# AN ARCHAEOLOGICAL INVENTORY FOR THE PROPOSED HAMMER DIVERSION IMPROVEMENT PROJECT, TEHAMA COUNTY, CALIFORNIA

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## INTRODUCTION

The U.S. Fish and Wildlife Service (USFWS) has proposed a fish passage improvement project on the South Fork (SF) of Cottonwood Creek at the Hammer Diversion located at 8855 Hammer Loop Road, Red Bluff, California (T.26N., R.8W., in Section 12 MDB&M, Raglin Ridge 7.5' USGS quad – Figure 1). The South Fork of Cottonwood Creek lies in Tehama County and joins Cottonwood Creek about 10 miles west of the town of Cottonwood. The project site is on private property in the upper part of the south fork, about 32 miles upstream of the confluence with Cottonwood Creek, at a site known as the Hammer Diversion. The Hammer family has an appropriative right for 3 cfs on the South Fork of Cottonwood Creek. Diverted flows are used to generate electricity, irrigate, and as a secondary source of domestic water for a residence on the property.

Under the authority of the Central Valley Project Improvement Act (CVPIA), the USFWS has developed an Anadromous Fish Restoration Program (AFRP) with the broad goal of doubling natural production of anadromous fish in the rivers and streams of the Central Valley. The AFRP and other ecosystem restoration programs have recommended improving fish passage in Cottonwood Creek as a priority for the CVPIA, because it supports three runs of Chinook salmon as well as Central Valley Steelhead. Improving fish passage at this site (stream mile 43.85) will enable anadromous fish access to an additional five miles of stream habitat. Cottonwood Creek lies in Tehama and Shasta Counties and flows east to the Sacramento River, joining it near the town of Cottonwood.

As the proposed fish passage project utilizes federal funds it must comply with Section 106 of the National Historic Preservation Act of 1966 (NHPA) which requires Federal agencies to take into account the effects of their undertakings on historic properties. Consideration of 36 CFR 60 Criteria for the potential listing to the National Register is required for cultural properties within the project area.

The California Environmental Quality Act (CEQA), requires state and local public agencies to identify the environmental impacts of proposed discretionary activities or projects, determine if the impacts will be significant, and identify alternatives and mitigation measures that will substantially reduce or eliminate significant impacts to the environment. Historical resources are considered part of the environment and a project that may cause a substantial adverse effect on the significance of a historical resource is a project that may have a significant effect on the environment.

The following report is offered in compliance for both the NHPA and CEQA requirements for the proposed fish passage project.

## PROPOSED UNDERTAKING AND AREA OF POTENTIAL EFFECTS

The undertaking consists of the demolition of the existing dam and installation of a new intake and pump station at the current point of diversion (Figure 2). Water conveyance improvements include upgrading 1250 linear feet of the current open ditch by installing a 4" PVC pipe either within or immediately adjacent to the existing ditch. Water storage will be upgraded through the placement of a 2,500 gallon water storage tank and pump system for low pressure irrigation of gardens and orchard. Upgrades to the residence on site will include solar and emergency power upgrades and residential energy efficiency upgrades that meet Tehama County standards. A limited number of trees near the residence will be partially or entirely removed to improve solar power capabilities. The residence receives power intermittently from the seasonal Hensley Creek Hydro plant. The electrical interface from this plant is to be upgraded at the house, and it is anticipated to be the primary source of electricity in the winter months. No work will be undertaken at the hydroelectric plants on South Fork Cottonwood Creek and Hensley Creek as a part of this undertaking. Detailed engineering plans are appended as Appendix A of this document.

The area of potential effects (APE) for this project includes the construction footprint within and immediately adjacent to the stream bank where the dam will be removed and the 1250 linear feet adjacent to the existing open ditch where the water conveyance pipe will be buried. The dam was originally constructed by the landowner's grandfather in the 1930s and is discussed in greater detail below. The APE also includes the interior and exterior of a private residence constructed in 1976 and the footprint where a 2500 gallon water storage tank will be placed. The total area of the APE is one (1) acre.



**Figure 1.** Proposed project location


Hammer Diversion Project Vicinity
T26N, R8W, Section 12, Tehama County, CA
USGS Raglin Ridge, CA 7.5'
Project Area
Panther
Spring
Creek
Cottonwood
South
Fork
Gulch
Hammer Place
Secret Flat
Biscuit Flat
Sulphur Spring
Quail
Hensley
Hensley Springs
14
13
6
1
N
1:24,000
Miles
0
0.25
0.5
0.75
1

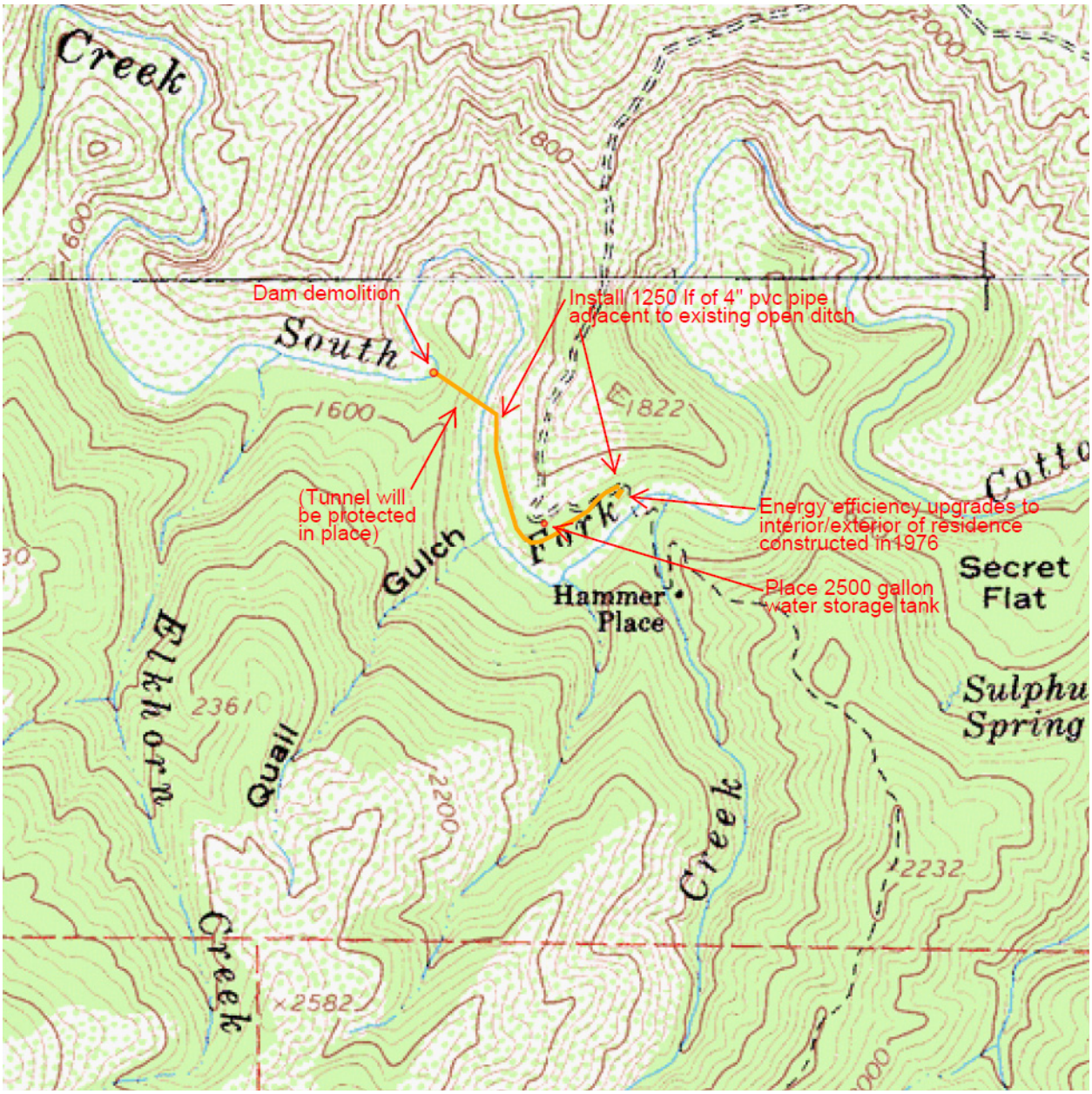


**Figure 2.** Close up of project area showing proposed activities.

## ENVIRONMENTAL SETTING

The project area is located on the eastern edge of the Coast Range mountains in the Henneke-Stonyford association (USDA 1967). The soils of the Henneke-Stonyford association are shallow to moderately shallow, steep to very steep, and rocky. These soils are underlain by hard volcanic rock composed of serpentine and greenstone. The elevation in the project area ranges from about 1,400 to 1,600 feet, and the annual rainfall ranges between from 20 to 45 inches. The vegetation is chamise, buck-brush, mountain mahogany, manzanita, scrub oak, California holly and gray pine. Shrubs are the dominant plants.

## LOCAL ENVIRONMENT

The project site is located on a 160-acre parcel referred to hereafter as the Hammer Property. It is located in a remote part of Tehama County 1.5 miles outside the east boundary of the Trinity National Forest and east of the Yolla Bolly Wilderness Area. It now serves as the primary residence of Harold Hammer, whose great grandfather purchased the property and whose grandfather made most of the original improvements as a hunting and camping destination for the Hammer family in the 1930s. The property includes a 1224 square foot domestic residence constructed by Mr. Hammer in 1976 and several outbuildings.

Of particular interest on the property is the electric power that is generated through hydroelectric plants on South Fork Cottonwood Creek and Hensley Creek built by the landowner. Mr. Hammer, an accomplished electrician, has constructed a complex system to combine the power generated by the hydroelectric and PV systems for use on the property and for storage in a battery storage bank. The original stream diversion and hydroelectric power plant were constructed in the 1930s and 40s to provide power and water to the camp.

## PREHISTORY

Archaeological investigations within the Southern Cascade region since the 1960s have resulted in the expansion and refinement of earlier understandings of prehistory. Based on analysis of materials recovered from eight Southern Cascade sites, Johnson (n.d.) has postulated a five phase, rather than two, chronological sequence for the vicinity that spans the last 4,000 years. As Baumhoff had observed in 1957, most of the changes between cultural complexes seem to indicate general shifts in available trade items and external relations, rather than any major internal changes in subsistence patterns or social systems (Wiant 1981:51). The complexes noted by Johnson (n.d.) include: Deadman, Kingsley, Dye Creek, Mill Creek, and the Ethnographic Yana.

The Deadman complex is associated with the period from 1500 to 500 B.C. representing the earliest known distinct temporal period thus far recognized in the Southern Cascade mountain foothills. This sequence is characterized by a prevalence of basalts over obsidian and siliceous lithic raw materials, large variable projectile points, and the presence of manos and metates.

The Kingsley Complex, also defined by Johnson (n.d.) temporally follows the Deadman Complex and is associated with the time period from 500 B.C. to A.D. 500. Characteristics of this sequence include the use of large stemmed and corner-notched projectile points made principally of basalt, scoop Olivella shell beads, and spatulate bone tools. The use of hopper mortars and flat-ended pestles first begin to appear in the archaeological record during this time and are seen in conjunction with slab metates and shaped rectangular manos.

The Dye Creek Complex, is associated with the period from A. D. 500 to 1500 (Johnson n.d.). According the Johnson (n.d.) the characteristics of this complex include large serrated projectile points of obsidian and basalt, Gunther barbed variants and specimens morphologically similar to Columbia Plateau cornernotched styles. Ground stone implements are common and include hopper mortars, flat-ended pestles, manos and slab metates.

The Mill Creek Complex temporally follows Dye Creek and is associated with the period from A.D. 1500 to 1845. Mill Creek stratigraphically overlies Dye Creek components and indicates selection for obsidian and fine-grained lithic materials over basalts for the manufacturing of small triangular points. Other projectile points commonly found during this sequence include Desert Side-notched and Southern Cascade variants.

The final complex defined by Johnson (n.d.) is associated with the ethnographic Yana or protohistoric period following historic contact. Characteristic material traits associated with this sequence include white porcelain trade beads, large clam shell disc beads, twined basketry with overlay designs, slab metates, manos, hopper mortars, flat-ended pestles, small triangular serrated obsidian and glass projectile points in addition to miscellaneous artifacts of Euro-American manufacture.

**ETHNOGRAPHY**

At the time of Euroamerican contact, most of the western side of the Sacramento Valley north of about Suisun Bay was inhabited by Wintun-speaking people. This large group of Penutian stock was divided into a southern Patwin group, a central Wintun or Nomlaki group, and a northern Wintu stock. The northernmost Wintu group was further divided into nine sub-areas, with the present project area being located within the eastern-most extension of the Bald Hills sub-group's territory (see Du Bois 1935: Map 1).

Wintu subsistence was based largely on three main staples: deer, acorns and salmon. All three were abundant throughout northern California, although the latter two were available only seasonally. These staples were supplemented with an immense array of less abundant resources, some seasonally available and some procurable on a year round basis.

So crucial was salmon as a food resource to the Wintu and other groups of northwestern California that the availability of this food source has been used as an important variable in assessing prehistoric population levels (Baumhoff 1963) and has been considered a major determinant of site distribution for several groups (Chartkoff and Chartkoff 1975; Raven et al. 1984). The prime location of the present project area in relation to this resource cannot be overemphasized.

Other important riverine resources included trout, lampreys, whitefish, suckers, mussels, and clams. Fish poisons were used in some of the small streams and in still pools in securing various aquatic resources (La Pena 1978:338), many of which were then dried and stored for winter use (Du Bois 1935:18).

Deer constituted a major dietary staple, a food source which was both abundant and available essentially year round. Deer were often hunted individually with bow and arrow, but also communally by being driven into snares, ambuscades or over cliffs (Du Bois 1935: II-B). Many other animals were hunted with bows or slings, or snared, clubbed or shot in communal drives. These included bear, rabbit, quail and other birds, as well as rodents and certain reptiles (Du Bois 1935: 11-13).

Acorns constituted the third primary staple of the Wintu, a food resource which was seasonally abundant as well as storable. Prepared during late prehistoric time periods with a hopper mortar and pestle into a meal for soup or flour for bread, acorns were available for immediate consumption or for winter storage. Black and valley oak acorns were preferred for breads by the Wintu (Du Bois 1935:19). Buckeye, which like acorns had also to be leached, was an important vegetal resource, and other vegetal foods, including herbs, nuts, berries, fruits, seeds and roots, were consumed in large quantities in early spring and summer (Du Bois 1935: 19-21).

The available ethnographic information documents a pattern of land use, settlement and subsistence orientation which was quite complex. Not only were there permanent village sites established throughout Wintu territory, particularly along major streams such as the Sacramento River, but these Indians made seasonal use of a wide variety of less-permanent villages and camps as well. As already noted, the nature of Wintu settlement and land use within this portion of the northern Sacramento Valley was influenced by the nature and distribution of local resources, which in turn were conditioned by the existence of a mosaic of distinct but contiguous geomorphic habitat areas. By moving from one ecosystem to another and scheduling their exploitative activities in order to arrive at a particular resource during its peak of production and ease of attainment, the Wintu supplemented their primary staples of anadromous fish, acorns and deer meat by hunting and collecting virtually every type of animal and plant food available within their territorial range. In addition to serving dietary needs, many of the collected animals/animal parts, hundreds of varieties of plants, and inorganic minerals were also sought for medicinal, technical and magico-religious purposes.

In the midst of plenty, it would appear that the Wintu might suffer shortages only during the harshest winter months, while the abundance of food would have resulted in sedentism and intensification of exploitative practices. That neither seems to have occurred has been partially explained by their fairly recent entry into the area (Whistler 1977) and the geographically extensive distribution of the various resources upon which they relied. The salmon runs, seasonal procurement of big game (especially deer), and the collection of acorns, which together supplied the primary staples for these Indians, required major forays from the home base since all three were concentrated in different areas. Moreover, the collection of exotic raw materials, such as obsidian and certain other utilitarian materials, involved long and arduous trips. The locations and availability of these resources could obviously not be so modified by Wintu technology that they could be suited randomly to behavior. Rather, it was necessary for the Wintu to suit their behavior to the nature of their own technology and the character and distribution of the resources being exploited. In other words, the Wintu had to arrange their patterns of movement, as well as other behavioral patterns, in such a way that they had the necessary resources accessible to them at all times. It was in this way that the "environment" of the Wintu, and of all hunters and gatherers for that matter, exerted its most pervasive and direct influence upon their material and especially their social culture.

The assimilation of Wintu culture has been well documented and its major forces analyzed (Greenwood and Shoup 1983). The earliest contacts with Euroamericans were probably with hunters, trappers and explorers who sporadically entered and crossed Wintu territory during the 1820's and 1830's. A malaria epidemic in 1833 killed an estimated 75% of the Sacramento Valley Indians, and undoubtedly affected many Wintu villages (Cook 1955). The Wintu probably never overcame the devastating effects of the epidemic, and thus were unable to effectively resist the onslaught of gold rushers and settlers into their territory during the early 1850's.

**HISTORY**

*Mexican Land Grants*

Much of the information in this section is extracted from Watts and Dugas (1998). The earliest historic use occurred within the upper Sacramento valley by Euroamericans in association with Mexican land grants. In 1828, the Mexican government began issuing land grants to “foreigners” with the proviso that the land was to be used and improvements made. Several grants were issued within the Mill, Deer and Antelope Creek watersheds in 1844 along the east side of the Sacramento River. Primer Canon or Rio de los Berrendos “River of the Antelope” was granted to Job F. Dye and consisted of 26,637 acres of land along the lower reach of Antelope Creek. Rio de los Molinas “River of the Mills” began south of Rio de los Berrendos and was associated with the Mill Creek watershed. This land, approximately 22,200 acres, was granted to Albert G. Toomes. The most southerly land grant of concern was located at the mouth of Deer Creek, Rancho Bosequejo “sketch.” This grant was about 22,206 acres in size and was granted to the infamous Peter Lassen.

Cattle ranching was the main occupation of the Ranchos occupying the east side of the Sacramento river. The first herd of approximately 350 Spanish “long horn” cattle in addition to 150 horse and mules was purchased at Sutters Fort and brought to the upper Sacramento valley, specifically, Rancho Bosquejo, by Peter Lassen in 1844. Albert Toomes and Job Dye began ranching operations about three years later (1847), also stocking their land with “long horn” cattle brought up from Monterey (Dye 1951). Cattle from these ranches were allowed to range for forage from the valley into the upper watersheds of Antelope, Mill and Deer Creeks. Activities from ranchos located on the east side of the Sacramento River had the first substantial impact on the local Native American Wintun, Southern and Yahi Yana populations. These groups for the most part were spared the cultural disruption and decimation caused by earlier missionization and the Hudson Bay Trappers. Cattle grazing resulted in native groups being denied access to traditional hunting and acorn gathering areas in the valley and lower foothills, pushing the Yana further up into the hills. Cattle grazing also caused competition with the native animal populations for forage including deer, antelope and elk. By the turn of the century, over grazing of the area resulted in the replacement of native flora with non-native species.

*Lassen Trail*

The gold rush of 1849 brought thousands of immigrants from the east into California seeking their fortunes in the gold fields or a better way of life in the west. Peter Lassen developed and advertised an overland route "the Lassen Trail" as a shortcut to the upper Sacramento Valley (Swartzlow 1964). His trail veered off from the established Applegate trail and ventured south along the Pit River, crossed Big Meadows (now Lake Almanor), proceeded west through Round Valley, along Round Mountain to the Narrows and followed an East/West trending ridge to Lassen's Rancho Bosquejo in the valley. The Lassen Trail was not the short cut to Eden (Sacramento Valley) as described by Peter Lassen based on descriptions in the immigrant diaries of Goldsborough Bruff and Alonzo Delano (Read & Gaines 1944, Delano 1936). The hardships along this route suffered by immigrants were so extreme, use of this trail was abandoned as an overland route by 1851, only three years after the trail was established. The lack of forage for livestock was a serious problem faced by immigrants as described in the following passage:

> "When I found the Pines began to give place to ever-green oaks.....I observed many trees that had been cut down, so that the poor hungry cattle could browse upon the tender branches- a substitute that would scarcely sustain life" (Delano 1936).

The influx of people across the Lassen Trail in concert with ranching activities in the valley and foothills disrupted the native cultures and caused competition for forage between native animal populations and the large numbers of mules, oxen and horses brought across the trail as well as competition for deer and other game between immigrants and native peoples (Read & Gaines 1944). By the 1860s, pressures brought to bear on native populations by immigrants and settlers would eventually result in conflict and the subsequent decimation of native American Indian populations of this area within twenty years (circa 1870).

*Ranching*

As mentioned earlier, ranching first began in this area by Peter Lassen and others after receiving land grants east of the Sacramento River from the Mexican government. J.S Cone recorded one of the earliest brands in California, the "pilot wheel" used on his herds located on the west side of the Sacramento River. The face of cattle ranching changed considerably in Tehama County as a result of a severe drought, which killed the majority of cattle herds between 1861 and 1862 in California (Vankat 1970). Approximately 30,000 head of cattle were lost in Tehama County from starvation during this period. In order to reduce cattle mortality many oak groves were felled to provide feed to starving herds. The drought also resulted in a significant change in emphasis from cattle to sheep ranching in Tehama County and provided the impetus to begin the practice of summering livestock on the abundant feed found in mountain meadows.

J.S Cone also brought sheep ranching into the area by 1856. Cone purchased portions of the Rancho Rio de Molinos in 1869, sold his cattle and went into the sheep business. By the 1860s, three million sheep ranged in California and almost half were located in the Central Valley. At this time, Tehama County had more than 300,000 head of sheep. The numbers of sheep in California doubled by 1876 to six million head. The Ward brothers, Ephiram and James, also started in the sheep business by 1870. Fourteen years later (1884), Cone bought out the interest of James Ward, merging the two companies into the Cone/Ward sheep company. Sheep ranching would continue by Cone/Ward firm until the late 1930s.

Another large sheep operation was established in the 1870s owned by Leo L. McCoy out of Red Bluff. McCoy was a prominent sheep rancher in the Red Bluff area for many years (Daily News N.D.). Although, sheep ranching was the emphasis in the watersheds by 1870; cattle ranching also continued on a smaller scale. The first black cattle "Galloway Bulls" were brought into the Lyonsville area by Jack Turner circa 1870. Turners' cattle were wintered in the vicinity of the Antelope Creek canyon (Daily News 1956, 1970).

In 1868 J.S. Cone began acquiring large tracts of land. He purchased portions of the Rio de los Berrendos in 1868 (acquiring the rest by 1887), the Adobe Ranch (near Red Bluff) in 1882, and portions of the Rio de Los Molinos rancho in 1884. Cone also acquired large tracts of land from the Central Pacific Railroad Company in the Mill and Antelope creek watersheds. Near the turn of the century, the first purebred Herefords were brought into Tehama County by Doug Cone, J.S Cone's son. From about 1886 through 1909, the Cone operation "free grazed" cattle and sheep on Forest Reserve lands. By 1907, the Forest Reserves had been converted into National Forest lands. Permitted range allotments were set-up on National Forest lands to control grazing practices on public lands. Past

grazing practices had severely impacted native vegetation replacing native species with exotic grasses and forbs. Over grazing especially by sheep had left vast tracts of barren land in the foothills and erosion problems. The Forest Reserves and later the Forest Service were established to protect the landscape from the earlier abuses. However, the advent of World War I brought an increased need for meat. Grazing practices on National Forest lands were immediately relaxed in the face of the National emergency. The price of meat skyrocketed and stockmen were allowed to graze unrestricted to fill the need.

> "Cattle and sheep ranchers, seeing the prices soar, increased their herd sizes. These enlarged herds were then grazed on lands that had previously been carefully managed to prevent overgrazing, or any grazing at all. The result included massive overgrazing, and poor animal quality from starvation. Between the 1920's and 1930's, many ranchers went bankrupt" (Prather 1995).

This resulted in extreme over grazing of National Forest allotments and the surrounding areas. Along with many other ranchers, this also appears to have contributed to the demise of the Cone/Ward outfit by 1938.

Burning brush in the fall to make travel easier and forage better the following year was a standard practice of sheep herders. Sheep herders of the northern and southern Sierras were known to constantly burn downed fuel, small trees and understory vegetation resulting in devastating effects to forest regeneration and commercial timber:

> "Stockmen had an agreement among themselves that the last one out of the mountains in the fall were to set fire to the brush and let it go until fall rains put it out" (Eaton 1941).
>
> "Sudworth (1900) describes forest fires as so prevalent (late August to late October) that travel was often difficult because of dense smoke" (McKelvey & Johnston 1992).
>
> "We can reasonably infer that the intensity of sheep grazing for nearly 40 years in the Sierra Nevada impacted stand structure and regeneration patterns, producing lasting changes in mixed communities of grasses, forbs and shrubs.....In the absence of competing vegetation, regeneration (of mixed conifer forests) was rapid and dense when sheep and fires ignited by sheep herders were no longer prevalent in montane forest" (McKelvey & Johnston 1992).

Sheep fell out of favor due to their destructive nature on the landscape and the negative effect of burning on commercial timber stands. For the most part, cattle ranching replaced sheep in the Mill, Deer and Antelope creek watersheds circa 1930. Ranching operations appear small compared to the early years of the livestock industry. Cattle were wintered in the valley and brought up to private lands or Forest Service allotments in the foothills and mountains during the summer.

*Land of Recreation Opportunities*

When entering Tehama County along Interstate 5, the visitor is greeted with large signs noting the recreational opportunities of the county. Hunting, fishing, horseback riding and camping have long been an attraction of Tehama County. Beginning in the late 1930s and continuing today, individuals living and working in the cities (e.g. Red Bluff) began purchasing properties in rural areas of the mountains as seasonal recreational retreats. These are generally modest campsites used for hunting and possess limited amenities. Most often these camps are passed on through the family and utilized seasonally for recreation. On occasion, more permanent residences have been constructed on these rural sites.

*The Hammer Family*

The property was established by the current owner's grandfather as "Hammer Camp," a private family retreat, in the 1930s. The family made numerous improvements to the property which are discussed in more detail in other sections of this report, in particular, a diversion dam referred to as the "Hammer Diversion" and a water conveyance tunnel, both originally constructed in the 1930s and 1940s. Notes from an interview with Harold Hammer conducted by the author on September 4, 2013, are included at the end of this report as Appendix B.

## LITERATURE REVIEW

A literature search for previous work and resources near the project area was completed by the Northeast Information Center (NEIC) of the California Historical Resources Information System (I.C. File # G13-6). Based on the information provided by the NEIC, no cultural resource surveys have been conducted within the APE or within ½ mile of the project area. No prehistoric or historic sites have been recorded within the APE or within ½ mile of the project area.

## NATIVE AMERICAN CONSULTATION

On 12 and 13 November 2013, project review and consultation memos were sent via email as well as via U.S. Postal Service to five tribes and individuals identified by the Native American Heritage Commission as having an interest in the area where the project is located. The list of recipients and copies of the memo are provided in Appendix C. Copies of all memos and transmittal e-mails (when used) are on file at the CRT office, Sherwood, OR. The memos included information regarding the results of the archaeological survey. Follow up emails were sent to the tribes and individuals on 5 February 2014. No responses have been received.

## PROJECT FIELD INVENTORY

An archaeological survey of the APE was conducted on September 4, 2013, in compliance with the Secretary of the Interior's Professional Qualification Standards (48 FR 44716, Sept. 1983). The author was oriented to the project area on the ground by Jeff Souza of Tehama Environmental Services using an aerial map of the Area of Potential Effect (APE) (Figure 3). The Hammer Diversion and water conveyance tunnel feature, known to have been originally constructed in the 1930s, were relocated. Survey in the vicinity of the diversion was conducted with the use of waders. The rest of the APE was surveyed using both meandering and parallel transects spaced approximately 15 meters apart. Periodically, a trowel was used to clear away duff to examine the subsurface soil. Erosion cuts and rodent burrow spoils were examined for artifacts, ecofacts and soil discoloring (e.g., midden deposits). A compass and survey-grade Trimble GeoXT GPS were also used during the survey. All activity areas within the APE were surveyed using these methods (Figure 4).

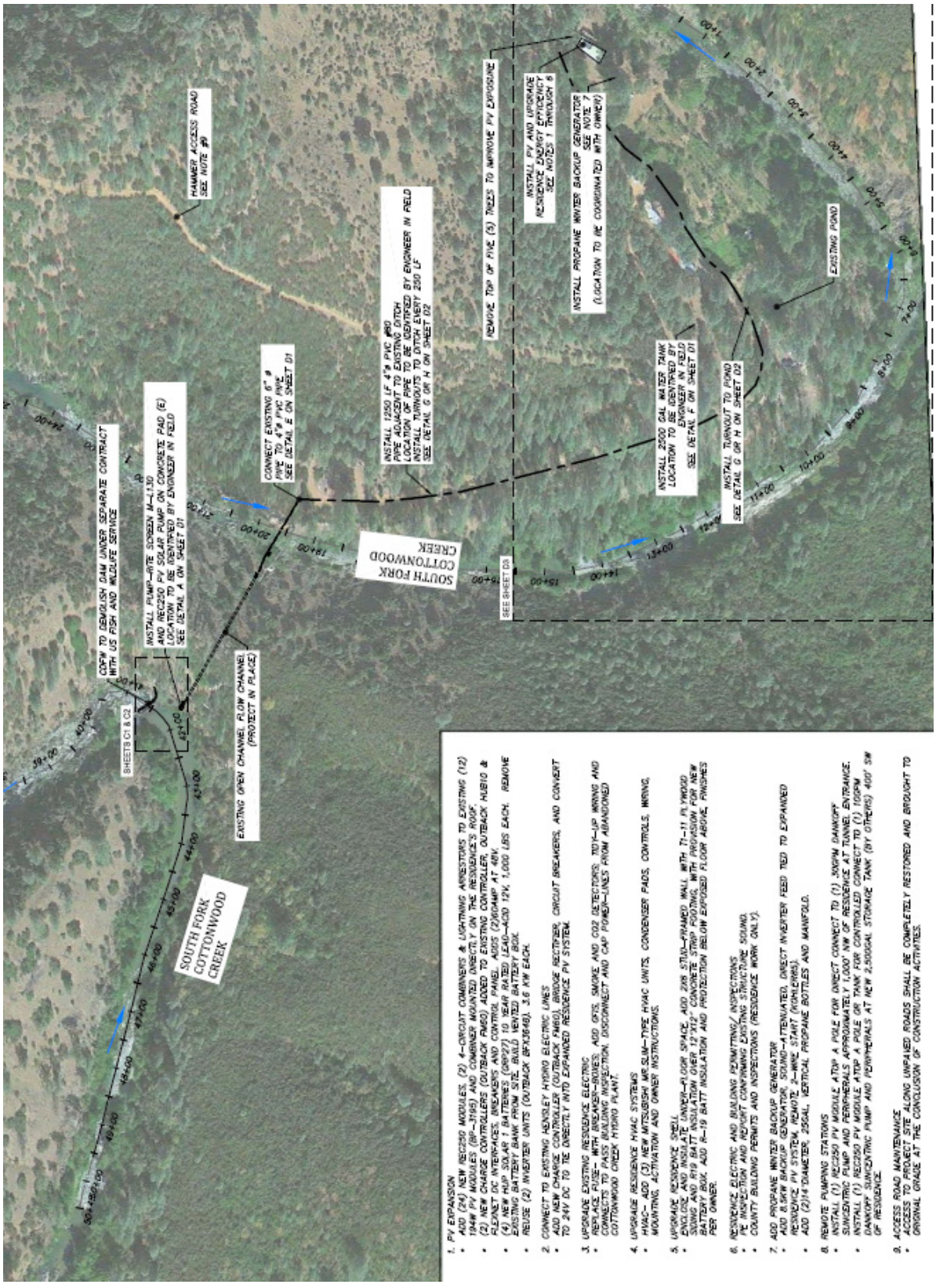


**Figure 3.** Aerial photograph showing project activities.

**Figure 4. Need a Figure 4 showing Dave's survey transects on a USGS quad.**

## CULTURAL RESOURCE IDENTIFICATION

Numerous features associated with residential irrigation and hydroelectric power generation were documented on the property, both within and outside the APE. These include a concrete stream diversion dam (the "Hammer Diversion," a water conveyance tunnel, residential hydroelectric power plants, scaffold and and elevated pipe crossings, and an irrigation ditch (see Figure 5). Research has determined that some of these features meet the age threshold to be considered historic properties that are potentially eligible for inclusion on the National Register of Historic Places (NRHP), while others do not meet the age criterion.

Though the original hydroelectric plants and portions of the associated support structures and features may have been originally constructed in the late 1930s and early 1940s - it is apparent from the interview with Harold Hammer that virtually no remnants of these original constructions survived a 1960 flood event. Further, the hydroelectric power plants in use today were constructed by Harold Hammer no earlier than 1975. Likewise, the irrigation ditch that is in use today was reconstructed in 1975, while the scaffolds and pipe crossings in use today were constructed after 1975.

There are two features associated with the residential irrigation and hydroelectric power generation on the property that were constructed in the 1930s and still retain some original elements: the concrete stream diversion dam (the "Hammer Diversion") and the water conveyance tunnel. These cultural resources were consequently documented and evaluated for their significance and potential eligibility to the NRHP. They are discussed in more detail below and on the appropriate CA DPR site forms, which are attached to this report as Appendix D.

**Figure 5. Cultural features identified during survey.**

*Water Conveyance Tunnel*

This site consists of a hand-dug tunnel excavated during the summer months between1926 and 1931 (Hammer, personal communication 4 September 2013) (Figure 6). On the east end, the tunnel functions as an intake behind the Hammer Diversion and has a functioning head gate. The tunnel extends approximately 250 feet to the west through the hillside conveying water to an outlet that has been used for the generation of electricity and irrigation. The interior of the tunnel is not finished, but rather consists of raw exposed rock. Portions of the tunnel are collapsing and a wooden roof has been constructed in portions of the tunnel to keep the water flow unobstructed.

In 1960, a massive flood damaged or destroyed much of the hydroelectric infrastructure on the property, including the tunnel. The gate on the tunnel had been left open during the winter, allowing floodwater to shoot through the tunnel and blow out the generator shack and bridges. It was not until 1973 that Mr. Hammer began to remove the sand that had filled in the tunnel from the 1960 flood, and subsequently rebuild the diversion bam in 1974 (see below). Repairs to the interior of the tunnel include supports for the eroding roof and walls. The flooding in 1960 is documented by J. O. Rostvedt (1965) in, "Summary of Floods in the United States During 1960, Geological Survey Water-Supply Paper 1790-B."

**Figure 6. East entrance to water conveyance tunnel, looking west across South Fork Cottonwood Creek?**

*Hammer Diversion Dam*

The diversion dam, constructed for the purpose of providing residential irrigation and electricity generation, is founded on bedrock, spans the entire creek bed (approximately 80 feet) and ties into bedrock exposures on each bank. Numerous natural rock outcrops have also been incorporated into the body of the dam. The crest elevation of the dam is at 1501.6 feet above sea level (asl). On average, the width of the concrete is 24" along the flat top surface of the dam. Portions of the dam are as narrow as 16" and as wide as 36".

A total of three flashboards are present on the dam. Two flashboards are located along the eastern portion and measure 44" and 24" in width and are each 12" tall. A larger "main" flashboard is located to the west and measures 60" wide and 54" tall. The concrete becomes smoother, more eroded and friable toward the western portion of the dam. The eastern portion is blockier and appears sounder. The exterior face of the dam appears to be as tall as 8 feet – based on the impressions of 4 by 8 foot plywood sheets used in the most resent reconstruction efforts.

When the first dam was built in 1934, it consisted primarily of rock and had no flashboards. In 1938, portions of the top edge of the dam began to wear away and flashboards were added to alleviate this issue. Between 1940 and 1958 the dam underwent numerous seasonal repairs during summer months. These generally included the addition of hand mixed concrete, stone and scavenged iron. Constant repair was necessary in the upkeep of the dam. In 1960 the dam was left in a state of disrepair after a large flood destroyed the associated electric generators. The dam was reconstructed in 1974 (see below). Seasonal maintenance repairs have continued almost annually. Larger repairs were undertaken in 1986 and required the use of a temporary dam for repairing notches wearing into the main body of the dam.

Following the "era of gas generators and propane refrigerators," as Harold Hammer refers to the period after the 1960 flood until 1974, he rebuilt the diversion dam with 110 sacks of concrete, rebar and scrap iron (personal communication 4 September 2013). The current dam was built in one year using ½" plywood sheets for forms. 750 watts of electricity from the Hensley Creek generator (AC to DC) was used to power the cement mixer. A gas welder was used to armor the edges of the dam with grader blades.

As a result of this major reconstruction effort, as well as the serial repairs and maintenance through its use life, the diversion retains very little of its original character. A small portion of the original masonry and cobble construction may still be visible on the central eastern side of the diversion (Figure 7). Figures 8 and 9 show additional views of the Hammer Diversion as it appears today.

10. Near the center of the diversion structure, native rock pieces appeared mortared together to create a buttress at the face of the diversion structure. The concrete/rock conglomerate is about 4 feet to 5 feet in length and triangular in plan shape. No seepage was apparent through or beneath the diversion structure at this location, although daylight can be seen when looking through conglomerate parallel to the face of the concrete structure.

**Figure 7. View of original masonry and cobble construction on east side of Hammer Diversion (Sage 2013:11).**

Figure 8. View of Hammer Diversion Dam to the Northeast

Figure 9. View of Hammer Diversion Dam below and to the East

## EVALUATION OF SIGNIFICANCE

As part of the comprehensive review of the cultural resources documented during the survey and the evaluation of their significance, it was determined that the Hammer Diversion dam and water conveyance tunnel are historic and are associated with a family recreation camp that has its roots in the history of a longtime Tehama County family. In consideration of 36 CFR 60 Criteria for potential listing of the property to the National Register, the diversion dam and water conveyance structure were evaluated both in the context of the historical development of Tehama County as a whole, as well as the more specific patterns of land ownership for the purposes of seasonal recreation (e.g. hunting camps).

*Historic Context for the Hammer Property*
The theme of recreation during the first half of the twentieth century in Tehama County provides the key elements for the historic context for the Hammer Property.

The property has been in the ownership of the Hammer family of Red Bluff since the first quarter of the 20th century. According to land patent records, Simon Hammer, great grandfather of current landowner Harold Hammer, made a cash sale transaction for the property in Township 26N Range 8W Section 12 on 6/22/1917. While it is possible Simon purchased the land for an unknown purpose, the earliest recollections of improvements made on the property come from Harold Hammer, who recollects that his grandfather, Herbert Henry Sr., started developing it in the 1920s after the land had been purchased for use as a summer family camp. Most of the improvements were designed to generate residential power for the camp and to improve irrigation for the family's garden and orchard.

Based on a variety of public records, it appears that Herbert Henry Hammer was born in Nebraska in 1871 and moved to Red Bluff, California, with his family (parents Simon and Marietta and siblings Katherine and Justin) in 1887 at the age of 16. He is listed in the voter roles as a mechanic in 1896 and as a foundry man in the 1900 census. He married Lillie Stillwell in 1898 and lived in Red Bluff until his death in 1957. Two entries in the Iron Trade Review shed some light on a period in H.H. Hammer Sr's early career as the owner-operator of Red Bluff Iron Works:

> November 5, 1908: "The foundry of H.H. Hammer, Red Bluff, Cal, was badly damaged Oct. 22, the loss entailed amounting to about $7000, not including the loss of patterns." (Iron Trade Review Volume 43, 1908:784)
>
> November 26, 1908: "The Red Bluff Iron Works, H.H. Hammer, proprietor, Red Bluff, Cal., advises that materials are being gathered on the site of the old foundry destroyed by fire to build a new concrete building, 66x60 feet, fire proof throughout. All new equipment has been ordered, and it is expected that the building will be ready for occupancy by January, 1909." (Iron Trade Review Volume 43, 1908: 905).

Although no other references to his business have been found, this early misfortune does not appear to have hindered his prospects or his career, given his long life in the community and his ability to spend time at the family retreat. Herbert's son and Harold's father, Herbert Henry Hammer Jr., was born in Red Bluff in 1915, and Harold himself was also born in Red Bluff in 1935. The land records indicate another cash sale of property in Section 12 on 7/10/1934 assigned to Lillie Stillwell Hammer, Harold's mother. According to Harold, the family stopped using the property for summer use in 1954, and his mother still lives in Red Bluff today. Harold now lives on the property in a house he built in 1976. While his father was still alive (he died in 2008 at the age of 93), Harold notes that his father and brother had built a winery/ root cellar and had produced up to 150 gallons of wine at one time.

Twenty years before the Hammer family arrived in Tehama County, on 15 May 1867, the Directors of the Industrial Immigration Association wrote a letter to the editors of the Daily Alta newspaper regarding "The Resources of Tehama County," among which they make the following observations that would prove relevant to the history of the Hammer family:

> "11—The establishment of a woolen-mill would be the best investment of capital extant. Lumber is cheap, wool plenty, and water-power abundant—going to waste…

13—An iron-foundry would pay well; also a woolen mill aforesaid…
14—More water power than any other county in the state….
19—Mechanics get well paid, except printers, the business in that line being overdone…" (Daily Alta, 15 May 1867, page 3)

As noted above, H.H. Hammer Sr. took advantage of the lucrative nature of both the mechanics' industry and the iron industry in Red Bluff to make his contribution to the economic development of Tehama County. However, it should also be noted that the family did not take advantage of the water power to be harnessed on their mountain property for commercial gain, as a woolen mill or a lumber mill might have provided. Instead, the property remained strictly a family retreat away from the business lives they created for themselves in the more populated parts of Tehama County.

Tehama County is the gateway to Lassen National Park, Burney Falls, Lake Almanor and other well-known recreational areas noted for scenic qualities, fishing, hiking, and hunting opportunities. Recreational communities arose in the twentieth century when roads were constructed for automobiles and provided the public with greater access to California's rugged mountains and lakes. Small communities have developed to serve the seasonal tourist trade. Property types associated with recreational residential properties include clusters of small tracts on lakes or rivers for cabins. Cabins are often built with a rustic or vernacular flair. Outbuildings such as boat houses or garages may be represented.

The Hammer Property, though it embodies a slice of one family's history, does not represent part of a greater pattern of recreational development in Tehama County. The property is not part of a neighborhood or cluster of cabins built on small tracts adjacent to a lake or river. The Hammer property is a large tract of 160-acres and was minimally developed as a farm with orchard and grape vines for the family, thus it does not reflect the regional trend to create a seasonal community at a scenic destination. Under consideration in this report are two structures associated with the Hammer property: the water conveyance tunnel and diversion dam.

*Addressing the Criteria for Determining Significance for the Water Conveyance Tunnel and the Hammer Diversion*
As set forth by the National Park Service, " the quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
B. That are associated with the lives of significant persons 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 history or prehistory.

The criteria of eligibility are addressed below for the water conveyance tunnel and the Hammer Diversion dam.

Criterion A: The early history of Tehama County revolves around the large-scale manipulation of its abundant natural resources for commercial purposes. As noted above, the infrastructure constructed on the Hammer Property and modified over the course of 90+ years reflects the evolution of a private family's recreational and residential needs. The property was never cultivated or manipulated for large-scale commercial agriculture or industry, and it was not part of the trend of organized recreational development communities that still exist as historic districts on northern California's national forest lands. In short, the development of the Hammer property is not associated with events that have made a significant contribution to the broad patterns of our history. Thus, neither the water conveyance tunnel nor the Hammer Diversion can be considered eligible under *Criterion A*.

Criterion B: While the Hammer family has lived and contributed to the civic life of Tehama County for more than 100 years, there is no individual family member associated with this property whose life history rises to the level of historic significance to be considered an "important person" under *Criterion B*. Thus, neither the water conveyance tunnel nor the Hammer Diversion can be considered eligible under *Criterion B*.

Criterion C:
*Water Conveyance Tunnel –* While the tunnel was originally dug by hand in the 1920s and represents an impressive feat of perseverance, hard work and competent engineering on the part of H.H. Hammer Sr., it cannot be considered the work of a master or a feature that possesses high artistic value. Moreover, ongoing erosion, the destruction and siltation caused by the 1960 flood, and the subsequent reconstruction efforts have diminished the feature's integrity of design and method of construction.

In 2000, Caltrans prepared a state-wide historic context for water conveyance infrastructure. The development of hydroelectric power in California proved to be a major factor in the state's expanding economy in the beginning of the twentieth century (Caltrans 2000: 54). According to Caltrans, the pioneering period of hydroelectric development from the 1890s through the turn of the 20th century saw experimental efforts by communities or small businesses to build systems that would serve that community or an economic area. The second phase, from around 1905 to World War II saw the consolidation of those small municipal efforts into monumental systems "designed by some of the most notable engineers of their era…[that] represent major achievements in civil engineering" (Caltrans 2000:54). The third phase of historic hydroelectric development in California began in the 1920s and was characterized by the rise of government regulation and public entities stepping in to develop power generation (Caltrans 2000:54).

The water conveyance tunnel constructed by H.H. Hammer does not fit easily into the hydroelectric power generation themes developed by Caltrans (Caltrans 2000). The personal use of hydroelectric power developed strictly for use on one recreational property appears outside the more civic-oriented development of electricity represented by the period of consolidation and watershed development (1905 to Present) and period of public development of hydroelectric power that began in the 1920s.

*Hammer Diversion Dam*
Like the water conveyance tunnel, the Hammer Diversion was designed and originally built by H.H. Hammer Sr, in the 1930s. Using the natural bedrock features of the creek and locally-available stacked rock with no flashboards and a gate valve at the bottom to push water through the tunnel, he designed and built a practical solution to the problem of water management on his property. Both Mr. Hammer and his descendants have continuously repaired, modified, and reconstructed the dam over its 80+ year history. Although remnants of the original stacked rock construction are still visible in one section of the dam, the most significant modification occurred when Harold Hammer rebuilt the dam using cement, rebar, and scrap iron in 1974. These changes have diminished the feature's integrity of design and original methods of construction, nor does the appearance of the dam any longer convey the feeling of its original materials.

Both the tunnel and the dam are part of a residential irrigation and hydroelectric power generation infrastructure that served the needs of an individual property, but neither feature, nor the system as a whole, represents a significant or distinguishable entity and neither feature can be considered eligible under *Criterion C*.

Criterion D:
Although usually applied to the information potential of archaeological sites, a building or feature can be eligible in the context of Criterion D if the structure itself contains important information that contributes to our understanding of human history or prehistory. Both the tunnel and the diversion dam have been recorded on DPR site record forms that include all the details of their construction, materials, and history in relation to the development of the Hammer Property. Neither structure is likely to yield additional information that is important to our understanding of human history, and thus, neither can be considered eligible under *Criterion D*.

Integrity:
The infrastructure on the Hammer Property has been subject to ongoing maintenance and replacement over the years. While this fact does not necessarily negate the significance of potentially significant historic properties, it is important to note that many of the changes have altered or completely replaced the original design, materials, and workmanship of the features to the extent that they no longer convey a connection to the potential period of significance, which would be from 1917-1963 (the 50-year threshold for consideration of eligibility to the NRHP based on the criteria for historic significance). The feeling and association of the dam is also diminished because of changes to the workmanship from a hand built structure with local cobbles to a concrete and steel structure.

## FINAL RECOMMENDATIONS

As a result of the research and fieldwork conducted for this project, it has been determined that the proposed construction activities will have no effect on historic properties and should proceed as planned. However, in the event subsurface cultural remains over 45 years of age are encountered during ground disturbing activities, all work should cease at the general area of discovery and the USFWS regional archaeologist should be notified immediately. A field exam by a professional archaeologist may be required and further steps for resource protection will be implemented, including mitigation and consultation with the Native American Indian community if human remains are encountered (following NAGPRA procedures).

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APPENDIX A
Hammer Project Engineering Drawings

APPENDIX B
Notes from Harold Hammer interview, 14 September 2014

**INTERVIEW – HAROLD HAMMER**

The following notes are the results of a short interview with Harold Hammer on September 4, 2013 in the living room of his home on the Hammer Property:

Harold Hammer (Born 1935) - Graduated from Reed College in Portland, OR. Started graduate school in Chicago – "to hell with that" and moved back to Red Bluff to work in the electronics business.

Father (Born 1915 – Died 2009/2010)
Mother (Still lives in Red Bluff, Ca)
Grandfather (Born 1870s – Died 1957 at 87 or 88) - Owner-operator of Red Bluff Iron Works. Cast the water nozzles that hit the pelton wheels for the electric generators, came out to property every summer.

Harold's father told him that from 1926-1931, mostly in the summer, the tunnel was built.
Harold's grandfather had originally hired a hard rock miner, and after only making 10 feet in one winter, he was disappointed and did the remaining work himself.

The first year or two there was a temporary dam.
First dam built in 1934 was mostly rock, no flashboards, used a gate valve at the bottom to push water through the tunnel.

Began to wear where in places (present flashboard locations), and put flashboards in 1938.

Between 1940 and 1958 there were several small repairs.

Summer use was abandoned in 1954.

The ditch from the pipe crossing after the tunnel was dug in one week.

First electric plant was just below the current house – would always get sand in it. This had 55 feet of fall with a 12 inch pipe, five pelton wheels and 10 nozzles. (The *Pelton wheel* is a water impulse turbine. It was invented by Lester Allan Pelton in the 1870s.) It used a horizontal pulley and a flat belt with a twist to turn the generator. 3.5 Kw DC was produced. There was an electric transmission line to the camp and $SO_2$ refrigerators.

The dam would leak in the summer. As a child, Harold would find the leaks with his toes, and stuff the leaks with rags to close them up.

Second Plant – raised the 1st site and used larger nozzle with a needle valve and larger pelton wheel. Produced 1800 watts. But the creek was still getting into the site on occasion.
Third Plant was at the end of the tunnel. Harold had drawn up plans for a Banki water turbine. His grandfather had built it at his shop incorrectly and then died (1957). Harold's father told him they had to put it in as a last wish for the grandfather. It didn't work. "I told you so", said Harold.

The next year or two (1960) there was a huge flood. The gate on the tunnel had been left open that winter, and the water shot through the tunnel and blew out the generator shack and bridges. The site was abandoned for the generation of electricity, and the dam was also left to erode. The "Era of gas generators and propane refrigerators" began.

In 1970 Harold decided he wanted some electricity at the site again, and began building the Hensley Creek upgrade. There had been winter-use electricity generation on Hensley Creek in the past. The grandfather had previously built

a small reservoir on this creek - these earlier generators were able to get a few hours of power a day using the magnetos out of several Model T Fords.

Harold's 1970 upgrade used 5 inch structural pipe he salvaged in Sacramento, and cut in half so it would fit in his Volkswagen pickup. He raised the dam on Hensley Creek. The next year, in January, he used 900 feet of buried plastic pipe from the grandfather's old reservoir to get water to an old pelton wheel. This generated 750 watts, and was in use for 3-4 years. This was the source of electricity to build the current dam.

The ditches were also rebuilt in the 1970s.

In 1973 and 1974 Harold cleared the sand that had filled in the tunnel from the 1960 flood, and built the new dam. The dam was built with 110 sacks of cement, rebar and scrap iron. The 750 watts from the Hensley Creek generator (AC to DC) was used to power the cement mixer. A gas welder was used to armor the edges of the dam with grader blades. The current dam built in 1 year using ½' plywood sheets for forms.

In 1975 he installed 5 Kw generator (Modified Francis Turbine). It shook and leaked grease so he torn it open. The company had put it together upside down. He fixed it, but it wasn't machined perfectly and used too much water. In the summer he would only get 500 watts. He then added two 2" nozzles and a pelton wheel to get 1200 watts. He had used his grandfather's forge to build the pelton wheel. He then added another nozzles to raise the output to 1500 watts.

The current towers are welded construction built using angle iron salvaged from demolished apartments in Red Bluff. Previous towers (before the 1960 flood) were built using bolts and rivets because his grandfather couldn't weld in those earlier days. The cables used in the spans are salvaged from a crane at Diamond Lumber after the hours had been exceeded for use.
Harold's father did most of the trail work on the property.

His mother helped pack rocks for the main dam.

Concrete extension walls were added to the tunnel to eliminate the infilling of sand. He also added a few walls and roof to interior potions of the tunnel to reduce collapsing.
Harold's current house was built in 1976.

In 1982 a new pelton wheel was installed at the tunnel generation site.
At this point, Harold began to mill grey pine on site for some of the numerous outbuildings.
His brother and father built a winery/root cellar and had produced up to 150 gallons of wine at one time.

In 1986 Harold used a temporary dam to aid in the repair a notch wearing out of the concrete in the main dam. This was the last repair made to the current structure.

Harold thinks his last project will be a 10 foot by 12 foot Garden shed with a cement floor.

APPENDIX C
Tribal Consultation Documents

APPENDIX D
Site Forms

APPENDIX E

Hammer Diversion Drawings