction. Site-Specific Research: Projectile points, obsidian hydration rate development; Assemblage building; Paleoenvironment; Site formation processes.	
Report	Jackson, Thomas L.	1976	Report of the Middle Eel Planning Unit Archaeological Survey	US Forest Service, Region 5, San Francisco, California	CR	Prehistory	Extensive survey project with surface collection, sourcing. Excavations at two sites, MEN-861 and MEN-900. (also listed in Part II as S-000358)	
Report	Jackson, Thomas L., and Christopher T. Morgan	1997	Phase II Archaeological Investigations at CA-TEH-115/H, Tehama County, California	Pacific Legacy, Inc., Aptos, California	SV	Prehistory, History	Evaluation of CA-TEH-115/H. Analytical studies: Obsidian sourcing and hydration, lithic analysis, faunal analysis, historic artifact assemblage. Research issues: Chronology; Settlement/Subsistence; Exchange systems; Ethnic identity.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Thesis	Jaffke, Todd D.	1997	A Spatial and Temporal Analysis of Morphological Variation Among Gunther Barbed Projectile Points of the Central North Coastal Ranges	M.A. Thesis, Sonoma State University, Rohnert Park	CR	Prehistory	Thesis identifying spatial and temporal patterns associated with Gunther barbed projectile points from Mendocino County.	
Chapter	Jenkins, R. C.	2005	A Fluted Point from Siskiyou County, California	In Archaeology Without Limits: Papers in Honor of Clement W. Meighan, edited by B.D. Dillon and M.A. Boxt, pp. 61-68, Labyrinthos, Lancaster.	UK	Prehistory	Discussion of a fluted projectile point from Siskiyou County.	
Report	Jensen, Peter M.	1977	Test Excavations at CA-SHA-543 on the East Fork of Clear Creek Shasta County, California	Department of Anthropology, California State University, Chico	SV	Prehistory	-	CA-030-0099
Book	Jensen, Peter M.	1980	Archaeological Excavations at the Kett Site, CA-SHA-491, Shasta County, California	CSU Chico Anthropological Papers 2	SV	Prehistory	Evaluation of CA-SHA-491 (The Kett Site). Research issues: Chronology; Regional artifact taxonomies; Socio-economic activities; Settlement pattern of the Sacramento Valley/Foothill region.	CA-030-0008
Report	Jensen, Peter M.	1985	Archaeological Test Excavations at site CA-SHA-1430 near Bella Vista, Shasta County, California	Jensen & Associates, Chico, California	SV	Prehistory	Test excavations at CA-SHA-1430 on Dry Creek in Shasta County. Report includes artifact descriptions, and discussion on bone, shell and charcoal.	CA-030-0181
Report	Jensen, Peter M.	1990	Archaeological Test Excavations at Prehistoric Site "Spring Valley #1" Located near Churn Creek, North Redding, Shasta County, California	Jensen & Associates, Chico, California	SV	Prehistory	Testing at Spring Valley #1. Analytical studies are limited to analysis of the lithic artifact assemblage.	
Report	Jensen, Peter M.	1990	Archaeological Data Recovery Excavations at Site CA-SHA-483, Near I-5 and Oasis Road, Shasta County, California	Jensen & Associates, Chico, California	SV	Prehistory	Evaluation of CA-SHA-483. Analytical studies: Artifact assemblage (lithic analysis).	
Report	Jensen, Peter M.	1993	Archaeological Test Excavations, Site CA-SHA-551, Near Oasis Road and Interstate 5, Redding, Shasta County, California	Jensen & Associates, Chico, California	SV	Prehistory	Testing at CA-SHA-551. Analytical studies: Radiocarbon data, human remains, artifact assemblage (lithic analysis). Research issues: Site Function; Temporal Patterns; Settlement.	
Report	Jensen, Peter M.	1994	Archaeological Data Recovery, Site CA-SHA-961, Girvan Road at Olney Creek, Redding, Shasta County, California	Jensen & Associates, Chico, California	SV	Prehistory	Evaluation of CA-SHA-961. Analytical studies: Lithic analysis; beads, radiocarbon data, fauna, flora and shellfish remains. Research issues: Culture history; Settlement/subsistence; Social organization.	
Report	Jensen, Peter M., and A. Farber	1982	Archaeological Data Recovery Program at CA-SIS-342 on 02-SIS-97 PM 41.5 to 42.3	California Department of Transportation, Sacramento, California	UK	Prehistory	Evaluation of CA-SIS-342. Analytical studies: Lithic analysis, macrobotanical remains, faunal analysis, obsidian sourcing and hydration, historic artifact assemblage, Research issues: Chronological sequence; Subsistence; Lithic characteristics; Obsidian sources and procurement; Geoarchaeology; Site type.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Jensen, Peter M., and A. Farber	1982	Archaeological Test Excavation at Site CA-TRI-205 on 02-TRI-299 PM 36.7 to 37.2 02206-135711	California Department of Transportation District 2, Redding	KM	Prehistory	Evaluation of CA-TRI-205. Analytical studies: Lithic analysis, faunal analysis, historic artifact assemblage, obsidian sourcing and hydration. Research issues: Site integrity; Chronology; Population movements.	CA-030-0011
Report	Jensen, Peter M., and Kathleen Tyree	1993	Archaeological Surface Collection and Subsurface Testing Program Site CA-SHA-1968/H, Near the Sacramento River, Redding, Shasta County, California	Jensen & Associates, Chico, California	SV	Prehistory	Evaluation of CA-SHA-1968/H, lithic scatter. Analytical studies: lithic analysis. Research issues: Site Function; Temporal Patterns; Settlement, Land Use and Subsistence Patterns.	CA-030-0545
Report	Jensen, Peter M., and Paul R. Reed	1979	An Anthropological Overview and Cultural Resources Inventory of the Northern Sacramento Valley and Southern Cascade Range.	Bureau of Land Management, Redding, California	SCF, SV	Prehistory	Archaeological synthesis of the Northern Sacramento Valley and Southern Cascade Range. Includes ethnographic, prehistoric and historic backgrounds. Discusses management options for Northern California archaeological sites.	
Article	Jewell, Donald P.	1964	Archeology of the Oroville Dam Spillway	California Department of Parks and Recreation Archeological Reports 10, Sacramento, California	SN	Prehistory	Excavations at CA-BUT-99, -100, and -101 at the Oroville Dam spillway, focusing on housepit features.	
Article	Jobson, R., and W. R. Hildebrandt	1980	The Distribution of Oceangoing Canoes on the North Coast of California	Journal of California and Great Basin Anthropology 2(2):165-174	CR	Prehistory, Ethnography	Discusses evidence concerning the distribution of ocean-going canoes and creates a model to characterize the occurrence of canoes used on the north coast.	
Report	Johnson, Jerald J.	1966	Archaeological Investigation at 4-SIS-258 Site Report	Department of Anthropology, University of California, Davis	UK	Prehistory	Site report for 4-SIS-258. Poor quality report-because of age. No front cover for citation information	
Report	Johnson, Jerald J.	1966	A Preliminary Survey of the Archaeological Resources of Lower Mill Creek	Department of Anthropology, University of California	SV	Prehistory	Archaeological survey of Lower Mill Creek. Includes survey results and site descriptions.	
Report	Johnson, Jerald J.	1987	Tehama Lake Excavations at Six Prehistoric Sites	Hornet Foundation, California State University, Sacramento	SV	Prehistory	Evaluation of CA-TEH-387, CA-TEH-1196, CA-TEH-1197, CA-TEH-1211, CA-TEH-1232, CA-TEH-1264 at Tehama Lake. Analytical studies: Lithic analysis, soil analysis. Research issues: Ethnographic boundaries; Chronology; Settlement patterns; Exchange systems.	
Report	Johnson, Jerald J.	1988	Dutch Gulch Lake Excavations at Six Prehistoric Sites	Hornet Foundation, California State University, Sacramento	SV	Prehistory	Evaluation of CA-SHA-290/H, CA-SHA-291/H, CA-SHA-294, CA-SHA-1144/H, CA-SHA-1158 and CA-TEH-748 at Dutch Gulch Lake. Analytical studies: Lithic analysis, beads (shell, glass), radiocarbon data, soil analysis, obsidian sourcing and hydration, dendrochronology, archaeobotanical analysis, faunal analysis. Research issues: Subsistence models; Economic exchange; Population and mortuary studies; cultural assemblages.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Article	Johnson, Jerald J.	1994	Prehistoric Human Remains, Petroglyphs, Structures and Miscellaneous Features from Northeastern California	Institute of Archaeology and Cultural Studies Report Number 6. Department of Anthropology, California State University, Sacramento	SV	Prehistory	Winter village sites in the southern Cascades, Dye Creek Ranch.	
Article	Johnson, Jerald J.	2003	The Yahi and Southern Yana: An Example of Conservatism, Genetic Isolation, and an Impoverished Resource Base	Proceedings from the Society for California Archaeology annual meeting 16:95-102	SCF	Prehistory, Ethnography	Summary of settlement patterns of the Yahi and Southern Yana tribes including site types and resource background.	
Report	Johnson, Jerald J., and D. Theodoratus	1984	Dutch Gulch Lake Intensive Cultural Resources Survey	Foundation of California State University, Sacramento and Theodoratus Cultural Research, Sacramento and Fair Oaks, California	SV	Prehistory	Intensive archaeological survey of the Dutch Gulch Lake including 117 prehistoric sites (25 with historic components) and 166 historic sites. Discussion includes the prehistory of North Central California, ethnographic findings (Bald Hills Wintu, Ethnographic inventory), historical findings (Exploration, miming, agriculture), project impacts and evaluation of significance for the NRHP.	
Report	Johnson, Jerald J., and D. Theodoratus	1984	Tehama Lake Intensive Cultural Resources Survey	Foundation of California State University, Sacramento and Theodoratus Cultural Research, Sacramento and Fair Oaks, California	SV	Prehistory, History	Intensive archaeological survey of the Tehama Lake including 80 prehistoric sites (nine with historic components) and 33 historic sites. Discussion includes the prehistory of North Central California (Bald Hills Wintu and Nomlaki Wintun Boundary), ethnographic findings, historical findings (Exploration, mining, early settlers, railroad, towns), project impacts and evaluation of significance for the NRHP.	
Report	Johnson, Jerald J., and D. Theodoratus	1984	Black Butte Lake Intensive Cultural Resources Survey	Foundation of California State University, Sacramento and Theodoratus Cultural Research, Sacramento and Fair Oaks, California	SV	Prehistory, History	Inventory and evaluation of significance for the NRHP of Orland Buttes, Black Butte, Buckhorn Recreation Area, Southeast Shoreline, Grizzly Flat and Nomlaki Coves, Squaw Point Recreation Area, Burris Creek Recreation Area. Discussion includes auger testing, ethnographic investigations and historic investigations (oral history, data analysis).	
Report	Johnson, Jerald J., and S. Dondero	1990	Excavations at Archaeological Site CA-TEH-10, Cemetery 1: Black Butte Lake, Glenn and Tehama Counties, California	Hornet Foundation, California State University, Sacramento	SV	Prehistory	Removal, relocation and reburial of prehistoric cemetery, CA-TEH-10 at Black Butte Lake. Analytical studies: Human remains and associated artifacts (shell beads, lithics, faunal remains, flora remains), dentition, obsidian sourcing. Research issues: Hokan-Penutian cultural boundaries; Hokan-Penutian prehistory; Exchange networks; Mortuary practices; Subsistence activities.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Chapter	Johnson, Jerald Jay	1978	Yana	In California, edited by Robert F. Heizer, pp. 225-235. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	SCF	Ethnography	Yana ethnography.	
Article	Johnson, Jerald Jay	1993	Manos and Metates in Northern California: An Example of the Need for More Stringent Application of the Scientific Method	In There Grows a Green Tree: Papers in Honor of David A. Fredrickson, Center for Archaeological Research at Davis 11: 335-350	KM, SV	Prehistory	Comprehensive review of prehistoric milling tools in northern California, including an analysis of the time-space distribution of each type and their larger archaeological and ethnographic contexts.	
Report	Johnson, Keith L.	1976	Test Excavations at the Old Tower House Site (CA-SHA-192), Whiskeytown National Recreation Area, Shasta County, California	Department of Anthropology, California State University, Chico	SV	Prehistory, History	Testing at Old Tower House (CA-SHA-192). Analytical studies are limited to the lithic artifact analysis and historic artifact descriptions.	
Report	Johnson, Keith L. and L. Skjelstad	1974	The Salvage Archaeology of Site 4-SHA-177, Whiskeytown National Recreation Area, Shasta County, California	Department of Anthropology, California State University, Chico	SV	Prehistory	Salvage archaeology of CA-SHA-177. Analytical studies: Lithic analysis, flora (seed) remains, historic artifact assemblage.	
Chapter	Johnson, Patti J.	1978	Patwin	In California, edited by Robert F. Heizer, pp. 350-360. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	SV	Ethnography	Discussion of the Patwin culture.	
Report	Johnston, James and E. Nilsson	1983	Archaeological Test Excavations at the Meek Site: CA-SIS-900	Mountain Anthropological Research, Yreka, California	UK	Prehistory	Evaluation of CA-SIS-900, the Meek Site. Analytical studies: Obsidian sourcing and hydration, lithic analysis, Research issues: Chronology of the Shasta Valley; Lifeways of the Shasta.	
Report	Johnston, Jim, Chris O'Brien, Michael Dugas, Diane Watts, Jamie Moore, Wally Woolfenden	2001	Ishi Wilderness Area: Archaeological Test Excavations	Mountain Heritage Associates and Lassen National Forest	SCF	Prehistory	Testing at CA-TEH-710, -199, -620, -562, -684, -1767, -1822, -200, -704, -293. Analytical studies: Lithic analysis, faunal analysis, obsidian analysis, macrobotanical analysis, radiocarbon dating. Paleoenvironment, prehistoric and historic background. faunal analysis. Research issues: Construction of a cultural chronology; Identification of past lifeways, Understanding cultural process.	
Book	Jones, Alice Goen (ed.)	1981	Trinity County Historic Sites	Trinity County Historical Society, Weaverville, California	KM	History	Historical resources inventory. Somewhat folksy narrative, anecdotes and descriptions of many local families, ranches, mines (including Coffee Creek mining district), etc. Extensive use of primary sources, including newspaper articles and deed books (as well as many secondary sources). Brief descriptions of 52 key historical sites.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Jones, Theodore E.	2004	Archaeological Investigations at CA-HUM-323, The Nooning Creek Site, King Range National Conservation Area, Humboldt County, California	Origer and Associates	CR	Prehistory	Investigation of CA-HUM-323 at Nooning Creek. Analytical studies: Lithic analysis, obsidian hydration and sourcing. Research issues: Activities of the occupants; Chronology; Inter-group interaction; Technological and social change;	
Report	JRP Historical Consulting	2005	Historical Resources Evaluation Report, Evergreen Road Bridge (08C-0008) Replacement Project Over South Fork of Cottonwood Creek, Tehama County, California	JRP Historical Consulting, LLC, Davis, California	SV	History	Evaluation of the Evergreen Road Bridge on Cottonwood Creek.	
Report	Kaijankoski, Philip, Deborah Jones, and Patricia Mikkelsen	2011	Test and Data Recovery Excavations at CA-SHA-2602 for the PG&E Hat Creek Powerhouse 1 Pedestrian Bridge Replacement Project, Shasta County, California	Far Western Anthropological Research Group, Inc., Davis, California	SCF	Prehistory	Evaluation of CA-SHA-2602. Analytical studies: Radiocarbon, obsidian sourcing and hydration, lithic analysis, faunal analysis, Plant remains. Research issues: Paleoenvironmental reconstruction, Chronology of the Pit River, Subsistence-Settlement-Social Interaction and Migration.	
Report	Kellawan, Rebecca	2012	Cultural Resources Survey and Evaluation for the Volta No. 1 Powerhouse Domestic Waterline Upgrade Project, Shasta County, California	Far Western Anthropological Research Group, Inc., Davis, California	SV	Prehistory, History	Recordation of historic features at CA-SHA-2904/H. No prehistoric artifacts were observed.	
Report	Kelly, John L. and H. John McAleer	1986	An Archaeological Survey, Assessment, and Recommendations for the Ohio Flat Mining District, CA-TRI-943, Trinity County, California	Bureau of Land Management, Redding, California	KM	History	Ohio Flat Mining District (CA-TRI-943), mining area. Analytical studies: feature and artifact discussion. Also included in Lowden Ranch Mining District, the Lewiston Mining District, Grass Valley Creek and the Ohio Flat Mining District.	CA-030-0175
Report	Kelly, M. S., E. Nilsson, and J. H. Cleland	1987	Archaeological Investigations at Lake Britton, California Pit 3, 4, 5 Project Archaeological Site Testing	Wirth Environmental Services, San Diego, California	SCF	Prehistory	Excavations at CA-SHA-337, CA-SHA-350, CA-SHA-356, CA-SHA-375, CA-SHA-379, CA-SHA-382, CA-SHA-383, CA-SHA-385, CA-SHA-386, CA-SHA-395, CA-SHA-396, CA-SHA-397, CA-SHA-399, CA-SHA-400, CA-SHA-407, CA-SHA-419, CA-SHA-420, CA-SHA-431, CA-SHA-433, CA-SHA-436, CA-SHA-1401, CA-SHA-1417, CA-SHA-1418, CA-SHA-1464, CA-SHA-1465, CA-SHA-1471, CA-SHA-1474 on Lake Britton. Analytical studies: Obsidian sourcing and hydration, radiocarbon data, lithic analysis, faunal analysis, beads (shell, bone, glass, nut), ceramics, historic artifact assemblage, shell analysis, macrobotanical analysis, pollen analysis, tephra analysis, human remains. Research issues: Paleoenvironment, Cultural chronology, Settlement/Subsistence, Demography, Social interaction/Migration, Cultural Contact/Acculturation).	

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Thesis	Kennedy, Michael Anthony	2005	An Investigation of Hunter-Gatherer Shellfish Foraging Practices: Archaeological and Geochemical Evidence from Bodega Bay, California	Ph.D. Dissertation, University of California, Davis	CR	Prehistory	Experimental archaeology gathering return-rate data for 18 open coast and estuary taxa in Sonoma County.	
Paper	Keter, Thomas S.	1989	Overview of the Prehistoric and Historic Grasslands of the North Fork Basin of the Eel River	Paper presented at the 23rd annual meeting of the Society for California Archaeology	KM	Prehistory, History	Society of California Archaeology paper on the North Fork and Eel River basin past environment, land-use activities, and cultural history.	
Paper	Keter, Thomas S.	1990	Settlement and Conflict: The Refuge Period and Historic Settlement in the North Fork Eel River Basin 1854-1864	Paper presented at the 24th annual meeting of the Society for California Archaeology	CR, KM	History, Ethnography	Society of California Archaeology paper on how traditional Athapascan culture of the North Fork and Eel River basin was destroyed during historic settlement (1854-1864).	
Paper	Keter, Thomas S.	1991	Territorial and Social Relationships of the Inland Southern Athabascans: A New Perspective. Paper presented to The Society for California Archaeology	Paper presented at the 25th annual meeting of the Society for California Archaeology	KM	Prehistory	Society of California Archaeology paper on territorial and social relationships of the inland southern Athabascans. Includes ethnographical and historical overviews. Research Issues: Social and Political organization (with other inland tribes); Linguistic relationships.	
Paper	Keter, Thomas S.	1992	The Effects of Historic Land-use Activities on the Streams and Aquatic Resources of the North Fork of the Eel River	Paper presented at the 26th annual meeting of the Society for California Archaeology	CR, KM	History	Society of California Archaeology paper on historic land-use activities on the North Fork and Eel River. Includes sections on anadromous and resident fish and the historic land-use effects on the aquatic environment.	
Report	Keter, Thomas S.	1995	Environmental History and Cultural Ecology of the North Fork of the Eel River Basin, California	Heritage Resource Program, Six Rivers National Forest	KM	Prehistory	Analysis of ethnographic data and natural resources used by the Wailaki and Lassik people. Suggests potential prehistoric site settlment patterns in the area of the North Fork region.	
Article	Keter, Thomas S.	1999	A Look Back: Twenty-Five Years of Cultural Resources Management on the Six Rivers National Forest	Proceedings from the Society for California Archaeology annual meeting 12:173-187	KM	History	Cultural Resources Management history in the Six Rivers National Forest.	
Article	Kett, W.F.	1947	Fifty years of operation by the Mountain Copper Company, Ltd., in Shasta County, California	California Journal of Mines and Geology 43(2): 105-162	SV	History	General geology of the Iron Mountain Region.	
Report	King, Jerome, Kelly McGuire, Kimberley Carpenter, Mary Maniery, Cindy Baker, Helen McCarthy, and Heather Scotten	2004	Class I Cultural Resources Overview and Research Design for the Alturas, Eagle Lake, and Surprise Resource Areas	Far Western Anthropological Research Group, Inc., Davis, California	UK, SCF, SN	Prehistory, History	Class I cultural resource overview for Alturas, Eagle Lake, and Surprise Resource Areas. Research issues: Prehistoric- Chronology; Mobility; Subsistence-settlement change; Late Holocene large-game hunting; Population replacements. Historic- Chronology; Demography; Consumer behavior; Ethnicity; Technology; Cultural geography; Adaptive strategies.	
Report	King, Thomas F.	1966	An Archaeological Survey of the Dos Rios Reservoir Region, Mendocino County, California	National Park Service	KM	Prehistory	Large-scale survey of the Dos Rios Reservoir near Round Valley. Recorded 357 new archaeological sites. (also listed in Part II as S-000692)	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Article	Kniffen, Fred B.	1928	Achomawi Geography	University of California Publications in American Archaeology and Ethnology 23(5):297-332	SCF	Ethnography	Ethnography and geography of the Achomawi tribe.	
Report	Kowta, M.	1988	The Archaeology and Prehistory of Plumas and Butte Counties, California: An Introduction and Interpretive Model	Department of Anthropology, California State University, Chico	SN	Prehistory	An interpretive model of the prehistory of Plumas and Butte counties. Discusses ethnographic and geographical background of the Maidu and Konkow, Washoe. Includes discussion on climate change and regional chronology.	
Report	Kowta, Makoto, Blossom Hamusek, William Dreyer, Russell Bevill, Philip Lydon, Eric Wohlgemuth	2000	Archaeology of the Platina Site, CA-SHA-279, Shasta County, California	Report submitted to Shasta-Trinity National Forests and Bureau of Land Management, Redding, California	SV	Prehistory	Field school project (1989) on The Platina Site (CA-SHA-279). Analytical studies: Lithic analysis, faunal analysis, archaeobotanical analysis, obsidian hydration and sourcing analysis. Research Issues: Mobility strategies; Chert sourcing for the region; Settlement and Mobility Strategies. Site specific research: Identify components, identify the "property types", reconstruct the adaptive strategies for each component.	
Thesis	Kraft, Jarith A	1998	Gold Miners Living on the Fringes: A Historical Ethnographic Study, Butte County, California	M.A. Thesis, California State University, Chico	SV	History	M.A. thesis on the archaeological and historical investigations at CA-BUT-1106H, the Butte Creek Miners Camp near Centerville. Study of the Centerville mining district as a “fringe area of the frontier,” with both Euro-American and Chinese occupations. Assessment of various “frontier models.”	
Report	Kraft, Jarith A. and Barbara Woodrum	2005	Historical Overview of the Tehama-Shasta Bend District, California	Cultural Resources Publications: History, Bureau of Land Management, Redding, California	SV	History	Overview of the history of the Bend District in Tehama and Shasta counties.	
Report	Krieger, Julie	1987	Archaeological Excavations at Fowlers Campground, F.S. Site No. 05-14-61-44, Siskiyou County, California	U.S. Forest Service	UK	Prehistory	Excavations at Fowlers Campground (CA-SIS-587). Analytical studies: Lithic analysis, obsidian hydration and sourcing, radiocarbon data. Research issues: Taxonomy of dated archaeological materials; Site significance; Ethnic and linguistic affiliation.	
Report	Krieger, Julie and Andrew Goheen	1984	Archaeological Excavations, Giant Crater Prehistoric Site FS 05-14-61-324	U.S. Forest Service	UK	Prehistory	Test excavations at the Giant Crater Site FS 05-14-61-324. Analytical studies: Lithic analysis and obsidian sourcing and hydration.	
Thesis	Kristofors, Kris V.	1973	The Copper Mining Era in Shasta County, California 1896-1919: An Environmental Impact Study	M.A. Thesis, California State University, Chico	SV	History	Copper mining 1896-1919 in Shasta County. Geography MA. Environmental damage resulting from the direct smelting of heavy sulphide ores.	
Article	Kroeber, A.L., and E.E. Gifford	1949	World Renewal: A Cult System of Native Northwest California	University of California Anthropological Records 13:1-155	CR	Prehistory, Ethnography	Reviews religious systems of northwest California emphasizing world renewal ceremonies like the White Deer Skin Dance and Jump Dance.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Article	Kroeber, Alfred L.	1932	The Patwin and Their Neighbors	University of California Publications in American Archaeology and Ethnology 29(4):253-423	SV	Ethnography	Ethnography of the Patwin tribe.	
Book	Kroeber, Alfred L.	1936	Karok Towns	University of California Publications in American Archaeology and Ethnology 35(4):29-38.	KM	Ethnography	Ethnography of Karok towns. Includes a list of settlement names and estimated population sizes compiled through interviews with two Karok members.	
Book	Kroeber, Theodora	1961	Ishi in Two Worlds: A Biography of the Last Wild Indian in North America	University of California Press. Berkeley & Los Angeles, California	SCF	Ethnography	Biography of Ishi, the Yahi Indian	
Article	Lake, Robert G.	1983	Shamanism in Northwestern California: A Female Perspective on Sickness, Healing and Health	White Cloud Journal 3(1): 31-42	CR	Ethnography	Study on the perspectives and practices of a novice, female Yurok shaman.	
Report	LaLande, Jeff, Eric W. Ritter, and James J. Barnes	2015	Archaeology of a Chinese Mining Camp (Site CA-SIS-1801H) Located near Hawkinsville/Yreka, Siskiyou County, California	Cultural Resources Publications: Archaeology, Bureau of Land Management, Redding, California	UK	History	Discussion of a Chinese gold-mining camp (CA-SIS-1801H) and associated mining features, situated in north-central Siskiyou County.	CA-030-0657
Chapter	LaPena, Frank R.	1978	Wintu	In California, edited by Robert F. Heizer, pp. 324-340. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	KM, SV	Ethnography	Discussion of the Wintu culture.	
Article	Larson, William E.	2010	The Smith Creek Rockshelter: Results of Test Excavations at a Rockshelter Located in Humboldt County, California	Proceedings from the Society for California Archaeology annual meeting 24	KM	Prehistory	Evaluation of the Smith Creek Rockshelter in Humboldt County.	
Report	Larson, William E.	2014	Archaeological Assessment of Three Prehistoric Sites (CA-BUT-214, CA-BUT-336, CA-BUT-568) at Lake Oroville, Butte County, California	Archaeological Research Center, Department of Anthropology, California State University, Sacramento	SN	Prehistory, History	Assessment of CA-BUT-214, CA-BUT-336, CA-BUT-568 at Lake Oroville. Analytical studies: Lithic analysis, faunal and floral remains, mussel shell analysis, human remains, bedrock features, obsidian hydration and sourcing, basalt sourcing, radiocarbon dating, historic artifacts. Research Issues: Chronology; Settlement Patterns and Interaction Spheres; Subsistence Intensification and Climate Change; Social Evolution and Complexity.	CA-030-1782
Thesis	Lassiter, Francisco	1984	The Cultural Ecology of the Sinkyone Indians of Northwestern California	M.A. Thesis, California State University, Humboldt	CR	Ethnography	Ecology of the Sinkyone Indians.	
Book	Layton, Thomas N.	1990	Western Pomo Prehistory: Excavations at Albion Head, Nightbird's Retreat, and Three Chop Village, Mendocino County, California	Institute of Archaeology, University of California, Los Angeles	CR	Prehistory	Investigations from Albion Head (CA-MEN-1704, CA-MEN-1809, and CA-MEN-1844) and Nightsbird's Retreat (CA-MEN-1805) and Three Chop Village (CA-MEN-790).	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Thesis	Leader, Herman A.	1928	The Hudson's Bay Company in California	Ph.D. Dissertation, University of California	CR	History	The Hudson's Bay Company. History to 1821, from 1821 to modern.	
Thesis	Lechner, Theresa Marie	2005	The Late Kingsley/Early Dye Creek Fauna from CA-TEH-290	M.A. Thesis, California State University, Sacramento	SCF	Prehistory	Thesis study of the subsistence-settlement activities of the southern Cascade region through faunal analysis at CA-TEH-290 (Dead Man's Cave). Analytical studies: faunal analysis, dental increment analysis, lithic analysis (projectile points), radiocarbon data, obsidian sourcing and hydration. Research issues: Subsistence practices; Population.	
Report	Leigh, Anastasia T., Lisa, A. Shapiro, and Robert J. Jackson	2002	Phase II Investigations at CA-TEH-303 and CA-TEH-305 on State Route 99, Tehama County, California	Pacific Legacy, Inc., Cameron Park, California	SCF	Prehistory	Evaluation of CA-TEH-303 and CA-TEH-305. Analytical studies: Lithic analysis, obsidian sourcing and hydration, faunal analysis, human remains, shell beads, historic artifact assemblage, botanical analysis. Research issues: Chronology; Settlement/Subsistence; Exchange systems.	
Thesis	Leonhardy, Frank C.	1961	The Cultural Position of the Iron Gate Site	M.A. Thesis, Department of Anthropology, University of Oregon	UK	Prehistory	Investigation at Iron Gate reservoir site on the Klamath River. The thesis discusses site descriptions, house floors, artifact assemblages, faunal remains, projectile point types and radiocarbon data. Research issues: Chronology and cultural comparison.	
Book	Leonhardy, Frank C.	1967	The Archaeology of a Late Prehistoric Village in Northwestern California	Museum of Natural History Bulletins 4		Prehistory	Published version of Leonhardy 1961.	
Article	Lesure, Richard G.	1998	The Constitution of Inequality in Yurok Society	Journal of California and Great Basin Anthropology 20(2):171-194	CR, KM	Ethnography	Counter argument to Collier's (1988) model of inequality in kin-based societies with precontact Yurok ethnographic evidence.	
Report	Levulett, V., T. Ruhstaller, and L. Bell	1980	Class III Inventory of Northwestern California Timber Tracts within Sustained Yield Unit 13 Del Norte, Humboldt, Trinity and Mendocino Counties	Far Western Anthropological Research Group, Inc., Davis, California	CR, KM	Prehistory, Ethnography	Intensive cultural resource inventory in Del Norte, Humboldt, Trinity and Mendocino Counties. The inventory includes one historic site, two multicomponent sites, and 17 prehistoric sites.	
Thesis	Levulett, Valerie Anne	1985	The Prehistory of Southwestern Humboldt County: A Study of Coastal Archaeological Sites in the King Range National Conservation Area	Ph.D. Dissertation, University of California, Davis	CR	Prehistory	Dissertation study on Humboldt County coastal sites in the King Range (CA-HUM-177, CA-HUM-176, CA-HUM-175, CA-HUM-277, CA-HUM-279, CA-HUM-281, CA- HUM-182, CA-HUM-184, CA-HUM-186, CA-HUM-248). Analytical studies: Lithic analysis, obsidian sourcing; faunal analysis; shellfish analysis, human skeletal remains. Research issues: Chronology of coastal occupation; Seasonality of coastal resource use; Coastal site typology.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Levulett, Valerie, and William R. Hildebrandt	1987	The King Range Archaeological Project: Results of the 1984 Field Season: Excavations at CA-Hum-307, Hum-276, Hum-270, and Hum-175	Anthropological Studies Center, Sonoma State University	CR	Prehistory	Archaeological investigations at four coastal sites (CA-HUM-307, CA-HUM-276, CA-HUM-270, CA-HUM-175) within the King Range National Conservation Area. Analytical studies: Lithic analysis, bone and antler artifacts, shell artifacts, beads, faunal remains, obsidian hydration and sourcing, radiocarbon data, burial features, Research issues: Chronological sequence for coastal settlement; Trade/exchange; Settlement and subsistence.	
Other	Littlejohn, Hugh W.	1928	Nisenan Geography: Field Notes and Manuscript (CU-23.1 No. 18)	University of California Archives; Museum of Anthropology Archives; Ethnological Documents, Berkeley, California	SCF, SN	Ethnography	Field notes from Hugh Littlejohn 1928 of Nisenan ethnography.	
Report	Lloyd, Jay B, Douglas R. Harro and Andrew P. Monastero	2008	Testing and National Register Evaluation of CA-BUT-1225/1226/1227/1228/H at Round Valley Reservoir	Applied EarthWorks, Inc.	SCF	Prehistory	Evaluation of CA-BUT-1225/1226/1227/1228/H. Archaeological Northern (Northwestern) Sierra Nevada and Southern Cascade Range. Analytical studies: Lithic analysis, obsidian sourcing and hydration. Research issues: Chronology; Technology; Settlement systems and land-use strategies; subsistence.	
Article	Loud, L.L.	1918	Ethnogeography and Archaeology of the Wiyot Territory	American Archaeology and Ethnology 14(3):221-437	CR	Prehistory	Ethnogeography and archaeology of the Wiyot territory. Discusses ethnobotany, fauna, surrounding tribes, and contact period with settlers.	
Book	Lydon, P. A. and J. C. O'Brien	1974	Mines and Mineral Resources of Shasta County, California	California Division of Mines and Geology, Sacramento, California	SCF, SV	History	Describes the geological history of the county and discusses the many metallic and non-metallic minerals present.	
Article	Lyman, R. Lee, Linda. A Clark, and Richard E. Ross	1988	Harpoon Stone Tips and Sea Mammal Hunting on the Oregon and Northern California Coasts	Journal of California and Great Basin Anthropology 10(1):73-87	CR	Prehistory	Analysis of Gould's (1966) projectile point function arguments on arrow and harpoons.	
Chapter	Mack, Joanne M.	1991	Upper Klamath River Canyon Prehistory	In Klamath River Canyon Prehistory and Ethnology, Cultural Resource Series No. 8. Bureau of Land Management, Oregon State Office, Portland	UK	Prehistory	Prehistory and chronology of the Upper Klamath River Canyon region.	
Report	Mack, Joanne M.	1996	Preliminary Report on the Upper Klamath River Canyon Project: Sumer of 1995 Archaeological Testing Report on CA-SIS-1198 and CA-SIS-1721, Site Evaluation Report, and Ethnobotanical Report	Pomona College, Claremont, California	UK	Prehistory	Testing, evaluation and ethnobotany at CA-SIS-1198 and CA-SIS-1721. Includes excavation summary reports, site catalogues, and ethnobotany notes.	CA-030-0060, CA-030-0581

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Mack, Joanne M.	1999	Report on the Upper Klamath River Canyon Project: Summers of 1996 and 1997 Archaeological Testing Report on CA-SIS-1198 and CA-SIS-1721, Site Evaluation Report, and Ethnobotanical Report	University of Notre Dame	UK	Prehistory	Survey results and evaluation of CA-SIS-1198 and CA-SIS-1721. Archaeological and ethnobotanical report of the Upper Klamath River.	CA-030-0060, CA-030-0581
Report	Mack, Joanne M.	2000	Archaeological Investigations at the Wise Eagle (CA-SIS-2136) and Geese Flying (CA-SIS-2135) Sites, Klamath River Canyon. Includes obsidian sourcing/hydration, radiocarbon, pollen, blood residue, soil chemistry analyses,	Report prepared for Bureau of Land Management	UK	Prehistory	Evaluation of Wise Eagle (CA-SIS-2136) and Geese Flying (CA-SIS-2135) sites.	CA-030-0948, CA-030-0949
Report	Mack, Joanne M.	2003	Test Excavation at Paradise Craggy Village (CA-SIS-1066H), Upper Klamath River, Northern California	Report prepared for Bureau of Land Management, Redding, California	UK	Prehistory, History	Evaluation of CA-SIS-1066H, Paradise Craggy Village. Analytical studies: Lithic analysis, historic artifact assemblage, faunal analysis, shell analysis, macrobotanical analysis, soil analysis, radiocarbon data, obsidian sourcing and hydration. Research issues: Subsistence patterns; Settlement patterns; Trade networks and interaction spheres.	CA-030-0210
Chapter	Mack, Joanne M.	2011	On the Role of Siskiyou Utility Ware as a Social Network Marker in the Late Prehistoric Northern California and Southern Oregon	In Perspectives on Prehistoric Trade and Exchange in California and the Great Basin, edited by Richard E. Hughes, pp. 114-134. University of Utah Press, Salt Lake City	UK	Prehistory	Research on ceramics of the southern Cascades of southern Oregon and northern California. Focuses on Siskiyou Utility Ware within house pits.	
Article	Mack, Joanne M.	2015	Comparison of Two Shasta Villages' Obsidian Source Use	Proceedings from the Society for California Archaeology annual meeting 29:33-38	UK	Prehistory	Comparison of obsidian sourcing at two Shasta village sites, The Iron Gate site and Coyote's Paw site (CA-SIS-1198).	CA-030-0581
Report	Mack, Joanne M., D. J. Theodoratus, M. M. Ashman, H. McCarthy, and D. L. Genett	1991	Klamath River Canyon Prehistory and Ethnology	Cultural Resource Series No. 8. Report on file, US Department of the Interior, Bureau of Land Management, Oregon State Office, Portland	KM, UK	Prehistory, Ethnography	Land-use chronology for the Upper Klamath region.	
Report	Maniery, J. G.	1990	Northern Pomo Prehistory, Archaeological Test Excavations at CA-MEN-2138: Redwood Valley, Mendocino County, California	PAR Environmental Services, Inc., Sacramento, California	KM	Prehistory	-	
Report	Maniery, Mary L., and Marshall Millett	2008	Living on the Smith: Architectural History and Historical Archaeology of Jedediah Smith Campground and Hiouchi Flat, Redwood National and State Park	PAR Environmental Services, Inc., Sacramento, California	CR	History	Archival and field investigations of 11 historical resources within the Jedidiah Smith Redwood National and State Park. Research objectives focus on historical archaeology sensitivity.	
Report	Maniery, Mary L., and Monica Nolte	2012	Archaeological Test Excavations at the Zopfi Homestead, Hiouchi Flat, Del Norte County, California	PAR Environmental Services, Inc., Sacramento, California	CR	Prehistory, History	Testing of the Zopfi homestead (JED-PAR-5) at Hiouchi Flat. Includes prehistoric artifact summary, historic artifact summary, feature descriptions.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Article	Mark, Robert, and Evelyn Billo	1998	Two Stray Quadrupeds at Weitchpec	Rock Art Papers 13:155-156	CR	Prehistory	Two quadruped petroglyphs (CA-HUM-173) discovered near Weitchpec.	
Report	Martin, Ilse B., David T. Hodder and Clark Whitaker	1981	Overview of the Cultural Historic Resources of Euro-American and Other Immigrant Groups in the Shasta-Trinity National Forest	Geoscientific Systems and Consulting, Playa Del Rey, California	KM, UK, SCF, SV	History	Overview of the Euro-American historical and cultural resources of within the Shasta-Trinity national Forest. Includes list of historic sties declared eligible for the NRHP.	
Report	Martin, Ilse B., David T. Hodder and Clark Whitaker	1981	Overview of Cultural Historic Resources of Euro-American and Other Immigrant Groups in the Shasta-Trinity National Forest	Geoscientific Systems and Consulting, Playa Del Rey, California	KM, UK, SCF, SV	History	Overview of the Euro-American historical and cultural resources of within the Shasta-Trinity national forest. Includes list of historic sites declared eligible for the NRHP.	
Book	McCarthy, Helen	2012	Field Guide to Plants Important to the Oroville Maidu Community with Maidu Names and Uses	California Department of Water Resources	SN	Ethnography	Oroville plant field guide with Maidu names and uses.	
Book	McCarthy, Helen, Heather Scotten, and Brandy Doering	2004	Konkow Maidu Tribal Presence in the Lake Oroville Area: An Ethnographic and Ethnohistoric Inventory	Far Western Anthropological Research Group, Inc., Davis, California	SN	Ethnography	Ethnography of the Konkow Maidu in the Lake Oroville Area. Includes interviews, archival research and site inventory.	
Report	McCarthy, Helen, Heather Scotten, and Brandy Doering	2009	Maidu Life in the Feather River Area: A Photo Essay	Far Western Anthropological Research Group, Inc., Davis, California	SN	Ethnography	Ethnographic investigation using photographs of Maidu people and places.	
Report	McCarthy, Helen, William Hildebrandt, and Laureen Swenson	1982	A Cultural Resource Overview for the Mendocino National Forest and the East Lake Planning Unit, BLM, California: Volume I: Ethnography and Prehistory	California Archaeological Consultants, Inc., Woodland, California	KM, SV	Ethnography	Cultural resources inventory and evaluation within the Mendocino National Forest. The analytical data is limited to lithic analysis. Research issues: Development of chronology sequences; Identification of subsistence changes; Causes of subsistence/settlement pattern change; Social organization changes; Development of predictions.	
Article	McCarthy, Helen, William R. Hildebrandt, and Laureen K. Swenson (eds)	1985	Ethnography and Prehistory of the North Coast Range, California	Center for Archaeological Research at Davis 8	CR	Prehistory, Ethnography	Ethnography and prehistory of the North Coast Range. Research issues focus on site typology and prediction of site locations.	
Article	McCoy, Jessica and Heidi Shaw	2015	Chasing Archaeological Site Narrative: The Case of CA-TEH-74/H	Proceedings from the Society for California Archaeology annual meeting 29:165-171	SCF	Prehistory, History	Re-investigation of CA-TEH-74/H to evaluate its present condition through modern techniques.	
Report	McDonald, James	1979	Cultural Resource Overview, Klamath National Forest, California	Klamath National Forest	KM, UK	Prehistory, History	A synthesis of Klamath National Forest area environment and culture history.	
Chapter	McGuire, Kelly R.	1989	Incised Stones	In Prehistory of the Sacramento River Canyon, Shasta County, California	SV	Prehistory	Analyses a large assemblage of middle Holocene portable rock art, and places within its larger archaeological context, and proposes its probable function within the larger society.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	McGuire, Kelly R. and M. E. Basgall	1985	Test Excavations at Sheepy East 1, Lower Klamath Lake Siskiyou County, California	Far Western Anthropological Research Group, Inc., Davis, California	UK	Prehistory	Testing at Sheepy East 1, Lower Klamath Lake. Analytical studies: Lithic analysis, human remains, obsidian sourcing and hydration, radiocarbon data, shell beads, faunal analysis.	
Report	McInturf, Hack	1994	Once Upon a Depression	Unpublished manuscript	SV	History	A manuscript on mining and the depression era.	
Article	Meacham, C.M.	1984	A Great Basin Pecked Style Petroglyph in the North Coast Ranges	Journal of California and Great Basin Anthropology 6(2):260-265	KM	Prehistory	Discussion of a petroglyph fragment discovered in the Yolla Bolly-Middle Eel Wilderness.	
Report	Meighan, Clement W.	1955	Archaeology of the North Coast Ranges, California	In Papers on California Archaeology, University of California Archaeological Survey Reports 32-33:1-37	KM	Prehistory	Compares excavations results from CA-MEN-500 to archaeological complexes known in the North Coast Ranges. Includes artifact inventory and descriptions.	
Article	Merriam, C. H.	1926	The Classification and Distribution of the Pitt River Tribes of California	Smithsonian Miscellaneous Collections 78(3):1-52	UK, SCF	Prehistory, Ethnography	Ethnic relations and geography of the Pitt River tribe of northeastern California.	
Report	Meyer, Jack	2013	A Geoarchaeological Overview and Assessment of Northeast California: Cultural Resources Inventory of Caltrans District 2 Rural Conventional Highways: Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties	Far Western Anthropological Research Group, Inc., Davis, California	KM, UK, SCF, SV	Prehistory	Geoarchaeological overview of Caltrans District 2: Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties. Analytical studies: Radiocarbon and soil survey. Research issues: Archaeological site location models; Paleolakes and early sites; Active volcanism and archaeology; Sampling buried sites.	
Report	Meyer, Jack, and Jeffrey S. Rosenthal	2008	A Geoarchaeological Overview and Assessment of Caltrans District 3	Far Western Anthropological Research Group, Inc., Davis, California	SN, SV	Prehistory	Geoarchaeological report of Caltrans District 3 including environmental setting for Sierra Nevada, Cascade Range, Coast Ranges and Sacramento Valley. Discusses buried site potential and archaeological site structure.	
Report	Meyer, Jack, Philip Kaijankoski, and Jeffrey S. Rosenthal	2011	A Geoarchaeological Overview and Assessment of Northwest California Cultural Resources Inventory of Caltrans District 1 Rural Conventional Highways: Del Norte, Humboldt, Mendocino, and Lake Counties	Far Western Anthropological Research Group, Inc., Davis, California	CR, KM	Prehistory	Geoarchaeological report of Caltrans District 1. Research issues: Archaeological sensitivity model; Paleocoastal migration; Approaches for identifying and sampling buried sites.	
Report	Mikkelsen, Patricia, and Deborah Jones	2010	Data Recovery Excavations at CA-SHA-3643/H at the Pit 1 Weir Access at Cassel Bridge, Fall River Mills, Shasta County, California	Far Western Anthropological Research Group, Inc., Davis, California	SCF	Prehistory, History	Evaluation of CA-SHA-3643/H. Analytical studies: Lithic analysis, fauna, botanical analysis, obsidian source and hydration, historic artifacts assemblage. Research issues: Chronology; Subsistence-settlement pattern change; Interregional exchange.	
Report	Mikkelsen, Patricia, Michelle Tiley, and Pit River Tribal Members	2009	National Register of Historic Places Registration Form for the Pit River Aboriginal Cultural District, Shasta County, California	Far Western Anthropological Research Group, Inc., Davis, California	SCF	Prehistory, History, Ethnography	National Register of Historic Places forms and letters. Includes "Prehistoric Sites and Traditional Cultural Properties within the Pit River Aboriginal Cultural District"	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Milburn, John W., David A. Fredrickson, Meredith Dreiss, Laurie Demichael, and Wendy Van Dusen	1979	Volume I—A Preliminary Report on the Archaeology of CA-HUM-129	Anthropological Studies Center, Cultural Resources Facility, Sonoma State University	CR	Prehistory, History	Excavation of CA-HUM-129 at Stone Lagoon. Includes discussion on the artifact inventory, prehistoric and historic feature descriptions, human remains, lithic analysis, bone and bone/antler tools, and hooks.	
Chapter	Miller, V.P.	1978	Yuki, Huchmon and Coast Yuki	In California, edited by Robert F. Heizer, pp. 249-255. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	CR, KM	Prehistory, Ethnography	Discussion of the Yuki and Huchmon culture.	
Article	Millett, Marshall and E. Ritter	2013	The Church Rock Petroglyph Site: Function, Style, Digital Documentation, and 3D Visualization	American Indian Rock Art 40:1017-1040	SV	Prehistory	Analysis of the rock art at CA-SHA-39, the Church Rock Petroglyph Site.	
Article	Moore, Jamie	2004	Acculturation Model for the Mountain Maidu	Proceedings from the Society for California Archaeology annual meeting 17:17-22	SN	Ethnography	Examination of the Mountain Maidu and Euro-American interactions during the 19th century.	
Article	Moore, Jamie	2009	The Ghost of Procurement Past and the Humbug Basalt: XRF Identification along with Spatial and Temporal Distribution in Portions of Butte, Lassen, Plumas, and Tehama Counties, Northern California	Proceedings from the Society for California Archaeology annual meeting 21:103-108	SCF, SN, SV	Prehistory	Source identification for Humbug Basalt in northern California.	
Report	Moratto, Michael J.	1973	An Archaeological Overview of Redwood National Park	National Park Service	CR	Ethnography	Archaeological overview of Redwood National Park and inventory of cultural resources.	
Report	Moratto, Michael J. (Ed)	1995	Archaeological Investigations, PGT-PG&E Pipeline Expansion Project, Idaho, Washington, Oregon, and California	INFOTEC Research, Inc. and Far Western Anthropological Research Group, Inc.	SCF, SV	Prehistory	Report of surveys, excavations, and data analyses involving 695 cultural resources along the PGT-PG&E Pipeline Expansion Project in Idaho, Washington, Oregon, and California.	P-52-001528
Article	Moss, Madonna L. and Jon M. Erlandson	1998	Early Holocene Adaptations on the Southern Northwest Coast	Journal of California and Great Basin Anthropology 20(1):13-25	CR	Prehistory	A review of Minor (1995, 1997) and Lyman (1997) use of the term "pre-littoral", and suggest using "Early Holocene" for the northwest coast prehistory.	
Article	Motz, Lee, Eric W. Ritter, and James Rock	1986	Glass Trade Beads from Two Shasta Sites in Siskiyou County, California	Journal of California and Great Basin Anthropology 8(1):116-128	UK	Prehistory, History	A study on the glass bead assemblage from two protohistoric cemeteries (CA-SIS-168 and CA-SIS-937) in Siskiyou County.	CA-030-0150
Book	Napton, Kyle L. and E. A. Greathouse	2000	Archaeological Investigations at CA-TEH-001621/H, California Department of Forestry and Fire Protection Ishi Conservation Camp, Tehama County, California	CDF Archaeological Reports 25	SCF	Prehistory	Testing at CA-TEH-1621/H. Analytical studies: Obsidian sourcing and hydration, lithic analysis, faunal remains, soil chemical analysis. Research issues: Settlement; Site formation; Technology; Subsistence economy; Chronology; Ethnicity.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Napton, Kyle L. and E. A. Greathouse	2010	Archaeological Investigations at P-53-000942/CA-TRI-942, Trinity County, California	California State University, Stanislaus	KM	Prehistory	Evaluation of CA-TRI-942. Analytical studies: Lithic analysis. Research issues: Site function; Site chronology; Subsistence/settlement patterns; Relationship with the Shasta Complex.	
Other	New Haven Colony Historical Society	N.D.	Wilkes Expedition; Diary of Passed Midshipman Henry Eld, 7 September 1841 to 29 October 1841	New Haven Colony Historical Society	CR, KM, UK, SV	History	Diary September-October 1841 of a journey from Fort Vancouver to Oregon Territory through San Francisco, California. Includes sketches.	
Report	Newland, Michael and Mark Walker	2015	A Cultural Resources Damage Assessment of a Segment of the Topsy Road, Siskiyou County, California	Anthropological Studies Center, Sonoma State University	UK	History	Damage assessment of Topsy road (Yreka-Fort Klamath Wagon Road) study area, Siskiyou county. Obsidian sourcing and hydration, radiocarbon data,	
Article	Newland, Michael D.	2006	Gold in the Tailings	Proceedings from the Society for California Archaeology annual meeting 19:93-96	SN	History	Evaluation and reconstruction of two placer-mining sites, Spring Valley Gulch (CA-BUT-1872/H) and McCabe Creek Complex (CA-BUT-362/H).	
Report	Newland, Michael D. Margaret J. Markwyn, Robert G. Douglass, Mark D. Selverston	2012	DRAFT: Spring Valley Gulch Placer Mining Complex (CA-BUT-1872/H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Technical report and evaluation of CA-BUT-1872/H, the Spring Valley Gulch Placer Mining Complex on the southside of the West Branch Feather River. The report discusses the site history and evaluation of 165 historical features that date from 1860 to 1901, representing the remains of the creek placer gold mining along Spring Valley Gultch.	
Report	Newland, Michael D. Mark D. Selverston, and Margaret J. Markwyn	2013	Enterprise Bench Placer Mine (CA-BUT-2570H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-2570H, the Enterprise Bench Placer Mine, located near Enterprise. The technical report discusses the site history and evaluation of the mid- to late- 19th century placer mining events.	
Report	Newland, Michael D. Robert G. Douglass, and Mark D. Selverston	2011	DRAFT: Nash Homestead Complex (CA-BUT-2229H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Technical report of CA-BUT-2229H, the Nash Homestead Complex, on the north side of Thermalito Forebay. The report discusses the site history and evaluation of 19 historical features that date to the 19th century and represent the remains of the homestead complex of Patrick and Ellen Nash.	
Report	Newland, Michael D. Robert G. Douglass, Mark D. Selverston	2014	Flea Valley Ditch (CA-BUT-1068H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-1068H, the Flea Valley Ditch, located on the west bank of the West Branch Feather River. The report discusses the remains of a mid- to late-19th century lumber flume-and-ditch system.	P-04-001068
Report	Newland, Michael Mark Selverston, Lori Stevens, Adrian Praetzellis	2011	Oroville Dredge Fields (CA-BUT-465H): Site Technical Report and NRHP Evaluation. Forks of the Feather River Historic District Evaluation	Department of Water Resources, State of California	SN	History	Evaluation of CA-BUT-465H, the Oroville Dredge Fields site.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Newland, Micheal D., Robert G. Douglass, and Mark D. Selverston	2014	Big Bend Still (CA-BUT-2429H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-2429H, the Big Bend Still, located on the north bank of the Big Bend section of the North Fork Feather River. The technical report discusses the site history and evaluation of the remains of a domed rock oven used from the late-19th to early-20th century.	
Report	Nickels, Adam, Eric Ritter, John Fogerty, Amy Barnes, and Mark Carper	2015	Cultural Resources Investigation for Limekiln Project Area, Trinity River Restoration Program, Trinity County, California	Bureau of Reclamation, Sacramento, California	KM	History	Survey of a portion of the Trinity River canyon, with limited subsurface testing at the Premier Hydraulic Mining site (LK-01/CA-030-2030). (also listed in Part II as FY2015-27)	CA-030-2030
Report	Nilsson, Elena	1985	Archaeological Test Excavations at CA-SIS-1088, Siskiyou County, California	Mountain Anthropological Research, Greenview, California	UK	Prehistory, History	Evaluation of CA-SIS-1088, the Hunter Site. Analytical studies: Lithic analysis, obsidian sourcing and hydration, radiocarbon data, historic artifact assemblage, faunal analysis. Research issues: Relationship between CA-SIS-1088 and FS 05-05-57-48; Site function; Chronology; Settlement and subsistence patterns; Effects on the site by Euro-American intrusion.	
Report	Nilsson, Elena	1987	Archaeological Test Excavations at CA-SIS-154, CA-SIS-1103, and CA-SIS-1105, Siskiyou County, California	Mountain Anthropological Research, Redding, California	UK	Prehistory	Evaluation at CA-SIS-154, CA-SIS-1103 and CA-SIS-1105.Analytical studies: Lithic analysis, faunal analysis, obsidian sourcing and hydration, radiocarbon data, historic artifact assemblage. Research issues: Chronology; Settlement and subsistence; Euro-American influence; Population movements; Shasta Complex analysis.	
Report	Nilsson, Elena	1988	Archaeological Test Excavations at the Ager III Sites CA-SIS-331, CA-SIS-332, CA-SIS-1281, and CA-SIS-1282, Siskiyou County, California	Mountain Anthropological Research	UK	Prehistory	Evaluation of CA-SIS-331, SIS-332, SIS-1281 and SIS-1282, all semi-permanent late period habitation areas. Analytical studies: Geoarchaeology Study, flotation analysis, faunal analysis, ceramic analysis, radiocarbon dating, obsidian hydration and sourcing, human osteological analysis, lithic analysis. Research Issues: Site function; Chronology; Settlement/subsistence patterns; Effects of Euro-American contact and acculturation on aboriginal use; Relationship of Shasta Valley occupants with migrating population (with particular reference to Whistler's (1997) model of multi-staged entry of Penutian speakers into California from the north).	
Report	Nilsson, Elena	1990	Archaeological Test Excavations at CA-TRI-1019: A Late Prehistoric Site in the Upper Trinity River Region of Northern California	Mountain Anthropological Research, Chico, California	KM	Prehistory	Evaluation of CA-TRI-1019, the Reading Creak East site. Analytical studies: Lithic analysis, faunal analysis, macrobotanical remains, obsidian sourcing and hydration. Research issues: Site function; Chronology; Settlement/subsistence; Shasta Complex.	CA-030-0318

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Paper	Nilsson, Elena	1991	Coming of Age: Archaeological Research Within Shasta Valley, Siskiyou County, California	Paper presented at the 25th Annual Meeting of the Society for California Archaeology	UK	Prehistory	Paper given at the Society of California Archaeology annual meeting summarizing the current archaeological database for the Shasta Valley and provisional two-phase cultural sequence.	
Report	Nilsson, Elena, K. Morgan Banks, Gregory Greenway	1989	Archaeological Data Recovery Investigations at CA-SIS-900: A Late Prehistoric Site in Shasta Valley, California	Mountain Anthropological Research, Chico, California	UK	Prehistory	-	
Report	Nilsson, Elena, Kathleen Hull, and Russell Bevill	1996	Archaeological Inventory of the Proposed Orwick Land Exchange, Scott Mountain, Siskiyou County, California	Dames & Moore, Inc., Chico, California	UK	Prehistory, History	Survey of 48 parcels, surface collections, and limited testing of eight sites within the Scott Mountains, Siskiyou county. Analytical data: Lithic analysis, obsidian hydration and sourcing. (also listed in Part II as FY1997-16)	CA-030-0153, CA-030-0223, CA-030-0235, CA-030-0236, CA-030-0984, CA-030-0985, CA-030-0986, CA-030-0987
Report	Nilsson, Elena, Russell Bevill, and Jerald J. Johnson	1996	Archaeological Investigations at CA-PLU-969/H Drakesbad Resort, Warner Valley, Lassen Volcanic National Park	Mountain Anthropological Research and Dames & Moore	SCF	Prehistory	Test excavations at CA-PLU-969/H, a multicomponent site located in the upper Warner Valley. Analytical studies: Lithic analysis, obsidian sourcing and hydration, fauna and flora remains, radiocarbon data, organic blood residue analysis, sediment analysis and historic artifact descriptions. Research issues: Paleoenvironments; Cultural chronology; Subsistence orientations; Settlement patterns; cultural affiliations; Flaked stone technology and obsidian procurement.	
Report	Nilsson, Elena, Sandra Flint and Gregory Greenway	1991	Archaeological Test Excavations at CA-TEH-1488, the New Creek Site, Tehama County, California	Mountain Anthropological Research	SV	Prehistory	Evaluation of CA-TEH-1488 (The New Creek Site), lithic scatter (with human remains). Analytical studies: Lithic analysis, burial analysis, faunal analysis, shellfish analysis, historic artifact assemblage, macrobotanical analysis, obsidian hydration and sourcing analysis. Research Issues: Site function; Chronology and population migration; Subsistence/settlement patterns.	
Article	Nissen, K.M., and E.W. Ritter	1986	Cupped Rock Art in North Central California: Hypothesis Regarding Age and Social/Ecological Context.	American Indian Rock Art 11:59-75	SV	Prehistory	Discovery of a rock art site at McCardle Flat (CA-SHA-511).	
Book	Nixon, Stuart	1966	Redwood Empire: An Illustrated History of the California Redwood Country	E. P. Dutton and Company, New York	CR	History	A general-audience history, long on narrative and short on scholarship.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Thesis	Noble, Michelle D.	2011	An Examination of Variability in Northern California Ground Stone Technologies	M.A. Thesis, California State University, Sacramento	SN, SV	Prehistory	Ground stone technology (use-wear patterns) from northern Sierra Nevada (CA-NEV-199), Lake Oroville and the Feather River Drainage (CA-BUT-84, -362/H), The Sacramento Valley (CA-SAC-225 and BUT-288), and the southern Coast Ranges. Research Issues: Intensification and extensification; Raw material choice; Tool design and toolkit composition.	
Article	Nomland, Gladys	1935	Sinkyone Notes	University of California Publications in American Archaeology and Ethnology 36(2):149-178	CR	Ethnography	Ethnography of the Sinkyone tribe.	
Article	Nomland, Gladys	1938	Bear River Ethnography 2	University of California Anthropological Records 2(2):91-124	CR	Ethnography	Ethnography of the Bear River tribe.	
Article	Nopel, John	1959	The Yana and Yahi Indians of Butte County – Part I	Diggin's 3(3)2, 4-11. Butte County Historical Society	SN, SV	Prehistory, Ethnography	Discussion and description of the Yana and Yahi tribes.	
Report	Oetting, Albert C.	1996	Archaeological Inventory and Evaluation of the Orwick BLM Copco Lake Land Exchange Parcels, Siskiyou County, California	Heritage Research Associates	UK	Prehistory, History	Inventory and evaluation of 13 Copco Lake Land Exchange Parcels. Limited testing at ten prehistoric sites. Analytical data: Lithic analysis, obsidian hydration and sourcing. (also listed in Part II as FY1997-17)	CA-030-0145, CA-030-0146, CA-030-0147, CA-030-0935, CA-030-0946, CA-030-0947, CA-030-0948, CA-030-0949, CA-030-0950, CA-030-0951
Chapter	Olmsted , D. L., and O. C. Stewart	1978	Achumawi	In California, edited by Robert F. Heizer, pp. 225-235. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	UK, SCF	Ethnography	Achumawi ethnography	
Report	Olsen, William H. and F. A. Riddell	1963	The Archaeology of the Western Pacific Railroad Relocation, Oroville Project, Butte County, California	Department of Parks and Recreation, Division of Beaches and Parks, Interpretive Services Section	SN	Prehistory	Test excavations at CA-BUT-98, CA-BUT-103, CA-BUT-105, CA-BUT-131. Analytical studies: Lithic analysis, faunal analysis, human remains. Research issues: Archaeological relationships; Sequence for the Oroville Area.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Origer, Thomas M.	1995	An Evaluation of CA-HUM-945: An Archaeological Site near Redway, Southern Humboldt County, California	Thomas M. Origer, Consulting Archaeologist, Cotati, California	CR	Prehistory	Evaluation of CA-HUM-945 near Redway, California. Analytical studies: Lithic analysis, obsidian hydration and sourcing, ethnobotanical remains. Research issues: Extend of cultural deposits; Artifact classes; Site integrity; Chronological duration; Technological and social change;	
Report	Origer, Thomas M.	2000	A Search for an Earthquake: Archaeological Investigations at CA-HUM-177, Humboldt County, California	Origer and Associates	CR	Prehistory, History	Investigations at CA-HUM-177. Analytical studies: Debitage analysis, obsidian sourcing and hydration, faunal analysis, floral analysis, shellfish remains, historic artifact inventory (glass bead).	
Book	Orsi, Richard J.	2007	Sunset Limited: The Southern Pacific Railroad and the Development of the American West, 1850-1930	University of California Press	CR, KM, UK, SV	History	Detailed discussion of the political, economic, technological, and land-use histories of the Southern Pacific Railroad and its subsidiaries. Includes information on SPRR interactions with federal agencies, some discussion of important legislation (Taylor Grazing Act, Sawyer Act, etc.).	
Book	Palmer, Lyman L.	1880	History of Mendocino County, California	Alley, Bowen & Co., San Francisco, California	CR	History	History of Mendocino County. Discusses Bear Flag War, county history, mining, schools, Native Californians, Mexican grants, statistical, legislative and political histories.	
Paper	Parkman, Edward B., and Sylvia Stewart-White	1985	Yontocket: Returning Balance to the Center of the Tolowa World	Bureau of Land Management, Redding, California	CR	Ethnography	Yontocket village and Tolowa ethnography (CA-DNO-11, CA-DNO-13).	
Report	Parkman, Edward Breck	1984	An Archaeological Evaluation of the Yontocket Village Site (CA-DNO-19), Lakes Earl and Tolowa Project. California Department of Parks and Recreation, Northern Region Headquarters, Santa Rosa, California	California Department of Parks and Recreation, Northern Region Headquarters	CR	Prehistory	Evaluation of CA-DNO-19, village site. Limited excavation with no analytical studies presented.	
Report	Paterson, Alan M., Rand F. Herbert and Stephen R. Wee	1978	A Historical Overview of California's North Coast Region with Particular Reference to Designated lands in Sustained Yield Unit No. 13		CR	History	History of Humboldt and Mendocino counties including trapping, logging, shipping, and transportation in association with San Francisco Bay.	
Book	Payen, Louis A.	1966	An Atlatl from Potter Creek Cave, Shasta County, California	Unpublished manuscript	SV	Prehistory	Discussion of an atlatl recovered from Potter Creek Cave including comparisons with atlatls from other regional and cultural-temporal considerations.	
Article	Payen, Louis A. and R. E. Taylor	1976	Man and Pleistocene Fauna at Potter Creek Cave, California	Journal of California and Great Basin Anthropology 3(1):51-58	SV	Prehistory, History	Data analysis at the Potter Creek Cave timeframe controversy. Reported radiocarbon studies and obsidian hydration on the 1965 trenching and excavation by Payen (1966).	
Report	Peak and Associates	1984	A Lithic Examination of the Collection from CA-SHA-1434	Peak & Associates, Inc.	SV	Prehistory	Lithic analysis of flakes collected from CA-SHA-1434 for the City of Redding.	CA-030-0177

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Peak, Ann S.	1977	Final Report on the Test Excavations at CA-SHA-544, Lake Redding Estates, Shasta County, California	Peak & Associates, Inc.	SV	Prehistory	Evaluation of CA-SHA-544, habitation site. Analytical studies are limited to lithic artifact analysis. Research issues discusses the presence of the village.	
Book	Petersen, Edward	1965	In the Shadow of the Mountain – A Short History of Shasta County, California	Self-published, Cottonwood, California	SV	History	Shasta County history of Native American people, miners, and settlers of the community of Cottonwood.	
Report	Pfilf, Julie	1995	Research Design for the Historical/Archaeological Investigations at CA-HUM-662H, the Humboldt Harbor Lighthouse near Samoa, Humboldt County, California	Bureau of Land Management, Arcata, California	CR	History	Research design for investigations at CA-HUM-662H, the Humboldt Harbor Lighthouse. Research issues: Earl Pomeroy's Model of the American West; World Systems Theory; Consumer Behavior Patterns; Chronology; Architecture and spatial organization; Ethnicity and gender;	CA-HUM-0662
Article	Philben, Vicki, and Eric Ritter	2009	Ceramic Assemblage from the Old Shasta County Hospital (CA-SHA-4321H), 1855-1900	Proceedings from the Society for California Archaeology annual meeting 22	SV	History	Examination of the ceramic assemblage from the Shasta County Hospital (CA-SHA-4321H).	
Thesis	Pierson, Heidi K.	2008	The Historical Archaeology of Ethnicity at Two Mining Sites in West Redding, California	M.A. Thesis, California State University, Chico	SV	History	Thesis study of the Bird's Nest Cabin (CA-SHA-3642H) and Double Happiness Site (CA-SHA-1787H). Research Issue: Were these sites solely occupied by Chinese miners, or were they multiethnic mining camps?	CA-030-0391, CA-030-1518
Chapter	Pilling, A.R.	1978	Yurok	In California, edited by Robert F. Heizer, pp. 137-154. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	CR	Ethnography	Discussion of the Yurok culture.	
Thesis	Plyley , Stefan D.	1996	The Shasta Indians of California: A Historical Geography	M.A. Thesis, California State University, Chico	UK	Prehistory, History	Historical geography of Shasta Indians. Research Issues: How did the presence of Euro-Americans affect the subsistence patterns of the Shasta Indians? How did the geographic displacement of Shasta Villages and food sources lead to conflict between the Shasta and Euro-Americans? What arrangements were made to mitigate the hostilities between the Shasta and Euro-Americans? What as the post-treaty conditions of the Shasta people?	
Article	Pope, Saxton T.	1920	The Complete Medical History of Ishi	University of California Publications in American Archaeology and Ethnology 13(5):175-213	SCF		The Complete Medical History of Ishi	
Article	Pope, Saxton T.	1974	Hunting With Ishi - The Last Yana Indian	Journal of California and Great Basin Anthropology 1(2):152-173	SCF	Ethnography	Reprint of Saxton T. Pope 's work "The Story of the Last Yana Indian".	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Praetzellis, Adrian, Mark D. Selverston, Mike Newland, Mark Walker, Jo Markwyn, and Robert G. Douglass	2006	McCabe Creek Placer Mining Complex (CA-BUT-362/H): Evaluation and Site Technical Report, Oroville Facilities Relicensing FERC Project No. 2100	Sonoma State University, Rohnert Park, California	KM	History	Brief overview of the McCabe Creek Placer Mining Complex (CA-BUT-362/H) from the Oroville region. Discusses six major eras of mining between 1848 and 1942.	
Article	Pritchard, W. E, D. M. Hill, Sonia R. Purcell, and Roy Purcell	1966	The Porter Rock Shelter Site (But-S177), Butte County, California	University of California Los Angeles Archaeological Survey Annual Report 8, pp. 291-315	SN, SV	Prehistory	Excavations at a late-period rockshelter near Butte Valley, with projectile points, beads, and perishables.	
Report	Raskin, Karen	2014	Archaeological Excavations at Locus 7 Homesite in the Town of Falk and the Elk River Mill and Lumber Company, Headwaters Forest Reserve, USDI-Bureau of Land Management, Humboldt County, California	Cultural Resources Facility, Humboldt State University	CR	History	Investigations at the Headwaters Forest Reserve in the town of Falk. Discusses historic background and previous studies. Excavations focus on structural building analysis and historic artifacts.	
Report	Reed, Karen L.	1980	The Chinese in Tehama County: 1860-1890. Research Paper No. 6	Association for Northern California Records and Research	SV	History	Overview of the anti-Chinese agitation, legislation, and violence that marked the state's history, and the general anti-Chinese attitudes in the state into the specific locale of Tehama County.	
Report	Reese, Elena, Will Anderson, Hannah Ballard, and William Shapiro	2009	Archaeological Mitigation Report for the AG-TPUD-8 Site	Pacific Legacy, Inc.	KM	History	Archaeological mitigation for historical mining site complex. (also listed in Part II as FY2009-16)	CA-030-1859
Report	Reynolds, Linda	1981	Mumbo Jumbo Archaeological Site: (FS #05-14-59-184) A Preliminary Report	Shasta-Trinity National Forest, Redding, California	KM	Prehistory	Limited test excavation at FS #05-14-59-184, the Mumbo Jumbo Site. Report includes artifact inventory and field methods.	
Report	Reynolds, Terry S., and Charles Scott	1980	Battle Creek Hydroelectric System	-	SV	History	History of the hydroelectric system at Battle Creek and the expansion of hydroelectric/power companies in Northern California: 1896-1980.	
Report	Rich, William	2014	A Cultural Resources Investigation for the Trinity River Restoration Program-Dutch Creek Phase Located in Junction City, Trinity County, California	William Rich and Associates	KM	History	Inventory of eight historic sites: Evans Bar Mine (WRA-01), Lang Junkans Mine (WRA-04), Dutch Creek Mine (CA-TRI-700H), Perkins Bar Mine (WRA-03), Munster/Myers Mine (WRA-03), Johnson Point Mine (WRA-07), Joe Ham Mine (CA-TRI-718H), and Unknown Mine (WRA-08).	CA-030-2037
Report	Rich, William, and James Roscoe	2009	Historical Archaeological Investigations at the Train Engine House in the Townsite of Falk and the Elk River Mill and Lumber Company Headwaters Forest Reserve, USDI Bureau of Land Management, Humboldt County, California	Cultural Resources Facility, Humboldt State University	CR	History	Historic investigations at the Train Engine House at the town of Falk. Discusses artifact recovery from the main engine house building and adjacent rooms. Includes interpretation of dating the southeast room, and discusses domestic food, work clothing and workplace alcohol consumption.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Riddell, Francis	1982	Cultural Resource Review of Butte Valley Wildlife Area, Siskiyou County	Department of Fish and Game	UK	Prehistory	Twenty-four sites recorded in the Butte Valley Wildlife Area, Siskiyou County. Three basic types of sites: Base of hills facing the lake, sites on lake shore and sites along creeks. No description or discussion of artifacts in this report. The report consists of site descriptions and NRHP eligibility recommendation.	
Chapter	Riddell, Francis A.	1978	Maidu and Konkow	In California, edited by Robert F. Heizer, pp. 370-386. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	SN	Ethnography	Maidu and Konkow ethnography	
Thesis	Ritter, Eric W.	1968	Culture History of the Tie Wiah (4-But-84), Oroville Locality, California	M.A. Thesis, University of California	SN	Prehistory	Excavation at Tie Wiah (4-BUT-84), Oroville Lake. Analytical studies: Obsidian hydration, lithic analysis, shell bead analysis, human remains. Research Issues: "…postulated prehistoric human behavior patterns will be compared with the analogous ethnographic literature."	
Article	Ritter, Eric W.	1970	Northern Sierra Foothill Archaeology: Culture History and Culture Process	Center for Archaeological Research at Davis	SN	Prehistory	Cultural-historical summary of the Lake Oroville area with an emphasis placed on findings from BUT-84.	
Article	Ritter, Eric W.	1985	Multifaceted Research and the Enigmatic Shingletown Cliff Paintings of Northern California	American Indian Rock Art 12:65-74	SCF	Prehistory	Study of Shingletown cliff paintings.	
Report	Ritter, Eric W.	1986	The Historic Archaeology of a Chinese Mining Venture near Igo in Northern California	Cultural Resources Report: Archaeology, Bureau of Land Management, Redding, California	SV	History	Inventory of historic artifacts representing Chinese mining found near Igo.	
Report	Ritter, Eric W.	1987	Archaeological Test Excavations at Spider Rockshelter (CA-Teh-1432), Lower Mill Creek Canyon, California	Cultural Resources Report: Archaeology, Bureau of Land Management, Redding, California	SCF	Prehistory	Testing at CA-TEH-1432, the Spider Rockshelter site. Analytical studies: Lithic analysis, faunal remains, obsidian sourcing and hydration, historic artifact assemblage. Research issues: Culture chronology; Settlement/subsistence; Technology; Trade/exchange; Deposit formation processes.	CA-030-0214
Report	Ritter, Eric W.	1989	Sheep Rock Shelter (CA-SIS-266): Archaeological Test Excavations in Shasta Valley	Cultural Resources Report: Archaeology, Bureau of Land Management, Redding, California	UK	Prehistory	Evaluation at CA-SIS-266, the Sheep Rock Shelter. Analytical studies: Lithic analysis, fire-affected rocks, seed analysis, palynology, faunal analysis, obsidian sourcing and hydration, radiocarbon data. Research issues: Site integrity; Chronology of the deposit; Identify intact deposits.	CA-030-0144

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Ritter, Eric W.	1994	An Archaeological Inventory and Evaluation for Select Western Tehama County Lands	Bureau of Land Management, Redding, California	KM, SV	Prehistory	Limited testing of six sites in land-exchange parcels. Analytical data: Limited to artifact summaries and the analysis of Prospect Chert Quarry. The sites include CA-030-584 (Snag View Scatter), CA-030-585 (Eye Fly Site), CA-030-586 (Broken Tank Scatter), CA-030-587 (Leather Oak Scatter), CA-030-588 (Prospect Quarry), and CA-030-589 (Dead Pine Site). (also listed in Part II as FY1994-24)	CA-030-0584, CA-030-0585, CA-030-0586, CA-030-0587, CA-030-0588, CA-030-0589
Report	Ritter, Eric W.	1996	Supplemental Report on Archaeological Site Testing for the Western Tehama Land Exchange Project	Bureau of Land Management, Redding, California	SV	Prehistory	Limited testing of sites in land-exchange parcels. (also listed in Part II as FY1996-05)	CA-030-0637, CA-030-0647, CA-030-0650
Article	Ritter, Eric W.	1998	Boundary, Style and Function: Extrapolation from the Keno, Oregon, Pictographs	American Indian Rock Art 25:81-101	UK	Prehistory	An excellent example of a plateau petroglyph complex in southern Oregon with linkages to those found in the Lava Beds area of northern California.	
Report	Ritter, Eric W.	2009	Implementation of the Shasta-Yreka Road CA-SHA-2806 Historic Properties Treatment Plan	Bureau of Land Management, Redding, California	SV	History	Treatment plan implementation for the Shasta-Yreka Road (CA-SHA-2806H). Discusses historic background and context. (also listed in Part II as FY2010-03)	CA-030-0187, CA-030-0551, CA-030-1399
Report	Ritter, Eric W.	2011	The Middle Creek Road CA-SHA-2667H Historic Property Treatment Plan Implementation	Bureau of Land Management, Redding, California	SV	History	Middle Creek Road (CA-SHA-2667H) treatment plan implementation. Discusses historic artifact assemblage. (also listed in Part II as FY2011-13)	CA-030-1079
Article	Ritter, Eric W. and E.B. Parkman	1992	Rock Art of the Foothills of the Northern Sierra Nevada Southern Cascade Range Interface	American Indian Rock Art 18:81-104	SCF, SN	Prehistory	Discussion of known petroglyph sites at the interface of the northern Sierra Nevada and southern Cascade foothills.	
Report	Ritter, Eric W. and K.D. Tyree	1999	Rockshelter Excavations on Hogback Ridge, Tehama County, California: the Archaeological Record	Cultural Resources Publications: Archaeology, Bureau of Land Management, Redding, California	SCF	Prehistory	Excavation of three rockshelters on Hogback Ridge: CA-TEH-1554 (B&B Rockshelter), CA-TEH-1555 (Blue Dick Rockshelter), CA-TEH-1556 (Pipevine Rockshelter). Analytical data: Lithic analysis, obsidian sourcing and hydration, blood residue analysis, faunal and flora remains, human burials. Research issues: Chronology; Settlement/Subsistence; Technology; Trade/exchange; Site formation.	CA-030-0454, CA-030-0455, CA-030-0473
Report	Ritter, Eric W. KD Tyree and Elaine Sundahl	2013	Archaeological Resources of the West Tehama Land Exchange Project	Cultural Resources Publications: Archaeology, Bureau of Land Management, Redding, California	SV	Prehistory	Excavation of CA-TEH-1614 and CA-TEH-1615. Analytical studies: Lithic analysis, obsidian sourcing, chert petrography, blood residue.	CA-030-0585, CA-030-0588

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Book	Ritter, Eric W., ed.	1992	Gold and Lumber: Two Papers on Northern California History and Archaeology	Cultural Resources Publications: History/Archaeology, Bureau of Land Management, Redding, California	SV	History	Two papers on Northern California History and Archaeology. Paper 1: Historical and Archaeological Investigations at the Horsetown Mining Complex, Shasta County, California discusses gold mining history in northern California with evidence from CA-030-0475 (trenches, rock work, a rock dam, ditches, a granite quarry, adits and tailings). Paper 2: The Historic Blue Ridge Flume of Shasta and Tehama Counties, California (Dottie Smith) discusses the Blue Ridge Flume important role in the lumber company.	CA-030-0310, CA-030-0475
Report	Ritter, Eric W., James Barnes, and Barbara Woodrum	2014	Frank and Lena's Neighborhood: Historical Archaeology in Rural Early 20th Century Northern California	Cultural Resources Publications: Archaeology/History, Bureau of Land Management, Redding, California	SV	History	Twentieth century rural families near Redding, specifically CA-SHA-2399/H, The Green Place. Discusses historic artifact assemblage. Research Issues: Socio-political organization; Economics and environment; Industrial/technological development.	CA-030-0520
Chapter	Ritter, Eric, and Harvey L. Crew	2008	The Multiplicity of Prehistoric Flaked Stone Tool Assemblages in the Northern Sacramento Valley	In Avocados to Millingstones, Papers in Honor of D.L. True, edited by Georgie Waugh and Mark E. Basgall, pp. 27-50. Monographs in California and Great Basin Anthropology No. 5 Archaeological Research Center, California State University, Sacramento	SV	Prehistory	Discusses surface lithic scatters on Pleistocene terraces in Redding	
Film	Roberts, Magdalena	2012	A Man Called Ishi	ALVA Productions, California State University, Chico	SCF		Biography of Ishi, the Yahi Indian	
Book	Robertson, Donald	1998	Encyclopedia of Western Railroad History, Volume IV: California	Caxton Printers, Ltd., Caldwell, Idaho	CR, KM	History	Overview of railroads in California: dates of operation, history of consolidation, uses (freight, passenger, logging, etc.). Lists of early post offices and military forts, with dates. Several maps but without details/landmarks.	
Book	Rocca, Al M.	1993	The Shasta Dam Boomtowns, Community Building in the New Deal Era	Redding Museum of Art and History, Redding, California	SV	History	Shasta Dam towns and community	
Book	Rocca, Al M.	1995	America's Shasta Dam, A History of Construction 1936-1945	Redding Museum of Art and History, Redding, California.	SV	History	Construction of the Shasta Dam	
Paper	Roscoe, J.	1995	CA-HUM-513/H, A Borax Lake Pattern Site Located in a Coastal Setting	Paper presented at the 29th annual meeting of the Society for California Archaeology	CR	Prehistory	Society of California Archaeology annual meeting paper presentation of data from CA-HUM-513/H.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Rose, Chelsea E., Katie Johnson, and Mark A. Tveskov	2010	'On and Onwards': A Comprehensive Study for the Applegate Trail, The Southern Route to Oregon	Southern Oregon University Laboratory of Anthropology, Ashland, Oregon. Prepared for the Oregon Department of Transportation (ODOT).	UK	History	A Comprehensive Study for the Applegate Trail	
Report	Rosenthal, Jeff and Jack Meyer	2009	Cultural Resources Survey and Geoarchaeological Investigation of the Hamilton City Flood Damage Reduction and Ecological Restoration Area, Glenn County, California	Far Western Anthropological Research Group, Inc., Davis, California	SV	Prehistory	Reconnaissance and geoarchaeological exploration of seven prehistoric and two historic-period archaeological sites, six prehistoric isolates, one historic-period building, seven historic-period structures, and one landscape feature.	
Report	Ruby, Allika	2013	Extended Phase I and Phase II Archaeological Investigation of CA-HUM-1157 for the Van Duzen-Peanut State Route 36 Improvement Project, Humboldt County, California	Far Western Anthropological Research Group, Inc., Davis, California	KM	Prehistory	Evaluation of CA-HUM-1157 on Highway 36. Analytical studies: Artifact assemblage. Research issues: Chronology; Residential mobility and regional settlement patterns; Lithic procurement; Interregional exchange and the Athabaskan intrusion.	
Book	Sackman, Douglas Cazaux	2010	Wild Men: Ishi and Kroeber in the Wilderness of Modern America	Oxford University Press	SCF	Ethnography	Stories of Ishi and Alfred Kroeber	
Report	Salter, John	2003	White Paper on Behalf of the Karuk Tribe of California: A Context Statement Concerning The Effect of the Klamath Hydroelectric Project on Traditional Resource Uses and Cultural Patterns of the Karuk People Within the Klamath River Corridor	PacifiCorp in Connection with Federal Energy Relicensing Commission	CR, KM	Ethnography	Documents Karuk tribal uses of resources found within the Klamath River corridor (especially on health and salmonid resources). Includes ethnographic interviews of Karuk people.	
Article	Sapir, Edward, and Leslie Spier	1943	Notes on the Culture of the Yana	University of California Anthropological Records 3(3):252-253	SCF	Ethnography	Notes on the Culture of the Yana	
Report	Schlichter, Alice	1981	Wintu Dictionary	UC Berkeley Department of Linguistics	KM, SV	Ethnography	Wintu dictionary.	
Article	Selverston, Mark D.	2006	Historical Maidu of the Feather River	Proceedings from the Society for California Archaeology annual meeting 19:77-82	SN	Prehistory, History, Ethnography	Summarizes the potential of research issues exploring the Konkow Maidu living on the frontier of the colonial expansion (CA-BUT-1890/H).	
Report	Selverston, Mark D., Adrian Praetzellis, and Robert G. Douglass	2011	Forks of the Feather River Historic District, Historic-era Resources District Evaluation	Anthropological Studies Center, Sonoma State University	SN	History	Historical research on Forks of the Feather River Historic District 1830-1957. Evaluation results for historic-era properties within the project area elaborating on three dominant historic contexts: Gold rush, settlement, and other extraction industries.	
Report	Selverston, Mark D., Margaret J. Markwyn, Mark Walker, Michael G. Delacorte, and Mark Basgall	2005	Archaeological and Historical Resources Inventory Report, Oroville Facilities Relicensing FERC Project No. 2100	Sonoma State University and California State University	SN	Prehistory, History	Archaeological and historical resources inventory. A total of 478 historical, 250 prehistoric and 75 multi-component sites were identified and documented.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Selverston, Mark D., Micheal D. Newland, Robert G. Douglass, and Margaret J. Markwyn	2011	DRAFT: Bell Ranch Placer Mining Complex (CA-BUT-499/H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Technical report of CA-BUT-449/H, the Bell Ranch Placer Mining Complex, near Loafer Creek. The report discusses the site history and evaluation of the historic-era component, including 160 historical features that date to the mid- to late-19th century.	
Report	Shackley, Steven M.	1987	US Sprint Fiber Optic Cable Project Archaeological Testing of Four Sites in California: CA-BUT-5, TEH-1468, SHA-1684, SIS-332	Dames & Moore, Inc., Chico, California	UK, SV	Prehistory	Evaluation of CA-BUT-5, TEH-1468, SHA-1684, SIS-332. Wide spatial range of sites. Analytical studies: Lithic analysis, historic artifact assemblage, obsidian sourcing and hydration. Research Issues: Hunter-Gatherer mobility and lithic technology; Technology and residential mobility.	
Report	Shapiro, L. A., R. J. Jackson, A. T. Leigh, and K. C. Long	2000	Phase II Investigations: CA-TEH-45, State Route 99 at Antelope Creek, Tehama County, California	Pacific Legacy, Inc., Cameron Park, California	SCF	Prehistory	Evaluation at CA-TEH-45 on Antelope Creek. Analytical studies: Lithic analysis, faunal analysis, human bone, shell beads, obsidian sourcing and hydration, radiocarbon data, macroflora analysis. Research issues: Chronology; Settlement/subsistence; Population mobility; Technology; Site formation; Exchange systems.	
Report	Shapiro, Lisa	2007	Phase III Data Recovery at Prehistoric Archaeological Site CA-TEH-34 for the Toomes Creek Bridge Replacement Project on State Route 99 in Tehama County, California	Pacific Legacy, Inc., Cameron Park, California	SV	Prehistory	Evaluation of CA-TEH-34. Analytical studies: Lithic analysis, obsidian sourcing and hydration, faunal analysis, paleoethnobotany, radiocarbon data, shell beads, shellfish remains. Research issues: Chronology; settlement/subsistence; Population mobility and ethnolinguistic affiliation; Technology and assemblage reconstruction; Exchange and external relations.	
Report	Shapiro, Lisa and Robert J. Jackson	2001	Phase III Archaeological Investigations in the Eastern Locus of CA-SHA-47 for the Proposed Turtle Bay Bridge on the Sacramento River in Redding, Shasta County, California	Pacific Legacy, Inc.	SV	Prehistory	Evaluation of CA-SHA-47. Analytical studies: Lithic analysis, obsidian sourcing and hydration, faunal analysis, archaeobotanical. Research issues: Archaeological Context; Cultural chronology; Reconstruction of paleoenvironment; Flaked stone technology; Settlement, subsistence, and social organization; External relations.	
Article	Shaw, Heidi A. and Eric W. Ritter	2015	Ailments and Cures in California's Early Shasta County History (1849-1900)	Proceedings from the Society for California Archaeology annual meeting 29:21-32	SV	History	Review of historic-era health care of Shasta County through archaeological collections and literature.	
Report	Shoup, Laurence H.	1983	An Interpretation and Assessment of the Significance of the Historic Cultural Properties of Redwood National Park	-	CR	History	Discussion of historical events linked to specific resources in the park, especially ranches and farms. Earlier presentation of the Self-sufficiency vs. Dependency model used in Greenwood and Shoup (1984).	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Chapter	Silver, Shirley	1978	Chimariko	In California, edited by Robert F. Heizer, pp. 205-210. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	KM	Ethnography	Discussion of the Chimariko culture.	
Chapter	Silver, Shirley	1978	Shastan Peoples	In California, edited by Robert F. Heizer, pp. 211-224. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	KM, UK	Ethnography	Discussion of the Shastan culture.	
Article	Simons, Dwight D., Thomas N. Layton, and Ruthann Knudson	1985	A Fluted Point from the Mendocino County Coast	Journal of California and Great Basin Anthropology 7(2):260-269	CR	Prehistory	Discussion on a fluted, crypto-crystalline projectile point discovered near Caspar, Mendocino County.	
Article	Simpson, Glenn D.	1998	Wreckers on the Bay: The Archaeological Potential of Historic Shipwrecks in the Humboldt Bay Region	Proceedings from the Society for California Archaeology annual meeting 11:135-140	CR	History	Predictive modeling for identifying the location of historic shipwrecks within the Humboldt Bay region.	
Report	Sinclair, William	1904	The Exploration of the Potter Creek Cave	University Press	SV	Prehistory	Excavations at Potter Creek Cave recovering quaternary fauna and bone tools.	
Book	Smith, C. E., and W. D. Weymouth	1952	Archaeology of the Shasta Dam Area, California	Reports of the University of California Archaeological Survey 18. University of California, Berkeley	SV	Prehistory	Excavation of three sites in the Shasta Dam area (Site 22, Site 21, and Site 20). Analytical studies: Lithic analysis, beads (seed, shell and glass), human remains.	
Chapter	Smith, Dottie	1992	The Historic Blue Ridge Flume of Shasta and Tehama Counties, California	In Gold and Lumber: Two Papers on Northern California History and Archaeology. Cultural Resources Publications: History/Archaeology. Bureau of Land Management, Redding, California	SV	History	A study of the construction of wooden flumes for logging practices, like the historic Blue Ridge Flume in the Shasta/Tehama region.	
Report	Smith, Dottie	1997	Historical Overview of the Western Tehama County Foothills	Cultural Resources Publications: History, Bureau of Land Management, Redding, California	SV	History	History of western Tehama County focusing on BLM lands. Discussion on project area includes mines, logging, agriculture, livestock, trails/roads).	
Report	Smith, Dottie and E. W. Ritter	1995	Historic Data Inventory of the Shasta County Interlakes Special Recreation Management Area	Cultural Resources Publications: History, Bureau of Land Management, Redding, California	SV	History	Discussion of mining (gold, copper, silver, zinc) and hydroelectric development in the Management Area; lists and describes >160 mines and mining claims. Information on Shasta Dam and the Central Valley Project.	
Article	Smith, Sheli O.	2006	The Archaeological Survey of the Shipwreck Frolic	Proceedings from the Society for California Archaeology annual meeting 19:43-48	CR	History	Archaeological survey of the gold rush era shipwreck Frolic at Point Cabrillo State Reserve.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Thesis	Snyder, Devin	2014	Evaluating the Validity of The Chico Regional Cultural Chronology: Radiocarbon and Obsidian Analysis at Three Late Period Village Sites	M.A. Thesis, California State University, Chico	SV	Prehistory	Radiocarbon and obsidian analyses at CA-BUT-1, CA-BUT-7 and CA-BUT-12. Evaluates the validity of the Chico cultural sequence. History of the chronology building. Radiocarbon results truly define the Chico Complex, however, the obsidian hydration does not.	
Article	Spier, Leslie	1930	Klamath Ethnography	University of California Publications in American Archaeology and Ethnology 30	KM, UK	Ethnography	Ethnography of the Klamath tribe.	
Chapter	Stern, T.	1998	Klamath and Modoc	In Plateau, edited by D. E. Walker, pp. 446-466. Handbook of North American Indians 12, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	UK	Prehistory	Discussion of the Klamath and Modoc tribe culture.	
Article	Stewart, Suzanne	2006	They Came to Stay: Post-Gold Rush Settlement at the Forks of the Feather River	Proceedings from the Society for California Archaeology annual meeting 19:97-102	SN	History	Comparison of research issues from four post-gold rush historic-era sites (CA-BUT-2229H, -2652/H. -194/H, -2522/H).	
Report	Stewart, Suzanne B., and David A. Fredrickson (eds)	1979	A Cultural Resources Survey of the Round Valley Indian Reservation, Mendocino and Trinity Counties, California	National Park Service	KM	Prehistory	Archaeological survey of Round Valley Indian Reservation near Covelo.	
Article	Strayer, Sandra	2011	Ribar High 2 Ground Stone Tool Analysis	Proceedings from the Society for California Archaeology annual meeting 25	CR	Prehistory	Ground stone tool analysis as the result of salvage archaeology in Humboldt County at site Ribar High 2.	
Paper	Strumpf, Gary D.	1998	Gold Mining in Siskiyou County 1850-1900	Occasional Paper No. 2. Siskiyou County Historical Society, Yreka, California	UK	History	Inventory and descriptions of gold mining in Siskiyou County.	
Report	Sullivan, N.	1990	Black Butte Lake, The Human Biology of Cemetery 2, CA-TEH-10	Hornet Foundation, California State University, Sacramento	SV	Prehistory	Excavation of 269 human burials at CA-TEH-10, Cemetery 2. Analytical studies: Dental development, paleodemography, skeletal pathology, dental pathology, craniometrics.	
Report	Sullivan, Tammy, Eric W. Ritter, Richard Silva, James Barnes, John Hitchock, Richard Jenkins, James Rock, Claude Singleton, Kathleen Moody, Larry Alexander, and Ann Wagner	2005	An Archaeological Study of the Yreka Trail, Siskiyou County, California	Bureau of Land Management, Northern California Resource Center, US Forest Service, California Department of Forestry and Fire Protection, and Siskiyou County Historical Society	UK	History	Collaborative study of the Yreka Trail and Pitt River Road between BLM, Forest Service, and California Resource Center. "Survey resulted in a precise definition of the Yreka Trail route...There are many different reasons why it is an important pieces of history..."	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Paper	Sundahl, Elaine	1976	Churn Creek: A Possible Early Lithic Locality in Shasta County, California	Paper presented at the 10th annual meeting of the Society for California Archaeology	SV	Prehistory	Society of California Archaeology annual meeting paper presentation of archaeological data from Churn Creek in Shasta County.	
Thesis	Sundahl, Elaine	1982	The Shasta Complex in the Redding Area, California	Department of Anthropology, California State University, Chico	SV	Prehistory	Thesis study of CA-SHA-222 and CA-SHA-266, two Shasta Complex sites. Analytical studies: Lithic analysis (projectile points), distribution of bone/shell artifacts, obsidian sourcing and hydration, radiocarbon data, burial analysis. Research issues: "A hypothetical model for the history and life style of the Shasta Complex people is offered which draws on archaeological, ethnographic and linguistic studies"	
Report	Sundahl, Elaine	1985	Archaeological Investigations at the Spattercone Site (FS 05-14-61-308) in the Medicine Lake Highlands Northeastern California	Shasta College Archaeology Laboratory, Redding, California	UK	Prehistory	Damage evaluation of FS 05-14-61-308, the Spattercone site. Analytical studies: Obsidian sourcing and hydration, lithic analysis. Research issues: Site function; Cultural identification; Utilization of Grasshopper Flat obsidian.	
Report	Sundahl, Elaine	1985	An Archaeological Evaluation of the Mumbo-Jumbo Site (CA-TRI-622) in Northern California	Shasta College Archaeology Laboratory, Redding, California	KM	Prehistory	Evaluation of CA-TRI-622, the Mumbo-Jumbo site on Mumbo Creek. Analytical studies: Lithic analysis, stratigraphy, obsidian hydration and sourcing. Research issues: Chronology; Site function; Obsidian distribution; Cultural affiliation; Regional implications.	
Report	Sundahl, Elaine	1986	Cultural Resources of the Shasta Lake Pool Area, Shasta County, California	Shasta-Trinity National Forest, Redding, California	SV	Prehistory, History	Survey of the Shasta Lake Pool area. Inventory of 37 sites recorded.	
Report	Sundahl, Elaine	1986	Archaeological Investigations in the Jones Valley Area of Shasta Lake, Shasta County, California	Shasta College Archaeology Laboratory, Redding, California	SV	Prehistory	Impact assessment at CA-SHA-987, the Cow Pasture site (FS 05-14-58-121). Analytical studies: Obsidian sourcing and hydration, lithic analysis, historic artifact assemblage. Research issues: Effects of inundation on obsidian hydration.	
Report	Sundahl, Elaine	1987	Archaeological Testing on Cable Creek, South Fork Mountain Sites 05-14-52-375 and 05-14-52-406, Trinity County, California	Hayfork Ranger District, Shasta Trinity National Forests	KM	Prehistory	Testing at 05-14-52-375 and 05-14-52-406, Cable Creek. Analytical data: Lithic analysis and obsidian hydration and sourcing analysis. Research issues: Chronology, cultural sequence, settlement/subsistence, and cultural affiliations at high elevation sites.	
Report	Sundahl, Elaine	1988	Cox Bar (CA-TRI-1008): A Borax Lake Pattern Site on the Trinity River, Trinity County, California	Shasta College Archaeology Laboratory, Redding, California	KM	Prehistory	Borax Lake Pattern on the Trinity River at Cox Bar (CA-TRI-1008). Analytical studies: Geoarchaeological studies, obsidian sourcing and hydration, lithic assemblage. Research issues: Chronology; Paleoenvironmental reconstruction; Subsistence patterns; Ethnic/Linguistic affiliation.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Sundahl, Elaine	1990	Test Excavations at CA-SHA-499, The Chirpchatter Site, Shasta County, California	Shasta College Archaeology Laboratory, Redding, California	SCF	Prehistory	Testing at CA-SHA-499, The Chirpchatter site. Analytical studies: Lithic analysis, radiocarbon data, obsidian sourcing and hydration.	
Article	Sundahl, Elaine	1992	Cultural Patterns and Chronology in the Northern Sacramento River Drainage	Proceedings from the Society for California Archaeology annual meeting 5:89-112	SV	Prehistory	Review of archaeological investigations, cultural patterns and chronology of the northern Sacramento Valley.	
Report	Sundahl, Elaine	1992	Archaeological Investigations in the Squaw Creek Drainage, Shasta County, California, Vol. 1: Overview	Shasta College Archaeology Laboratory, Redding, California	SCF, SV	Prehistory	Synthesis of excavations of CA-SHA-475, CA-SHA-499 (The Chirpchatter Site), CA-SHA-534, CA-SHA-537, CA-SHA-864 (The Wheeler Site), CA-SHA-1598, CA-SHA-1601 (Happy Hunting Camp), CA-SHA-1870 by the Shasta College Archaeology classes. Analytical studies: Radiocarbon data, obsidian sourcing and hydration. Research issues: Chronology; Settlement/subsistence; Raw material procurement; Cultural identity and ethnolinguistic boundaries; Hypothetical model of prehistory for the Squaw Creek Drainage.	
Report	Sundahl, Elaine	1993	Archaeological Excavations in the Bend Area, Tehama County, California	Shasta College Archaeology Laboratory, Redding, California	SCF	Prehistory	Evaluation of CA-TEH-810, CA-TEH-1523 and CA-TEH-1526. Analytical studies: Obsidian sourcing and hydration, radiocarbon data, human burials, Protein residue analysis, lithic analysis, faunal analysis. Research issues: Chronology; Site function; Cultural relationships.	CA-030-0038, CA-030-0370, CA-030-0417
Report	Sundahl, Elaine	1996	West Redding Archaeological Project: CA-SHA-1556 and CA-SHA-1738, the Quartz Hill Sites	Shasta College Archaeology Laboratory, Redding, California	SV	Prehistory	Evaluation of CA-SHA-1556 (Quartz Hill Site) and CA-SHA-1738 (Quartz Hill II Site). Analytical studies: Radiocarbon data, obsidian hydration and sourcing, faunal analysis, shell analysis. Research Issues: Comparison of the make-up and frequency of elements of artifact assemblages. Does there exist sufficient differences in cultural content and economic strategies between the Shasta Complex peoples occupying the two environments to warrant differences in toxemic labels?	CA-030-0295, CA-030-0346

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Sundahl, Elaine	1997	Archaeological Investigation into the Prehistory of the McCloud River, Shasta and Siskiyou Counties, California	Shasta College Archaeology Laboratory, Redding, California	SV	Prehistory	Evaluation of CA-SIS-1615/H (Four Mile Flat), CA-SIS-595 (FS 05-14-61-42, Cattle Camp), CA-SIS-1614 (FS 05-14-61-441 Swimming Hole), CA-SIS-1751 (FS 05-14-61-452, River Edge Lithic Site), CA-SIS-1619 (FS 05-14-61-433 Upper Falls), CA-SIS-597 (FS 05-14-61-44 Fowlers Campground Site), CA-SIS-593 (FS 05-14-61-40, Lower Falls), CA-SHA-687 (FS 05-14-61-32 Ash Camp), CA-SHA-686 (FS 05-14-61-8 Ah-Di-Na). Analytical studies: Obsidian hydration, radiocarbon data, beads (in-nut, glass), faunal remains, lithic analysis. Research issues: Chronology; Economic patters; Obsidian technology; Ethnic migration; Cultural framework of the McCloud River.	
Report	Sundahl, Elaine	1998	West Redding Archaeological Project: Excavations at CA-SHA-1991, Shasta County, California	Shasta College Archaeology Laboratory, Redding, California	SV	Prehistory	Evaluation of CA-SHA-1991. Analytical studies: Obsidian sourcing and hydration, radiocarbon dates, protein residue analyses, pollen analysis, lithic analysis. Research issues: Chronology; Subsistence patterns; Ethnic/cultural/taxonomic identification; Models of cultural history.	CA-030-0423
Report	Sundahl, Elaine	1999	Archaeological Investigations at CA-SHA-2611/H, The Moccasin Creek Site	Shasta College Archaeology Laboratory, Redding, California	SV	Prehistory	Evaluation at CA-SHA-2611/H, Moccasin Creek Site. Analytical studies: Lithic analysis, obsidian sourcing and hydration, radiocarbon data, protein residue analysis. Research issues: Cultural chronology; Economic use patterns; Social patterning.	CA-030-1052
Report	Sundahl, Elaine	2001	Archaeological Investigations at CA-TEH-1783, The Jelly Mound Site	Shasta College Archaeology Laboratory, Redding, California	SCF	Prehistory	Test excavations at CA-TEH-1783, the Jelly Mound site. Analytical studies: Lithic analysis, faunal analysis (including shellfish), and soil studies. Research Issues: Cultural chronology; Cultural identity; Site function and settlement patterns.	
Book	Sundahl, Elaine	2004	Archaeological Investigations at CA-TEH-847, Upper Massacre Mound	Shasta College Archaeology Laboratory, Redding, California	SCF	Prehistory	Evaluation of CA-TEH-847, Upper Massacre Mound. Analytical studies: Obsidian sourcing and hydration, radiocarbon data, faunal remains. Research issues: Chronology; Economic patterns and ecological relationships; Technology; Site spatial arrangement; Ritual use; Intersite cultural relationships.	CA-030-0406
Report	Sundahl, Elaine	2006	CA-SHA-484: A Wintu Village on Stillwater Creek	Shasta College Archaeology Laboratory, Redding, California	SV	Prehistory, History	Evaluation of CA-SHA-484 at Stillwater Creek. Analytical studies: Lithic analysis, historic artifact assemblage.	

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Sundahl, Elaine	2009	Archaeological Investigations at CA-TEH-1781, The Lost Salmon Site	Shasta College Archaeology Laboratory, Redding, California	SCF	Prehistory	Evaluation of CA-TEH-1781, the Lost Salmon Site. Analytical studies: Obsidian sourcing and hydration, radiocarbon data, botanical survey, fauna, shellfish, bead, lithic analysis. Research issues: Chronology; Economic, Settlement patterns and ecological relationships; Spatial arrangement; Technology; Ritual use; Inter-site cultural relationships.	CA-030-1134
Report	Sundahl, Elaine, and Eric W. Ritter	1997	West Redding Archaeological Project: Chinese and Native American Occupations at CA-SHA-1544/H and CA-SHA-1969/H	Bureau of Land Management, Redding, California	SV	Prehistory, History	Evaluations at two multi-component sites (CA-SHA-1544/H, CA-SHA-1969/H) near Redding: prehistoric use and mining-related occupation, including habitation by Overseas Chinese individuals. Investigations carried out under a BLM - Shasta College Cooperative Agreement.	CA-030-0097, CA-030-0558
Report	Sundahl, Elaine, and Gay Berrien	1986	Test Excavations at two Prehistoric Sites (FS 05-14-54-127 and FS 05-14-54-130) on the Big Bar District, Shasta-Trinity National Forests	U.S. Forest Service	KM	Prehistory	Test excavation of two sites, the Cox Bar Site and the Squaw Camp Site (FS 05-14-54-127 and FS 05-14-54-130). Analytical studies: Lithic analysis, and obsidian sourcing and hydration.	
Report	Sundahl, Elaine, and S. E. Clewett	1988	Test Excavations at CA-SIS-888, Butte Valley Wildlife Area, Northeastern California	Shasta College Archaeology Laboratory, Redding, California	UK	Prehistory	Evaluation of CA-SIS-888 within the Butte Valley Wildlife Area. Analytical studies: Obsidian sourcing and hydration, radiocarbon data, lithic analysis.	
Report	Sundahl, Elaine, and S. E. Clewett	1991	Archaeological Investigations in the Salt Creek Drainage, Shasta County, California	Shasta College Archaeology Laboratory, Redding, California	SV	Prehistory	Evaluation of CA-SHA-1357 (Salt Creek Drainage). Analytical studies: Obsidian hydration, radiocarbon data. Research issues: Cultural Chronology; Subsistence Patterns. Contains an appendix by Eric Ritter on glass trade beads from Wintu sites.	CA-030-0003
Article	Sundahl, Elaine, and Winfield Henn	1993	Borax Lake Pattern Assemblages on the Shasta-Trinity National Forests, North-Central California	Journal of California and Great Basin Anthropology 15(1):73-90	KM, SV	Prehistory	Comparison of the archaeology from the Shasta-Trinity area with "Borax Lake Pattern" assemblages.	
Article	Sundahl, Elaine, Eric W. Ritter, and Bruce H. Baxter	2000	St. Rose Catholic Church, French Gulch, California: An Archaeological Investigation	Publications of the Shasta College Museum 1	SV	History	Salvage archaeology of the St. Rose Catholic Church damaged by a fire in 1998. The report presents and discusses the inventory of historic artifacts recovered.	
Report	Sundahl, Elaine, Trudy Vaughan, K. D. Tyree and Rebecca Newland	2001	Archaeological Investigations at Crestline Damnation Prehistoric Site	Coyote and Fox Enterprises, Redding, California	SV	Prehistory	Evaluation of CA-SHA-724 (FS 05-14-59-43). Analytical studies are limited to obsidian hydration studies and lithic analysis.	
Article	Swezey, Sean L. and Robert F. Heizer	1977	Ritual Management of Salmonid Fish Resources in California	Journal of California and Great Basin Anthropology 4(1):2-29	KM	Ethnography	Review of northern California ethnography connected to anadromous fish.	
Thesis	Tamez, S.	1981	An Archaeological Overview of the North Coast Range and Northwestern California	M.A. Thesis, San Francisco State University	CR	Prehistory	Cultural resources overview of the southern North Coast Ranges, emphasizing the history of research and development of synchronic settlement pattern models and site typologies.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Texier, Bruno J., Mark D. Selverston, and Margaret J. Markwyn	2013	Stone House Bar and Deep Gulch Placer Mine (CA-BUT-2569H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-2569H, the Stone House Bar and Deep Gulch Placer Mine, located on the Big Bend portion of the North Fork Feather River. The technical report discusses the site history and the evaluation of 29 historical remains of eluvial placer gold minding in the mid-19th century.	
Report	Texier, Bruno J., Robert G. Douglass, and Mark D. Selverston	2009	Cummings-Eakle Hop Ranch Complex (CA-BUT-1940H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SV	History	Evaluation of CA-BUT-1940H, Cummings/Eakle Hop Ranch Complex. Historic artifact descriptive list. The report discusses the evaluation of the 1890 ranch complex.	
Report	Texier, Bruno J., Robert G. Douglass, and Mark D. Selverston	2014	Hutchinson/Feather River Railway Lumber Railroad (CA-BUT-1889H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-1889H, a segment of Hutchinson/Feather River Railway Lumber Railroad, on the north side of the South Fork Feather River. The technical report discusses site history and evaluation of the abandoned railroad grade and associated features which were once part of the logging and lumber railroad for the Hutchinson Lumber Company.	
Report	Texier, Bruno J., Robert G. Douglass, and Mark D. Selverston	2015	Fischer Homestead Complex and Placer Mine (CA-BUT-393/H, Formerly CA-BUT-2652/H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-383/H, the Fischer Homestead Complex and Placer Mine, northeast of Oregon City. Technical report includes the site history and the evaluation of the historic-component, a mid-19th to early-20th century agriculture and small-scale mining occupation.	
Report	Theodoratus Cultural Research	1980	Cultural/Historical Overview: Six Rivers National Forest	Theodoratus Cultural Research. Prepared for Six Rivers National Forest, Eureka, California	CR	Prehistory	History, ethnography, and history of archaeological research in the Six River National Forest.	
Report	Theodoratus Cultural Research	1981	Native American Cultural Overview, Shasta-Trinity National Forest	Theodoratus Cultural Research. Prepared for Shasta-Trinity National Forest, Redding, California	KM	Prehistory	Major literature review of the Shasta-Trinity National Forest, focused on the history of research and the range of resource types that exist on the Forest.	
Report	Theodoratus Cultural Research	1984	Ethnographic Inventory for Public Law 95-341, North Central California	Theodoratus Cultural Research. Prepared for Bureau of Land Management, Redding, California	KM, UK, SCF, SN, SV	Ethnography	Ethnography and ethnogeographic breakdown of Nomlaki, Wintu, Shastan groups, Chimariko, Pit River Indians, Yana, and peripheral groups (Hupa and Karok, Lassik, Nongatl, and Modoc).	
Report	Tibbetts, Deborah	2016	A Study of Historic Transportation Routes in Tehama County, California	Bureau of Land Management, Redding, California	SCF, SV	History	A study of transportation trails and roads in Tehama County. Such routes include Nobles Pass and Lassen trail in association with Highway 36.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Tiley, Shelly	2011	Rebuttal to the Beckham Report Regarding the Mechoopda Indians	Tiley Consulting; Edited by Far Western Anthropological Research Group, Inc., Davis, California	SV	Ethnography	Rebuttal to the arguments provided by Beckham (2006) that the Mechoopda Tribe of the Chico Rancheria is not a "Tribe". Discusses ethnographic references to the Mechoopda, relationship of pre-contact and post-contact villages, consistency of occupation.	
Report	Tiley, Shelly, and Shannon Tushingham	2011	Native American Ethnogeography, Traditional Resources, and Contemporary Communities and Concerns—Cultural Resources Inventory of Caltrans District 1 Rural Conventional Highways: Del Norte, Humboldt, Mendocino and Lake Counties	Far Western Anthropological Research Group, Inc., Davis, California	CR, KM	Ethnography	Native American Ethnogeography of Caltrans District 1 (Del Norte, Humboldt, Mendocino and Lake Counties). Research issues: Archival research, Linguistic distribution and Native American Ethnogeography; Traditional lifeways; Ethnohistory; Contemporary communities.	
Article	Todt, Donn L., and Nan Hannon	1998	Plant Food Resource Ranking on the Upper Klamath River of Oregon and California: A Methodology with Archaeological Applications	Journal of Ethnobiology 18:273-308	UK	Ethnography	Ethnographic, biogeographic, nutritional and experimental data used to rank relative value of plant food resources at precontact in the Upper Klamath River.	
Report	Tordoff, Judith D. and Dana McGowan Seldner	1987	Dutch Gulch Lake Excavation at Thirteen Historic Sites in the Cottonwood Mining District	U.S. Army Corps of Engineers, Sacramento	SV	History	Excavations at the Cottonwood Creek mining complex.	
Report	Tordoff, Judith D., Mary L. Maniery	1986	Analysis, Evaluation, Effect Determination and Mitigation Plan for Two Chinese Mining Sites in Butte County, California	Public Anthropological Research	SN	History	Evaluation of two 19th century Chinese Mining sites, CA-BUT-882 and CA-BUT-612. Discusses the site's historic artifact assemblage and faunal analysis. Research Issues: Ethnicity; Acculturation/assimilation; Chronology; Overseas cultural contact; Subsistence practices; Spatial organization; technology.	
Report	Tordoff, Judith D., Mary L. Maniery	1989	Data Recovery at Two Mining Sites in Butte County, California	PAR Environmental Services, Inc., Sacramento, California	SN	History	Data Recovery of two 19th century Chinese Mining sites, CA-BUT-882 and CA-BUT-612. Discusses historic artifact assemblage and faunal analysis. Research Issues: Chronology; Subsistence; Spatial organization; Acculturation and trade networks.	
Report	Tordoff, Judy	2013	Historic Context for Mining along the Trinity River	AECOM	KM	History	Examination of Trinity River mining history.	
Book	Treganza, Adan E.	1954	Salvage Archaeology in Nimbus and Redbank Reservoir Areas, Central California	Reports of the University of California Archaeological Survey 26. University of California, Berkeley	SV	Prehistory	Salvage archaeology at CA-SAC-169 and CA-TEH-58 at the Nimbus and Redbank reservoirs. Analytical studies: Lithic analysis, bead analysis (stone, shell, nut, glass), human remains (77 burials). Brief site description and excavation summary of CA-SAC-169.	
Report	Treganza, Adan E.	1957	Archaeological Investigations at the William B. Ide Adobe, Red Bluff, California	University of California MS #260. Berkeley	SV	History	Archaeological investigations at the William B. Ide Adobe in Redbluff, California	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Book	Treganza, Adan E.	1958	Salvage Archaeology in the Trinity Reservoir Area, Northern California	Reports of the University of California Archaeological Survey 43. University of California, Berkeley	KM	Prehistory	Salvage excavation results of CA-TRI-45, CA-TRI-57, CA-TRI-70, CA-TRI-112, CA-TRI-113. Work carried out as early as 1952. See Treganza 1959 for full excavation results.	
Report	Treganza, Adan E.	1959	Salvage Archaeology in the Trinity Reservoir Area, Northern California: Field Season 1958	Reports of the University of California Archaeological Survey 46. University of California, Berkeley	KM	Prehistory	Salvage excavation results of CA-TRI-45, CA-TRI-57, CA-TRI-70, CA-TRI-112, CA-TRI-113. Report includes site descriptions with limited analytical studies. Expansion of excavation results from Treganza 1958.	
Report	Treganza, Adan E.	2001	Salvage Archaeology Along Clear Creek and Cow Creek, Shasta County, California	Archives of California Archaeology no. 27	SV	Prehistory	Salvage archaeology of CA-SHA-169, CA-SHA-170, CA-SHA-184 and CA-SHA-205. Analytical studies: Burial analysis, lithic analysis, shell analysis, faunal analysis.	
Report	Treganza, Adan E., and Martin H. Heicksen	1960	Salvage Archaeology in the Whiskeytown Reservoir Area and the Wintu Pumping Plant, Shasta County, California	Department of Anthropology, San Francisco State College, San Francisco, California, Bethany College	SV	Prehistory	Salvage archaeology at Clear Creek, Happy Valley and Anderson Area, Cow Creek Area and Red Bank Reservoir Area (CA-TEH-58). Discusses site assemblage, burial analysis. Research Issues: Mortuary practices discussion.	
Book	Treganza, Adan E., Martin Heickson, and Wallace Woolfenden	1969	The Archaeology of the Black Butte Reservoir Region, Glenn and Tehama Counties, California	San Francisco State College Anthropology Museum: Occasional Paper 2	SV	Prehistory	Salvage archaeology in the Black Butte Reservoir region at CA-GLE-10, CA- GLE-11, CA-GLE-15. Site descriptions and discussion on mechanical drilling equipment.	
Report	Treganza, Adan E., Robert L. Edwards, and Thomas F. King	1967	Archaeological Survey and Excavations along the Tehama Colusa Canal, Central California	Frederic Burk Foundation for Education and the US National Park Service, Western Region	SV	Prehistory	Excavation of sites (CA-TEH-233, CA-TEH-20, CA-TEH-22, CA-TEH-23) along the Tehama-Colusa Canal. Analytical studies are limited to lithic analysis and human remains analysis.	
Report	Treganza, Adan, C.E. Smith, and W.D. Weymouth	1950	An Archaeological survey of the Yuki Area	University of California Anthropological Records 12: 113-128	KM	Prehistory	Archeological survey of Yuki territory in historical times. Includes the Eden, Williams, Hull, and Round valleys of the Eel River. Discusses settlement patterns, house pits, quarries, textiles, tools, ornaments, and burials.	
Article	Treganza, Aden E.	1964	An Ethno-archaeological Examination of Samwel Cave.	Cave Studies 12	SV	Prehistory	Examination of Samwel Cave, Shasta County.	
Book	Tucker, Wilma and Don Tucker	1992	Mendocino - From the Beginning: Twenty Million Years of History of a Small Town	-	CR	History	Overview of the History of Mendocino.	
Article	Tushingham, Shannon	2005	An Ancient Campground	Redwood Currents	CR	Prehistory	A local prehistory of the Jedediah Smith Redwoods State Park River for the public.	
Thesis	Tushingham, Shannon	2009	The Development of Intensive Foraging Systems in Northwestern California	Ph.D. Dissertation, University of California, Davis	CR, SV	Prehistory	Dissertation on intensive foraging systems focused on salmon fishing and acorn processing in northwestern California.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Book	Tushingham, Shannon	2013	Archaeology, Ethnography, and Tolowa Heritage at Red Elderberry Place, Chvn-su'lh-dvn, Jedediah Smith Redwoods State Park	California Department of Parks and Recreation Archaeology, History and Museums Divisions, Publication Number 30, Sacramento	CR, KM	Prehistory	Tolowa, history and their cultural heritage as viewed from a single locality within Jedediah Smith Redwoods State Park named Chvnsu'lh-dvn (TcuncuLtun), or Red Elderberry Place.	
Article	Tushingham, Shannon and Colin Christiansen	2015	Native American Fisheries of the Northwestern California and Southwestern Oregon Coast: A Synthesis of Fish-Bone and Implications for Late Holocene Storage and Socio-Economic Organization	Journal of California and Great Basin Anthropology 35(2):189-216	CR	Prehistory	Synthesis of fish bone data from archaeological sites located in southwestern Oregon and northwestern California.	
Article	Tushingham, Shannon and Robert L. Bettinger	2013	Why Foragers Choose Acorns before Salmon: Modeling Back-loaded vs. Front-loaded Resources	Journal of Anthropological Archaeology 32:527-537	CR	Prehistory	Poster comparing back-loaded versus front-loaded (acorn vs. salmon) resources on north coast.	
Article	Tushingham, Shannon and Jennifer Bencze	2013	Macro and Micro Scale Signatures of Hunter-Gatherer Organization at the Coastal Sites of Point St. George, Northwestern Alta California	California Archaeology 5(1):37-77	CR	Prehistory	Quantitative assessment of two key ideas set forth in Richard Gould's 1966 monograph concludes that the components at CA-DNO-11 and CA-DNO-13 reflect two different adaptive strategies: a more mobile foraging system in the Middle Period and a sedentary village-based system in the Late Period.	
Article	Tushingham, Shannon, Amy M. Spurling, and Timothy R. Carpenter	2013	The Sweetwater Site: Archaeological Recognition of Surf Fishing and Temporary Smelt Camps on the North Coast of California	Journal of California and Great Basin Anthropology 33(1):25-38	CR	Prehistory	Archaeological evidence for the storage and construction of temporary summer camps at sites CA-DNO-22, CA-DNO-335, CA-DNO-1030, CA-DNO-1031, CA-DNO-1032, CA-DNO-53. Research issues: Smelt procurement coupled with ethnographic research.	
Report	Tushingham, Shannon, William Hildebrandt, Julie Garibaldi, and Allika Ruby	2008	Archaeological Test Excavations and Sensitivity Assessment for Jedediah Smith Campground, Redwood National and State Parks, Del Norte County, California	Far Western Anthropological Research Group, Inc., Davis, California	CR	Prehistory	Test excavations of at the Jedediah Smith campground (CA-DNO-26. CA-DNO-332, CA-DNO-333, CA-DNO-334, CA-DNO-XX13 (temp)), Del Norte county. Analytical studies: Lithic analysis, obsidian hydration and sourcing, radiocarbon dating, floral and faunal remains, Research issues: Chronology; Regional settlement patterns (prehistoric use of interior rivers); Development of intensive foraging systems; Houses; Prehistoric exchange systems; Cultural continuity and change in the historic period.	
Report	Tveskov, Mark, Kelly Derr, Nicole Norris, and Richard Silva	2001	Archaeological Investigations of the Siskiyou Trail: Cascade-Siskiyou National Monument, Jackson County Oregon	Department of Sociology and Anthropology, Southern Oregon University	UK	History	Survey of the Siskiyou Trail, also known as The Oregon-California Trail. The Hudson's Bay Company (1920s), The First American Pioneers (1930s), Gold Rush and State of Jefferson (1840-1850), Transportation (i.e. railroad) (1860-1887). Archaeological survey on the Cascade-Siskiyou National Monument.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Tyler, Kathy and Eric Ritter	2013	McAdams Deadwood Chinese Mining Camp CA-SIS-5097	Northern California Resource Center	UK	History	Excavation at McAdams/Deadwood Chinese Mining Camp, CA-SIS-5097H. Discusses historic artifact assemblage archival and interview work. Research Issues: Chronology; Spatial organization/landscape use; Dietary/subsistence uses; Technology; Consumer choices; Indulgence; Acculturation/assimilation/adaptation; Labor organization/demographics; Gender, class, status, age; Health and hygiene; Tribal and cosmology. Draft report with many blank sections.	CA-030-1723
Thesis	Tyree, Kathleen D.	1992	Debitage Variation as a Measure of Adaptive Strategy: A Study of Three Lithic Assemblages from Shasta County, California	M.A. Thesis, California State University, Chico	SV	Prehistory	Analysis of debitage technology variability of the "Shasta Complex" and "Tehama Pattern" from sites CA-SHA-992 (Hartnell), CA-SHA-1544 (Eagle Court), CA-SHA-266 (Middle Mule Pond). The research objective proposes an alternative taxonomic system.	CA-030-0097
Report	Tyree, Kathleen D. and Elaine Sundahl	2002	Prehistory of CA-SHA-1544, The Middle Mule Pond Site, Shasta County, California	Bureau of Land Management, Redding, California	SV	Prehistory	Evaluation of CA-SHA-1544, the Middle Mule Pond Site, midden deposit. Analytical studies: Lithic analysis, soil/sediment analysis, human bone analysis, faunal analysis, flora analysis, shell analysis, radiocarbon, obsidian hydration and sourcing. Research issues: Chronology; Settlement-subsistence; Ethno-linguistic models; Adaptive strategies.	CA-030-0097
Report	URS	2008	Historical Archaeological Evaluation Report for CA-SHA-4169/H, -4171H, and -4172/H, Buckhorn Grade Improvement Project, Shasta and Trinity Counties	URS Corporation	KM	History	CA-SHA-4169/H (Greenhorn Mine Camp), CA-SHA-4171H (Double Header Mine complex), CA-SHA-4172/H (Sawpit Gulch Mining Complex and Remington Homestead). Discusses historic artifact assemblage and feature details. Research Issues: Technology; Historical ethnography; Ethnic and cultural groups; Women and families; Economy; Policy.	
Report	Van Bueren, Thad M.	2013	Archaeological Investigations near the Northern Outpost of the Mendocino Reservation in Mendocino County, California	Anthropological Studies Center, Sonoma State	CR	Prehistory, History	Analyzes collection from David Fredrickson (1966) of the archaeological investigations at four sites on the 1855-1866 Mendocino Reservation (CA-MEN-454H, CA-MEN-455H, CA-MEN-3580H, and CA-MEN-3581H).	
Other	Van Dyke, Walter	1891	Early Days in Klamath	Overland Monthly 17:104 Second Series	CR	History	Description of lifeways and environment of northern California in the 1880's told by explorer Walter Van Dyke.	
Report	Van Tilburg, Jo Anne, Frank Bock and A.J. Bock	1987	The Church Rock Petroglyph Site: Field Documentation and Preliminary Analysis	Occasional Papers of the Redding Museum No. 4 pp.66	SV	Prehistory	Discusses the rock art at CA-SHA-39, the Church Rock Petroglyph Site.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Vaughan, Trudy	1981	The Archaeology of the Hazel Creek Multicomponent Site, F. S. # 05-14-59-238	Mt. Shasta Ranger District, Shasta Trinity National Forest	SV	Prehistory, History	Mitigation of FS 05-14-59-238 at Hazel Creek. Discusses excavation summary of the prehistoric and historic components.	
Report	Vaughan, Trudy	1982	Partial Mitigation, Rattlesnake Hill Aboriginal Site, F. S. # 05-14-59-209	Mt. Shasta Ranger District, Shasta Trinity National Forest	SV	Prehistory	Mitigation of FS 05-14-59-209 at Rattlesnake Hill. Discusses lithic analysis (projectile points and diagnostic obsidian fragments).	
Report	Vaughan, Trudy	1983	Archaeological Investigations at the Racetrack (CA-TRI-243), South Fork Mountain, Trinity County, California	Shasta-Trinity National Forest, Redding, California	KM	Prehistory	Investigations at CA-TRI-243. Discusses lithic and obsidian hydration and sourcing.	
Report	Vaughan, Trudy	1984	The Archaeology of the Salt Flat Ethnohistoric Complex, (CA-TRI-862), Trinity County, California	Shasta College Archaeology Laboratory	KM	Prehistory, Ethnography	Limited testing at CA-TRI-862, Salt Flat Ethnographic Complex, a multicomponent site near Lewiston. Analytical studies: Lithic analysis, faunal and flora remains, historic artifacts (ceramics, glass, metal, cloth etc.)	CA-030-0075
Report	Vaughan, Trudy	1985	Historical Archaeology on the Lamoine Lumber and Trading Company Railroad Logging System, Shasta County, California	Mt. Shasta Ranger District, Shasta Trinity National Forest	SV	History	-	
Report	Vaughan, Trudy	1985	Archaeological Investigations at Two Historic Camps of the McCloud River Lumber Company and the McCloud River Railroad	Shasta-Trinity National Forest, Redding, California	SV	History	National Register evaluations of two 1920s-era railroad logging camps in southeastern Siskiyou County.	
Report	Vaughan, Trudy	1986	Archaeological Investigations at a Sacramento River Mining Camp (CA-SHA-1450), Shasta County, California	Bureau of Land Management, Redding, California	SV	History	Small-scale excavation report of a ca. 1877-1900 mining camp; no research design or formal evaluation.	CA-030-0190
Report	Vaughan, Trudy	1992	Archaeological Investigations at CA-SHA-47 and CA-SHA-236 on the Sacramento River, Redding, Shasta County, California	Coyote and Fox Enterprises, Redding, California	SV	Prehistory	Testing at two sites (CA-SHA-47, CA-SHA-236). Includes flotation results.	
Report	Vaughan, Trudy	2001	Archaeological Investigations at CA-SHA-2830, The Win River Casino Site, at the Redding Rancheria, Redding, Shasta County, California	Coyote and Fox Enterprises, Redding, California	SV	Prehistory	Test excavations of a Shasta Complex village site including human remains.	
Report	Vaughan, Trudy and Elaine Sundahl	2002	Archaeological Investigations at CA-SHA-891 in the McConnell Arboretum of Turtle Bay Exploration Park, Redding, Shasta County, California	Coyote and Fox Enterprises, Redding, California	SV	Prehistory	Evaluation of CA-SHA-891. Analytical studies: Lithic analysis, obsidian hydration, human burial. Research issues: Site integrity and function; Chronology; Subsistence.	
Chapter	Vaughan, Trudy and Eric W. Ritter	1992	Historical and Archaeological Investigations of the Horsetown Mining Complex, Shasta County, California	In Gold and Lumber: Two Papers on Northern California History and Archaeology, Cultural Resources Publications: History/Archaeology, Bureau of Land Management, Redding, California	SV	History	Historical and Archaeological Investigations at the Horsetown Mining Complex, Shasta County, California discusses gold mining history in northern California with evidence from CA-030-0475 (trenches, rock work, a rock dam, ditches, a granite quarry, adits and tailings).	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Vaughan, Trudy, Elaine Sundahl, and Eric W. Ritter	2011	Leopardman Archaeology: Test Investigations at CA-SHA-2048 West of Round Mountain, Shasta County, California	Cultural Resources Publications: Archaeology, Bureau of Land Management, Redding, California	SCF	Prehistory	Evaluation of CA-SHA-2048. Analytical studies: Obsidian sourcing and hydration, radiocarbon data, stratigraphy, lithic analysis. Research issues: Site function; Cultural-historical relationships (Do the cultural materials match the Northern Yana?).	CA-030-0524
Report	Vaughan, Trudy, Elaine Sundahl, and K.D. Tyree	1994	Archaeological Test Excavation at CA-SHA-2027, Nobles Trail Road, Shasta County, California	Coyote & Fox Enterprises, Redding, California	SV	Prehistory	Test excavation at CA-SH-2027, a prehistoric site on Nobels Trail Road. Analytical studies limited to lithic analysis and obsidian sourcing and hydration.	
Report	Waechter, Sharon A. and D. Craig Young	2015	Archaeological Evaluation Report for Site CA-SIS-329 for the Randolph C. Collier SRRA Water/Waste Water Project (Water/Sewer; EA 02-4E670; EFIS 0212000031-0) and OSHA Break Room (EA 02-4G300; EFIS 0213000099-0)	Far Western Anthropological Research Group, Inc., Davis, California	UK	Prehistory, History	Evaluation of CA-SIS-329. Analytical studies: Lithic analysis, faunal analysis, archaeobotanical, obsidian souring and hydration, radiocarbon data. Research issue: First long-term habitation of the Klamath River Canyon; Timing of Increased sedentism and salmon fishing; Establishment of fish camps; Prehistoric/ethnohistoric travel corridors; Abandonment of permanent settlements.	
Report	Waechter, Sharon A. and Thomas M. Origer	1992	Archaeological Investigations at Pilil (CA-MEN-1793), on the Black Butte River, Mendocino National Forest	Consulting Archaeologists, Cotati, California	KM	Prehistory	Small excavation at CA-MEN-1793, Pilil, on the Black Butte River. Includes obsidian sourcing and hydration analysis.	
Report	Walker, Mark K. and Michael Delacorte	2015	Supplemental Archaeological and Historical Resources Inventory Report, Oroville Facilities Relicensing FERC Project No. 2100	Anthropological Studies Center, Sonoma State University	SN	Prehistory, History	Archaeological and historical resources inventory at Lake Oroville.	
Report	Walker, Mark K., M. Phil, Margaret J. Markwyn, and Mark D. Selverston	2011	DRAFT: John McKinstry Smith Ranch Complex (CA-BUT-2522/H and CA-BUT-1861H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Technical report of CA-BUT-1861H and CA-BUT-2522/H. Discusses the site histories and historic components of the John McKinstry Smith 19th-century ranch complex.	
Report	Walker, Mark K., M. Phil, Margaret J. Markwyn, and Mark D. Selverston	2011	DRAFT: Frerichs Homestead Complex (CA-BUT-194/H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-194/H north of Potter Ravine. Technical report on site history, and the evaluation of the historic-era component, a large late-19th and early-20th century artifact scatter and homestead complex of Ludwig and Mary Frerichs.	
Report	Walker, Mark K., M. Phil, Robert G. Douglass, and Mark D. Selverston	2011	DRAFT: Hubbard Flat Ethnohistoric Settlement and Goat Ranch Complex (CA-BUT-448/H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-448/H, Hubbard Flat Settlement and Goat Ranch Complex. Technical report of the site history and evaluation of the historic-era component, a agricultural complex with parcels dating as early as 1850s.	
Report	Walker, Mark M., M. Phil, Bruno J. Texier, Robert G. Douglass, and Mark D. Selverston	2014	Craig Area Logger Artifact Deposits (CA-BUT-2395H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-2395H, the Craig Area Logger Artifact Deposits, located in the Craig Recreation Area. The technical report discusses site history and the elation of mid-20th century artifact concentrations.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Report	Walker, Mark M., M. Phil, Margaret J. Markwyn, and Mark D. Selverston	2013	Gray Boy Chromite Mine (CA-BUT-2116H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-2116H, the Gray Boy Chromite Mine, on the west bank of the West Branch Feather River. The technical report discuses site history and elation of the chromite mine operated briefly during World War I.	
Report	Walker, Mark M., M. Phil, Margaret J. Markwyn, and Mark D. Selverston	2013	Lime Saddle Placer Mining Complex (CA-BUT-1559H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-1559H, the Lime Saddle Placer Mining Complex, located in the Lime Saddle Memorial Park on the West Branch Feather River. The technical report discusses the site history and evaluation of a late 19th- to early-20th century sluicing complex.	
Report	Walker, Mark M., M. Phil, Margaret J. Markwyn, Robert G. Douglass, and Mark D. Selverston	2013	Loafer Creek Tributary Placer Mine (CA-BUT-1879H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-1879H, the Loafer Creek Tributary Placer Mine. The technical report discusses the site history and evaluation of a 19th century placer mining operation.	
Report	Walker, Mark M., M. Phil, Margaret J. Markwyn, Robert G. Douglass, and Mark D. Selverston	2013	Big Bend Mining Tunnel Outlet and Labor Camp (CA-BUT-1986H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Evaluation of CA-BUT-1986H, The Big Bend Mining Tunnel Outlet and Labor Camp, located in Dark Canyon. The technical report discusses the site history and evaluation of the Big Bend Tunnel built between 1882 and 1887.	
Report	Walker, Mark M., M. Phil, Margaret J. Markwyn, Robert G. Douglass, and Mark D. Selverston	2014	Edel Consolidated Mining Complex and Jackson Bar Isolated Dwelling (CA-BUT-1886/H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	Prehistory, History	Evaluation of CA-BUT-1886/H, the Edel Consolidated Mining Complex and Jackson Bar Isolated Dwelling, downstream of Ponderosa Dam. The technical report discusses site history and evaluation of the historic-era component, six loci of mining-related features and operation from 1903 to 1940.	
Report	Walker, Mark M., Robert G. Douglass, Margaret J. Markwyn, and Mark D. Selverston	2014	Potter Ravine Mining Complex (CA-BUT-391/H): Site Technical Report	Anthropological Studies Center, Sonoma State University	SN	History	Technical report of CA-BUT-391/H, the Potter Ravine Mining Complex, located on both sides of Potter Ravine Creek. The report discusses the site history and evaluation of the historic-era component, a large complex of 13 loci of mining and residential features.	
Chapter	Wallace, William J.	1978	Hupa, Chilula, Whilkut	In California, edited by Robert F. Heizer, pp. 164-179. Handbook of North American Indians 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC	CR, KM	Ethnography	Discussion of the Hupa, Chilula, and Whikut tribe culture.	
Article	Washburn, Dorothy K.	1987	A Neighbor Factor: Basket Designs in Northern and Central California	Journal of California and Great Basin Anthropology 9(2):146-173	CR, KM, UK, SCF, SN, SV	Prehistory, Ethnography	Analysis of basket design in northern and central California.	
Article	Waterman, T. T.	1917	Ishi, the Last Yahi Indian	Southern Workman 46:528-537	SN	Ethnography	Biography of Ishi, a Yahi Indian.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Article	Waterman, T. T.	1920	Yurok Geography	University of California Publications in American Archaeology and Ethnology 16(5):177-314	CR	Ethnography	Ethnography and geography of the Yurok tribe.	
Report	Waugh, Georgie	1995	Historic Property Survey Report Proposed Bridge Replacement and Curve Realignment on State Highway 36 in Tehama County, California	California Department of Transportation	SV	Prehistory	Evaluation of CA-TEH-789 (also recorded as CA-TEH-679), occupational midden site. Analytical studies: Obsidian sourcing and hydration, radiocarbon dating, faunal analysis, historic artifact assemblage, and lithic analysis. Research Issues: Chronology; Economic structure; Settlement patterning; Ethnic affiliation.	
Report	Wee, Stephen	1980	Brief Historical Overview of Interior Humboldt and Mendocino Counties. In Levulett, Valerie A., Talbot B. Ruhstaller, and Linda A. Bell (1980). Class III Inventory of Northwestern California Timber Tracts Within Sustained Yield	Far Western Anthropological Research Group, Inc., Davis, California	CR, KM	History	Historical overview of interior Humboldt and Mendocino Counties.	
Report	Wee, Stephen R. and Julia Costello	2001	Historic Roads, Mine Tailings, and Water Systems in Lower Oregon Gulch	Far Western Anthropological Research Group, Inc., Davis, California	KM	History	Evaluation of historic-era sites CA-TRI-1355H (Pawtucket Ditch), CA-TRI-1356H (old State Route 20), and CA-TRI-1569H. Discusses historic site descriptions and artifact assemblages. Research issues: Mining sites; Water systems.	CA-030-1403, CA-030-1404, CA-030-1627
Report	Weitze, Karen J.	1981	Historic Research Evaluation Report, Sacramento River Canyon	Caltrans District 2, Redding, California	SV	History	Relatively detailed historical overview, but mostly limited to the project area (Dog Creek to town of Southern, north of Redding on the Sacramento River). Calls out several historical periods and themes relevant to the local area. Includes a list of potential historic-era sites: mining camps/townsites, wagon roads, railroads, mining operations.	
Thesis	Welch, James R.	2000	Sprouting Valley: An Historical Ethnobotany of the Potter Valley Pomo Based on Research by Dr. John W. Hudson	M.A. Thesis, Department of Interdisciplinary Studies (Ethnobotany), Sonoma State University	KM	Ethnography	Study of John W. Hudson, ethnographer, and his study of Potter Valley Pomo from 1890-1920. Research issues address characterizing the historical relationship s between culture and botany.	
Book	Welch, James R.	2013	Sprouting Valley: Historical Ethnobotany of the Northern Pomo from Potter Valley, California	Department of Geography, University of North Texas, Denton, Texas	KM	Ethnography	Historical ethnobotany of the Northern Pomo. Discusses reconstruction of Potter Valley Pomo plant knowledge, cultural and physical landscape, historical encounters. Lists an inventory of Potter Valley Pomo plants, plant technologies, preparation and applications.	
Book	Wells and Chambers	1882	History of Butte County	Harry L. Wells, San Francisco	SV	History	History of Butte County.	
Book	Wells, Harry L.	1881	History of Siskiyou County, California	D. J. Stewart & Co., Oakland	KM	History	History of Siskiyou County.	
Thesis	Wheeler, Barbara	1994	A Functional Analysis of the McKee Uniface in Northern California	M.A. Thesis, California State University, Chico	CR, KM, UK, SV	Prehistory	Functionality of the McKee uniface.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

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Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Paper	Whistler, Kenneth W.	1977	Wintun Prehistory: An Interpretation Based on Linguistic Reconstruction of Plant and Animal Nomenclatures	Proceedings of the 3rd annual meeting of the Berkeley Linguistic Society	KM, SV	Prehistory	Paper presented on Wintun language and nomenclatures.	
Chapter	Whistler, Kenneth W.	1979	Linguistic Prehistory in the Northwest California Culture Area	In A Study of Cultural Resources in Redwood National Park pp.11-26, edited by P Bickal	CR	Prehistory	Linguistics of prehistoric northwest California.	
Report	Whitaker, Adrian R.	2006	2005 Archaeological Investigations in the King Range National Conservation Area	University of California, Davis	CR	Prehistory	Investigations at five sites (CA-HUM-295, CA-HUM-300, CA-HUM-278, CA-HUM-277, CA-HUM-1866) in the King Range National Conservation Area. Analytical studies: Lithic analysis; radiocarbon dates, obsidian hydration and sourcing, and fauna (mammal, bird, shellfish). Research issues: Documentation of coastal sites; chronology of coastal sites; Marine versus terrestrial resources use over time.	
Thesis	Whitaker, Adrian R.	2008	The Role of Human Predation in the Structuring of Prehistoric Prey Populations in Northwestern California	Ph.D. Dissertation, University of California, Davis	CR	Prehistory	Dissertation creating a model on population dynamics of mussel, sea lions and deer under human predation. Tests prediction model with archaeological data from Punta Gorda Rockshelter, Humboldt County.	
Report	Whitaker, Adrian R.	2009	Data Recovery Report for the Punta Gorda Rockshelter, A Well Preserved Coastal Shell Midden in Humboldt County, California	University of California, Davis	CR	Prehistory	Data recovery at the Punta Gorda Rockshelter, Humboldt county. Analytical studies: Lithic analysis, bone tool artifacts, fauna (mammal, marine mammal, shellfish, bird), and radiocarbon data. Research issues: Chronology; Human impact on prey populations	
Article	Whitaker, Adrian R.	2009	Are Deer Really Susceptible to Resource Depression? Modeling Deer (Odocoileus hemionus) Populations Under Human Predation	California Archaeology 1:93-108	CR	Prehistory	Discusses consequences of human predation on deer populations.	
Report	Whitaker, Adrian, and Shannon Tushingham	2011	Archaeological Boundary Testing and Site Stabilization Plan at the Point Saint George Management Area, Del Norte County, California	Far Western Anthropological Research Group, Inc., Davis, California	CR	Prehistory	Evaluation of the Point Saint George Management Area (CA-DNO-11). Analytical studies: Radiocarbon data, lithic analysis, faunal analysis, archaeobotanical, and human remains. Research issues: Regional settlement patterns; Intensive foraging systems; Houses and households; Prehistoric exchange systems; Prehistoric impacts on pinniped and molluscan populations.	
Article	Whitaker, Adrian, and Shannon Tushingham	2014	Quantitative Assessment of Ethnographically-Identified Activity Areas at the Point Saint George Site (CA-DNO-11) and the Validity of Ethnographic Analogy	Journal of California and Great Basin Anthropology 34(1):1-16	CR	Prehistory, Ethnography	Test the validity of ethnographic descriptions and the archaeological record at a Tolowa village site (CA-DNO-11).	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Chapter	Whitaker, Adrian, and William R. Hildebrandt	2011	Why were Northern Fur Seals Spared in Northern California? A Cultural and Archaeological Explanation	In Human Impacts on Seals, Sea Lions and Sea Otters: Integrating Archaeology and Ecology in the Northeast Pacific, Edited by Todd J. Braje and Torben C. Rick, Chapter 9. pp. 197-219. University of California Press	CR	Prehistory	History of sea lion hunting in Northern California from the Stone Lagoon archaeological record from prehistory to European contact.	
Report	Whitaker, Adrian, Tod Hildebrandt, and Christopher Kimsey	2011	Archaeological Testing and Mitigation at Six Sites along the PG&E Garberville-Laytonville 60kV Transmission Line, Humboldt and Mendocino Counties, California	Far Western Anthropological Research Group, Inc., Davis, California	CR	Prehistory	Test excavation at six sites between Garberville and Laytonville (CA-MEN-3553, CA-MEN-433, CA-MEN 3098, CA-HUM-1229, CA-HUM-1230, and CA-HUM-1231). Analytical studies: Lithic analysis, obsidian sourcing and hydration, and radiocarbon data. Research issues: Culture chronology of the North Coast Ranges; Residential mobility and regional settlement patterns; Lithic procurement systems; Interregional exchange and the Athabaskan intrusion.	
Report	Whitaker, Adrian, William R. Hildebrandt, and Michael Darcangelo	2009	Data Recovery Report for the Fountain Slide Repair Project, CA-SHA-4410/H (P-45-004410), Shasta County, California	Far Western Anthropological Research Group, Inc., Davis, California	SCF	Prehistory	Evaluation of CA-SHA-4410/H. Analytical studies: Obsidian sourcing and hydration, radiocarbon data, archaeobotanical, lithic analysis, faunal analysis, historic artifact assemblage. Research issues: Chronology; Subsistence-settlement; Inter-regional exchange; Ethnolinguistic reconstruction and Intertribal relationships.	
Report	White, Gregory G.	1989	A Report of Archaeological Investigations at Eleven Native American Coastal Sites, Mackerricher State Park, Mendocino County, California	California Department of Parks and Recreation, Cultural Heritage Resource Protection Division	CR	Prehistory	Investigations at MacKerricher State Park (CA-MEN-429, CA-MEN-2230/H, CA-MEN-2015, CA-MEN-427, CA-MEN-425/426, CA-MEN-422, CA-MEN-828, CA-MEN-416, CA-MEN-428, CA-MEN-829, CA-MEN-830). Analytical studies: Lithic analysis; bone, antler and shell artifacts, historic artifact assemblage, radiocarbon data, obsidian hydration and analysis, fauna (especially shellfish) and flora analysis. Research issues: Chronology; Subsistence; Seasonality; Shellfish analysis.	
Article	White, Gregory G.	1991	New Finds on the Mendocino County Coast	Newsletter of the Society for California Archaeology 25(1):1;16-19	CR	Prehistory	Newsletter article reporting four new findings at MacKerricher State Park: 1) Bone and antler tool assemblage, 2) Occurrence of occupation by A.D. 80, 3) foraging theory model predicts developmental pattern, and 4) analysis suggests economic focus of each occupation had an effect on species diversity.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Thesis	White, Gregory G.	2003	Population Ecology of the Prehistoric Colusa Reach	Ph.D. Dissertation, University of California, Davis	SV	Prehistory	Dissertation addressing the archaeological and paleoenvironmental record of the Sacramento River corridor through the Sacramento Valley. Sites include CA-COL-246/H, CA-COL-245/H, CA-COL-158, bad CA-COL-247. Analytical studies: Soil studies, radiocarbon data, and artifact descriptions. Research issues: Hydrologic, geomorphic and vegetation change; prehistoric human population change; patterns of the late Quaternary flood plain formation; Prehistoric human settlement-subsistence change.	
Report	White, Gregory G.	2003	Cultural Resource Overview and Management Plan, Sacramento River Conservation Area, Tehama, Butte, Glenn, and Colusa Counties, California. Archaeological Research Program Report No. 50	California State University, Chico	SV	Prehistory, History	Cultural resource overview and survey for Sacramento River Conservation Area. Research issues: Significance and eligibility; Prehistoric population density; Paleobiology; Geoarchaeology and paleoenvironment.	
Report	White, Gregory G.	2015	The Loveliest of Places: A Study of the Pre-Mansion Historical Resources of Bidwell Mansion State Historic Park, Northern Buttes District, California Department of Parks and Recreation	Sub Terra Consulting, Archaeology and Paleontology, Chico, California	SV	History	History of the Bidwell Mansion, Chico. Research issues: Prehistoric Native American occupation; Early historical Native American occupation (1849-1852); Early Rancho de Arroyo Chico (1849-1852); Rancho expansion and development (1852-1868). Discusses archaeological investigations at the mansion.	
Book	White, Gregory G., James West, and Jack Meyer	2005	Archaeological Overview and Assessment and Archaeological Research Design, Lassen Volcanic National Park	Archaeological Research Program, California State University, Chico	SCF	Prehistory	Cultural overview and site inventory around Lassen Volcanic National Park. Research issues: Prehistoric settlement patterns; Prehistoric chronology; Change in the intensity of park use; Geomorphology and archaeological visibility; Cultural response to demographic forcing; Cultural response to climate change; Resource intensification.	
Article	White, Gregory G., Terry Jones, James Roscoe, and Lawrence Weigel	1982	Temporal and Spatial Distribution of Concave Base Projectile Points from the North Coast Ranges, California	Journal of California and Great Basin Anthropology 4(2):67-79	CR, KM	Prehistory	Small projectile point types distributed north and west of Clear Lake basin.	
Report	Whiteman, Erik	2009	An Archaeological Investigation and National Register of Historic Places Evaluation of the Saddle Ridge Site, Headwaters Forest Reserve, Bureau of Land Management, Humboldt County, CA	Cultural Resources Facility, Humboldt State University	CR	Prehistory	Test excavations at the Headwaters Forest Reserve Saddle Ridge Site. Analytical studies: Lithic analysis, macrobotanical remains, faunal remains, organic residues on lithics, obsidian hydration, radiocarbon dating. Research issues: Chronology; Subsistence-settlement pattern reconstruction and adaptive change; Exchange and social interaction.	

Zone: CR - Coast Ranges, KM - Klamath Mountains/High North Coast Ranges, SCF - Southern Cascade Foothills, SN - Sierra Nevada, SV - Sacramento Valley

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Thesis	Wiant, Wayne C.	1981	Southern Yana Subsistence and Settlement: An Ecological Model	M.A. Thesis, California State University, Sacramento	SCF	Prehistory, Ethnography	Southern Yana Subsistence and Settlement. Research Issues: Proposes an alternative paradigm that is based on a review of environmental, ethnographic, and archaeological sources.	
Article	Williams, Samuel J.	2014	Quantitative Approaches for Identifying Archaeological Site Occupation Types: A Case Study from Late Holocene Mendocino County, California	Proceedings from the Society for California Archaeology annual meeting 28:381-389	CR	Prehistory	Comparison of site function between CA-MEN-829 and the Bird Runner Site.	
Other	Wilson, Dale	1998	The Oregon to California Trail California Segment: Ashland, Oregon to Sacramento, California	Oregon-California Trails Association	UK, SV	History	Historic overview of the Oregon to California Trail (Ashland to Sacramento). Majority of the document is tour guide and itinerary with maps and photographs.	
Report	Winthrop, Kathryn R., and Anne Chambers	1988	Poor But Not So Poor: The Depression Era in Western Siskiyou County	Winthrop Associates Cultural Research	KM, UK	History	Historical overview and oral history interviews of the Great Depression and its effects on rural Siskiyou County; archaeology of two cabin sites possibly from the Depression era. Application of Shoup's model of "metropolitan," "dependency," and "self-sufficiency" economic patterns and Robbins' "colonial model" of economic exploitation.	
Report	Winthrop, Kathryn R., and Dennis J. Gray	1985	First Spring Archaeological Test Excavation (CA-SIS-425), Siskiyou County, California	Winthrop & Winthrop	UK	Prehistory	Test excavations at CA-SIS-425 in the Klamath National Forest. Analytical studies are limited to lithic tool analysis, artifact descriptions, and obsidian sourcing and hydration.	
Report	Winthrop, Kathryn R., Dennis J. Gray, Robert H. Winthrop	1987	Oak Knoll Historic Data Recovery Project Sites 05-05-51-49 and 05-05-51-50, Klamath National Forest	Winthrop Associates Cultural Research	KM	History	Test excavations at two small historic-era sites (FS 05-05-51-49 and 05-05-51-50. Analytical studies: Artifact inventory and faunal analysis. Also includes oral histories. Research issues: Self-sufficiency model; Dependency model; Metropolitan model.	
Chapter	Wohlgemuth, Eric	1989	Archaeobotanical Remains	In Prehistory of the Sacramento River Canyon, Shasta County, California, Center for Archaeological Research at Davis, edited by Mark E. Basgall and William R. Hildebrandt pp:H1-H37	SV	Prehistory	Discusses plant macrofossils and subsistence variability at the Sacramento River Canyon. Sites subjected to flotation analysis include CA-SHA-1176, CA-SHA-1175, CA-SHA-1169, CA-SHA-476.	
Chapter	Wohlgemuth, Eric	1992	Plant Macrofossils from CA-SHA-47 and CA-SHA-236, Redding, California	In Archaeological Investigations at CA-SHA-47 and CA-SHA-236, Redding, Shasta County, California, by T. Vaughan pp.105-140. Coyote & Fox Enterprises	SV	Prehistory	Paleobotanical investigation and analyses of six flotations samples from CA-SHA-47 and ten samples from CA-SHA-236.	

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Appendix A. Annotated Bibliography of Cultural Resources Documents.

Type	Author	Year	Title	Publisher	Zones	Topic areas	Notes	BLM sites
Book	Woodrum, Barbara	2009	Fluming the Hogback: Historical Resources Related to The Empire Flume, Tehama County, California	Cultural Resources Publications: Archaeology/History, Bureau of Land Management, Redding, California	SCF, SV	History	Study of the historic Empire Flume (constructed 1871-1873) and its role in the development of the northern California lumber industry; reportedly the first V-flume to be used in combination with a logging railroad. Some evidence that the flume was constructed by Overseas Chinese workers.	
Report	Woodrum, Barbara	2009	Historic Overview of the Shasta-Yreka Road. Appendix 6 in Report on Implementation of the Shasta-Yreka Road (CA-SHA-2806H) Historic Properties Treatment Plan	Bureau of Land Management, Redding, California	UK	History	The history of the Shasta-Yreka Road/Turnpike (CA-030-0187/CA-SHA-2806H. Discusses historic Gold Rush and post-Gold Rush road systems linking the towns of Shasta and Yreka.	CA-030-0187
Report	Woodrum, Barbara	2011	Middle Creek Road Historical Background	In The Middle Creek Road (CA-SHA-2667H) Historic Property Treatment Plan Implementation, by E. Ritter. USDI Bureau of Land Management, Redding, California	SV	History	Historical background for CA-SHA-2667H, the Middle Creek Road site for the History Property Treatment Plan.	
Report	Woods, Clyde M.	1985	Ethnographic Report for the Pit 3,4 and 5 Project, Shasta County, California: An Inventory of Native American Cultural Resources and Related Concerns for Lake Britton and Portions of the Lower Pit River	Wirth Environmental Services, San Diego, California	SCF	Ethnography	-	
Thesis	Woolfenden, Wallace B.	1970	A Study in Historic Sites Archaeology	Master's thesis, Department of Anthropology, California State University, San Francisco	SV	Prehistory, History	Thesis examining the assemblages from two multi-component cemetery sites CA-GLE-10 and CA-SHA-46. Both sites include extensive burial, feature, and artifact assemblages.	
Thesis	Zancanella, J.K.	1987	A Study of Projectile Points from the East Central Sacramento Valley, California	Masters thesis, Department of Anthropology, California State University, Chico	SCF, SV	Prehistory	A synthesis of recorded projectile points from the east-central Sacramento Valley.	

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