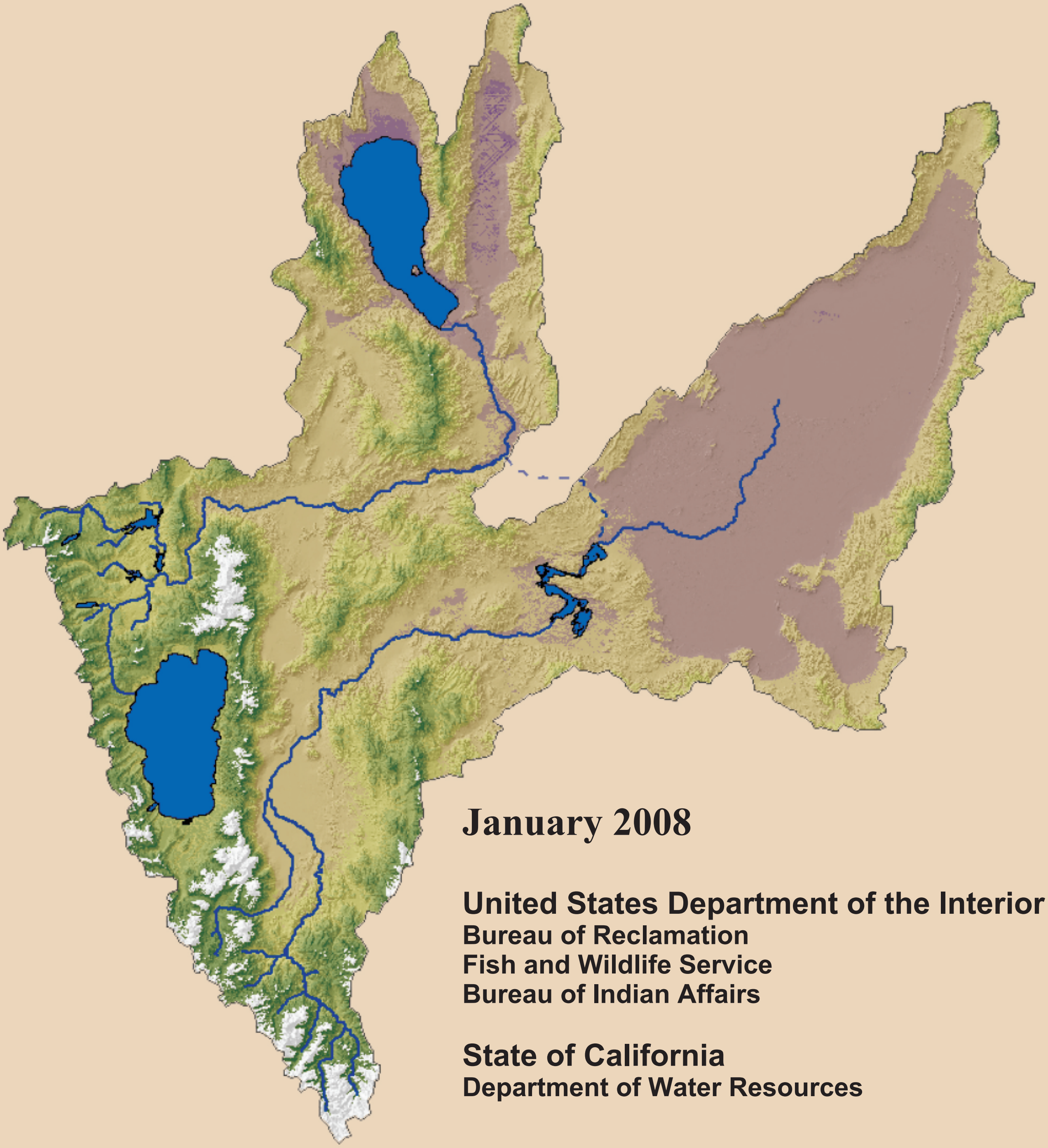
Final Environmental Impact Statement/Environmental Impact Report

Truckee River Operating Agreement

Cultural Resources Appendix



January 2008

United States Department of the Interior
Bureau of Reclamation
Fish and Wildlife Service
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State of California
Department of Water Resources

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Table of Contents

Table of Contents – continued

Page

Table of Contents – continued

Page

Tables

Table

Maps

Map

CULTURAL RESOURCES APPENDIX

This appendix contains an overview of the prehistoric, ethnographic, and historic uses of the study area; a condensed Truckee River historic timeline; tables that detail elevations and flows under all alternatives with specific cultural resource information in table form for each facility and stretch and two tables which list all National Register of Historic Places (NRHP) properties in the primary and secondary study areas. A comprehensive bibliography follows.

The first section, the overview of human use of the study area, has been written with two primary purposes in mind: to describe the major prehistoric, ethnographic, and historic uses of the study area which have shaped its present physical condition and contributed to its attitudes; and to identify the physical evidence which could be expected to remain from these uses—the cultural resources sites of today. It includes three maps and table CRA.1, "Key Aspects of Protohistoric Washoe and Nevada Northern Paiute Cultures."

In preparing this appendix, the following types of sources were reviewed: studies and reports, both detailed and general, which are applicable to the entire study area or a portion of it; site forms; and a number of reports on small scale and a few larger scale archeological surveys and literature searches, often related to recent development. Reports on testing or excavation of sites near or in the primary area defined for the cultural resources evaluation of the study action (chapter 3); general and specific historical and ethnographic works; historic maps; Bureau of Reclamation (Reclamation) project information; U.S. Geological Survey (USGS) data and staff; and site locational data from a number of sources were also reviewed.

Information from California and Nevada files was obtained by mail and in site visits, primarily in 1993 and 2003, including contacts with the California and Nevada State Historic Preservation Offices. When responsibility for the cultural resources portion of the study was reassigned late in 1994 and early in 2003, every effort was made, for reasons of economy of time and funds, to use the data which had been collected previously. In the summer of 1995, site information was obtained from the Truckee and Sierraville Ranger Districts of the Tahoe National Forest and Toiyabe National Forests; the Forest Service's Lake Tahoe Basin Management Unit; the U.S. Army Corps of Engineers (COE), Sacramento, California; and Reclamation's Mid-Pacific Regional Office, Sacramento, California.

Discussions also were begun with the State Historic Preservation Offices and updates were obtained from California and Nevada site repositories. Responses to late summer 1996 requests for updated information were received from the Forest Service's Lake Tahoe Basin Management Unit; Sierraville District of the Tahoe National Forest; the Northeast Information Center at Chico; the North Central Information Center at Sacramento, California; and the Nevada State Museum. The various tables CRA.2 lists recorded cultural resources in specific lakes and reaches, while tables CRA.3(A & B) lists the properties in the primary and secondary areas included in the National Register of Historic Places, by State. While thoroughness is the focus of this project, it is possible that occasional data gaps may occur in the site information. These gaps, however, are not believed to affect the overall accuracy of the presentation or conclusions.

I. Section 1: Overview

A. Study Area

The study area is within the eastern Sierra Nevada subregion of the western Great Basin culture area and includes the montane environment, a transition area, and the western basin floor. Within Elston's (1986) framework, the study area is within the Lahontan Basin and the northern portion of the Eastern Slope of the Sierra Nevada. The area contains a great deal of evidence of human occupation extending to approximately 11,000 years BP (before present). Information from each of the successive cultural periods, briefly described below, reflects how people of the period coped with their particular environmental conditions within the study area and provides a basis for analysis.

B. Prehistoric Settlement

Primary sources for the discussion are Elston (1986), Jennings (1986), Adovasio (1986), and Madsen (1986), supplemented by Raven (1990) and a number of survey reports and site forms not cited individually. Of the 442 sites listed in the various lake/river stretch tables, and the 77 NRHP sites in tables CRA.3-A and B, a majority are prehistoric or protohistoric.

1. Pre-Archaic Period

Pre-Archaic people (11,500 to 7,000 BP) primarily hunted large game such as mammoth, camel, and horse, but appear to have also used plants and fish and shellfish from streams and marshes. Artifacts from this period found to date on the ground surface in the study area include distinctive stone projectile points and associated tools such as scrapers and knives.

2. Archaic Period

New adaptations were needed as the climate became drier and the types of game and plants changed, particularly on the basin floor. This set of adaptations, known as the Archaic Period, began as early as 9000 BP, thus overlapping with the Pre-Archaic/ Paleo-Indian, but in most cases cultural materials date to circa (ca.) 7000 BP or later and continued in various forms until at least 500 BP.

3. Early Archaic Period

The types of sites and artifacts found in the Early Archaic generally indicate that the people used a greater variety of plants and animals than the Paleo-Indians had, with increasing emphasis on plants throughout the period. Projectile points, represented by the Pinto and Gypsum types, were smaller, and hunting techniques appear to have changed based on the presence of rock walls, rows of cairns, and brush fences which suggest greater dependence on game drives and ambushes. Tools of ground stone for grinding seeds or preparing other plant parts (including manos, metates, mortars, and pestles) were introduced. Food and tools were stored in pits, house pits, caves, and rockshelters.

Although sites are found in upland areas, larger sites are found in valley bottoms near permanent streams or springs. Trade in exotic materials, e.g. shell and obsidian, was well developed during the early Archaic Period as illustrated by the presence in Hidden Cave, Nevada, of obsidian from 22 different locations in Nevada and California (map 1).

4. Middle Archaic Period

During the Middle Archaic Period (ca. 4000-1500 BP [AD 500]) the same types of tools as found in the Early Archaic continued to be used, but the tools and sites were more numerous and are found in locations apparently not used in the Early Archaic.

Sites are more frequent in the uplands, particularly along valley floors, but there was continued and more intensive use of village-like sites near the mouths of the Truckee and Humboldt Rivers, where house pits are ca. 2.5 meters in diameter and 40 centimeters deep.

On the northern slopes of the Sierra Nevada, Martis complex base camps with pithouses are found on valley margins, particularly in areas with hot springs and deposits of lithic material, e.g., Alder Hill and Truckee Basin (map 1). Both seasonal and permanent camps were reused. Rugged uplands were used in the early and middle, but not in the last part of the Middle Archaic.

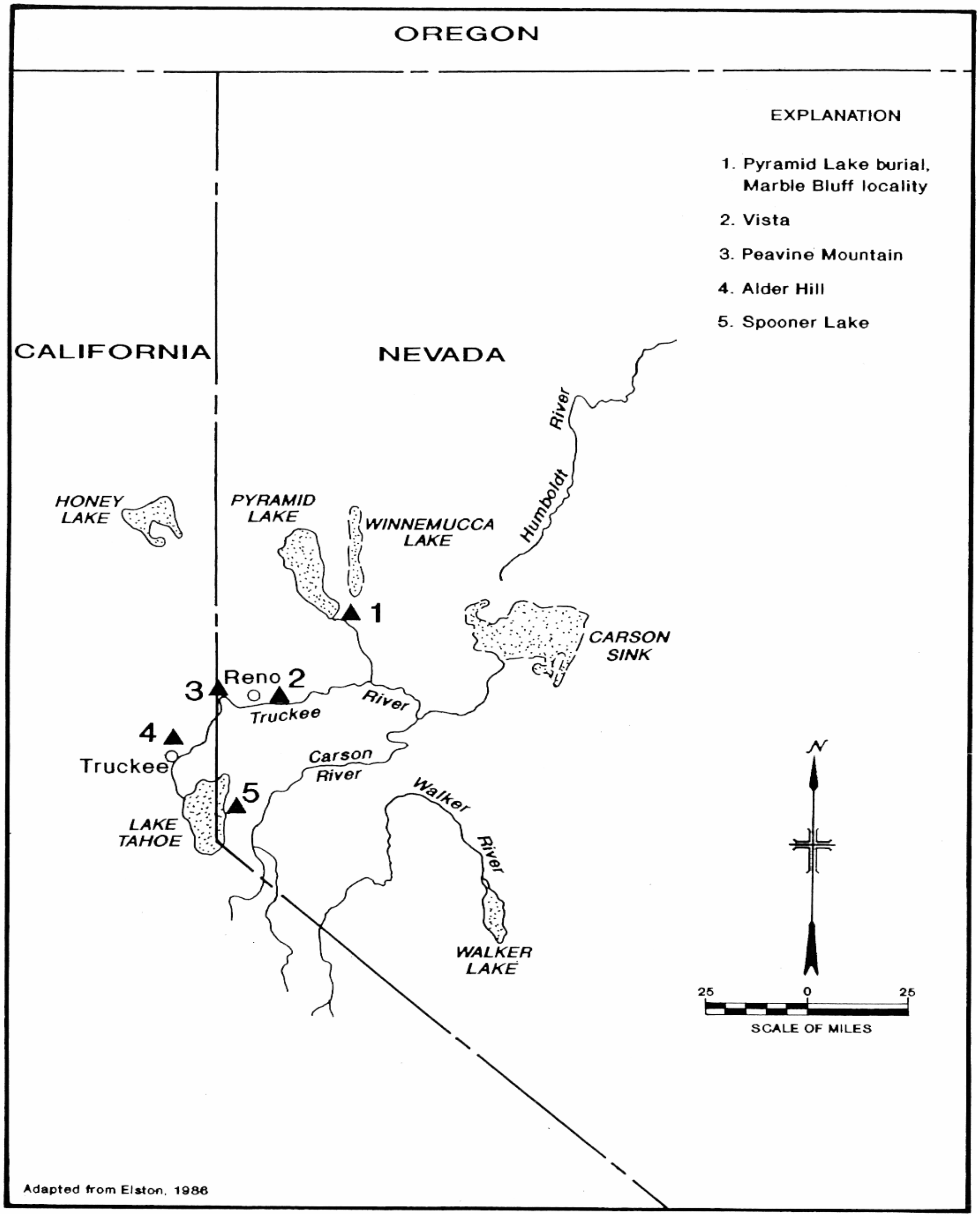
Twining of baskets decreased as coiling apparently became more popular and, after ca. 3500 BP, Lovelock Wickerware was the most common type of basket until AD 1. Trade continued to be important, and portable art was developed/refined.

Rock art, a type of cultural resource found in the prehistoric and ethnographic periods which is rarely firmly dated, appears to begin during the Middle Archaic Period in the study area and is found in mountain settings, along canyon walls, and occasionally on boulders along lake shores.

5. Late Archaic Period

The Late Archaic Period basically extends from AD 500 to AD 1500 or to European contact, but continues later in a few areas. Again, many of the tools and objects used in the Middle Archaic continued to be used, but point types changed to smaller, lighter varieties (Rose Springs and Eastgate) with the introduction of the bow and arrow. Subsistence centered on seeds and nuts, including pinon; on fishing; and on hunting small game (particularly rabbits). Tools for processing plant food were more elaborate and more abundant and incorporated pottery for the first time.

Changes in basketry during this period included the decline of the distinctive, localized Lovelock Wickerware for burden baskets. After AD 1000, container shapes begin to resemble those of the historic wares. The construction of basketry and sandals in general appear to follow previous cultural developments.



Map 1.—Some key investigated cultural resource site locations in the study area.

Villages at the mouth of the Truckee and Humboldt Rivers were intensively used, but houses were smaller than in earlier periods; food and other resources were appropriated from all parts of the environment.

During the late Kings Beach period, one of the last formal subdivisions of the Late Archaic, transition from the prehistoric to the protohistoric Washoe in the north part of the eastern slope of Sierra Nevada can be documented. Clear evidence for a transition from the Late Archaic (post-AD 1000) to the protohistoric Nevada Northern Paiute in the Lahontan Basin, however, is not reported.

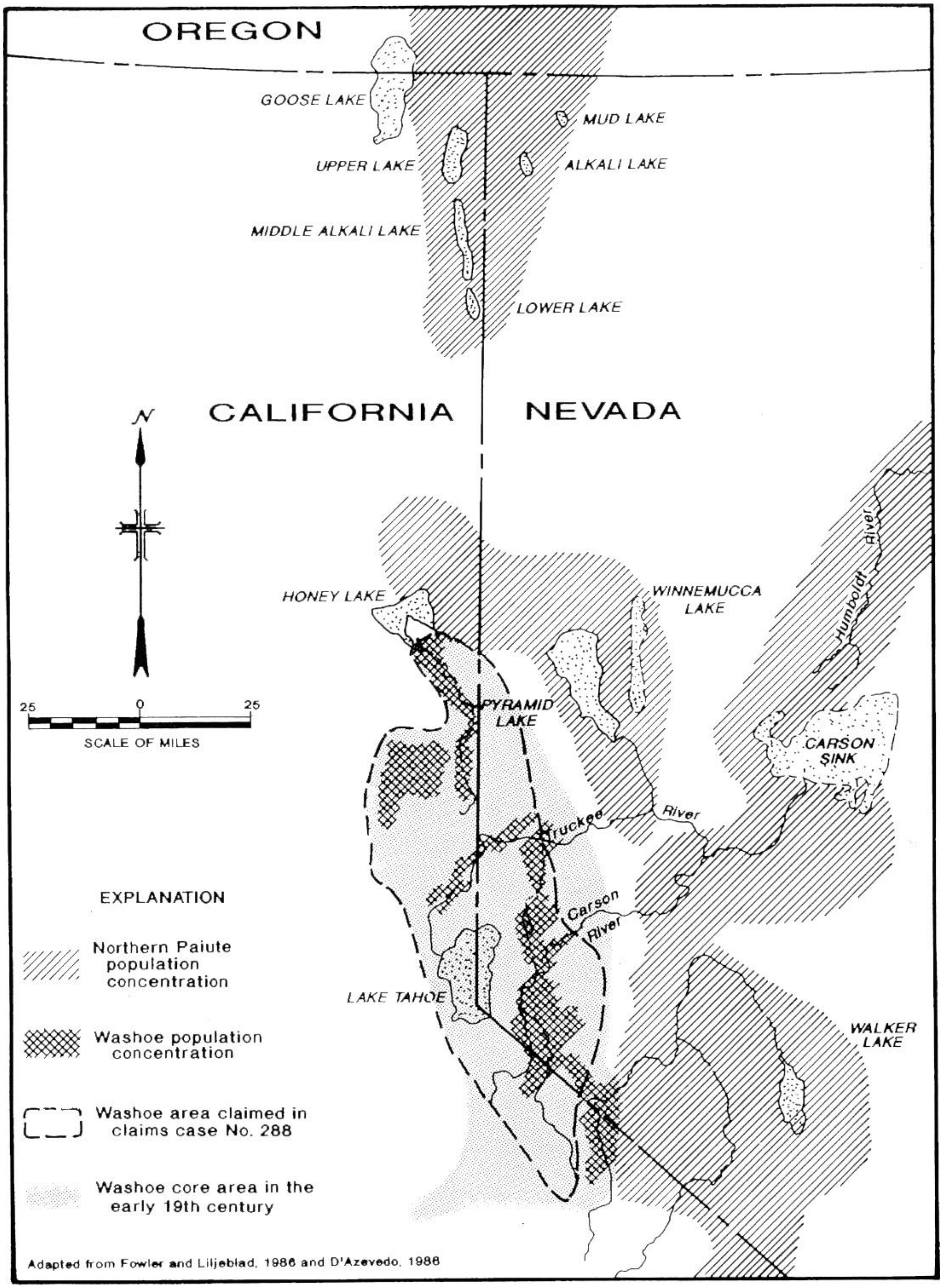
C. Ethnographic Use

When the first United States citizens passed through the study area in the late 1820s and early 1830s, the cultures of its long-standing residents, the Washoe and the Nevada Northern Paiute, were well adapted to the region's ecology. Within the areas which have been defined for these groups in the early 19th century, shown on map 2, were a variety of plant, animal, and mineral resources which provided a livelihood.

The subsistence of the Washoe and the Nevada Northern Paiute was based on the use of resources from different parts of their area as these were available. (A few resources, such as fish in Lake Pyramid, were usually available year round.) And, although all resources were reduced during some periods of drought, the variety allowed survival when a portion of the resources was not available. Keeping population and available resources in balance was critical to survival.

Aside from one major difference—language—there are many more similarities than differences between the two cultures. To illustrate these similarities and occasional differences, the primary aspects of the two cultures are given in table CRA.1. The data in table CRA.1 are taken largely from chapters by Fowler and Liljeblad and by D'Azevedo in Volume 11 of *The Handbook of North American Indians (1986)*, who present a view of the two cultures at or just prior to contact based on available ethnographic sources and research and from *Wa She Shu: A Washoe Tribal History* published in 1976 by the Inter-Tribal Council of Nevada. Additional information is taken from Fowler (1986), Hinkle and Hinkle (1987), Townley (1977), and individual research reports.

Views presented by Fowler and Liljeblad and D'Azevedo are not those of the trappers or explorers, nor of the later miners and settlers, whose story is given below. They saw the lands utilized by the Washoe and Northern Paiute as empty and available. The trappers and explorers and guides noted the general absence of the horse and the "grubbiness" of the few people they saw in the study area. The immediate impact of the trappers and explorers on the land and thus to the Washoe and Northern Paiute was minimal.



Map 2.—Extent of North American Indian settlement in the study area during the first quarter of the 19th century.

Table CRA.1 — Key aspects of protohistoric Washoe and Nevada Northern Paiute cultures

Washoe	Nevada Northern Paiute
Social structure	
Local groups of two to ten houses of extended families loosely clustered in winter camps, sometimes occupied year-round by old and young. Other times of year: one or a few individuals or small groups for foraging or hunting; occasional gathering of several groups for special activities: pinon harvesting, fishing, important gathering of families in spring at Lake Tahoe (Daowaga).	A home district, ca. 50 people in winter camp. Smaller and changing groups for foraging and hunting. Concentration of subgroups for: fishing during fish runs, gathering pinon in the south. Names of groups are related to geographic or main resource base. Many of subgroups tied only by language.
Leadership	
Leader of local group selected by consensus; certain tasks (e.g., antelope hunts, gathering) lead by person with special skills received through dream contact.	Local camp group "headman," selected by consensus, helped group come to decisions; certain tasks (e.g., antelope hunts, fish runs, rabbit drives) led by person with special skill.
Structures	
Winter: conical, pole frame, 12-15 feet diameter, set in shallow pit, covered with bark or bundles of grass/tule tied to frame; sometimes a covered passage way led to entrance. Often placed on high ground near rivers and springs. *Summer*: dome of brush or tule and/or a windbreak or overhead shade of poles and brush.	Winter at Pyramid Lake: dome shaped, pole frame structure covered by mats with mat covered passage to entrance. Winter in mountains: conical, pole frame structure set in pit, covered with branches and mud. Summer: brush shelter or windbreak.
Equipment	
Basketry, of critical importance, twined and coiled; ones used in gathering, storing, and preparing food included conical burden baskets, trays, bowls, water jars, beaters. Cradles. Hooks for pinon gathering. Mortar and pestles and manos and metates for seed preparation. Bows, arrows, points and quivers, nets, snares, traps, snowshoes, and corrals, and rock alignments for hunting. Platforms, nets, weirs, hooks, spears, harpoons, traps, rafts, and decoys for fishing.	Basketry, very important, twined; used in collecting, preparing and storing food; included burden baskets, trays, bowls, water containers, beaters. Cradles. Hooks for pinon nuts. Manos and metates and mortar and pestles for seed preparation. Bows, arrows, points, and quivers, nets, snares, traps, corrals, and rock alignments for hunting. Platforms, large nets, harpoons, hooks, spears, weirs, tule boats and decoys for fishing.

Table CRA.1 — Key aspects of protohistoric Washoe and Nevada Northern Paiute cultures

Washoe	Nevada Northern Paiute
Clothing	
Plant or skin apron or breechclout; some deerskin dresses, shirts, capes; woven rabbit skin robe and blankets; moccasins for winter or rough country, lined with a plant such as sage or grass; some skin leggings; and headbands for men and women.	Plant or skin apron or breechclout; deerskin shirt and dresses, with decoration in north; capes of hide; woven rabbit skin blankets; moccasins for rough or winter weather; overshoes of bark with rabbit skin socks; badger boots; and headbands for men and women.
Ornamentation	
Earrings for pierced ears of shell, beads, bone for men and women; tatoos for men and women (at ages 9-15 usually); black, white, and red face and body paint. Hair: men: loosely braided; facial plucked; shoulder length and bangs for women.	Earrings for women, sometimes for men; tatoos for both, necklaces for both for dances. Hair: single feather of hawk, eagle or magpie in, worn loose until 1880s; men plucked facial hair and eyebrows into a straight line.
Marriage	
Arranged by parents independently or after couple identified desire to parents. If all agree, couple moves in together. Can live with either family, often with mother of wife until first child, then move into own house with either side of family. No marriage of cousins, two generations back. Marriage of two brothers to two sisters common.	Arranged by parents; wishes of couple considered. Boy moves in with girl, gifts may be exchanged by parents. After child is born, couple move into own house, may live with either family. Marriage of two brothers to two sisters common.
Divorce	
By agreement, several reasons were legitimate including: incompatibility, friction with family, laziness.	Not described.
Death	
Burial in a remote place, under logs, or cremation of person, possessions, and house. Mourning for several days, with prayers, bathing, change of clothing; close relatives continued mourning for longer period. Ghosts move in whirlwinds.	Body wrapped in a hide, legs flexed; burial in a crevice, cave or on hillside with possessions. Seeds or beads spread on the grave. House torn down and moved or burned. Name not mentioned again. Mourning included wailing, cutting hair, covering face with ashes and pitch. Mourning continued for a year for spouse. Ghosts move in whirlwinds looking for their homes.

Table CRA.1 — Key aspects of protohistoric Washoe and Nevada Northern Paiute cultures

Washoe	Nevada Northern Paiute
Ceremonies	
Prayers for communal activities by task leader or shaman. Social dances at communal activities, e.g., at fall pinon harvest four nights of dancing with rabbit hunts during day, a feast on the fourth night at which families share nuts specially picked and prepared for others, next day prayers and bathing before beginning harvest.	Prayers for communal activities by shaman or task leader. Dances held at communal fish runs at Pyramid Lake in fall, winter, and spring.
Food	
Plants: 170 items identified as used, gathered by women as primary food supply, including seeds, nuts, roots, berries, tubers, green shoots, and tobacco. Animals: deer, mountain sheep, antelope, rodents including rabbit and beaver; several types of fish, shellfish (allowed Northern Paiute to fish in Truckee Meadows and Honey Lake); insects and larvae; waterfowl, other fowl. Limited trade to obtain other food: imported from west: acorns, papam bulbs, and a grub; exported to west: salt, obsidian, pine nuts, rabbit skins. Imported from the east: antelope and cui-ui; exported to east, less clear, but probable: acorns, (and shells and obsidian). The eagle, hawk, owl, magpie, and crow were never killed; the bear rarely.	Plants: 150 species sought; primary food supply gathered by women, including seeds, nuts, roots, berries, tubers, green shoots, and tobacco. Animals: deer, mountain sheep, antelope, rodents including rabbit, beaver, and porcupine; fish, especially cui-ui, chub, dace, redside, and trout (allowed Washoe to fish at Pyramid Lake); waterfowl, other fowl. Trade not discussed, but presence of obsidian, acorns, and shells, and discussion of trade under Washoe indicates probable.

The impacts of thousands of immigrants responding to the 1848 discovery of gold in California, the establishment of trading posts, settlement, and the Comstock discovery (and related development), however, were increasingly severe. The steady stream of people, with their wagons and stock, ate and trampled the grasses and meadows, cut the trees for firewood, killed the game, and damaged the streams and lakes. Settlers erected fences, little more than barriers alien to Indian cultures. By 1860, a commercial fishery was established at Lake Tahoe from which the Washoe were excluded.

The Northern Paiute and Washoe, whose survival had depended on cooperation, not conflict, and who had not generally adopted the horse, were not well-equipped to resist settlement. Sporadic efforts to resist were made by the Paiute, and to a lesser extent by the Washoe, in the late 1850s and early 1860s, including the 1860 Battle of Pyramid Lake. (See below, “Settlement and Exploitation.”) Indian resistance to settlement was met by fiercer settler counter-resistance. Little effort was made to identify which tribal group or individual was responsible for attacks, with the Washoe frequently blamed for the acts of others. To quell the violence, settlers called on the United States military; in response, in 1860 the military established Fort Churchill.

Also, in partial response to the Pyramid Lake fighting, in 1859 the U.S. Government set aside for consolidation of the Nevada Paiutes at Pyramid Lake and Walker River. And while many Paiute refused to leave their local districts to go to the Pyramid Lake reserve, settlers continued to use the land and fishery into the 1900s. In partial response to these conditions, small colonies and reservations continued to be set up for the Paiute, in some cases in relatively undisturbed areas like Fallon. Little attention was paid to lands for the Washoe, and not until 1917 was a small government funded tract set aside near Carson City. Lands allocated individually under the Dawes Severalty Act (1887) were usually waterless and sometimes barren.

With no access to the resources of their livelihood, some Washoe and Northern Paiute worked as laborers for food or wages, clustered on the outskirts of new towns or on ranches. Well into the 20th century, individuals struggled to regain land or be compensated. For discussion of reservation formation and land status and current conditions, see "Social Environment" and "Indian Trust Resources" in chapter 3.

D. Historic Settlement

The overview of historic development within the study area is drawn largely from three sources: *Sierra-Nevada Lakes*, by George and Bliss Hinkle, a 1949 classic which references a large number of contemporary sources and observations, pertinent documents, and later scholarly works. The volume was republished in 1987 by the University of Nevada Press with a foreword by Gary F. Kurutz, Director of Special Collections at the California State Library. The second volume is Mark Townley's *Turn This Water into Gold, the Story of the Newlands Project*, which details old Churchill County, Nevada, and of the development of one of the first national reclamation projects. Its extensive bibliography includes primary documents and contemporary sources, as well as secondary sources. Because the volume was commissioned by the Truckee River Irrigation District, events are presented from a particular perspective, with facts clearly laid out. The third volume is *Early Engineering Works Contributory to the Comstock*, a detailed and illustrated documentation of aspects of development which substantially affected the study area. Other sources are added to supplement primary sources.

1. Exploration

Although the Spanish and other adventurers/explorers knew of the Sierra Nevada mastiff as late as the last quarter of the 18th century, it and adjacent areas were not systematically explored until well into the next century. A brief description of the parties who passed through the study area in the early 19th century illustrates the limited nature of early exploration and contact.

As in much of early western American exploration, the fur trade companies were often the first to blaze new trails and make new contacts. Operating for the Hudson's Bay Company's Snake River Brigade, in 1828 Peter Skene Ogden journeyed to the Humboldt River, visited the Carson Sink, and in 1829 pioneered an Anglo trail to the Carson River (State of Nevada, 1995: II-3).

In 1832 and 1833, trapper and trade Joseph Reddeford Walker followed Ogden's trail further west. His trapping and exploring party examined the land from the Great Salt Lake to Mexican California. He encountered resistance from Humboldt Sink Paiutes on his trip west and on his 1834 return. One of his party members was a French-Canadian named Truckee. Walker's boss was Captain Benjamin Louis de Bonneville, commemorated by Washington Irving in *Adventures of Captain Bonneville in the Rocky Mountains.*

The first systematic, and thus the most referenced exploration, was the 1843-44 United States Corps of Topographical Engineers' expedition led by John Charles Fremont. Entering the study area from the Oregon country with guide Kit Carson, Fremont focused on extending the exploration he completed the previous year (of the area from the Missouri River to the Rockies) westward from the Rockies through Oregon Territory. Although the Federal work ultimately served expansionist purposes, it was a scientific expedition that emphasized accurate observation, recording, and mapping of information.

Within the primary study area, two of Fremont's references are particularly notable: His party followed an Indian trail along and then camped on the eastern shore of Pyramid Lake (name coined by Fremont) during a mid-January snowstorm. "Some half-naked Indians, speaking a Snake dialect, appeared the next morning, and one of them told of a river at the end of the lake," Fremont noted. Fremont moved south along the river to its big bend near an Indian village where he reported the inhabitants were well-armed and well-fed, unlike their visitors of the previous day. While camped in this spot the party feasted for hours on huge lake trout. The resident Paiute provided a map of the river and its source, a large mountain lake three days distant to the southwest (Hinkle and Hinkle, 1987:46-47).

On January 16, Fremont set off west along what he called the Salmon Trout River. On the 17th, he decided to turn south away from the river (Hinkle and Hinkle, 1987:47). He reached and camped on the Walker River, where he mentions that the Indians (Washoe) bartered their staple food, the pinion nut, for cloth and trinkets. Eleven years later, in another government-sponsored exploration, part of Fremont's exploring party mapped the Humboldt and Carson Rivers.

2. Emigrants

Even prior to Fremont's more detailed description of the study area, the limited knowledge available from trappers and adventurers was put to use by a small number of enterprising individuals who guided emigrants to California, the so-called "promised land." In 1841, the first of the emigrant parties left Missouri; they followed the Overland Trail and the

Carson River Branch, the primary route subsequently used by most of the 100,000 who went to California. The journey, however, proved difficult. Suffering from illness and hunger, members were provided pine nuts and fish by "local" Indians (State of Nevada 1995: II-4).

More emigration followed. Beginning in 1844, following Fremont's first expedition, a number of parties went over the trail to California in rapid succession. Among these were the Stevens-Townsend party, which was the first to cross the steep ascent of the Sierras in the Truckee area. The party reached Humboldt sink on October 24, 1844, where they picked up a Paiute guide. One of the party said the Paiute reminded him of the trapper Truckee who had been a member of Walker's party in the 1830s. Whether this is true is a matter of speculation.

From the big bend of the Truckee onward, the teams staggered through innumerable fords and careened along miles of narrow boulder-strewn embankments before they struck open country. The train reached the junction of the Truckee and Donner Creek in mid-November. Three of the party stayed at Donner Lake where they built a cabin at the site of today's state park monument. Two of these three left the cabin, one survived until the following spring (Hinkle and Hinkle, 1987:55-58). By September 1845 Truckee Pass was established as one of two routes to California, and by May 1846 the immigration was in full swing.

Between May and July 1846**,** Hinkle and Hinkle report that there were 500 teams on the trail between Independence, Missouri, and Fort Bridger, California. By August, the great migration had begun. Among the parties: Craig-Stanley and Lippincott-West, with Edwin Bryant-Richard Jacob close behind. There were perhaps 400-500 people who made the journey between the end of July and September (Hinkle and Hinkle, 1987:61).

In October, the Gordon-Dickensen company passed Donner Lake, followed several days later, dangerously late in the season, by the Harlan-Young party. But the Harlan-Young party was followed by yet one more company: the Donner party of 80, probably the most haphazardly organized and least resourceful of all those who crossed the Sierra (Hinkle and Hinkle, 1987:62). The Donner party lost its chance to make the crossing by stopping to build cabins. Of the many parties which left Missouri for California, the Donner party is the best known because it failed. The last rescue mission to the Donner party, lead by W.O. "Le Gros" Fallon, an Irish adventurer, arrived at Donner Lake in April 1847 to find no survivors. Hinkle and Hinkle note that this mission was probably more a salvage than a rescue one (1987:82).

And nearly 150 years later, the Donner Party tragedy endures in the annals of American exploration and culture. In his history of the Donner Party, Reno journalist Frank Mullen Jr. noted that "through the mist of fifteen decades, the ghosts of the Donner Party still speak to us. These people and their adventures … branded the American imagination as surely as did the *Titanic* or the Battle of the Little Big Horn" (Mullen Jr., 1997: 10).

Religion also played an important role in the area's exploration. Traffic on the emigrant trail also grew as officials of the Church of Jesus Christ of the Latter Day Saints directed church members to settle and irrigate western Utah Territory (then part of the study area), including the Carson Valley (Townley, 1977:3). This pattern of Mormon expansion in the mid-19th Century is evident throughout the American West.

3. Settlement and Exploitation

By the 1850s, some individual capitalists who had made the arduous journey west moved back across the mountains to establish "trading posts" at key river crossings and rest spots used by the westward wagons. In addition to supplying the first permanent settlers, they freighted supplies, livestock, and whiskey to points along the Carson, Humboldt, and Truckee Rivers (Townley, 1977:3). These posts included: Mormon Station in the Carson Valley established by John and Enoch Reese; Jamison (or Jameson) Station in Truckee Meadows (Raven, 1990); Owens and Ing trading post in vicinity of Jameson's; Lower Crossing near Wadsworth by Bill Gregory; Johntown, a mining camp near later Carson City; Franktown in the Carson Valley; Ragtown on the Carson Route; and a site in the Honey Lake area; Genoa, grown from Mormon Station; Stone and Gates near Jameson's Station; Carson City; Stone and Gates trading post in Truckee Meadow; Lake's Crossing near Reno; Fuller at present Virginia Street in Reno; the Kenyons in Long Valley; and Williams Station in Carson Valley, 25 miles east of Dayton. And, in 1856, Kentuckian B.F. Huffaker introduced cattle into Truckee Meadows (State of Nevada, 1995:II-8).

The United States Indian agent for western Utah Territory (at that time including Nevada) described the emigrant trail in 1859:

> Every few miles, too, on this great thoroughfare, both on the Humboldt and Carson rivers, can be found a whiskey shop, the proprietors of which have the presumption to call 'trading posts.' Some of these inhuman vendors of poisonous liquor to the poor ignorant Indian will take last badger or rabbit skin from him (quoted in Townley, 1977:3).

Liquor sales to Indians were not the only way in which they were enlisted to benefit the trader. At Ragtown, the first post in the lower Carson drainage, owners Asa and Catherine Kenyon not only sold goods, food, hay, and alcohol at "astronomical prices," they trained Indians to steal stock from wagon trains and drive the cattle to a remote holding area until Asa Kenyon negotiated a price in cash or goods with the emigrants for the return of their stolen stock. The Kenyons and their Indian accomplices are reported to have survived nicely on this "tax," which was little more than blackmail (Townley, 1977:3).

Yet the majority of the region's early settlers were not ethically questionable traders or merchants, but honest ranchers or farmers. From their early base in Mormon Station and Franktown, the Mormons dug irrigation ditches, set up sawmills, gained control over finance, education, town administration, and resources such as water rights throughout the Carson Valley. While new Mormon settlers were industrious regarding community establishment, however, church leadership stifled growth. In November 1856, church officials in Salt Lake City abolished the Carson City outpost; by spring most of these early settlers were gone. Their developments were purchased or taken over by gentile settlers, with Mormon Station becoming Genoa (Hinkle and Hinkle, 1987:120).

By the end of 1858, there were 12 ranches in the Truckee Meadows, and by 1860, the area north of Truckee Pass was the most densely populated of the Sierra (Raven, 1990). In 1854, there were two settlers on the Susan River; by 1856, there were scores with 36,000 acres of land claims recorded throughout the area (Hinkle and Hinkle, 1987:113). Before 1859, a group of settlers had established themselves to the south in Truckee Meadows, supported by the Gates and Stone trading post (Hinkle and Hinkle, 1987:128). That year, the Truckee Turnpike Company began development of a cutoff road which left the main Truckee Pass road near Verdi and followed the Little Truckee to a point near Downieville, passing just north of Truckee (Webber) Lake near Summit Pass (Hinkle and Hinkle, 1987:222). The following year, Dr. David Gould Webber built a small hotel at Little Truckee Lake just south of Henness Pass Road (Hinkle and Hinkle, 1987:213).

The 1859 discovery of gold in Virginia City sparked even more growth. Traffic in both directions along the routes became even heavier with new posts, small settlements, and the expansion of earlier stops continuing through the 1860s. The trading posts on the trails became stagecoach stops. As a young man going west in 1859, writer Horace Greeley visited Ragtown, which had become a stop on Major Chorpening's California Mail Company route (Townley, 1977:3).

The same year Greeley visited the area, Captain James H. Simpson of the Corps of Topographical Engineers was directed to map the interior of the Great Basin (another term coined by Fremont) and to improve roads across this vast region. His new wagon road joined with the established overland route, providing a shorter route to California. This new route was followed by the Pony Express, Union Telegraph, and the Overland Stage Company in the early 1860s and was heavily used after the discovery of silver (Townley, 1987:3).

Formal land withdrawals for Indian Reservations happened around this time. In 1859, land surrounding Pyramid Lake was withdrawn from the public domain at the direction of Indian Agent Fred Dodge, but no further action was taken until March 23, 1875, when President Ulysses Grant formally authorized the Pyramid Lake Indian Reservation.

The reservation was—and still is—a land of seasonal temperature extremes. In the winter of 1875, the cold was so intense it immobilized native and non-native Pyramid Lake hunters and fishermen. Many settlers are reported to have responded by building fires and providing food, which many Indians were afraid to eat. Old Winnemucca, who was camped on the eastern shore of the lake, decided to obtain food by requiring two or three beeves per week from the 3000 head of cattle belonging to Anglos which were trapped around the lake (Hinkle and Hinkle, 1987:160).

The Congressional creation of western territories and states was a measured process, one usually guided by political agendas. Although the Omnibus Bill of 1850 created the State of California and the Territory of Utah, the border between the two would not be defined for a nearly a decade. Calls for assistance and recognition from the western Utah Territory area after 1857 resulted in the introduction of a bill in the Federal Congress to create Nevada Territory, but radical Southern States who feared increased northern anti-slavery sympathies blocked the bill. With the 1859 discovery of gold, however, national attention focused on the Comstock, precipitating the growth, conflict, and promise of wealth necessary to stir Congress to action. They acted accordingly; on March 2, 1861, Nevada Territory became official.

By this time, the region's passive Indian population became increasingly hostile. Their response to the unabated growth—along with their increasing displacement and generally ill treatment—was an offensive in the spring of 1860 at a location just south of Pyramid Lake along the Truckee. The 1860 wars actually consisted of two battles, the first, the Battle of Pyramid Lake, won by the Pyramid Lake Paiutes (although others may have participated) against the haphazard Virginia City militia**,** and the second, the Battle of Truckee, won by heavy artillery-equipped Anglos. The Indians disbursed after the second battle; in September, some were led back to the reserve by Warren Wasson (Hinkle and Hinkle, 1987:164-168).

Despite Indian problems, regional growth continued. An 1861 territorial census registered 16,374 residents, which did not include Indians or transient prospectors. It was a diverse crowd:

> Nevada territory's population was a wild patchwork made up of established settlers, miners, purveyors of one kind or another—claim brokers, stage drivers, barkeepers and mill owners—indians, and a large flowing mass of transient mineralogists, speculators, gamblers, peddlers, camp followers and professional do-gooders (Hinkle and Hinkle, 1987:190-1).

Among the more famous arrivals possibly included in the census were Orion and Samuel Clements, who arrived from St. Louis on August 14, 1861. While Orion came on official business having been appointed Territorial Secretary, his soon-to-be famous brother, who referred to himself as the "secretary's secretary," may have fitted into one of the transient categories (Hinkle and Hinkle, 1987:191).

With this growth came more settlements. The following began or developed during the first half of the 1860s: south bank settlement near Ragtown; Little Truckee Lake (Webber Lake); a ferry and ranch at Drytown at Lower Crossing near Wadsworth; St. Clair on the South Branch of the Carson; Truckee, Stillwater, and James Richards setup on Old River; Friday's Station opened by Burke and Company in Squaw Valley; Wildcat Station, on the south shore of Carson Lake; and Buckland's Station and Donner Lake. In late 1861, the area around Pyramid Lake, withdrawn from the public domain two years previous, was withdrawn from sole settlement and records filed in General Land Office (McLane, 1990:4-5).

As early as 1863, hay ranches had been established at most of the favorable sites in the Truckee Meadows and Lahontan Valley—sagebrush areas on benches were avoided (Raven, 1990). One writer notes 1861 as the year construction began on the Pioneer and Cochran Ditches in the Truckee Meadows, which provided water for these hay meadows (State of Nevada 1995:II-10). The range was public domain, except for the private holdings of a few dozen families on drainages whose ranches extended several miles on either side of a channel. Ranchers used liberal territorial and state land laws to control the public range, while extending their holdings and avoiding taxes.

Settlers on the lower Carson River basin initially fed cattle driven from Texas or California on native hay and sold both the cattle and hay to the Comstock; hay prices were as high as $150 per ton. Townley notes that “all along the lower Carson River, individuals slowly displaced Indian Bands from the hay meadows and hired themselves and their teams out to mining firms, the Pony Express, Union Telegraph, and Overland Stage companies” (Townley 1987: 4).

Irrigation techniques were key to economic growth. In the early 1860s, at Mountain Wells Station, Mormons J.J. Cushman and “Uncle Dave” Wightman brought knowledge of rock and brush diversion techniques for irrigation with them from Utah. The approach allowed ranchers to water hay pastures, enlarging the areas used and accelerating the transition from native grasses to alfalfa, introduced in 1864. By 1866, ranchers began to burn tule thickets and level the sagebrush areas to enlarge meadows and create irrigated pastures, expanding their operations to meet demands. In addition to hay and cattle, primary sources of income for 1860s Lahontan Valley residents were toll road fees and the lease of animals to booming mines (Townley, 1977).

4. The Railroad

The expansion of activity and profits of toll road, freighting, and stage company owners moving goods and people back and forth between California and western Nevada during the early 1860s were noted by entrepreneurs and advocates of a relatively young form of transportation, the railroad. Galloway notes that a toll gate was far more profitable than an ordinary mine, due to high and consistent income. Receipts of one toll gate grantee, Swan and Company, whose road extending only one-tenth of the distance between Placerville and Virginia City, were $40,000-$70,000 annually (Galloway, 1947:32).

Among the early transcontinental railroad advocates was eastern civil engineer Theodore Judah, who, in 1856, completed construction of the first railroad west of the Mississippi River, the Sacramento Valley Railroad. Although widely ridiculed, Judah persisted: he believed a railroad could traverse the imposing mountain range to connect with the eastern leg of the proposed transcontinental railroad. In 1860, Judah surveyed a practical rail route over the Sierra mastiff. Realizing he needed local financial support, he secured commitments from investors, and on June 28, 1861, the Central Pacific Railroad formally organized in

Sacramento. Major backers included California Governor Leland Stanford, Sacramento hardware merchants Collis P. Huntington and Mark Hopkins, and San Francisco retailer Charles Crocker—otherwise known as the "Big Four" (Lamar (ed.), 1998: 187-88, 581).

In 1862, the Central Pacific Railroad placed an agent in Strawberry Valley to document the volume of goods and passengers transported during an 8-week period. He recorded 19,386,200 pounds (9,693.1 tons) of freight moved by 2,772 teams. The chief engineer estimated in his October report that 43,800 tons of freight were hauled over Johnson Pass yearly. His estimate was too high, because during the 8-week survey period, one-third of the total for the year was moved. Galloway believes a more reliable estimate for the period is 25,000 tons per year, which at an average of 5 cents per pound in 1862 would have yielded $2,800,000 (*sic*, should be 2,500,000). Based on records of the companies, passengers for 1862 were reported to be 13,405 at $30 each (Galloway, 1947:40).

While the new railroad company gathered statistics, it constructed a wagon road over Donner Summit to the Truckee River and on to the Carson Valley. The wagon road served more than one purpose: it competed with the southern toll roads, it allowed advance construction camps to be set up, and it secured right-of-way in competition with its rival, the Union Pacific Railroad, which was building westward across the continent (Hinkle and Hinkle, 1987:241).

With research results and surveys in hand, and perhaps as importantly, the intoxication of the rich strikes in Virginia City, in early 1863 groundbreaking ceremonies were held in Sacramento. Despite financial ups and downs, and with the help of a government subsidy made available in July 1864, the railroad moved forward with the energetic Crocker as construction supervisor (Galloway, 1947:49; Lamar (ed.), 1998: 187). Galloway notes that "as the Central Pacific Railroad extended farther and farther up the west slope of the mountains, the movement of freight gradually went to the railroad and the wagon road ahead of the rail heads" (Galloway, 1947:33).

Among the towns established in 1868 by the railroad's construction were Verdi, Boca, and Wadsworth, named for a Union general who died in 1864 (McLane, 1990:5). Reno, formerly Lake's Crossing, was created when one M.C. Lake deeded 80 acres to the Central Pacific for a depot and yard. The new town, named for General Jesse Lee Reno, a Union general with no connection to the railroad, incorporated in 1877 (Hemphill, 1986:12).

Although the Truckee site (Coburn's Station) had been around since 1846, it was not developed until 1863 when the Central Pacific wagon road was constructed over the pass and Joe Gray established a log house as a stage station. The Gray and Schaffer lumber mill was established south across the Truckee River of Coburn's to supply the railroad (Hinkle and Hinkle, 1987:246), which arrived in spring 1868. In July, fire destroyed the old station; but by December of 1868, there were 272 buildings and most of the residents of Donner Lake had moved to the new town, which took the river's name the following year (Hinkle and Hinkle, 1987: 287-288, 24). By that time, the town had begun to acquire its peculiar character, compounded of an intense respectability, a taste for the more expensive refinements of life, such as good cigars, good champagne, and good oysters, a sportive flair, expressed in heroic poker parties, and an easy tolerance of one of the most raffish underworlds in the West (Hinkle and Hinkle, 1987:288)**.**

The Central Pacific's race across the continent continued past Reno and Wadsworth to Promontory Point in Utah where, on May 10, 1869, it joined the Union Pacific Railroad (Galloway, 1947:49). When the railroad reached Reno in June 1868, intensive travel on the southern toll routes ended (Galloway, 1947:33).

From the Reno depot goods and passengers were delivered to the Comstock by road until the Virginia and Truckee Railroad connecting Reno with Virginia City was completed in August 1872, just over 3 ½ years after construction began. Regular passenger service was available in December. At the peak of construction, there were 1,200 laborers, mostly Chinese, in 38 camps spread along the 21 miles. The backers of the company were those with other investments in the Comstock (Galloway, 1947:51-55). Thus, with the promise of enormous wealth and the railroad's forward progress, on October 31, 1864, Nevada Territory officially became the State of Nevada.

5. Mining

The thousands of hopefuls and prospectors who came to California after 1849 swarmed over areas where finds had been made, then followed any rumor or report as they moved west. Substantive reports of discoveries for the Washoe area started in 1848 when remnants of Kearney's Mormon battalion, returning to Utah via Placerville and the Carson River, discovered gold on the southeast slope of Mr. Davidson. This find was followed by the discovery of silver on Mount Davidson in 1850 by several Mexicans and in 1852 by an army detachment (Hinkle and Hinkle, 1987:119). Placer deposits were worked from 1850 on. Yet it was the Canadian trader and sheepherder, Henry Tompkins Paige Comstock, who ultimately found and attached himself to the big strike of 1859 (Hinkle and Hinkle, 1987:149).

The population of the Carson Valley increased by 4,000 within the first weeks after the June 1859 find, and by April 1861 there were 76 stamp mills (Hinkle and Hinkle, 1987:170, 190). From 1859 until the mid-1870s, Comstock life was chaos, marked by exhilarating peaks, gut-wrenching lows, and claim-related litigation. Hinkle noted that "the bill for the first five years of litigation came to about ten million dollars, more than the best year's production total for all of the mines on the Lode" (Hinkle and Hinkle, 1987:236).

Between spring and fall 1863, "throngs of incredibly diversified humanity" poured into Virginia City by stage, mostly from California; by June, the population approached 15,000. Yet by June 1865, nearly two-thirds had left. Those who stayed continued to produce gold and silver, but were burdened with mine water, transportation difficulties, more litigation, wasteful exploration, and inadequate management (Hinkle and Hinkle, 1987:237, 239, 278).

Hinkle claimed that by January 1870, almost "every mine on the Lode was working under handicap of rising water and suffocating heat," and that year production was reduced to its lowest point (1987:282, 293). In 1873, the Big Bonanza of the Consolidated Virginia was struck, with production lasting until 1877 when the ore body terminated. Ironically, as production ended, workers completed the Sutro Tunnel to drain mine water. By summer, however, unemployment was massive. Production continued at minimal levels until the early 1880s as the population ebbed away. The outside world refused to believe it was over, and for many years after 1877 assorted dignitaries, including President Rutherford P. Hayes and General Ulysses S. Grant, continued to visit (Hinkle and Hinkle, 1987:314).

Lahontan Valley residents and prospectors also harbored high hopes for the big find. In 1862, three mining districts were organized within Churchill County. Production at the three mining camps, La Plata, Clan Alpine, and New Pass, was never of real value and the mills did not operate for more than a few months. Activity ended in 1870 and remained dormant until the early 1900s, when a small mining renewal at Fairview and Wonder (1910) and Rawhide (1908-10) temporarily drew workers from farms (Townley, 1977:6, 36-42).

Profits from the Virginia City mines during their two decades of production, however, did not approach the profits produced by ancillary services. Major earners were water (flumed and piped), transportation (road and rail) and the lumber industry (cutting, shipping, milling). These support industries had the most lasting impact on the study area's natural and cultural environment. Of lesser magnitude, but as important, was salt, necessary for ore reduction.

6. Salt Mining

Before the 1868 completion of the Virginia City railroad to Reno, salt was provided to the Comstock from mines in the Lahontan Valley. Two companies, Sand Springs Salt Mining Company and Humboldt Salt, were the Lahontan Valley's largest mineral producers in the 1860s. Salt from the Sand Springs operation was stored at Pyramid Lake to supply winter demand (Townley, 1977:8). A detailed map of another salt works, Soda Lake near Ragtown, was prepared by Russell in 1885. To transport cordwood and the salt from the desert mines to the Comstock, Otto Esche imported 15 Mongolian camels (Hinkle and Hinkle, 1987:276).

7. Water

Providing sufficient water for all uses at Virginia City and Gold Hill was, ironically, given periodic devastating mine flooding, of major difficulty and expense. The supply for the early mines was not sufficient, and what was available was often not usable for drinking or for boilers. To address this problem, the two companies formed to collect and distribute water, the Virginia Water Company and Gold Hill Water Company, consolidated on May 12, 1862. By September 1863 the company controlled streams from seven tunnels and distributed water to all points in Virginia City and Gold Hill (Galloway, 1947:57).

In 1871, the Virginia and Gold Hill Water Company reorganized and developed a bold plan to meet increasing demands. Water from streams high on the eastern slopes of the Sierra Nevada would be diverted into flumes and then into pressure pipe across the Washoe depression to Virginia City and Gold Hill. The design was unprecedented, and construction of this engineering feat took place at a time of low production on the Comstock. The completed aqueduct would be over 21 miles in length with a capacity of 2,000,000 gallons per day (Galloway, 1947:65-70).

Even before the October 1875 fire which destroyed much of Virginia City, it was clear that the supply from Hobart Creek was limited to 700,000 gallons per day in late summer, Plans were developed and construction of a second aqueduct (flumes and pipeline) commenced. The water supply for this aqueduct was to be stored in Marlette Lake, on the western slope of the Sierra Nevada above Lake Tahoe. The capacity of the lake was increased by raising the Marlette Lake dam, and a small regulating reservoir was built near the original Hobart Creek diversion. In 1887, after construction of a third pressure pipe, the water supply system included three reservoirs, over 21 miles of pressure pipe, and approximately 46 miles of covered box flume and the 3, 994-foot-long tunnel. The distribution system included three large wooden tanks, tanks at the mines, and a distribution reservoir (Galloway, 1947:70-73).

In 1875, while the mining interests were busy sending water from the Sierra to Virginia City, Von Schmidt presented his new plan for diversion of water to San Francisco or Sacramento, this time from the Truckee River near Bear Creek (Hinkle and Hinkle, 1987:47).

8. Lumber

Of the several enterprises that developed in connection with mining and milling activities on the Comstock, none was more important or widespread than those directed to the supply of lumber for multiple purposes and of wood for fuel (Galloway, 1947:75). From 1854 to 1860, three lumber mills in the study area, including those at Mormon Station, Franktown, and a steam mill in Kings Canyon 3 miles west of Carson City, served the needs of settlers and prospectors. By 1861, these three mills employed nearly 100 people.

The quantity of lumber required for houses, shops, stables, etc., for the population of Virginia City was estimated to have been as high as 25,000-30,000 board-feet. The needs of all the other communities which served the mines were enormous, but not as great as the lumber needed by the mines. The square set method of timbering required a large amount of timber for supporting the shafts and the drifts, stopes, and other parts of the mines (Galloway, 1947:75). One 1880 estimate placed 600 million board-feet of lumber buried in the Comstock mines (Hinkle and Hinkle, 1987:320; Galloway, 1947:101).

Wood almost entirely fueled local homes, businesses, mines, and with the exception of a few water-powered ones, the mills. Sierra Nevada forests were the sole source for this wood, as the desert mountains of the Virginia Range were treeless save for scattered pinon pine stands quickly exhausted the first few years (Galloway, 1947:77).

The volume of cutting and value of the wood is illustrated by the report in an 1860 letter that, "1,000 cords of nut pine wood were cut in Yellow Jacket Ravine, Gold Hill at a cost of $4.25 per cord" (Galloway, 1947:81). Hinkle and Hinkle noted that the immediate supply was gone by 1861 (1987:286). Timber on the Eastern slope of the Sierra Nevada was taken from the region extending from the Truckee on the north near Reno to the head waters of East Carson River in Alpine County, California, a distance of sixty miles. Logging was carried on from the base of the mountains in Carson, Washoe, Eagle and Steamboat Valleys and the Truckee Meadows up to heights of seven and eight thousand feet. The diminishing supply from the eastern slope compelled lumber men to cross the range to the western slope and heavily timbered areas around Lake Tahoe.

Lumber was cut from logs gathered by teams, railroads, steamers on Lake Tahoe, flumes, slides, and the Carson River. It was transported to the Comstock by teams, railroads, inclines, flumes and again by teams and by the Virginia and Truckee Railroad. Wood for fuel followed the same route. Hundreds of men, oxen, horses, and mules were employed, and especially in the days of the Big Bonanza, in the seventies, the mountains were the scene of an intense activity in logging, milling, and transporting lumber and cordwood (Galloway, 1947:77).

Figures provided by the Carson and Tahoe Lumber and Flume give an idea of the magnitude of production:

> . . . it controlled 50,000 acres and between 1873 and 1898 produced 750,000,000 board feet and 500,000 cords of wood. At the peak of this activity in the early eighties, its main flume certainly had a daily capacity of 500,000 board feet and 700 cords of wood (Hinkle and Hinkle, 1987:320).

By 1868, there were 18 mills west of the Washoe Valley and 14 mills near Truckee (Hinkle and Hinkle, 1987:286). These figures do not include the largest consolidated companies, such as the Carson and Tahoe, which began in the 1870s, and Hobart Estates, which began in 1896. And, in 1875, a large dam was constructed on the Truckee at Verdi to direct flow into a large holding pond which retained logs to be processed by the mill there (State of Nevada, 1995:II-14).

The Truckee Basin Mills are reported to have produced 500,000,000 board-feet between 1870 and 1880, an estimate based upon 1872 production figures (Hinkle and Hinkle, 1987:321). Lindstrom describes one Truckee Mill, the Pacific Lumber and Water Company, located 1.8 miles east of Boca. Established in 1870, the mill was considered as one of the best appointed mills on the line of the Central Pacific Railroad. Beyond the mill itself, the plant included a selection of planers, lath and molding machines, and produced all kinds of dressed and planed lumber. During its operation the plant produced more than 75,000,000 board-feet of finished lumber (Lindstrom, 1991:4)

Water was key to quickly moving raw timber or finished lumber. Chutes took logs to Lake Tahoe and other ponds from which they were floated to mills just after major runoff ended. Water flowing through V-flumes moved finished lumber, wood and other materials produced by high mills down the mountains at remarkable speeds (Galloway, 1947:86). In 1880, there were 10 flumes in Douglas, Ormsby and Washoe Counties, some of the larger became one of the region's most popular tourist attractions (Hinkle and Hinkle, 1987:320). One of the flumes belonging to Sierra Nevada Wood and Lumber Company—organized by W. S. Hobart and J. B. Overton—operated between 1878 and 1890.

Western historian Hubert Howe Bancroft estimated value of lumber production for a 20-year period prior to 1890 to be $80,000,000, or as Hinkle notes, a "figure that approaches the production total of all of the Bonanza mines" (Hinkle and Hinkle, 1987:321). Hinkle also notes that Bancroft underestimated the cut itself and, thus, the value he placed is felt to be too low. Yet as mining operations diminished, the number of mills returned to the number needed back to serve new development and population, with only minimal export.

E. Meeting Human Needs: Service Industries, Cultural Institutions, Recreation

1. Cultural

For more than two decades beginning in 1859, the development and operation of the Virginia City mines dominated or influenced virtually every livelihood in the study area. Yet the settlers who preceded the mining, and those who came for it, brought with them the needs for cultural institutions and services, including recreation, which expanded through time. Hinkle and Hinkle describe the impact of the 1870s on the Tahoe region:

> The exciting and incredibly prodigal decade fixed the entire social and material pattern of the Tahoe region. Big things were in the air, and daring, ingenious designs were in the news every day. In conversation men tossed millions back and forth as carelessly as they handled ingots of gold and silver. The curious blend of versatility, impulsiveness, and social conservatism of the fifties and sixties remained intact in the pioneers who worked the great Lode. With the vision of untold wealth, with leisure and increased security, these qualities took form in an intense curiosity concerning the natural world—generally with a view toward what Nature could be made to yield; in a readiness to embark upon the most extravagant and quixotic enterprises in order to indulge a whim, pamper a taste, or further a hobby; and in a profound regard for order, education, and material progress (1987: 303).

Among the first institutions established—a pattern consistent in American frontier community development—were schools and churches. Many of the settlers in the area north of Truckee Pass were Yankees and Midwesterners who placed a high value on education and religion. In 1851, Nevada County, California, had two public schools in Grass Valley and two in Nevada City; by 1859, there were 15 schools for no more than 600 pupils (Hinkle and Hinkle, 1987:216).

These cultural institutions flourished, mostly because of eastern and Midwestern transplants who brought their cultures west. By 1860, regional communities boasted of cooperative literary societies, music ensembles, packed theaters that hosted all types of works, and multiple newspapers (Hinkle and Hinkle, 1987:217). Education-wise, in 1871 Churchill County was required to provide a school for its children. Established on the Allen Ranch, Mr. Allen taught the children of Saint Clair and South Branch settlers. Education expanded; by 1879, the four school districts established in Churchill County after 1871 consolidated.

Miner James Galloway's quest for culture is a good example. During his nine years as a Comstock miner, he recorded his and his family's participation in and appreciation of local cultural events and schools. Although Episcopalian, he and his family also attended Presbyterian, Methodist, and Baptist churches. To obtain life insurance, he joined various fraternal orders and unions. And to slake their thirst for high culture, Galloway and his family frequented local theatres, including performances of Shakespeare's *Hamlet*. His children attended schools at Mt. Davidson, Cedar Hill, and Bishop Whitaker's school in Reno (Galloway 1947: 15-21).

2. Tourism/Recreation

As noted earlier, in 1860 Dr. David Gould Webber built a small hotel at Little Truckee Lake, just south of the heavily traveled Henness Pass Road. Webber's hotel did good business, but he was not interested in being an innkeeper. His vision was the presentation of the magnificent landscape with all its flora and fauna. He stocked the lake with two varieties of trout, built a solarium, mapped horse trails to the highlands, and built bridle paths through the woods. During the 1860s, he offered this quiet paradise to visitors for modest room and board charges for little to no profit (Hinkle and Hinkle, 1987:228-231).

Dr. Webber's hotel was probably the earliest attempt to capitalize on the attractions of the Sierra lakes and cater exclusively to an increasingly affluent touring and vacation public. This manifested because of the growth of an increasingly stable population during the 1850s and a slow yet steady growing national awareness of natural landscapes and historic cultures (an awareness that reached its zenith in the 1890s and early 1900s.) The experience was sought by those who only a decade earlier had experienced the perilous chaos of the gold rush and the terrors of the westward migration (Hinkle and Hinkle, 1987:213).

Two other northern mountain lakes as well as many small towns also attracted visitors in the 1860s. One of Dr. Webber's trails led to Independence, 6 miles to the southeast, which had boats and buildings by the 1860s (Hinkle and Hinkle, 1987:230). In 1867, a correspondent for the *Sacramento Union* noted two fine hotels at Donner Lake; there were also a few houses, a store, a sawmill, and a small steamer on the lake, the *Minnie Moody*. When the railroad reached Coburn's Station (Truckee), most of Donner Lake's population moved there and the steamer was moved to Tahoe, but the lake continued to be popular with tourists into the 1870s and beyond (Hinkle and Hinkle, 1987: 246, 247).

A better transportation network helped visitors appreciate more attractions. By 1871, there was a new road between Truckee and Tahoe's Hot Springs (Hinkle and Hinkle, 1987:291-292). Dan DeQuille, pseudonym of William Wright and author of *The Big Bonanza*, described "the first swimming bath to be found on the Pacific Coast" about a mile east of Carson City, at what would later become a state prison (*Carson River Atlas*, 1991:101).

Five years before the *Sacramento Union* writer commented on the Donner facilities, their correspondent, visiting Lake Tahoe, predicted an era of summer resorts and tourist trade contingent on the establishment of a few good hotels. Two years earlier, in 1860, Lake Tahoe had been a mystery to Anglos; it was the search for a more direct route to the Comstock from California that brought traffic to the lake, not its beauty. This was supplemented by the promise of mineral wealth in a prospect downstream near Squaw Valley in 1863, which later proved false (Hinkle and Hinkle, 1987:266, 272).

Farmers and mill operators arrived first. The flatlands around the site of present Meeks Bay and at Glenbrook produced hay and grain, and potatoes. Prospectors from the false alarm downstream at Squaw Valley came to Tahoe to build inns or lodges (Hinkle and Hinkle, 1987:266). In 1875, there were still vestiges of the 1860s in the 13 dairies scattered around the lake, supported by two cooper shops making butter firkins. The lakeshore was still a big hay producer, with an annual crop of 800 tons selling at $30 per ton (McGlashan cited in Hinkle and Hinkle, 1987:312).

In the 1870s, commercial fishing and lodging competed with intense logging and milling. In 1872, 20 trout from Tahoe, exhibited at the French Fair in San Francisco, sold for $1,500 (Hinkle and Hinkle, 1987:312). Although by 1875, with at least four steamers on the lake and a dozen hotels along the shore—and 148 pounds of trout reported caught in 3 hours—the resorts were considered of little value compared with the burgeoning lumber industry (Hinkle and Hinkle, 1987:311). But in 1876, one Mr. Pray, who had built the first mill at Tahoe in 1861, converted his mill to a hotel (Hinkle and Hinkle, 1987:315).

The following year, at the same time that Marlette Dam was being raised to supply water to the Comstock, world travelers visiting Lake Tahoe said it surpassed Lakes George Champlain, Geneva, Lucerne, Como, and Erie in natural beauty. Tahoe as a resort was primarily the private preserve of the Comstock magnates, for the vast majority of tourists marveled at the engineering feats of the big lumber and water companies, such as the V-flume of the Sierra Nevada Wood and Lumber, and not at the lake (Hinkle and Hinkle, 1987:315).

That an era of tourist development would come was portended when big-time investor Lucky Baldwin in 1878 bought a very large tract of land at Tahoe. But, in 1878 Tahoe had only two saloons, both reported to be on the genteel side, so most tourists sought their pleasures in Truckee, which despite distinguished visitors such as General Phil Sheridan, the Emperor of Brazil, and President Hayes, was still considered rambunctious (Hinkle and Hinkle, 1987:316).

Yet the town grew. By 1880 the booming Truckee boasted of 2,000 whites, 1,000 Chinese (confined to one side of town), and 50 Indians. One writer noted that

There were three hotels, the rebuilt general merchandise, and two jewelry stores; shoe, furniture, variety , hardware, clothing and drugstores; two meat markets, two livery stables, a bakery, a carriage shop, a bank, a Wells Fargo office, one newspaper, three breweries, and ten saloons . . .. The railroad now had a large roundhouse in Truckee, with space for sixteen locomotives, two snowplows, and a fire engine. Sawmills were sending millions of feet of lumber in every direction. Kilns were doing a thriving business turning out charcoal for the mines, and there was a smelting works in town (Hinkle and Hinkle, 1987:317).

Saloons and gambling were confined largely to the long block of Front Street. The red light district was moved from sites along the river to Jibboom Street, behind Front Street. Despite the vice, men gambled and gave generously to the churches (Hinkle and Hinkle, 1987:304).

And, in 1880, daily stages left Truckee Hotel for Webber, Donner, Tahoe, and Sierraville, though not primarily for the benefit of tourists (Hinkle and Hinkle, 1987:317). Three years later, W.F. Edwards, the editor of the *Truckee Republican*, published his *Tourists' Guide and Directory of the Truckee Basin.* This guide gave special attention to Lakes Donner, Tahoe, Independence, Meadow, and Webber as tourist attractions (Hinkle and Hinkle, 1987:328). Another Truckee River basin tourist attraction was Boca. The town of Boca, which began as a Central Pacific Railroad construction camp, grew as a lumbering and ice producing center, with ice harvesting continuing past 1915 (*Truckee River Atlas*, 1991:21). By 1880, it included a post office, school, hotel, a general store, sawmill, shingle mill and a number of cottages. But the primary tourist attraction was Boca Brewery Company. By 1882, 7 years after the company was formed, Boca Beer reported nationwide sales of 30,000 barrels annually, with production steadily falling behind demand (Hinkle and Hinkle, 1987:328).

Lake Tahoe's significant transition from lumber production with associated tourism to tourism associated with the lake's natural beauty occurred between 1888 and 1890. This is illustrated by the numbers of and kinds of visitors. In 1888, 3,000 individuals, mostly Easterners or Europeans, came to see Virginia City and its dependencies; in 1889, 6,000 people, mostly from California, came to see the lake and its surrounding mountains, to marvel at its natural beauty. Much of this increased appreciation of natural landscapes is due in part to environmental writing and travel publications by John Muir, John and Joseph LeConte, and Professor George Davidson (Hinkle and Hinkle, 1987:327). To further promote awareness of natural landscapes, in 1892 the enigmatic Muir and a few other like-minded San Franciscans formed the Sierra Club.

3. Farming/Ranching

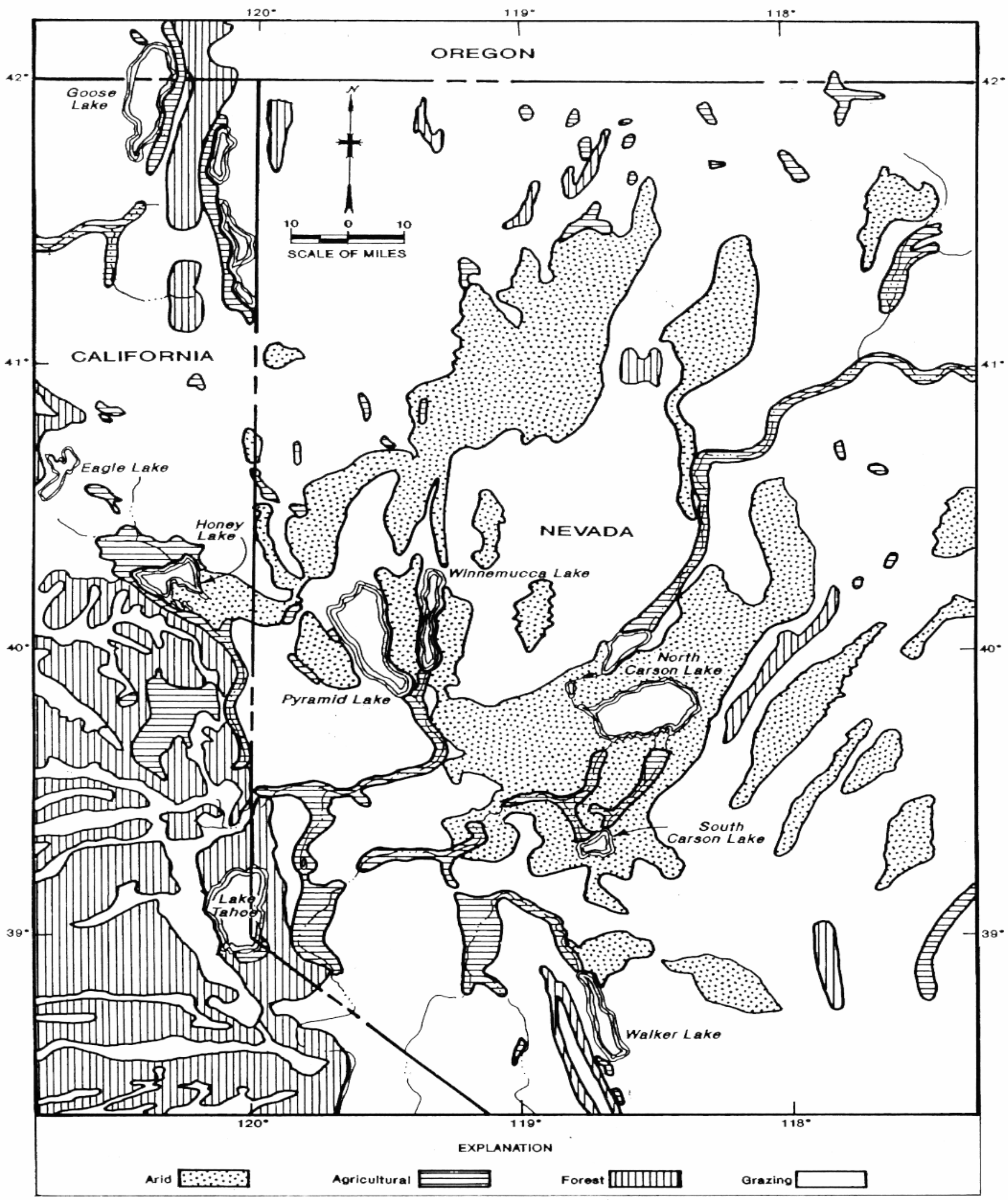
In the Lahontan Valley, the system of open range and irrigated hay ranching developed in the 1860s grew, fed by continuing mining-related demands. By the mid-1870s, a few ranchers were also driving their cattle into the mountains for the summer. As demand grew, competition for land and water increased, resulting in frequent court and range disputes. By the late 1870s, much land was fenced. Although the stakes were not as high for the rancher as they were for the big miners, ranching was a gamble; historical winter losses of 20-25 percent in the Lahontan Valley were not uncommon (Townley, 1977:9).

As in other areas of the American West, another contentious issue for beef ranchers was the arrival and expansion of sheep ranching. In early 1870, Charles Kaiser, Sr., and Warren W. Williams arrived separately in Churchill County and formed a partnership to import sheep and market wool and mutton. Williams had been in the area for a decade and had been a herdsman at Clan Alpine. Cattlemen threatened the partners, but they prospered until 1878 when they separated. Williams enlarged his holdings on both sides of the Humboldt Basin from Wadsworth to Wells, the largest holdings in Nevada at the time (Townley, 1977:9). In the 1880s, as the Big Bonanza ended, the "Beef Bonanza" began; demand for beef at the international—especially England—and national level was far greater than supply. The prosperity from beef production through the 1870s and 1880s spawned other business development, including a flour mill in 1881 and an artesian well cooperative. And in the 1880s, valley ranchers entered into contracts with stockmen from other locations to feed their cattle during the winter (Townley, 1977:13).

Among the Lahontan Valley ranchers, the favorite recreation was breeding and racing fast saddle horses. Townley noted that any man who could afford the pastime kept at least one riding horse to compete with his peers…at race weeks held throughout western Nevada. To attract the few women of the valley to Stillwater's races the owners of the hotel offered in print to provide a supper meal, tickets for the Race Ball, rooms, breakfast, and care for the horses of any man who brought his lady to the 1878 Spring Race Meet (Townley, 1977:13).

During the extremely severe winter of 1889-90, over one-half of the stock died; many ranches were sold by creditors the following spring. The extreme cold was followed by extreme drought in the early 1890s that diminished grass levels on public lands. Cattle competed with sheep, which had become very popular in the State, and with wild horses for pasture. An 1893 bill passed by the State Legislature provided for payment of 25 cents per head for each wild horse killed on public land. Townley noted that this was a source of income to Indians and cowboys alike for decades (Townley, 1977:14).

Plate VI of Israel Russell's 1885 study of the geology of Lake Lahontan (reproduced as map 3), shows land use in the Lahontan region under four categories: arid, agricultural, forest, and grazing. The dotted line indicates the extent of Russell's definition of Pleistocene Lake Lahontan. The extent and concentration of farming along drainages and in meadows, and the use of other areas for grazing, reflects settlement patterns and study area conditions as the Department of the Interior (Interior) began investigating the possibility of developing large-scale irrigation in the Western United States, to "reclaim" the land for settlement and agricultural purposes.



Map 3.—1885 Land use (Source: Russell).

F. Irrigation and Other Water Management

As noted in previous discussions of settlement and exploitation, early settlers selected prime spots along drainages and diverted water for irrigating crops and pastures, with reliance on irrigation increasing over time. Much of the area classified as agricultural on Russell's map would have relied on some kind of diversion network for success. Townley noted that "increased upstream irrigation also limited the [Carson] lake's elevation and ultimately eliminated the fish population, forcing the Indian band living there to become laborers on the valley ranches" (1977: 9).

In 1862, one of the largest floods reported on the Carson River split the river's one major channel (with sloughs) from Ragtown to Carson Lake into three channels. In response to the changes wrought by the flood, in 1864 Churchill County requested permission to construct a "bulkhead" across Old River, the most northerly of the new channels, and divert most of water to South Branch, the most southerly of the new channels. Approved in 1866, and the project was built with county funds. The system was supported by a network of simple dams and channels directing water to reclaimed lands (Townley, 1977:10).

Across the State line, on April 4, 1870, the California legislature authorized the Donner Lumber and Boom Company to construct a dam 500 feet downstream from Lake Tahoe's outlet. The company's 24-year franchise gave it virtual control of the lake's outlet and of the river to the town of Truckee, allowing for the collection of tolls for floating logs and cordwood for 20 years. The length of time of control of the dam and river was not stated (Hinkle and Hinkle, 1987:336).

Donner Lumber and Boom was also obligated to construct and maintain fishways at Tahoe Dam, and to not raise the lake level more than 5 feet. Yet the firm actually raised the level 6 feet and continued to collect tolls until 1897. The dam was a crib structure of timber and stone whose cost, combined with the cost of clearing the river, was $25,000. The dam was in operation in 1875 when Von Schmidt announced his third plan for conveying water to San Francisco (Hinkle and Hinkle, 1987:308).

By 1879, as water use increased on both sides of the valley, Lahontan Valley residents were painfully aware that upstream uses were taking almost all of the flow in mid and late summer. This fact, combined with continued expansion of beef production during the 1880s, stimulated plans for water storage and, ultimately, for Reclamation projects in the valley (Townley, 1977:14). In the interim, new dams replaced old. In 1882, workers completed a new irrigation dam at Pyramid Lake, replacing one dynamited in 1871 by Truckee Meadows settlers (State of Nevada, 1995:II-17).

Unlike California and Utah, which had recognized the value of irrigated lands, and of settling emigrants on them, Nevada had no interest in large-scale irrigation projects until mining had run its course. Thus, it was not until early in the 1880s that Reno and Carson City politicians began considering state laws to make private development of irrigation districts possible, or to authorize expenditures of State funds to create storage. No action was taken on these preliminary discussions, however (Townley, 1977:17).

The first major politician to present the case for and possibilities of approaching the need for comprehensive water storage and reclamation throughout the West was William M. "Big Bill" Stewart, who, in 1885, was also beginning a push to be reappointed as Senator from Nevada. He recommended the creation of a Federal commission of engineers and hydrologists to study the entire West and recommend sites which would be constructed with private or public funds. He succeeded in returning to the Senate and proposed withdrawing all irrigable public lands from sale or homestead and creating a Special Committee on Irrigation. The committee was approved with Stewart as its first chair.

In 1888, the United States Senate passed a resolution requiring the Secretary of the Interior to suggest means for surveying the arid States. When potentially irrigable sites were identified, the chairman intended to pass a bill returning the withdrawn Federal lands to the States to be sold to provide funds for construction of needed facilities. On October 2, 1888, the Senate approved the Secretary of the Interior's plan that the work be completed by the United States Geologic Survey (USGS) under the direction of one-armed Civil War veteran John Wesley Powell, then authorized $100,000 to complete this assessment. Within a month, survey parties arrived in Nevada to investigate possible sites.

While the survey was underway, Powell worked in Washington to arrange support for a federally administered program of Reclamation projects (Townley, 1977:19). By the end of 1889, surveyors had completed the Nevada assessment—the reports identified the most irrigable sites and recommended diversion of Truckee River water to the Lahontan Valley, which combined with Carson River flows, would irrigate 200,000 acres. But late that year, Stewart learned that Powell's staff had withdrawn 9 million acres of the best Western lands from public entry and intended to hold it for Federal purposes rather than release it to the States for development. An angry Stewart canceled the water supply study appropriations and sharply reduced funds to USGS.

At the same time USGS surveyors were locating appropriate sites, the people of Nevada were demanding that their State act: the 1889 legislature was elected with a clear mandate to do something for irrigation. Legislators responded. On March 6, 1889, the governor signed an act authorizing the Board of Commissioners of Churchill County to provide for the storage and distribution of water and the issuing bonds to pay for the work. The plan was terminated by the tragedy of the "White Winter" of 1889-90, during which over one-half of the stock in the Lahontan Valley died of exposure and starvation (Townley, 1977:14).

The legislature also sent a committee to Sacramento to meet with California's legislature to request that California recognize Nevada's rights to all land east of the crest of the Sierra Nevada and permit Nevada to manage the rivers which head on the east flank, the Truckee, Carson, and Walker. Predictably, the legislature's response was "no" (Townley, 1977:19).

A plan to create a lottery with proceeds to be used as construction funds also failed. But in 1889 an act to determine individual water rights and allocate irrigation water based on existing Colorado law passed. The legislation threatened larger users, who subsequently withdrew their support when the drought of the early 1890s ended, assuring the law's repeal.

A few of the faithful, including Francis G. Newlands, continued to work and plan for reclamation. Mr. Newland's plans included purchasing acreage in locations which had been identified by USGS as appropriate reclamation sites. (Townley, 1977:19-20, 23).

There was also no action on Western irrigation at the national level in the 1890s, other than annual National Irrigation Congresses. In 1894, Powell resigned from his position as head of USGS, realizing that his presence would continue to hurt the agency. Townley noted that

Powell had overestimated his influence in Congress in his desire to sponsor scientific development of reclamation in the West. He believed that state administration would inevitably result in land fraud and inefficiency in construction of reclamation projects (1977:19).

After a decade of inaction, on June 17, 1902, President Theodore Roosevelt signed the National Reclamation Act into law. Eleven days later, USGS submitted the six most feasible sites which had been identified during the 1888-89 surveys to the Secretary of the Interior. The Truckee-Carson, which had also had additional hydrographic studies in the 1890s, was one of the six. Two weeks later, the United States Reclamation Service was officially established within USGS, and very shortly, large parties of engineers and hydrologists were sent to the Carson and Truckee to lay groundwork for the Nation's first Federal reclamation project (Townley, 1977:27).

The Reclamation Act required that states have in place an effective water management statute and a State Engineer's office. Nevada met these requirements in February of 1903, about a month after Senator Newlands commented, off-the-record, at a meeting of the Reno Chamber of Commerce that the Truckee-Carson would be one of the first projects. Even with the appearance that the decision was a political one, the fact was that the site was the most technically favorable for development (Townley, 1977:27).

On March 14, 1903, the Secretary of the Interior selected five reclamation sites to be completed in the arid States; the Truckee-Carson Project was one (Townley, 1977:27). The others were the Salt River in Arizona, Minidoka in Idaho, Milk River in Montana, and the Platte in Wyoming/Nebraska.

G. Continuing Development

While planning and politicking for major irrigation development was underway at the State and national levels, changes and development begun in the 1880s continued or stabilized. In the mid-1890s, one James Richards established the town of Fallon on Mike Fallon's ranch, while serious discussions of creating a sugar industry in the Lahontan Valley continued well into the next century.

And with the advent of electric power, during the 1890s, four plants, The Floriston Pulp and Paper Company, the Truckee River General Electric Company, the Washoe Power and Development Company, and the Reno Power, Light and Water Company, were using Truckee River water to produce electric energy (Townley, 1977:47).

Lake Tahoe's transition to tourism expanded as it became the primary destination in the Truckee area. The Bliss enterprise formed a new corporation, the Lake Tahoe Railway and Transportation Company, obtained a franchise, and in 1889 began construction on a narrow gauge railroad down the Truckee River Canyon from Tahoe to Truckee. The 16-mile track was completed in 1890 and one year later the maintenance shops moved from Glenbrook to Tahoe City. Service was offered three times a day during the summer months. The train and climb were marvels; luminaries such as Henry Ford and Thomas Edison enjoyed the trip from inside the cab. With the railroad's completion, a new 170-foot luxury excursion steamer, the *Tahoe*, was added in 1896, the year after the Grand Central Hotel of the Bonanza period burned. The Bliss corporation responded by building Tahoe Tavern, for many years a world famous hotel (Hinkle and Hinkle, 1987:331-334).

The Hobart Mill, established in 1896 by Hobart and Overton who previously operated the Sierra Nevada Wood and Lumber at Lake Tahoe, processed timber from the vicinity of Independence and Webber Lakes until 1938.

In 1907, the Department of the Interior reserved an area of 4,640 acres for the Fallon Paiute and Shoshone Indians, who had relinquished their original allotments. An additional 841 acres were added in 1917 to the reservation's northern boundary. The government added an additional 2,640 acres in 1978 (State of Nevada, III-3, 22).

H. The Newlands Project

With authorization of what is now called the Newlands Project, Reclamation established their administrative office in Reno, mapped the Truckee Canyon, and selected the Derby Diversion Dam site. This accomplished, the surveyors moved east to map the route of Truckee Canal. By July, the surveyors were laying out water supply and drainage ditches for 200,000 acres of arable land. At that point, there were 15,000 acres of cultivated fields and an equal number of acres of pasture on 90 ranches between Ragtown and the Carson Sink, the result of four decades of livestock raising and winter feeding (Townley, 1977:95).

Between 1904 and 1911, the first irrigable lands were opened for settlement, with maps posted in Reclamation's Reno office as early as 1904. The earliest entrymen and families moved onto the parcels which were primarily in six townships around Fallon, with some others near the new town of Fernley. The fact that project publicity made it clear that water would not be available before 1905 did not deter squatters. Reclamation also contracted with ranchers and the railroad to exchange their earlier water rights for Reclamation water. The ranchers were required to subdivide large landholdings for sale, with lands also available from the railroad (Townley, 1977:36).

The first construction contract, for lined and unlined portions of the main canal, was awarded on June 13, 1903. Temporary construction camps, including Derby, were established along the alignment. In mid-1903 work commenced on Derby Diversion Dam, which would require 2 years to complete. The Truckee was diverted into a new channel cut on north of streambed; sand and gravel plants were set up in nearby canyons. Unfortunately, the Derby construction camp became notorious for the level of violence and larceny which took place.

The pressure to complete construction meant that anyone and everyone was hired on. Robbery and murder were common. "Not content with simply robbing the work force," Townley observed, "the Derby gangs removed equipment and construction materials and sold them in Reno and across the Sierra in California (Townley, 1977:33).

On June 17, 1905, a congressional delegation led by Senator Newlands dedicated the Derby Diversion Dam and Truckee Canal (Simonds, 1996:11). The first project water was delivered on February 5, 1906, and in that year 108 ranches were settled by 674 men, women, and children. The following year, Reclamation moved its office from Reno to Fallon. Reclamation resurveyed the town, which became the center of the Reclamation project and its related agriculture center (Townley, 1977:87).

While construction proceeded and entrymen anxiously awaited the day they could begin their new lives, Reclamation encountered obstacles to completing portions of the project. A full discussion of these and the players is well beyond the scope of this historic overview. Please see Townley (1977) and Simonds (1996) for a perspective on the critical issues and decisions which affected the project.

Once the Derby diversion canal project started supplying water to increasing numbers of parcels, it became apparent that Reclamation's original estimates of actual and available Truckee River flow and available Lake Tahoe storage were too large. "The Reclamation Service," Townley noted, "overestimated the annual flow of the Truckee River and underestimated the influence of the paper mills and power generating plants along the Truckee, as well as the ranchers of Truckee Meadows (Townley, 1977:47).

With the knowledge gained by experience in both hydrology and the political arena, in 1908 Reclamation decided that it was necessary to build a storage reservoir on the Carson River. In 1910, the Newlands Project was closed to entry until additional storage could be completed on the Carson or Truckee drainage (Townley, 1977: 41).

Just as these steps were taken, groups finally succeeded in bringing in a sugar producer. In 1910, a plant was constructed southeast of Rattlesnake Hill with brick fired and stone quarried on the site. In 1911, 30 tons of premium beet seed were imported from Bohemia and distributed to farmer contractors. In 1911, a farmer named Vannoy is credited with beginning intensive agriculture on selected soils, which allowed for production of the profitable truck crops which prevailed for a number of years (Townley, 1977:75).
In February 1911, construction started on the Carson storage unit known as Lahontan Dam and Reservoir. In the absence of sufficient water to irrigate crops, construction jobs kept farmers solvent. The Lahontan facility's completion four years later allowed land entry to resume with what was believed to be sufficient water and from 1914-1917, hundreds of settlers arrived (Townley, 1977:41).

On the Truckee's upper reaches, in 1913 the power company and Reclamation finally agreed on construction of Lake Tahoe Dam and completed the work that year. The United States assumed control of the dam on July 1, 1915, following a consent decree issued in Federal court. One of the issues addressed in the decree were hydropower operation flow rates. (Simonds, 1996:18).

But just water supply problems appeared to solved, distrust of Reclamation increased. "Distrust of the USRS had become so ingrained," Townley observed, "that entrymen seriously considered organizing a militia and taking control of the project and its works." In 1918, the Truckee-Carson Irrigation District (TCID) was organized, with the goal of resolving widespread dissatisfaction and management problems with the project (Townley, 1977:55, 52).

Realizing that storage provided by Lahontan Reservoir was insufficient, particularly in the late summer months, in 1920 Reclamation started to plan a 300,000 acre-foot storage reservoir in Spanish Springs Valley as an alternative to the project storage in Lake Tahoe. Costs were to be allocated to both new and old project lands; however, TCID would not agree and ultimately Reclamation scrapped the plan (Townley, 1977:113-115).

While the search and planning for additional storage was underway, Reclamation also acted to solve the drainage problems which had been recognized as early as 1904, but had not been addressed, largely due to political issues. By 1912, drainage approached crisis proportions. Townley observed that ground water levels "were close to the surface in most of the Lahontan Valley and irrigation completely saturated the root zone, killing or damaging the crops" (Townley, 1977:53). After much acrimony between water users and Reclamation, drainage was installed. Between August 1921 and January 1923, Reclamation installed 150 miles of deep drains throughout the project with an additional 81 miles completed by September 1923 (Townley, 1977:60).

On December 31, 1926, a contract between TCID and the (now renamed) Bureau of Reclamation transferred management of the Newlands Project to the district (Townley, 1977:52). This move paved the way for transfer by the recommendation of a fact finding commission investigating all Reclamation projects that the amount to be repaid be $3,281,999 rather than the project cost of $7,899,479 (Simonds, 1996:21). The transfer, however, did not eliminate water supply problems. In the drought years between 1921 and 1934, the district purchased additional water from Donner Lake and occasionally pumped water from Tahoe or Lahontan (Townley, 1977:113).

In 1926, the Federal Courts in Reno issued a temporary ruling dividing the Truckee waters among users. And, in 1929, an in-depth study of the Truckee River and Basin commenced, which would lead to defining criteria (Simonds, 1996:22).

Upstream users and others that increasingly advocated more storage formed the Washoe County Conservation District. And, in 1930, the Congressional delegation introduced legislation to acquire $1.5 million for construction of a reservoir on the Little Truckee River near Boca. The repayment period was to be 40 years; but the parties involved failed to agree, and Congress said no (Townley, 1977:115ff).

Dissatisfied with the Congressional opinion, TCID took a different approach and applied to the Reconstruction Finance Corporation for $100,000 for improvements to the existing project and for $400,000 for construction at Boca. A year later, a different Depression Era agency, the Works Progress Administration, authorized $1,500,000 for Truckee storage, but required resolution of water rights issues before funds would be released. Final settlement of those rights took 3 years. On September 21, 1935, President Franklin D. Roosevelt signed the appropriation for the Truckee River Storage Project, which also authorized design of Boca Reservoir (Townley, 1987:116). And, in the same year, the Truckee River Agreement defined storage in Lake Tahoe, set Floriston Rates, and addressed future pumping at Tahoe, considering the effects of pumping throughout the drought years, the 1920s and early 1930s (Simonds, 1996:24).

One type of depression era assistance from which the Newlands Project benefited was the moratorium on annual repayment charges on all Reclamation projects put in place from 1931 through 1934. During the period, project operations and maintenance charges were met through labor (Townley, 1977:124).

While Newlands Project development continued, increased automobile sales nationwide spurred a boom in Federal road construction and improvements in the 1920s and 1930s. The Lincoln Highway—which ran on various numbered routes across America from San Francisco to New York—was one which was hard surfaced. This brought increased tourism revenue to the entire area (Townley, 1977:121). And, the 1928 completion of a surfaced road in Lake Tahoe brought major changes to the resort.

I. Other Depression Era Activities

Early summer 1935, the first of two Civilian Conservation Corps (CCC) camps, Camp Carson River, was set up on the west edge of Fallon. Enrollees from the camps provided labor to the benefit of water storage and irrigation projects. Among these were the construction of Schekler and Toyeh (now the S Line) Reservoirs and improvements to Newlands Project features, including rebuilding concrete diversion gates, renovating the Truckee Canal, opening new ditches and cleaning canals (Townley, 1977:125).

CCC enrollees were also scheduled to provide some of the labor for construction of Boca Reservoir, but after strikes by labor unions objecting to their involvement, their role was limited to clearing the reservoir and associated project areas (Townley, 1977:117). Other construction for water storage occurred at Donner Lake where the dam was rebuilt, and a new structure was completed at Independence Lake in 1939.

In 1931, lawmakers in Carson City made a historic decision to help improve Nevada’s economy, one that would forever change the state’s image: the full legalization of high stakes gaming (Hemphill, 1986:12; State of Nevada, 1995:III-9)

1. Truckee Storage Project

On February 11, 1937, Interior Secretary Harold Ickes approved the design for Boca Reservoir, then penned a repayment contract with the Washoe County Water Conservation District (WCWCD) for $1,000,000 in construction costs. The costs of construction were to be repaid jointly by Washoe County and the WCWCD, which operates the reservoir (Townley, 1977:117). The project was designed to store water to irrigate 29,000 acres in Truckee Meadows and for power production and residential use (Truckee River Atlas, 1991:55; Townley, 1977:129).

In 1939, Reclamation completed construction on the Boca facility, then impounded water for the 1940 irrigation season. There was a 10 percent cost overrun on the project, which the WCWCD refused to pay. A separate problem arose when ranchers who participated in the project refused to abide by the contract clause allowing a maximum 160 acreage irrigation limitation, operating from the position that they controlled the canals in Truckee Meadows and would control Boca. In response, Secretary Ickes padlocked Boca. In 1941, Congress paid the overrun and exempted Truckee Meadows from the 160-acre limitation, providing an end but not a solution to the problem. By 1942, management of Boca Reservoir was turned over to WCWCD employees (Townley, 1977:117).

While Boca Reservoir's construction was underway, a process which brought lasting and significant change to Lake Tahoe and the Truckee area was put in place. In the winter of 1939, snow removal commenced, providing year-round access to the lake. Two years later, mailboat service ended, and in 1944, the railroad tracks between Truckee and Lake Tahoe were removed (Hinkle and Hinkle, 1987:354).

As the Tahoe-Truckee railroad disappeared into history, the 1913 suit to adjudicate Truckee River waters was settled. Known as the Orr Ditch Decree, it established individual rights and incorporated the 1935 agreement as a framework for operations (Simonds, 1996:24).

And, in 1940, workers completed U.S. Highway No. 40 between Truckee and Reno, following the Truckee River's course (State of Nevada, 1995:III-11).

2. The War Effort

Although still depressed at World War II's onset, the Newlands Project area economy eventually benefited, as did other parts of the study area and the nation, from the war. Technological improvements helped; the transition from farming techniques in place from the beginning of the project to mechanized ones occurred, with fallow and new lands being brought into production (Townley 1977:133).

The demand for agricultural products increased, locally and nationally, as the military established more bases. Townley describes the development of what would become the Fallon Naval Air Station:

In 1941, Senator McCarran and local business leaders pressed the Army Air Force (*sic*) to investigate the advantages of a training station in the valley…. A selection board visited in August, 1941, and agreed to develop a local base. COE designed the facility and solicited bids for work in July, 1942. The Dodge Construction Company was low bidder and promptly began leveling and hard-surfacing.

Once the runways were completed in 1942, the site was idle until the Navy decided to use the area as a gunnery range. The Navy took a duration and six months lease on the land and authorized construction of hangars and other buildings in late 1943. Simultaneously, the government obtained releases from property owners in Dixie Valley and Carson Sink for the use of the ranges. The station was commissioned by the commandant of the Alameda Naval Air Station, Captain Walter F. Boone, on June 10, 1944 (Townley, 1977: 129).

In the western part of the study area, other military efforts altered local life. A large army base at Honey Lake, a naval ammunition depot at Walker Lake, and an important strategic bombing and torpedo range at Pyramid Lake all reflected the higher military presence in general (Hinkle and Hinkle, 1987:354). Some of these were closed in 1945; others were used intermittently or grew to major facilities.

In 1943, TCID and Sierra-Pacific signed an indenture for water rights from Donner Lake (*Truckee River Atlas*, 1991:58). The private resort closed (Hinkle and Hinkle, 1987:351).

3. Early Post-War Developments

The concentration of smaller farm units into large family or corporate ones began in 1945, expanded in the 1950s, and has continued on a regular basis in the study area and nationally. And beginning in the 1950s, ranching in the early style was replaced by feeder operation and livestock auction houses (Townley, 1977:113).

In 1948, following the growing national trend of establishing more wildlife protective areas, he marsh lands north of Stillwater were transferred by TCID and the Department of the Interior to the Stillwater Wildlife Management Area (Townley, 1977:133).

With the end of the war in August of 1945 the need for military facilities in the valley was greatly reduced. Townley notes that by "November the torpedo range at Pyramid Lake was abandoned, as well as large parts of the Dixie Valley range. On June 1, 1946, the base went on caretaker status, with the Navy willing to convey administration to the county (Townley 1977: 132).

Six years after the end of World War II, another conflict manifested. In March 1951, the Fallon airbase reopened as a result of the Korean War. To accommodate the new jet aircraft, the Navy in 1952-53 constructed longer runways; this—and the base's expansion in general—required the acquisition of several neighboring ranches. In 1953, the Navy also reserved public lands for training ranges in Fairview Valley, Rawhide Flat and the Carson Desert (the base was designated a Naval Air Station in 1972) (Department of the Navy, 1998).

In other developments, Webber Lake continued as a resort in the 1940s, with no gaming allowed, and still continued as a resort into the 1990s (Hinkle and Hinkle, 1987:351). Two earthquakes, one on July 6 and another on August 23, 1954, caused major damage to Newlands Project distribution features (Simonds, 1996:25 and 26).

4. The Washoe Project

Although the Washoe Project's construction dates fall after the historic period, it is summarized briefly to complete the discussion of Reclamation project development features in the study area.

Congress authorized $43,700,000 for the Washoe Project, with construction to begin on August 1, 1956, but only when the committee created to resolve assorted differences had succeeded, a task which continued until 1961. Under the project, Tahoe water was to be divided—recreation given equal status with agriculture use (Townley, 1977:139).

In 1962, the Prosser Creek facility, constructed primarily to provide flood control, was the first Washoe Project feature completed. It was followed by the Stampede facility (1970) and Marble Bluff Dam and the Pyramid Lake Fishway (1975).

J. Other Late Developments

The Sierra Valley Decree of 1958 confirmed a water right for the Sierra Valley Water Company, which historically had diverted water from the Little Truckee River to the Feather River basin in California for irrigation. (See chapter 1 of the revised DEIS/EIR.)

A continued threat of flooding along the Truckee River resulted in the 1971 construction of Martis Creek Dam by COE. The structure on Martis Creek controls the flow of runoff from that drainage into the Truckee River, and is not considered a Truckee, Newlands, or Washoe Project facility.

Truckee River (TR) Historic Timeline

Date	Event	Consequence/Other
c.5000 B.C.	First evidence of human habitation in western Great Basin; "Early Archaic" cultures	Origins of Paiute cultural groups
1844	John C. Fremont visits Pyramid Lake & TR	First Anglo in study area; named Pyramid Lake, "Great Basin"
1852	First permanent settlement on TR	Eventually Reno
1859	Comstock Lode struck	Unprecedented growth and settlement
	First toll bridge over TR near Reno	

Truckee River (TR) Historic Timeline

Date	Event	Consequence/Other
	(11/29) GLO withdraws land for Indian Reservation	Pyramid Lake Indian Reservation
1861	Pioneer & Cochran Ditches built	First TR-fed irrigation ditches in area
1864	(10/31) Nevada proclaimed 36th State	
1868	Central Pacific RR reaches CA/NV border	Western leg of transcontinental RR
	Reno officially founded and named by Charles Crocker, CPRR	
1875	(3/23) President U.S. Grant formally proclaims Pyramid Lake Indian Reservation	Retroactive to 11/29/59
1877	Original Donner Lake “Dam” constructed	Rebuilt in the 1930s
1879	Original Independence Lake Dam constructed	Present dam built in 1939
1902	(6/17) Congress passes National Reclamation (Newlands) Act	Creates U.S. Reclamation Service (USRS)
1903	(3/14) SOI authorizes Truckee-Carson Irrigation Project (later Newlands Project)	First USRS project
1904	Fleish hydroelectric plant built	
1905	(6/17) USRS completes Derby Diversion Dam	Diverts TR water to Newlands Project
1906	Truckee Canal completed	Connects Truckee and Carson River basins
1908	U.S. Supreme Court issues “Winters Rights Decision”	Prohibits use of water by non-Indians that interferes with Tribes’ use of reserved water
	“Floriston Rates” established	Flow requirements dictated
1913	(3/30) Litigation (U.S. vs. Orr Ditch Water Co) between the U.S. and TR water users begins	
	New Lake Tahoe Dam completed	Replaced old timber crib dam
1915	(7/1) Based on Consent Decree, USRS assumes control of Lake Tahoe Dam	General Electric Decree
	USRS completes Lahontan Facility	First reservoir in Carson Valley
1918	Truckee-Carson Irrigation District (TCID) formed	To manage the Newlands Project
1923	USRS changed to U.S. Bureau of Reclamation (Reclamation)	
1926	Talbot Decree issued	Creates office of TR Water Master
	(12/31) Reclamation turns over Newlands Project management to TCID	
1930	TCID files application for appropriation of TR water to be stored in Lahontan Reservoir	
1931	Crude fishway built at Derby Diversion Dam	Never becomes operable
1935	(7/1) Defendants in Orr Ditch litigation sign agreement	Pyramid Lake Indian Reservation granted 5,875 acres for irrigation
	Truckee River Agreement enacted (operating criteria, flow rates, authorization to build Boca facility)	Formally established Lake Tahoe’s natural rim @ 6223 feet MSL and allows water storage to 6229.1 MSL

Truckee River (TR) Historic Timeline

Date	Event	Consequence/Other
1936	Winnemucca Lake declared National Wildlife Refuge	
1937	Reclamation completes Boca Facility	
1938	Winnemucca Lake dries up completely, due to water diversions at Derby Diversion Dam, drought, etc.	
	Beginning of 6-year drought (to 1944)	Pyramid Lake Lahontan cutthroat trout (LCT) become extinct
1944	(9/8) Orr Ditch Decree issued	Allocates water to tribe; Truckee Canal, individual water rights
1945	Diversion dam completed with construction of new TR channel at Marble Bluff	First Marble Bluff Dam
1948	Stillwater Wildlife Management Area established	224,000 acres
1950	First Marble Bluff Diversion Dam washes out	TR returns to original course
1950s	Related cutthroat trout strain reintroduced to Pyramid Lake	
1954	Reclamation receives authorization to initiate “Washoe Project”	
1955	CA/NV Interstate Compact Commission	Congressional Consent
1956	(8/1) Washoe Project approved, mostly for flood control and to assist spawning runs for Pyramid Lake fishes	Prosser, Stampede, and new Marble Bluff facilities
1959	“Tahoe-Prosser Exchange Agreement”	Exchange of Lake Tahoe water into Prosser for later release
1962	Reclamation completes Prosser Facility	
1967	(2/21) SOI issues Newlands Project Operating Criteria And Procedures (OCAP)	Total acreage: 74,500; total water duty: 406k a.f.
	(3/6) Pyramid Lake drops to 3,783.9 MSL	Lowest elevation in modern history
	Pyramid Lake cui-ui identified as in danger of extinction	
1968	Pyramid Lake Paiute Tribe (Pyramid Tribe) files first in series of lawsuits based on OCAP	Tribe claims water being wasted in Newlands Project at the expense of Pyramid Lake
1969	(7/7) CA & NV Governors meet to discuss Pyramid Lake’s declining elevation	
	Endangered Species Conservation Act passed	
	NEPA Passed	Establishes EPA
1970	Reclamation completes Stampede Facility	
	(August) Pyramid Tribe files suit against Secretary of Interior for failure to protect tribal water and property rights	

Truckee River (TR) Historic Timeline

Date	Event	Consequence/Other
	Pyramid Lake Lahontan Cutthroat Trout (LCT) listed as in danger of extinction	
1971	COE finishes Martis Creek Dam	Solely for flood control
1972	Pyramid Tribe begins fisheries programs	
	Clean Air Act passed by Congress	
1973	(2/20) “Gesell Opinion” issued	Requires Reclamation to deliver water to Pyramid Lake in excess of valid Newlands Project water rights
	Endangered Species Act passed	
	Under Gesell opinion, SOI notifies TCID that TR water “recoupment” to begin	All illegally-diverted TR water to be returned to Pyramid Lake
	(9/13) Interior notifies TCID of its intentions to terminate 1926 contract allowing TCID to operate Newlands Project	
	Federal district court in Washington, D.C. orders the implementation of new OCAP for TR	
1973	(12/21) US, on behalf of Pyramid Tribe, files lawsuit (NV vs. US) against NV parties in Orr Ditch Decree	Seeks to reopen decree to obtain a reserved water right for Pyramid Tribe to maintain lake levels based on 1908 Winters Doctrine (alleging 1859 as priority date)
1974	(March) TCID sues Interior over 1973 contract cancellation	
1975	Reclamation finishes new Marble Bluff facility	Last Washoe Project facility
	Pyramid Lake Lahontan Cutthroat Trout reclassified as threatened under Endangered Species Act of 1973	Tribe starts stocking lake with trout
1976	Nevada files suit in U.S. district court claiming ownership of Pyramid Lake bed	
	(10/1) Suit filed by Carson-Truckee Water Conservancy District, Sierra Pacific Power, and Nevada against Interior over Stampede Reservoir water use	Pyramid Tribe wants Stampede water for lake and fishery use*
1978	FWS, Portland, issues first cui-ui recovery plan	
1979	David L. Koch cui-ui hatchery constructed	
1982	(5/20) Friends of Pyramid Lake established	
	(7/20) Pyramid Tribe sues SOI over enforcement of Clean Water and Endangered Species Acts	
1982	(12/22) Pyramid Tribe wins suit filed on 10/1/76*	“dedicated waters” for cui-ui and LCT
1983	(6/24) U.S. Supreme Court declares Orr Ditch Decree as final and binding	
1984	(2/14) TCID signs temporary operation and maintenance contract	Newlands farmers must abide by 1973 OCAP (Gesell Opinion)

Truckee River (TR) Historic Timeline

Date	Event	Consequence/Other
	(5/25) Pyramid Tribe files application for maximum 3,000 cfs of TR water for use downstream from Derby Diversion Dam	Protested by TCID, Washoe County, Sierra Pacific Power, etc.
	(10/17) Pyramid Tribe filed for yet another application similar to one filed (5/25)	
1985	Reclamation Environmental Assessment claims that 63,100 acres in Newlands under irrigation, of which 57,518 had legal project rights	
	(12/12) Pyramid Tribe adopts "Statements of Principles for Settlement Negotiations," and enter TR negotiations	
1986	NV Senator Paul Laxalt fails to have Congress ratify the CA-NV Interstate Compact	Begins new era of TR negotiations
1986	NV Senator Harry Reid initiates TR negotiations among state, federal and other interests	Continued into 1987 with formal discussions
1987	Reclamation releases Newlands Project EIS that intended to reduce Newlands Project diversions by 1992	Proposed new OCAP
1988	(4/15) SOI adopts new OCAP for Newlands Project	
	(Oct.) Lake Tahoe falls below its natural rim (6,223.0 MSL)	Upper Truckee below the dam stops flowing
1989	(May) Preliminary Settlement Agreement (PSA) negotiated between Pyramid Tribe and Sierra Pacific	SPPC to store up to 39.5k a.f. for Pyramid Tribe fishery purposes
1990	Pyramid Tribe receives "treatment as state" status from EPA for the purpose of developing water quality standards	
	(11/16) Public Law 101-618 enacted	Truckee-Carson-Pyramid Lake Water Settlement Act
1991	(2/20) Truckee River Operating Agreement (TROA) negotiations begin in Carson City	
	(July) Due to drought conditions and low TR flows, Federal Water Master shuts off Truckee Meadows irrigation ditches	Repeated again June 1992, June 1994
1992	More drought: Lake Tahoe reaches lowest-ever lake surface elevation, 6,220.26 MSL	
1993	(7/13) MOU between Pyramid Tribe, Nevada, and Interior to confirm tribal rights to unappropriated TR waters and for NV to relinquish any rights to the beds and banks of the TR and Pyramid Lake	
1994	More drought: TR dries up completely on a 4 mile stretch in August	

Truckee River (TR) Historic Timeline

Date	Event	Consequence/Other
1995	(11/1) Federal Water Master drops minimal allowable flow at Farad from 350 to 300 cfs; difference will allow 20-30k a.f. to be stored in Stampede for Spring 1996 cui-ui/LCT spawning runs	Agreement between Sierra Pacific and Pyramid Tribe
	(12/6) U.S. vs TCID: sought to recoup water improperly diverted to the Newlands Project from TR between 1973 to 1988	TCID files motion to dismiss
1996	(3/25) State of Nevada Dept of Conservation initiates first in a series of discussions between Pyramid Tribe and TCID	Ends in July after 12 after both parties fail to agree on issues
1997	(January) “Flood of 1997” Repeated rain-on-snow events cause TR to flood	Reno, Sparks devastated
1998	(February) Reclamation releases first Draft TROA EIS to public	Repeated again in 2003-04
1999	(11/29) MOA between Pyramid Tribe, U.S. Fish and Wildlife, Reclamation, and BIA	Indicates responsibilities of these parties in the management of TR water designated to protect and conserve Pyramid Lake fishes
2003	Reclamation completes new fish ladder at Derby Diversion Dam	

II. Section II: Summary of Expected and Known Site Data

A. Introduction and Methodology

1. Cultural Resources Likely to Result from Prehistoric and Historic Use of the Study Areas

Given the settlement patterns and use of the study area described, the following are among the types of tangible cultural resource sites which could be expected in the general study areas: remains of clusters of or individual pit houses and associated living debris, such as ground or flaked stone and hearths, especially along drainages, lakes or near springs; locations of possible communal areas near houses; temporary, seasonal hunting camps with limited debris; bedrock mortars; rock art on canyon walls or boulders; rock alignments in former game areas; possible burials or caches in caves or crevices or other locations; small deposits or pieces of ground stone or mortars in gathering areas; quarries; ocher mining areas; historic buildings or foundations; irrigation diversions and ditches and flumes; lumber flumes; lumber mills; bridges; railroad alignments; agricultural fields; corrals and other cattle and sheep ranching features; fence lines; river crossings/fords; trails, roads and railroad routes; fishing and processing equipment, including weirs; recreation sites; and prospecting pits and mines.

For both primary and secondary study areas, many of the same types of resources could be expected. The following are categories less likely to occur: rock alignments in game areas, caves, mines, quarries (as a rule), and the main section(s) of lumber flumes.

The identification of resources which are Traditional Cultural Properties (TCP) that may be found within the area of potential effect will be completed in consultation with the Nevada Northern Paiute and the Washoe and other Indian tribes, as appropriate. Given the area's intense development, the probability of finding some of these types of sites intact may be limited.

2. Cultural Resources in the Primary Study Area

The area of potential effect, or primary study area, for the study includes: (1) the land covered by the maximum water surface, plus a band of up to 200 yards around the perimeter (exact width depends on the terrain and use of the water body) of all system lakes and reservoirs: Lake Tahoe, Donner Lake, Prosser Creek Reservoir, Independence Lake, Stampede Reservoir, and Boca Reservoir; (2) a corridor of approximately 200 yards on either side of the Truckee River for its entire length from Lake Tahoe to Pyramid Lake; (3) stretches of drainages between reservoirs or to the Truckee River; and (4) the land up to the 3,900-foot contour level above Pyramid Lake.

The secondary area includes Lahontan Reservoir and the lower Carson River valley; however, due to the projected minimal fluctuation levels for Lahontan Reservoir under the three alternatives—less than half- foot—and the sheer volume of both unrecorded and recorded cultural resource sites (estimated in the thousands) downstream from Lahontan Dam, only cultural resources recorded within 200 yards around Lahontan's shoreline are included.

a. Approach to Analysis

To complete the analysis of impacts to cultural resources, two primary pieces of information were necessary: site locations and water levels. The first was collected and plotted as described above. Obtaining the second set of data was more difficult. Data on reservoir volume and river flows from the July 2003 hydrologic model, to be used in analyses of all resources, were developed to the mean monthly level for the alternatives at various exceedences. The mean monthly flows provide no indication of the high and low flow within the period. (See chapter 3, "General Methodology" and "Water Resources" and the Hydrology Appendix for details of the model and for the streamflows used in analysis.)

(1) Lakes and Reservoirs

Although differences in water level fluctuation within a month could impact sites, the lack of daily information was not a major concern for reservoirs and lakes. The effects and sites affected would be the same under the clearly defined maximum and minimum elevations within the body of water, although accelerated under frequent changes.

(2) Truckee River and Major Tributaries

To obtain some feel for how great the variation within the monthly mean has been and what the difference in elevation could be, the records of actual daily streamflows for the month with the highest mean flow (USGS arithmetic average) during the period of record for a sample of USGS gauges on the Truckee River were checked. The results are presented below.

Example river gauge data (cfs)

Gauge	Month of maximum	Monthly mean	High daily1	Low daily
Truckee	May 1958	2,400 (4.65 feet)2	2,920 (5.17 feet)	2,070 (4.32 feet)
Reno	May 1952	5,679 (8.17 feet)	7,630 (9.29 feet)	4,840 (7.7 feet)
Nixon	June 1983	5,398 (8.6 feet)	6,490 (9.2 feet)	3,350 (7.43 feet)

[1] Daily average.
[2] ( ) approximate gauge height of flow.

In these examples, the difference in elevation between the high daily flow and the monthly mean is never greater than 1.1 feet, a small amount given the relative accuracy of plotting cultural resources sites. For current conditions, No Action, LWSA, and TROA, analysis for the Truckee River and its tributaries was performed using the maximum mean monthly lows identified as the high point. The results are believed to be good indicators of which sites could be impacted.

Yet translating the simulated flow data developed for reaches of the river into elevation information for the Truckee River was not straightforward. The assumptions made and approaches taken follow.

USGS gauging stations on the river were matched with points on reaches of the river flows from the model to the extent possible. Elevations for all gauging stations were plotted to approximately establish the elevation of the river at as many points as possible. Approximate slope between stations was determined to decide if it were reasonable to assume an increase in flow of a given number of feet at one point would be approximately the same increase at another point down the river, if there were no major inflow between. Areas of apparently greater slope were addressed separately. Because the number of river elevations available varies within reaches, the accuracy of projected water elevation is undoubtedly greater in some reaches than others. The least available information is in the Truckee River from Lake Tahoe to the Nevada-California State line. In most cases, the height of the simulated maximum mean flow above 0 gauge height at both ends of a reach was very close.

Against site data and water levels defined as described, potential impacts on cultural resources under current conditions, No Action, LWSA, and TROA were analyzed as follows:

For reservoirs and lakes:

Identifying all sites whose elevation(s) were at or below the maximum water surface levels. Water surface levels are rounded up or down to whole numbers as cultural resource site survey locational information is never given in fractions of a foot.

Comparing the elevation of the selected cultural resource sites to the maximum and minimum elevation of the water surface in three hydrologic conditions: very wet (10 percent exceedence), median (50 percent exceedence), and very dry (90 percent exceedence) for each system feature under current conditions, and No Action, LWSA, and TROA.

For the Truckee River and its major tributaries:

Identifying the maximum mean monthly flow in reaches of the river in very wet hydrologic conditions under current conditions, No Action, LWSA, and TROA. Streamflows in wet hydrologic conditions, and not median and dry, were used for two reasons. First, basic knowledge of locations of identified sites placed these above the minimum flow elevations, and second, maximum flows would include all possible sites.

Converting maximum flow data to elevations at specific gaging stations on both ends of the reach.

Comparing the elevation of sites located within reaches of the river to estimated flow elevation.

The cultural resources impacted under current conditions, No Action, LWSA, and TROA at the 10-, 50-, and 90-percent exceedences for reservoirs and lakes are identified in the tables below for each specific facility or stretch. For reaches and drainages, the maximum flow under current conditions and any alternative is used.

b. Nature of Impacts on Cultural Resources

The proposed action analyzed in this study includes no physical modifications, and, thus, impacts on cultural resources largely would be limited to those associated with submergence and exposure.

Submergence results in both scouring and deposition of sediment. (See chapter 3, "Sedimentation and Erosion.") Submergence affects cultural resources sites primarily by destroying the context in which they occur:

- By moving entire sites or individual items from their original location (more evident in river stretches).
- By eroding the soil from around the objects, often collapsing items from one time period (strata) into those from another time period, eliminating much of the information the site contained.
- By redepositing materials in foreign settings.
- By destroying items.
- By depositing layers of soil from elsewhere on moved or in-place materials, creating a false context.

High-volume flows and rapid changes in water elevation, as within lakes, are particularly damaging.

Permanent submergence in a setting without strong currents may protect or have little or no effect on cultural resources, although examination of these resources is difficult. Alternate exposure and recovering are particularly damaging to perishable materials. Sites located at the edge of a body of water are vulnerable to "wave-lapping" action, which can scour cultural resources.

Impacts on sites from submergence also vary with the type of site; a bedrock mortar or milling stone on a large boulder would not suffer in the same way that a surface scatter of small flakes or a fire hearth would.

Exposure of sites in public use areas abets another impact not related to water management: the theft of cultural items by private citizens for personal gain and/or profit. And, not only are exposed sites generally subject to greater destruction by natural forces, they are exposed to increasing levels of destruction by recreational purposes, as in the use of "flats" for motorcycling. Therefore, the total submergence of a cultural resource can provide protection from theft, natural, and recreation related impacts.

See Nesbitt, et al. (1991) for a discussion of the results of a survey of selected sites in the study area in which both the positive and negative effects of submergence and exposure described above are indicated.

III. Section IIA: Cultural Resource Tables

A. Lakes and Reservoirs

What follows are two types of tables for each lake or reservoir. The first (unnamed) table details high 10-percent (wet), median (50-percent), and low 90-percent (dry) exceedence elevations, with the projected month(s) for each condition included. These mean sea level (msl) based elevations help discern what cultural resources or properties at specific water

elevations might be affected by fluctuating water elevations in all four analyses, and which months indicated are dry or wet. Months are listed numerically (1-January, 2-February, etc.) with the water year as October through September.

The second table, labeled as a "CRA.2-[name]" table, lists known cultural resources and whether they are affected by any or all alternatives, based on the elevation table related to the facility and best available data. Used in favor of dense narrative, these tables provide instant graphic presentation of cultural resources and whether they are affected by the four study alternatives: Current Water Supply (C); No Action (N); LWSA (L); and TROA (T). If the boxes to the far right on each table are blank, it is either unknown as to whether they are affected, or insufficient (or unreliable) data cannot make accurate determinations.

After entry into an Access database (mostly for future report generation), all cultural resources were sorted first by facility, then by mean-sea-level elevation from highest to lowest. The data was then transferred to an Excel spreadsheet, which facilitates analysis and transfer to Word for this report.

1. Lake Tahoe

The table below shows maximum and minimum water elevations in wet, median, and dry hydrologic conditions under current conditions and the three alternatives. There is no difference in all alternatives under wet hydrologic conditions, and very little in median and dry hydrologic conditions. Elevation fluctuations under all alternatives remain constant and vary only minutely, less than a quarter-foot.

Alternative	Wet 10% high (msl)	Month(s) indicated 10% (water year)	Median (water year) (msl)	Dry 90% low (msl)	Month(s) indicated 90% (water year)	Fluctuation between 10/90 (ft)
Current	6229.00	6,7	6227.89	6222.75	12	6.25
No Action	6229.00	6,7	6227.57	6222.69	12	6.31
LWSA	6229.00	6,7	6227.57	6222.69	12	6.31
TROA	6229.00	6,7	6227.68	6222.66	12	6.34

As table CRA.2 shows, most of the cultural resources identified around Lake Tahoe are located well above the lake's maximum projected water elevation. Only those properties that fall near or under the lake's historic maximum water elevation of 6,229.69 feet would be affected under all alternatives. Properties with ** may be affected only on lower reaches approaching 6,229.69 feet. Additionally, the 18 properties listed at 6,230 feet msl could be subjected to wave-lapping action—depending on location—but only under the wettest of hydrologic conditions in early summer. Only two properties fall under the maximum water elevation, so they may be exposed in the median and driest months under all alternatives.

Thus, most cultural resource properties around the lake would not be affected under all alternatives and conditions, and the 33 that could be affected, only minimally.

Table CRA.2—Lake Tahoe

Site number	Short description	Elevation(s)	Affected, by alternative			
FS-05-19-14	Fishing camp	6530				
FS-05-19-661	Watson Creek 1928 concrete dam	6520				
FS-05-19-660	1928 Fulton's redwood water tank	6520				
FS-05-19-586	Two cabins	6520				
FS-05-19-667	Road/trail	6440-6680				
FS-05-19-659	1880s log cabin, canal, blacksmith shop, and dump	6440				
FS-05-19-653	Small dump, post 1920s	6400				
26-DO-8	Cave rock	6400				
FS-05-19-361	Trash dump/scatter	6380				
FS-05-19-366	Rock alignment	6360				
FS-05-19-15	Bedrock mortar	6360				
FS-05-19-363	Trash dump/scatter	6360				
FS-05-19-368	Trash dump/scatter	6360				
FS-05-19-666	Road/trail	6350-6640				
CA-PLA-128	Flake/lithic scatter	6320				
FS-05-19-364	Resort structure-foundation	6320				
FS-05-19-360	Trash dump/scatter-road trail	6320				
FS-05-19-362	Trash dump/scatter	6320				
FS-05-19-359	Trash dump/scatter	6320				
FS-05-19-365	Structure/foundation	6320				

Table CRA.2—Lake Tahoe

Site number	Short description	Elevation(s)	Affected, by alternative			
FS-05-19-356	Powerline	6310				
CA-ELD-548 (A&B)	3 bedrock milling features	6290-6300				
FS-05-19-654	1930s-1960s dump	6280-6320				
FS-05-19-655	Post-1913 dump	6280-6320				
FS-05-19-656	Post 1920s dump	6280-6320				
FS-05-19-657	Post 1920s dump	6280-6320				
FS-05-19-658	Post 1920s dump	6280-6320				
FS-05-19-652	Large dump, 1880s-1930s	6280-6320				
CA-PLA-707	Bedrock mortar	6280				
FS-05-19-675(H)	Logging site	6280				
FS-05-19-357	Trash dump/scatter	6280				
FS-05-19-587	Structure/foundation	6280				
26-DO-452	Zephyr Cove stables	6270				
FS-05-19-103	Historic homestead (Camp Richardson)	6260				
CA-ELD-71	Washoe Cemetery	6260				
CA-ELD-190	Trash/dump scatter	6260				
FS-05-19-301C	Unknown	6260				
26-OR-60	Structure/foundation	6260				
FS-05-19-482	Ditch/flume	6260				
CA-ELD-547 (A&B)	2 bedrock milling features	6250-6275				
FS-05-19-111	Tallac ditch flume	6250-6270				
P-9-53-H	Vikingsholm power house	6250				
FS-05-19-1	Bedrock mortar/slick	6250				
FS-05-17-57-17	Tahoe Tavern	6245				
CA-PLA-9	Beach campsite	6244<				
FS-05-19-585	Road	6240-6560				
CA-PLA-288	Seasonal hunting camp, basalt flakes, cores, point segment	6240<				
FS-05-19-6	Bedrock mortar	6240<				

Table CRA.2—Lake Tahoe

Site number	Short description	Elevation(s)	Affected, by alternative			
FS-05-19-43	Historic homestead	6240<				
CA-PLA-289	Obsidian flake and tool scatter	6240				
FS-05-19-674(H)	Trash dump/scatter	6240				
26-DO-408	Bedrock mortar	6240				
FS-05-19-358	Bedrock mortar	6240				
CA-PLA-11	Lithic isolate, scatter	6240				
CA-PLA-11	Lithic scatter-isolate	6240				
26-DO-451	Road/trail part of Lincoln Highway	6240				
FS-05-19-301A	Bedrock mortar	6240				
FS-05-19-16	Fishing camp	6240				
FS-05-19-13	Resting place	6240				
FS-05-19-17	Fishing camp	6240				
26-OR-61	Flake/lithic scatter	6240				
FS-05-19-301B	Bedrock mortar	6235-6240				
CA-PLA-13	Beach campsite, basalt proj. points	6235<				
CA-PLA-7	Flake/lithic scatter	6235				
CA-PLA-7	Flake/lithic scatter	6235				
CA-ELD-181	Flake/lithic scatter	6235				
K-14-177	Water wheel foundation	6235				
K-14-7	Ditch	6235				
26-DO-450	Zephyr Cove Resort	6235				
26-WA-2137	Flake/lithic scatter	6235				
CA-ELD-546	Lithic flake scatter with tools	6235				
Meeks Bay BRM	Single bedrock mortar	6235				
FS-05-19-111	Bedrock mortar/slick	6235				
FS-05-19-257	Structure/foundation	6235				
26-WA-1476	Flake/lithic scatter	6235				
FS-05-19-22	Bijou RR logging equipment/pier	6235				
FS-05-19-532	Road**	6230	C	N	L	T

Table CRA.2—Lake Tahoe

Site number	Short description	Elevation(s)	Affected, by alternative			
CA-ELD-184,179,180,195	Large prehistoric base camp, Tahoe and Taylor marsh**	6230-6280	C	N	L	T
FS-05-19-99(H)	Trash dump/scatter**	6230-6280	C	N	L	T
CA-ELD-188	Large diffuse historic trash dump, 1934 dam**	6230-6250	C	N	L	T
CA-PLA-40	Blackwood Indian site, wintering location**	6230-6240	C	N	L	T
CA-ELD-185	Unknown**	6230-6240	C	N	L	T
K-14-34	Old ditch**	6230-6240	C	N	L	T
K-14-24	Old RR bed**	6230-6240	C	N	L	T
CA-ELD-545-H	Diffused and concentrated historic artifact scatters**	6230-6240	C	N	L	T
CA-ELD-191	Trash dump/scatter**	6230-6235	C	N	L	T
FS-05-19-155	Tahoe Tavern: 14 features**	6230>	C	N	L	T
FS-05-19-157	Tahoe City - Truckee Road 1860s**	6230>	C	N	L	T
FS-05-19-106	Incline Railroad-cemetery**	6230>	C	N	L	T
CA-ELD-729	Bedrock mortar/slick	6230	C	N	L	T
FS-05-17-57-18	McKinney's Station	6230	C	N	L	T
FS-05-19-462(H)	Structure foundation	6230	C	N	L	T
FS-05-19-155	Tahoe Tavern: 14 features	6230	C	N	L	T
FS-05-19-156	Tahoe Tavern Road-Westshore Highway	6230	C	N	L	T
K-14-176	Water Powered Sawmill	6230	C	N	L	T
FS-05-19-268	Bedrock mortar	6230	C	N	L	T
26-DO-34	Probable location of mill	6230	C	N	L	T
P-9-52-H	Vikingsholm boat house foundations	6230	C	N	L	T
26-DO-4	Bedrock mortar/slick	6230	C	N	L	T
26-WA-38	Flake/lithic scatter	6230	C	N	L	T
26-WA-39	Isolate	6230	C	N	L	T
26-OR-63	Rock wall/feature	6230	C	N	L	T
26-OR-62	Flake/lithic scatter	6230	C	N	L	T
FS-05-19-353	Bedrock mortar	6230	C	N	L	T
CA-ELD-194	Historic log structure, well, and debris	6229-6240	C	N	L	T
CA-ELD-190	Stacked historic lumber	6229-6240	C	N	L	T

Table CRA.2—Lake Tahoe

Site number	Short description	Elevation(s)	Affected, by alternative			
CA-ELD-181	Small lithic site, debitage, and 1 Martis point	6229-6235	C	N	L	T
CA-PLA-718	Large, dense lithic scatter with tools	6226-6232	C	N	L	T
CA-ELD-739	Historic siltation and log barrier	6225-6230	C	N	L	T

2. Donner Lake

Much like its much larger Truckee River system neighbor to the southeast, there is no difference in Donner Lake's projected water elevations in all alternatives under wet late spring and early summer conditions and median conditions, and, unlike Tahoe, none under dry wintertime conditions.

Alternative	Wet 10% high (msl)	Month(s) indicated 10% (water year)	Median (water year) (msl)	Dry 90% low (msl)	Month(s) indicated 90% (water year)	Fluctuation between 10/90 (ft)
Current	5935.80	6,7	5931.33	5927.70	11-2	8.10
No Action	5935.80	5,6,7	5931.33	5927.70	11-2	8.10
LWSA	5935.80	5,6,7	5931.33	5927.70	11-2	8.10
TROA	5935.80	5,6,7	5931.42	5927.70	11-2	8.10

(11-2: Nov, Dec, Jan, Feb)

Table CRA.2—Donner Lake

Site number	Short description	Elevation(s)	Affected, by alternative			
CA-NEV-19	Basalt flakes, points	6000				
CA-NEV-12,13	Large area within Donner Memorial SP; includes several loci	5930-5960	C	N	L	T
CA-NEV-8	Dense, extensive flake and tool scatter, with house depressions	5860<	C	N	L	T

Of the three known cultural properties around Donner Lake that lie close to the water's edge, one, CA-NV-8, would lie well below the water elevation and never be exposed, while the lower reaches of the other, CA-NV-12 & -13, could be partially exposed in the driest part of the year, late fall through winter. Both would lie below the projected maximum elevation in wet late spring and early summer months. If any elements of CA-NEV-19 still exist (a 1991 report noted it as gone) it is well above the projected maximum lake elevations in all alternatives.

3. Independence Lake

As the most isolated facility on the Truckee River system, little cultural resource survey work has been accomplished. Model runs demonstrate no difference in projected water elevations under current conditions and the alternatives from late spring through summer in wet years, and less than two feet difference in median conditions and dry winter conditions. Fluctuation between the high/low water elevations, with the exception of TROA, is less than 5 feet. TROA would draw the reservoir down an additional 2 feet in mid-winter, so there is a chance some unrecorded cultural properties might be exposed during drawdown.

Generally, only three sites around the lake's perimeter would be affected under current conditions and all alternatives through submergence, while another lies far above the lake's projected maximum water elevation of 6949 feet under current conditions and all alternatives.

Alternative	Wet 10% high (msl)	Month(s) indicated 10% (water year)	Median (water year) (msl)	Dry 90% low (msl)	Month(s) indicated 90% (water year)	Fluctuation between 10/90 (ft)
Current	6948.87	6,7	6946.44	6943.94	11-1	4.93
No Action	6948.87	5,6,7,8	6946.43	6944.05	1	4.82
LWSA	6948.87	6,7,8	6946.43	6943.89	1	4.98
TROA	6948.87	6,7	6946.34	6942.44	1	6.43

Table CRA.2—Independence Lake

Site number	Short description	Elevation(s)	Affected, by alternative			
FS-05-17-56-116	Historic Basque Arborglyphs	6980				
FS-05-17-56-112	Basalt Flake Scatter	6880	C	N	L	T
CA-SIE-137	Historic water wheel w/Packard motor, debis, pipe, ditch, flume	6800-6840	C	N	L	T
CA-SIE-49	Temp camp: points, blades, knives, scrapers, glass, beads	6800	C	N	L	T

4. Stampede Reservoir

Model runs demonstrate no difference in projected water elevations under current conditions and the alternatives in mid-summer of wet years, and less than .10 foot difference in dry late winter month conditions between LWSA and No Action. TROA, however, would involve less drastic Stampede Reservoir releases during projected dry levels in early spring, thereby retaining more water and creating less fluctuation (nearly 50% less) between wet and dry, when compared to the other two alternatives and current conditions.

Alternative	Wet 10% high (msl)	Month(s) indicated 10% (water year)	Median (water year) (msl)	Dry 90% low (msl)	Month(s) indicated 90% (water year)	Fluctuation between 10/90 (ft)
Current	5948.77	7	5933.16	5824.33	2	124.44
No Action	5948.77	7	5933.38	5833.66	2	115.11
LWSA	5948.77	7	5933.69	5833.56	2	115.21
TROA	5948.77	7	5940.60	5884.25	3	64.52

Table CRA.2—Stampede Reservoir

Site number	Short description	Elevation(s)	Affected, by alternative			
CA-SIE-916	Prehistoric temp camp	6000				
FS-05-17-57-536	Prehistoric lithic scatter	6000				
FS-05-17-57-376	Milo’s Meadow site; lithic and historic trash scatter	5980-6000				
CA-SIE-888	Prehistoric scatter	5980				
CA-SIE-887	Dense prehistoric lithic scatter; sparse historic scatter	5960-6000				
CA-SIE-48 H&P	Ruins of dairy barn and house, cellar; lithic scatter and bedrock mortar	5960				
FS-05-17-57-535	Light lithic scatter	5960				
CA-SIE-889	Sparse flake and groundstone scatter	5950				
CA-SIE-181	Flaked tool scatter; groundstone, historic foundation**	5940-50	C	N	L	T
CA-SIE-890?	Prehistoric lithic scatter	5920-50	C	N	L	T
CA-SIE-880	Light scatter of basalt flakes	5920	C	N	L	T
CA-SIE-885	Prehistoric lithic scatter w/milling feature; historic occupation	5880-6000	C	N	L	T
CA-SIE-153	Hunting blind, lithic scatter and milling feature	5880<	C	N	L	
CA-SIE-11	Scatter of basalt flakes	5880	C	N	L	
CA-SIE-864	Lower Worn Mill	5880	C	N	L	
FS-05-17-57-377	Mysterious Descent site, lithic and historic trash scatters	5860-6000	C	N	L	
CA-SIE-47	Habitation site with points, scrapers, blades, rock features; large prehistoric occupation area	5860-5940	C	N	L	T?
CA-SIE-13	Basalt flake scatter	5840-5880	C	N	L	
CA-SIE-16	Basalt flake scatter	5840-5880	C	N	L	
CA-SIE-886	Moderate scatter of basalt flakes	5840	C	N	L	
CA-SIE-14	Basalt flake scatter	5800-40	C	N	L	
CA-SIE-15	Basalt flake scatter	5800-40	C	N	L	

CA-SIE-17	Temp camp; basalt flake scatter	5800	C	N	L	
CA-SIE-12	Light, extensive basalt flake scatter w/tools	5800	C	N	L	
CA-SIE-985	Boca & Loyalton RR segment	5700	C	N	L	
CA-SIE-914	Prehistoric temporary camp, bedrock milling location	5660-6000	C	N	L	T?

As the tables show, there are many known cultural resources recorded around the immediate perimeter of Stampede Reservoir, plus many others obviously recorded when the reservoir was drawn down to levels rarely witnessed. Those properties below the projected wet maximum elevation of just under 5,949 feet msl would be submerged under current conditions and the alternatives. Yet the dry exceedence level would vary impacts. If left under current conditions, LWSA, and No Action, many properties below 5,884 feet msl would be exposed and vulnerable part of the year. Under TROA, however, most of those properties would remain submerged and thus protected, due to less drastic fluctuations in water elevation. (T? indicates possible resource exposure at upper elevation reaches in the projected 90% dry exceedence level, TROA.)

5. Boca Reservoir

There is virtually no difference between current conditions and all alternatives for Boca Reservoir, in wet, median, or dry hydrologic conditions and projected elevation water elevations. The sole exception is TROA in late winter, which would retain more water, with less of a fluctuation between 10/90 exceedences, than the other three alternatives. This would allow any cultural resources that were exposed in the past when Boca Reservoir was drawn down to remain submerged and protected.

Alternative	Wet 10% high (msl)	Month(s) indicated 10% (water year)	Median (water year) (msl)	Dry 90% low (msl)	Month(s) indicated 90% (water year)	Fluctuation between 10/90 (ft)
Current	5605.07	5,6	5575.53	5521.48	1	83.59
No Action	5605.07	5,6	5573.93	5522.69	1	82.38
LWSA	5605.07	5,6	5573.93	5522.65	1	82.42
TROA	5605.07	5,6	5588.47	5531.11	2	73.96

Table CRA.2—Boca Reservoir

Site number	Short description	Elevation(s)	Affected, by alternative			
CA-NEV-28	Basalt flake/tool scatter	5720				
FS-05017-57-67	Boca bluff site: lithic scatter	5680				
FS-05017-57-175	Large lithic scatter with boulder metate; small historic concentration; structure remains/trash	5650>				
FS-05017-57-304	Basalt flake, tool scatter	5650				
FS-05017-57-305	Lithic scatter	5650				
CA-NEV-569H	Prehistoric lithic scatter and mano, historic structure remains	5640-80				
CA-NEV-80	Groundstone, flake, tool, and lithic scatter	5640				
FS-05017-57-302	Flake and tool scatter; groundstone	5640				
FS-05017-57-307	Flake, groundstone scatter	5620				
CA-NEV-454H	Historic trash and can scatter	5610-40				
CA-NEV-147	Lithic scatter**	5600-40	C	N	L	T
CA-NEV-83	Groundstone and lithic scatter**	5600>	C	N	L	T
CA-NEV-82	Groundstone and lithic scatter	5600<	C	N	L	T
CA-NEV-81	Large groundstone, lithic scatter w/12 concentrations	5600	C	N	L	T
CA-NEV-27	Basalt flake and tool scatter	5600	C	N	L	T
CA-NEV-26	Basalt tool and flake scatter	5520	C	N	L	T

Most recorded resources around Boca Reservoir fall well above the projected maximum elevation of just over 5,605 feet msl. The lower reaches of a couple resources, marked with **, could be subjected to wave lapping action at higher water elevations and exposure at lower water elevations, under all alternatives, in wet months. One, CA-NEV-26, would remain submerged even under the driest projected conditions.

6. Prosser Creek Reservoir

Much like the rest of the system, projected water elevations during the wet hydrologic conditions varies very little, about one foot less variance under LWSA. Yet, much like the other facilities on the tributaries, under TROA more water would be retained, thus creating less of a water elevation variance between wet and dry hydrologic conditions.

Alternative	Wet 10% high (msl)	Month(s) indicated 10% (water year)	Median (water year) (msl)	Dry 90% low (msl)	Month(s) indicated 90% (water year)	Fluctuation between 10/90 (ft)
Current	5741.13	6,7	5709.21	5664.49	11	76.64
No Action	5741.13	6,7,8	5712.54	5671.23	2	69.90
LWSA	5740.14	5	5712.53	5671.50	2	68.64
TROA	5741.13	6,7	5716.52	5694.83	2	46.30

Table CRA.2—Prosser Creek Reservoir

Site number	Short description	Elevation(s)	Affected, by alternative			
CA-NEV-56	Basalt flake scatter	5800>				
CA-NEV-61	Historic campsite, lithic scatter w/tools	5800<				
CA-NEV-57	Basalt flake scatter	5800				
CA-NEV-66	Extensive basalt spread	5800				
CA-NEV-67	Basalt flake scatter	5800				
CA-NEV-68	Basalt flake scatter	5800				
CA-NEV-71	Basalt flake scatter	5800				
	Segment: CA route, Overland Trail	5760-80				
FS-05-17-57-194	Small lithic scatter	5760-80				
CA-NEV-142	No description	5760-5800				
CA-NEV-58	Reputed Donner party campsite, basalt flakes/tools	5760-5800				
FS-05-17-57-194	Small prehistoric site	5760-5800				
CA-NEV-143	Lithic scatter	5760>				
CA-NEV-10	Basalt flakes/tooled fragments	5760				
CA-NEV-144	Lithic scatter	5760				
CA-NEV-702	Dancer: basalt/lithic scatters	5760				
CA-NEV-703	Six Arms: extensive basalt/lithic scatters	5760				
CA-NEV-704	Prancer: sparse lithic scatters	5760				
FS-05-17-57-607	Sparse basalt lithic scatter	5760				

Table CRA.2—Prosser Creek Reservoir

Site number	Short description	Elevation(s)	Affected, by alternative			
FS-05-17-57-609	Sparse lithic scatter; Chinese habitation site**	5740-60	C	N	L	T
CA-NEV-22	Campsite, basalt flakes/tools**	5720-60	C	N	L	T
FS-05-17-57-460	Extensive lithic scatter**	5720-60	C	N	L	T
FS-05-17-57-01	Donner camps; large prehistoric site**	5720-5840	C	N	L	T
CA-NEV-62, 63, 64	Temporary campsites w/basalt debris**	5720-5800	C	N	L	T
CA-NEV-23	Campsite. Lithic scatter	5720	C	N	L	T
CA-NEV-60	Basalt flake scatter	5720	C	N	L	T
CA-NEV-65	Basalt flakes, possible quarry	5720	C	N	L	T
FS-05-17-57-608	Extensive lithic scatter w/3 bedrock mortars	5700-800	C	N	L	T

Most resources around Prosser Creek Reservoir fall well above the projected maximum elevation of just over 5,741 feet. The lower reaches of five resources, marked with **, could be subjected to wave lapping action at higher water elevations and exposure at lower water elevations, under all alternatives, in wet and median months. In dry months, all recorded resources would be exposed if Prosser Creek Reservoir were drawn down to minimum projected water elevations under current conditions and all alternatives.

7. Pyramid Lake

Projected lake water elevations in wet and dry hydrologic conditions illustrate that although there are some variances, the difference in fluctuation in water elevation between wet/dry hydrologic conditions in current conditions and all three alternatives is just over one foot. TROA would allow slightly higher water elevations—the highest of all four conditions—in wet runoff early summer season. TROA would also allow Pyramid Lake to retain more water in dry winter months as well—less than ½ foot more than current conditions.

Alternative	Wet 10% high (msl)	Month(s) indicated 10% (water year)	Median (water year) (msl)	Dry 90% low (msl)	Month(s) indicated 90% (water year)	Fluctuation between 10/90 (ft)
Current	3851.88	6	3837.34	3822.05	12	29.83
No Action	3849.97	5	3835.04	3820.12	11	29.85
LWSA	3849.78	6	3834.68	3819.85	12	29.93
TROA	3853.33	6	3838.68	3822.48	12	30.85

Table CRA.2—Pyramid Lake

Site number	Short description	Elevation(s)	Affected, by alternative			
26-WA-949	No record	3900				
26-WA-948	No record	3900				
26-WA-946	No record	3890-4000				
26-WA-977	No record	3890				
26-WA-3397	Isolated flake	3890				
26-WA-3398	Two isolated flakes	3890				
26-WA-974	No record	3890				
26-WA-972	No record	3890				
26-WA-951	No record	3885				
26-WA-976	No record	3880-900				
26-WA-975	No record	3880-900				
26-WA-959	No record	3880-900				
26-WA-958	No record	3880-900				
26-WA-957	No record	3880-900				
26-WA-956	No record	3880-900				
26-WA-676	16 rock shelters, caves, stone-walled enclosures in tufa outcrop	3880				
26-WA-3400	Two isolated flakes	3880				
26-WA-3399	Isolated flake	3880				
26-WA-3401	Small lithic scatter	3880				
26-WA-945	No record	3880				
26-WA-619	Pictograph	3870-880				
26-WA-618	Pictograph	3870-880				
26-WA-617	Pictograph	3870-880				
26-WA-725	Rock shelter	3870				
26-WA-3402	Isolated flake	3870				
26-WA-950	No record	3870				
26-WA-947	No record	3870				
26-WA-166	Extensive habitation w/manos, metates, points	3860-80				
26-WA-775	Dense flake and groundstone scatter with 6 projectile points	3860-80				
26-WA-294	Series of sites with habitations and petroglyphs	3860-80				
26-WA-733	Small cave and scatter of ground and flaked stone	3860-3900				
26-WA-729	Rock shelter, wall, midden, cores, flakes, tools, petroglyph	3860-3900				
26-WA-973	No record	3860				
26-WA-967	No record	3860				
26-WA-299	U-shaped rock wall	3850	C			T
26-WA-165	Lithic scatter	3840-4100	C	N	L	T
26-WA-966	No record	3840	C	N	L	T
26-WA-968	No record	3830	C	N	L	T

Table CRA.2—Pyramid Lake

Site number	Short description	Elevation(s)	Affected, by alternative			
26-WA-934	No record	3820	C	N	L	T
26-WA-933	No record	3820	C	N	L	T
26-WA-932	No record	3820	C	N	L	T
26-WA-935	No record	3820	C	N	L	T
26-WA-936	No record	3820	C	N	L	T
26-WA-922	No record	3815	C	N	L	T
26-WA-26, -404, -7	2 adult male burial sites	3800-80	C	N	L	T
26-WA-85	Lithic scatter	3800<	C	N	L	T
26-WA-328	Fishing or possible burial site with cores, groundstone, sinkers, fragmentary human remains	3800	C	N	L	T
26-WA-PR08?	Isolated basket	3800	C	N	L	T
26-WA-1605	3 groups of exposed human remains	3795-98	C	N	L	T

As with other Truckee River facilities, many of the recorded cultural resources around Pyramid Lake fall well above the projected maximum elevation of 3,853 feet MSL under TROA in wet hydrologic conditions. One resource, 26-WA-299, is at the 3,850-foot level, and would only be impacted—barely so—under current conditions and TROA.

Most of the cultural resources around Pyramid Lake's perimeter, although "recorded" with site numbers, have no formal record, so it cannot be determined what these resources are. Many sites would remain submerged until dry winter months, when they could possibly be exposed. Under current conditions and TROA in winter, however, the minimum elevation of 3,822.48 feet msl would allow those five resources at 3,820 feet msl to remain submerged, whereas under LWSA and No Action these resources would risk exposure and possible erosive damage from wave-lapping action. All resources under the lowest project elevation, 3,819.85 feet msl (No Action in early winter) would remain covered.

8. Lahontan Reservoir

Lahontan Reservoir is part of what is known as the "secondary" study area, which comprises the reservoir proper and the Carson River valley downstream from Lahontan Dam. Much like most of the facilities on the Truckee River and its tributaries, there is no difference in reservoir water elevations under current conditions and all alternatives in wet and median hydrologic conditions, and less that a foot fluctuation between the three alternatives in dry hydrologic conditions. Yet the three alternatives illustrate greater fluctuation in water elevation than under current conditions; because of this, many cultural sites risk exposure due to these more pronounced fluctuations—about 7 to 8 feet more than under current conditions.

Alternative	Wet 10% high (msl)	Month(s) indicated 10% (water year)	Median (water year) (msl)	Dry 90% low (msl)	Month(s) indicated 90% (water year)	Fluctuation between 10/90 (ft)
Current	4163.50	4,5,6	4146.88	4113.00	10	50.05
No Action	4163.50	4,5,6	4146.47	4105.73	10	57.77
LWSA	4163.50	4,5,6	4146.47	4105.42	10	58.08
TROA	4163.50	4,5,6	4146.56	4106.12	10	57.38

Table CRA.2—Lahontan Reservoir

Site number	Short description	Elevation(s)	Affected, by alternative			
26-CH-1729	Float quarry w/lithic scatter	4320				
26-CH-371	Lahontan Reservoir Recon	4240				
26-CH-372	Lahontan Reservoir Recon	4230				
26-CH-1726,7,8	Material pit applications	4230				
26-CH-505	Prehistoric chert flake	4205				
26-CH-506	Open lithic scatter	4200				
26-CH-377	Lahontan Reservoir Recon	4200				
26-LY-241	Tufa petroglyphs	4190				
26-LY-239	Chert biface	4190				
26-LY-243	Obsidian flakes	4183				
26-CH-374	Lahontan Reservoir Recon	4180				
26-CH-375	Lahontan Reservoir Recon	4180				
26-LY-244	Obsidian projectile and chert flake	4180				
26-LY-245	Chalcedony and outrepasse flakes	4180				
26-LY-246	Stone artifacts	4180				
26-LY-24	Camp area, lithics	4180				
26-LY-27	Extensive petroglyphs**	4160-4320	C	N	L	T
26-CH-376	Lahontan Reservoir Recon**	4160-4200	C	N	L	T
26-CH-895	Historic trash and structures, Lahontan City site**	4160-4199	C	N	L	T
26-LY-238	Small metate	4160	C	N	L	T
26-LY-240	Core fragments	4160	C	N	L	T
26-LY-242	8 chert flakes	4160	C	N	L	T
26-LY-29	Metates and bone awl, buried camp site	4160	C	N	L	T
26-CH-132	Possible campsite	4150	C	N	L	T
26-LY-43	Clovis Point find	4130	C	N	L	T
26-LY-256	Historic trash remnants, stone foundations	4120	C	N	L	T

Table CRA.2—Lahontan Reservoir

Site number	Short description	Elevation(s)	Affected, by alternative			
26-LY-257	Historic trash remnants, stone foundations	4120	C	N	L	T
26-LY-258	Intense historic debris	4120	C	N	L	T
26-CH-373	Lahontan Reservoir Recon	4100	C	N	L	T

Most of the recorded cultural resources around Lahontan Reservoir's perimeter fall above the maximum projected water elevation of 4,163.5 feet msl under current conditions and all three alternatives. Three resources marked ** might be subjected to wave-lapping action and exposure at these elevations. In dry months under current conditions and all three alternatives, all affected cultural properties would be exposed. One resource, 26-CH-373, would remain submerged year-round, despite pronounced reservoir fluctuations. Most of the recording of Lahontan's cultural sites occurred in the mid-1970s, when the reservoir was drawn down to record low levels (below 4,100 feet msl) thus allowing extensive reconnaissance and recording.

Nevertheless, the three alternatives offer no clear-cut advantage over current conditions here, and may contribute to the exposure of prehistoric sites due to the greater wet/dry fluctuation levels the three alternatives offer. Of the three, TROA offers the least fluctuation between wet/dry hydrologic conditions, but not much—less that ¾ foot when compared to LWSA and No Action.

IV. Section IIB: Cultural Resource Tables

A. River Reaches and Stretches: California

Unlike analyzing reservoirs for impacts on cultural resources, doing the same with river reaches is much less precise due to severe methodological limitations of data collection and interpretation. Since it is nearly impossible to precisely translate and integrate a vertical condition like flow into another vertical condition like elevation for analysis (elevation of maximum flows in reaches), most of what follows is based on speculation tied into the best possible estimates of impacts.

1. Tahoe Release (Tahoe Dam to Donner Creek)

The maximum flow given on the rating table for the USGS gauge immediately downstream from Lake Tahoe is 114 cfs. Therefore the 10-percent exceedence maximum mean monthly flow of 1,494 cfs for all alternatives could not be straightforwardly converted to elevation. If the flow were the same each day of the month, the daily flow would be 53 cfs. Based on this, the need to control downstream flooding, and recent historical operation, a flow of 75 cfs per day was selected as a reasonable base for analysis. Thus, at 75cfs, the water surface elevation would be 3 ½ above 0 gauge elevation, or 6220 feet msl at the upper end and 5862 feet msl at the lower end near Donner Creek.

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 10% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	1494	2	177	0	11,12,1
No Action	1494	2	178	0	10,11,12,1
LWSA	1494	2	178	0	10,11,12,1
TROA	1494	2	178	0	10,11,12,1

Table CRA.2—Tahoe release

Site number	Short description	Elevation(s)	Affected, by alternative			
CA-PLA-156	Lithic scatter; bedrock grinding stone	6400				
FS-05-17-57-645	Deep Distance: extensive prehistoric basalt lithic scatter	6400				
FS-05-19-837	1930s Hobo Camp-cans, glass, fire rings	6240				
CA-PLA-25	Campsite, lithic scatter, Bear Creek site: bedrock mortars	6200-6300				
CA-PLA-886	Grandma's Bedspread: basalt flakes/projections	6200				

Table CRA.2—Tahoe release

Site number	Short description	Elevation(s)	Affected, by alternative			
CA-PLA-736	Flake scatter	6200				
FS-05-17-57-275	Prehistoric diffuse lithic scatter over large area	6200	C	N	L	T
CA-PLA-226	Basalt lithic scatter	6180				
CA-PLA-23	Lithic scatter w/chert, obsidian, bedrock grinding stone	6140-6180	C	N	L	T
CA-PLA-164	Large lithic scatter, basalt w/tools, point and debris	6140				
CA-PLA-165	Lithic scatter w/tools, debris	6140				
CA-PLA-166	Light lithic scatter and historic rock ring hearth	6120-6140				
CA-PLA-163	Basalt scatter on knoll	6120-6140				
FS-05-17-57-52	Historic: associate with Truckee-Tahoe RR	6110-6160				
FS-05-17-57-461	Historic dumpsite (1920s-1940s)	6110				
FS-05-17-57-643	Midway Tip: can dump-assorted debris	6100-6400				
FS-05-17-57-642	Herringtonville: earthern depression/possible cabin flat/assorted debris	6100-6400				
FS-05-17-57-485	Prehistoric lithic scatter	6100				
FS-05-17-57-431	Prehistoric small basalt flake scatter; historic rock wall	6080				
CA-PLA-162	Prehistoric bedrock mortar; scatter of lithics; historic trash	6075				
CA-PLA-150	Large lithic scatter: flakes, points, debris	6040-80				
CA-PLA-149	Prehistoric extensive lithic scatter; historic mining adit	6040-6120				
FS-05-17-57-276	Large basalt and obsidian flake scatter	6040-6120				
FS-05-17-57-007	Knoxville, 1863 mining site	6040-6080				
FS-05-17-57-235	Prehistoric lithic scatter	6030				
CA-PLA-22	Prehistoric camp w/basalt	6020				
FS-05-17-245	Historic log flume	6000-6200				
CA-PLA-152	Lithic scatter, chert, obsidian	6000-6040	C	N	L	T
CA-PLA-8	Prehistoric camp w/basalt debris, points and groundstone	6000<				
FS-05-17-57-279	No record	5980				
FS-05-17-57-278	No record	5980				
CA-PLA-153	Prehistoric basalt scatter, square nail, bottle glass	5960<				
CA-PLA-154	Basalt flake scatter	5960				
CA-PLA-21	Camp w/basalt flakes	5920-5960				
CA-PLA-155	Basalt flakes and point fragment; mano and metate fragments	5920<	C	N	L	T
FS-05-17-57-52	Historic RR grade	5880-6160				

Table CRA.2—Tahoe release

Site number	Short description	Elevation(s)	Affected, by alternative			
FS-05-17-57-296	Historic Basque arborglyphs	5880				
CA-PLA-151	Basalt flake scatter	5853				
CA-PLA-157	Isolated bedrock mortar; E. Truckee River bedrock mortar	5840-80				
FS-05-17-57-331	Mary’s site: large basalt lithic scatter	5840				
CA-PLA-27	Lithic scatter, bedrock grinding stone, possible base camp	5800-6060	C	N	L	T
FS-05-17-57-647	The Duck Stops Here: various historic artifacts	5500				
TTSA-HS4	Logging dam, possible mill site	5000-5040				

Five known sites within the primary area might be submerged by flows under current conditions and all alternatives: CA-PLA-23 and -27, whose plotted lower ends reach to or near the river’s edge; CA-PLA-155, plotted just above the river; and CA-PLA-152 and FS 05-17-57-275. Lower flows would likely not impact these sites.

2. Donner Release (Donner Dam to Truckee River)

As the table shows, at 10-percent wet maximum flow levels of 141 cfs in late spring, there is no projected difference between current conditions and the all alternatives.

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 10% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	141	5	35	2	6,7,8
No Action	141	5	35	2	6,7,8
LWSA	141	5	35	2	6,7,8
TROA	141	5	34	3	6,7,8

Table CRA.2—Donner release

Site number	Short description	Elevation(s)	Affected, by alternative			
CA-NEV-199	Midden w/basalt & obsidian flakes	5960				
CA-NEV-198	Prehistoric midden w/basalt and obsidian flakes	5960				
P-29-1123	Gradner Point: Projectile	5920				
CA-NEV-9	Large campsite: basalt tool fragments and flakes	5920				

The gauge height for the USGS gauge located .2 mile below Donner Dam is 5924 feet. Elevations for two of the four sites recorded along this reach downstream from Donner Memorial State Historic Park and downstream from the confluence of Cold Creek are given as 5960 feet. One of these, CA-NEV-199, and CA-NEV-9 (at 5920 feet) have been excavated and require no further consideration. Both of the two remaining sites are above the maximum Donner flow elevation and would not be affected.

3. Truckee River: Donner Creek to State Line (Donner-Boca Stretches Combined)

With one exception (a flume), all recorded cultural resource sites in this reach are located upstream from the Truckee /Little Truckee confluence. For analysis purposes, the elevation at the upstream end of the reach at Donner Creek is at 5840 feet msl, while the downstream end of the reach at the CA/NV state line is at 5040 feet msl. The Prosser gauge, located one mile upstream from the Prosser Creek/Truckee confluence (elevation 0 = 5602 feet msl) was also used to establish river elevations, mostly at mid-reach.

Donner (Donner Creek to Little Truckee River)

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 10% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	1652	2	336	23	10
No Action	1645	2	337	29	10
LWSA	1645	2	337	31	10
TROA	1652	2	333	34	12

Boca (Little Truckee River to State Line)

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 10% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	3329	5	657	162	11
No Action	3265	5	641	168	11
LWSA	3264	5	641	168	11
TROA	3405	5	628	163	11

Table CRA.2—Truckee-Donner/Boca

Site number	Short description	Elevation(s)	Affected, by alternative			
P-29-1230H	Historic RR Grade	5840-5860				
CA-NEV-74	Washoe camp	5840				
CA-NEV-178 FS-05-17-57-46	Historic logging dam and mill site; large basalt flake scatter	5817-5824	C	N	L	T
FS-05-17-57-24	Donner Creek (Prehistoric) Indian Site	5800	C	N	L	T
P-29-1231	Milling station	5800				
CA-NEV-849H	Industrial Site: Truckee Lumber Co. incinerator	5800				
CA-NEV-850H	Trash/lithic scatters	5800				
CA-NEV-851H	Historic Chinese campsite	5760-5800				
CA-NEV-29	Prehistoric camp w/basalt tools and flakes	5760				
CA-NEV-179	basalt flake scatter and tool fragments	5750-5760				
CA-NEV-179	Basalt flake and tool scatter	5750-5760				
P-29-1198, -1208H	Basalt biface thing flake, debris dump	5750				
CA-NEV-180	Basalt flake and tool scatter	5734				
CA-NEV-531H	Shallow middin w/aboriginal, Euroamerican component	5730				
CA-NEV-181	Possible campsite, lithic scatter w/obsidian, basalt and jasper	5706-5720				
CA-NEV-77	Campsite w/house rings, flakes, and points	5700				
FS-05-17-57-74	Three charcoal kilns	5700				
	Tahoe Ice Company	5680				
CA-NEV-182	Basalt flakes, tool fragments	5676				
FS-05-17-59-69	Martis Ice Dam: dry laid rock dam and ditch w/trash	5670				
FS-05-17-57-569	Several basalt flakes, historic bridges	5650				
CA-NEV-183	Basalt flakes, tool fragments	5640				
CA-NEV-555H	Historic bridge/culvert survey	5600-5900				
CA-NEV-600H	Boca Townsite/Brewery	5600				
CA-NEV-710H	Flume, historic debris	5300				
	Farad Powerhouse facility	5200				

Two cultural resources have elevations near the estimated river elevation at their locations and could be inundated by projected maximum mean flows under all alternatives. These are CA-NEV-178 and FS-05-17-57-24 (at 5800 feet msl). Other sites such as CA-NEV-531H and TTSA-HS4 (unrecorded logging dam site) are plotted near the river, but do not appear to lie within maximum projected surface levels. The Boca Brewery site, near Boca Townsite, would not be impacted by these flows.

4. Independence Release/LTR (Independence Creek and Little Truckee River to Stampede Reservoir)

There is virtually no difference in modeled release projections between current conditions and all three alternatives for Independence Creek and the Little Truckee River. TROA would involve slightly less (2 cfs) water in early summer.

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 10% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	105	6	22	2	11,2,7,8,9
No Action	105	6	22	2	11,2,6,7,8
LWSA	105	6	22	2	2,7,8,9,11
TROA	103	6	22	2	2,3

Table CRA.2—Indy release/LTR

Site number	Short description	Elevation	Affected, by alternative			
CA-SIE-133	Basalt flake scatter	6640				
CA-SIE-131	Basalt flake scatter	6560-6600				
CA-SIE-371H	Hobart Estates Co. RR logging system	6400-6520	C	N	L	T
CA-SIE-134	Hobart Estates Co. RR logging system	6400-6520	C	N	L	T
CA-SIE-1124	Prehistoric site	6395				
46-001324, -25, 29	NHD THP Sites 2, 4, 9	6230-6400				
CA-SIE-1322	Historic site (Little Truckee River) berm	?				

Efforts to determine the elevation of the maximum flow through this reach (105 cfs at the 10 percent exceedence level for June under current conditions, LWSA and No Action, and 103 cfs under TROA) were not useful. With only one gaging station located .4 mile downstream from the dam and considerable drop in elevation along the reach, perhaps with small falls, no estimate of elevation of the flow at the location of the seven cultural resource sites can reasonably be made. The two historic sites (water wheel and logging camp) were undoubtedly placed to take advantage of the creek flows and some features would reasonably be at the edge of or in the water. The purposes and exact relationship of the prehistoric sites to the creek are unknown.

5. Stampede Release (Stampede Dam to Boca Reservoir)

Model runs for the Little Truckee River between Stampede Dam and Boca Reservoir indicate that late spring releases under TROA are 82 cfs higher than under the other two alternatives, and only 63 cfs higher than under current conditions. The elevation for the maximum 973 cfs flow under TROA in very wet hydrologic conditions is estimated at 5621 feet msl for the gauge located 1 mile upstream of Boca Reservoir and projected to the up and downstream section on the reach.

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 10% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	910	5	157	30	10-2,6,8,9
No Action	891	5	156	30	10-2,6,8,9
LWSA	891	5	156	30	8 thru 2
TROA	973	5	144	38	1

Table CRA.2—Stampede release

Site number	Short description	Elevation(s)	Affected, by alternative			
CA-NEV-152	Unknown, no description	5800				
CA-NEV-151	Unknown, no description	5760				
CA-SIE-409H	Historic settlement, foundations, RR bed, historic trash dump	5720-60				
FS-05-17-57-010	Segment: CA Route, Overland Trail	5720				
CA-SIE-891	Sparse lithic scatter	5710				
CA-NEV-119	Flake tools, groundstone, lithic and tool scatter	5700-5810				
CA-SIE-892	Sparse lithic scatter	5700				
FS-05-17-57-556	Flake and groundstone scatter; historic trash	5680				
FS-05-17-57-557	Dense flake and tool scatter; historic can scatter	5680				
Reclamation-98-13	Little Truckee River weir	5660				
FS-05-17-57-61	Large prehistoric site under historic sawmill, houses	5640-5720				

Based on the projected river flow elevation outlined above, it is believed that no cultural resources recorded on this stretch would be affected under current conditions or the three alternatives.

6. Prosser Release (Prosser Creek Dam to Truckee River)

Projected releases under very wet hydrologic conditions in all alternatives vary so little that impacts to cultural resources, if any, would be negligible. Additionally, as no firm site locations are recorded for the reach, no discussion of impacts can be included.

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 90% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	510	5	85	5	4,8,9
No Action	510	5	84	5	4,7,8,9
LWSA	510	5	84	5	4,7,8,9
TROA	512	5	79	7	4

B. Truckee River Reaches and Stretches: Nevada

1. Truckee River: CA/NV State Line to E. McCarran Boulevard, Reno (Trophy/ Mayberry/ Oxbow/ Spice Stretches Combined)

To facilitate analysis, the four Truckee River reaches that run from the CA/NV state line to East McCarran Boulevard were combined into one stretch. Projected model runs for wet hydrologic conditions show that more water (3345 cfs at Trophy to 3242 cfs at Spice) would flow through these reaches under TROA in late spring than under current conditions and the other two alternatives, but not by much.

Trophy (State Line to 3.2 miles downstream)

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 10% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	3216	5	637	162	11
No Action	3147	5	632	178	11
LWSA	3147	5	632	177	11
TROA	3345	5	626	171	11

Mayberry (to Hunter Creek)

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 10% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	3194	5	622	159	11
No Action	3107	5	604	157	11
LWSA	3107	5	603	155	11
TROA	3299	5	598	152	11

Oxbow (Hunter Creek to U.S. 395)

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 10% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	3096	5	571	147	10
No Action	3038	5	539	110	11
LWSA	3038	5	538	109	11
TROA	3242	5	544	108	11

Spice (U.S. 395 to E. McCarran Blvd)

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 10% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	3062	5	544	120	9
No Action	2965	5	491	83	11
LWSA	2964	5	489	82	11
TROA	3175	5	501	81	11

Table CRA.2—State line/E. McCarran

Site number	Short description	Elevation(s)	Affected, by alternative			
SP-1	Chinese rice bowl fragments	5010				
SP-2	Lithic scatter	5000>				
26-WA-1409	Possible shelter with groundstone	4960				
26-WA-154	Campsite w/basalt fragments	4920				
CR-NV-03-1077	Lithic scatter	4920				
SH-11-1	Isolate: biface fragment	4920				

Table CRA.2—State line/E. McCarran

Site number	Short description	Elevation(s)	Affected, by alternative			
26-WA-1411	Campsite, lithic scatter, groundstone	4920				
26-WA-105	Mile long lithic scatter, bedrock mortar	4900	C			T
TY-123	Verdi Lumber Co.	4900				
26-WA-1406	Petroglyph associated with 1410	4880-4920				
26-WA-1410	Bedrock metate; historic stone wall	4860				
26-WA-1412	Bedrock metates	4840				
26-WA-1407	Bedrock mortar, metate, possible shelter	4820	C			T
26-WA-5442	Buried mortar on boulder, flakes, metate, historic lumber scatter	4800				
26-WA-5240	Petroglyph boulder, possible metate slick	4760				
26-WA-2157	Prehistoric site	4760				
26-WA-5440	Historic complex, w/foundations, debris	4760				
26-WA-5211	Historic corral and rock features	4760				
26-WA-5441	Last Chance irrigation ditch (1876)	4760				
26-WA-5408	One milling slick	4760				
26-WA-2156	bedrock milling features	4760				
26-WA-2155	Large lithic scatter	4720>				
26-WA-5439	Lite lithic scatter w/groundstone, possible historic log camp	4720				
26-WA-5359	5 bedrock metates; mortars	4720				
26-WA-5407	10 bedrock milling features	4680				
26-WA-5358	Bedrock metates	4660	C			T
26-WA-5357	Prehistoric isolate: mano	4660	C			T
26-WA-3406	Lake irrigation ditch	4560				
26-WA-4584	Jameson’s Station remnants	4520				
26-WA-5356	Modern and historic foundations, trash scatter	4420				
26-WA-5445	Diversion for Pioneer Ditch	4402				
26-WA-5348	Lithic/groundstone scatter, possible Washoe site	4400				
26-WA-148	Washoe Village site	4400				
26-WA-5352	Orr irrigation ditch	4400				
26-WA-5234	Highland irrigation ditch	4400				

There is a possibility, but no recorded evidence, that model flows under current conditions and TROA may affect four cultural resource sites, but much of this depends on the sites’ exact location in relation to the river’s high flow line, which cannot be accurately determined beyond approximately 4810-4900 feet msl and 4662 feet msl, respectively. These sites are

26-WA-105 and 26-WA-1407 (both near Verdi), and 26-WA-5357 and 26-WA-5358, (both near Mogul) which are plotted near the river.

2. Truckee River: Lockwood (E McCarran Blvd to Derby Diversion Dam)

Much like the other Nevada Truckee River stretches, projected model runs demonstrate that TROA would allow greater river flows in late spring than Current Conditions or any other alternative. Projected model runs for TROA would allow a flow 100 cfs greater in late spring than under current conditions, and 172 cfs more than under No Action or LWSA.

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 10% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	3164	5	642	182	10
No Action	3092	5	614	180	10
LWSA	3092	5	612	177	10
TROA	3264	5	621	183	11

Table CRA.2—Lockwood

Site number	Short description	Elevation(s)	Affected, by alternative			
26-WA-4585	Dense lithic scatter, shell, groundstone	4520				
26-WA-5216	RR temporary camp; historic debris	4420				
26-WA-2679	Small lithic workshop	4400				
CR-NV-03-1476	Town of Clark	4400				
26-WA-1601	Pictograph; lithics and groundstone	4380				
26-WA-3638	Diffuse lithic scatter, historic debris	4370				
CR-NV-03-1653	Town of Derby	4350				
26-ST-82	Large lithic scatter w/shell	4350	C			T
26-ST-197	Small flake scatter	4350				
26-ST-84	Flake and groundstone scatter, fire rock, mano and metate fragments	4330				
26-ST-196	Small and sparse lithic scatter	4330				
CR-NV-03-1726	Town of Patrick	4310				
26-ST-83	Historic debris	4298	C			T
26-ST-27	Extensive lithic scatter; quarry	4280-4320				
26-ST-193	Very large, sparse lithic scatter	4280				
26-ST-194	Lithic debris, metate and mano fragments	4280				

Table CRA.2—Lockwood

Site number	Short description	Elevation(s)	Affected, by alternative			
26-ST-195	Lithic debris, shell, metate fragments	4280				
26-ST-191	Dense concentrations of lithic debris and fire cracked rock	4270				
26-ST-192	Light lithic scatter, shell, metates, tools inc Rosegate Point	4265				
26-ST-5	Campsite	4250-4300				
26-ST-190	Sparse lithic scatter	4250				
26-WA-5214	Chert and obsidian flake and tool scatter, w/mano and shell	4215	C			T
26-WA-4586	Isolated chert flake	4215	C			T

Based on known cultural resource information, there is a low probability that four sites are currently being impacted by these maximum flows under Current Conditions and could be impacted under TROA, but not under No Action or LWS alternatives. The lower portion of sites 26-ST-82 and -83, both reported as being partially destroyed by gravel operations, may lie below the maximum flow elevations of 4355 and 4295 feet, respectively. Near Derby Diversion Dam, 26-WA-4586 and 26-WA-5214 (reported as disturbed) are two sites near the current and projected maximum flow elevations of 4220 feet that may be affected.

3. Truckee River: Derby Diversion Dam to Truckee River Delta (S Bar S/Nixon Stretches Combined)

Again, to streamline analysis, the two Truckee River stretches from Derby Diversion Dam to Marble Bluff Dam were combined. As the table shows, much more water would flow down the Truckee River under TROA in wet hydrologic conditions, nearly 170 cfs more in late spring than under current conditions, and slightly more than under No Action and LWSA. Projected model TROA flows could impact a handful of cultural resource sites located near the river, but as in other stretches, the precise location of these sites in relation to the river's maximum flow cannot be accurately determined.

Alternative	Wet 10% high (cfs) (used for analysis)	Month(s) indicated 10% (water year)	Median (water year) (cfs)	Dry 90% low (cfs)	Month(s) indicated 90% (water year)
Current	3095	5	580	71	2
No Action	3055	5	563	90	12
LWSA	3054	5	561	67	2
TROA	3264	5	284	90	11

Table CRA.2—Derby/Truckee River Delta

Site number	Short description	Elevation(s)	Affected, by alternative			
26-WA-2992	Unknown	4230				
26-WA-5213	Adoth town site, chisled stone foundations	4180	C ?			T ?
26-WA-5215	Small historic trash dump; hole in cap can fragments	4160				
26-WA-2680	Lithic scatter	4000				
26-WA-2984	No record	3980				
26-WA-2685	No record	3980				
26-WA-3074	No record	3910				
26-WA-3073	No record	3910				
26-WA-1016	Shaman burial; zoomorphs, CA trade beads	3880				
26-WA-1018	No record	3875				
26-WA-1019	Burial/habitation site	3872				
26-WA-1014	Burial/habitation site	3870				

Of the 12 sites, six are unrecorded, so it is impossible to know precisely what these sites are and their location. Only the Adoth townsite, 26-WA-5213, appears to lie just below the projected high flow elevation of 4185 feet msl and might be partially inundated under current conditions and TROA; however, there is no evidence of flooding reported with the site information.

C. Miscellaneous Tables

Table CRA.3 (A).—California Properties listed on the National Register of Historic Places within the Area of Potential Effect for the revised DEIS/EIR

Site name/description	National Register status	Year of decision National Register	County
Boca Dam	Listed, Newlands Project	1981	Nevada
Donner Camp 2.6 miles W. of Truckee on U.S. 40	Listed	1966	Nevada
Kruger House (aka C.B. White's) 10292 Donner Pass Road	Listed	1982	Nevada
Lake Tahoe Dam Outlet Gates and Gatekeeper's Cabin Tahoe City	Listed	1972	Placer
Lake Tahoe Dam Tahoe City	Listed, Newlands Project	1981	Placer

Table CRA.3 (A).—California Properties listed on the National Register of Historic Places within the Area of Potential Effect for the revised DEIS/EIR

Site name/description	National Register status	Year of decision National Register	County
Sardine Valley Archeological Site Truckee	Listed	1971	Sierra
Stampede Site Verdi	Listed	1971	Sierra
Watson Log Cabin Tahoe City	Listed	1979	Placer

Table CRA.3 (B).—Nevada Properties listed on the National Register of Historic Places within the Area of Potential Effect (primary and secondary) for the revised DEIS/EIR

Site name/description	National Register status	Year of decision National Register	County
1872 California-Nevada State Marker, NW of Verdi	Listed	1981	Washoe
W.E. Barnard House 950 Joaquin Miller Dr, Reno	Listed	2002	Washoe
Bethel AME Church 220 Bell St.	Listed	2001	Washoe
B.D. Billinghurst House 729 Evans Ave., Reno	Listed	1974	Washoe
Peleg Brown Ranch 12495 Old Virginia Road, Reno	Listed	1994	Washoe
Charles Burke House 36 Steward St., Reno	Listed	1984	Washoe
Cal-Vada Lodge Hotel Stateline Rd and NV 28, Crystal Bay	Listed	1994	Washoe
California Building 1000 Cowan Dr., Idlewild Park	Listed	1992	Washoe
Carson River Diversion Dam	Listed, Newlands Project	1981	Churchill
Churchill County Jail 10 W. Williams Ave., Fallon	Listed	2002	Churchill
Churchill County Courthouse 10 W. Willams Ave., Fallon	Listed	1992	Churchill
Clifford House 339 Ralston St., Reno	Listed	1983	Washoe
Derby Diversion Dam	Listed, Newlands	1978	Storey

Table CRA.3 (B).—Nevada Properties listed on the National Register of Historic Places within the Area of Potential Effect (primary and secondary) for the revised DEIS/EIR

Site name/description	National Register status	Year of decision National Register	County
	Project		
Robert Douglass House 10 S. Carson St., Fallon	Listed	2001	Churchill
El Cortez Hotel 239 West Second, Reno	Listed	1984	Washoe
First Church of Christ, Scientist W 1st and West St., Reno	Listed	1999	Washoe
First United Methodist Church West 1st and West St., Reno	Listed	1983	Washoe
Fleishmann Atmospherium Planetarium, University of Nevada, Reno (hereafter UNR)	Listed	1994	Washoe
Fort Churchill U.S. 95A 8 miles S. of U.S. 50	Listed	1966	Lyon
Fort Churchill and Sand Springs Toll Road	Listed	1997	Churchill
Frankovich House 557 Washington St.	Listed	1983	Washoe
Frey Ranch 1140 W. Peckham Lane, Reno	Listed	1999	Washoe
Lake Shore House Glenbrook Rd., Glenbrook	Listed	1979	Douglas
Lena Gale Cabin 726 Cedar, Zephyr Cove	Listed	2001	Douglas
Joseph Giraud House 442 Flint St., Reno	Listed	1984	Washoe
Glendale School S. Virginia and Kietzke Lane, Reno	Listed	1978	Washoe
William Graham House 548 California Ave., Reno	Listed	1983	Washoe
Joseph H. Gray House 457 Court St., Reno	Listed	1987	Washoe
Greystone Castle 970 Joaquin Miller Dr. , Reno	Listed	2002	Washoe

Table CRA.3 (B).—Nevada Properties listed on the National Register of Historic Places within the Area of Potential Effect (primary and secondary) for the revised DEIS/EIR

Site name/description	National Register status	Year of decision National Register	County
Grimes Point	Listed	1972	Churchill
Harmon School Kirn and Harmon Rds., Fallon	Listed	1989	Churchill
Hawkins House 549 Court, Reno	Listed	1979	Washoe
Hazen Store 600 Reno Highway, Hazen	Listed	2002	Churchill
Humphrey House 476 Ralston St., Reno	Listed	1983	Washoe
Immaculate Conception Church 590 Pyramid Way, Sparks	Listed	1992	Washoe
Lahontan Dam and Power Station	Listed, Newlands Project	1981	Churchill
Lake Mansion U.S. 395 next to Centennial Coliseum, Reno	Listed	1972	Washoe
Landrum's Hamburger System #1 1300 S. Virginia St., Reno	Listed	1998	Washoe
Levy House 111-121 California Ave., Reno	Listed	1983	Washoe
MacKay School of Mines Bldg. UNR	Listed	1982	Washoe
McCarthy-Platt House 1000 Plumas Dr., Reno	Listed	1984	Washoe
McKinley Park School, Riverside Drive and Keystone, Reno	Listed	1985	Washoe
Morrill Hall, UNR	Listed	1974	Washoe
Mount Rose Elementary School 915 Lander St., Reno	Listed	1977	Washoe
Nevada-California-Oregon Railroad Depot 325 E. 4th St., Reno	Listed	1980	Washoe
Nevada-California-Oregon Railroad Locomotive House and Machine Shop 401 E. 4th St., Reno	Listed	1983	Washoe

Table CRA.3 (B).—Nevada Properties listed on the National Register of Historic Places within the Area of Potential Effect (primary and secondary) for the revised DEIS/EIR

Site name/description	National Register status	Year of decision National Register	County
Senator Francis G. Newlands House 17 Elm Ct., Reno	Listed	1966	Washoe
Nortonia Boarding House 150 Ridge St., Reno	Listed	1983	Washoe
Nystrom Guest House 333 Ralston St., Reno	Listed	2000	Washoe
Oats Park Grammar School 167 E. Park, Fallon	Listed	1990	Churchill
Peavine Ranch 11220 N. Virginia St., Reno	Listed	2000	Washoe
Pincolini Hotel 214 Lake St., Reno	Listed	1984	Washoe
Rainier Brewing Company Bottling Plant 310 Spokane, Reno	Listed	1980	Washoe
Reno National Bank-First Interstate Bank 204 N. Virginia St., Reno	Listed	1986	Washoe
Reno Downtown Station (Post Office) 50 S. Virginia St., Reno	Listed , Nevada PO MPS	1990	Washoe
Riverside Hotel 17 S. Virginia St., Reno	Listed	1986	Washoe
Sand Springs Station	Listed	1980	Churchill
Southside School 190 E. Liberty, Reno	Listed	1993	Washoe
Stillwater Marsh	Listed	1975	Churchill
Twaddle Mansion 485 W. 5th, Reno	Listed	1983	Washoe
Tyson House 242 W. Liberty, Reno	Listed	1983	Washoe
University of Nevada Reno Historic District	Listed	1987	Washoe
Vachina-California Apartments 45 California Ave.	Listed	1986	Washoe
Veteran's Memorial School 1200 Locust St.	Listed	1995	Washoe

Table CRA.3 (B).—Nevada Properties listed on the National Register of Historic Places within the Area of Potential Effect (primary and secondary) for the revised DEIS/EIR

Site name/description	National Register status	Year of decision National Register	County
Virginia Street Bridge Over Truckee River	Listed	1980	Washoe
Washoe County Court House 117 S. Virginia St., Reno	Listed	1986	Washoe
Washoe County Library, Sparks Branch 814 Victorian Ave., Sparks	Listed	1992	Washoe
Whittell Estate 5000 NV 28, Incline Village	Listed	2000	Washoe
Withers Log House 344 Wassou, Crystal Bay	Listed	2000	Washoe

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