Chapter 2 Watershed Heritage and Human Influences

Chapter 2 establishes a historical context for understanding how we got to the current conditions in the watershed, as described in Chapter 3. This chapter discusses how past and present human activities and communities are tied to and have influenced or altered the resources in the watershed.

2.1 Native American Heritage and Influences

This section of Chapter 2 discusses the historic Native American territories and tribes that occupied the Upper Sacramento River watershed, and how Native American activities have influenced the natural resources and landscape in the watershed.

2.1.1 Prehistory

The upper Sacramento River watershed lies at the convergence of the Klamath Mountains, Cascade Range, and Great Valley physiographic provinces and is composed of several vegetation and zoological life zones (U.S. Geological Survey 2007). Prehistorically, several climate shifts created a varied landscape in the watershed. West (1989) describes a warmer and drier climate before 3,500 years before present (B.P.) creating a "richer, more productive resource base" in the higher elevations above the Sacramento River Canyon (West 1989). This climate would have allowed an oak woodland forest within the canyon in a much larger area than found today (West 1989). The many rivers and creeks provided a substantial amount of water as well as many of the freshwater resources such as fish and mussels that were used by local people prehistorically. Among the major plant resources recorded in prehistoric contexts as well as in ethnographic contexts are acorns, pine nuts, bulbs and corms, a variety of seeds, and manzanita (Basgall and Hildebrandt 1989). Animal remains collected and analyzed from four prehistoric sites in the Sacramento River canyon contained predominately large game, specifically artiodactyls (even-toed, hoofed animals such as deer and pigs), indicating a consistent use throughout prehistory (Basgall and Hildebrandt 1989).

The *Paleo-Indian Period* (12,500 to 10,000 B.P.) is characterized by the warming period associated with the Pleistocene/Holocene transition seen throughout North America. The tool technology of California during the Paleo-Indian period is delineated by fluted projectile points similar to Clovis, Cody, and Hellgap projectile point types that are found in the Great Basin (Statistical Research, Inc. 2004). These projectile point types are part of the larger Big-Game Hunting Tradition evidenced across North America during this period (Moratto 1984). The *Early Holocene Period* (10,000 to 8,000 B.P.) is a period of global deglaciation in the northern hemisphere, creating warmer and drier climates. Projectile point sequences are dominated by large stemmed projectile points subsumed under the Great Basin Stemmed series, in the area spanning the southern Cascade Range and the northern Sierra Nevada (Hildebrandt and King 2002). In addition to projectile points, bifaces, scrapers, large cores, and crescent forms are often found in deposits from this period, with very few manos, milling stones, and other food processing tools in association (McGuire 2002). Obsidian

sources for these tools and projectile points are found over 100 miles away, suggesting a highly mobile population (McGuire and Nelson 2002).

The *Early Archaic Period* (8,000 to 5,000 B.P.) marks a period of change in climate that is wetter, as well as a shift in use of the land and subsistence by prehistoric populations. Occupation sites begin to shift from lakeshores and marshes to perennial waterways and springs, and there is a marked increase in milling equipment located in the site assemblages (McGuire and Nelson 2002). Often discussed as the *Borax Lake Pattern,* the Early Archaic Period is typified by large lanceolate, corner-notched, and wide-stemmed projectile points. Unifacial flaked stone tools are typically manufactured from obsidian, local cherts, and basalts. It is likely that these points were hafted onto large darts or spears used in conjunction with an atlatl (a spear thrower designed to create a greater velocity on a thrown spear using leverage). Manos (handstones) and metates (milling slabs) are the most common form of milling equipment. The noted increase in milling equipment in site assemblages first seen in the Post Mazama Period is still observed during the Early Archaic (McGuire and Nelson 2002). There is evidence of increased use of vegetal materials and specialized processing techniques, and cultural elaboration from the wider Modoc Plateau area (McGuire and Nelson 2002).

The *Middle Archaic Period* (5,000 to 3,000 B.P.), often discussed as the *Squaw Creek Pattern* for the Redding/Upper Sacramento Valley area, saw continued use of manos and metates, and the introduction of the mortar and pestle. Stone tool forms include contracting stem projectile points (Squaw Creek Series), unifacial flake tools (McKee Uniface), awls, and wedges from a wider variety of obsidian sources. Atlatl weights imply use of the atlatl as the primary hunting weapon, and net weights and fishhooks imply an increased reliance on fishing (Basgall and Hildebrandt 1989). During this time, California began to experience more rainfall and a reestablishment of glaciers at the upper elevations in the Sierra Nevada (Minnich 2007). Recent research in eastern Shasta County indicates current vegetation regimes began to develop 2,200 years ago (Anderson et al. 2008).

The *Late Archaic Period* (3,000 to 150 B.P.) includes two distinct patterns: the *Whiskeytown Pattern* and the *Augustine Pattern*.

The *Whiskeytown Pattern* (3,000 to 1,700 B.P.) sees the continuation of atlatl use as a hunting weapon. Small to large side-notched and corner-notched darts are the most common form of projectile point. Manos and metates remain in use, and there is an increase in mortar and pestle use, indicating an increased focus on acorns.

The *Augustine Pattern* (1,700 to 150 B.P.), at times referred to as the *Shasta Aspect* for the Redding/Upper Sacramento Valley area, is marked by the introduction of the bow and arrow and the adoption of the hopper mortar and pestle (Johnson and Theodoratus 1984, Moratto 1984). Small projectile points (Gunther series, Desert Side-Notch series) suitable for arrow tips are found with increasing frequency in archaeological contexts. Hopper mortars, indicative of intensive use of acorns, become the dominant milling equipment. Manos and milling stones are used infrequently. The reliance on acorns and river resources such as salmon leads to the development of food preservation and storage (e.g., granaries). Well-established trade networks are in use as evidenced by obsidian from distant sources as well as coastal shell beads. Clamshell disc beads, spire lopped *Olivella* beads, and *Haliotis* ornaments and pendants are common forms of ornamentation. This pattern is associated with the ethnographically known Wintu.

2.1.2 Ethnography

The Wintu

The *Nomtipom* (Upper Sacramento Wintu) and *Winnemem Wintu* (McCloud Wintu) territories lie in the upper Sacramento River watershed area. At the time of contact with Euro-Americans, they were a semi-sedentary, foraging people living in permanent villages near rivers and streams (DuBois 1935). The *Nomtipom* occupied the area from Kennett (present-day Shasta Dam) north to Lamoine, particularly in the narrow canyon areas along the Sacramento River (DuBois 1935). The *Winnemem Wintu* occupied the McCloud River and Squaw Creek drainages as well as the area around the confluence of the Pit, Sacramento, and McCloud Rivers; a large majority of this area now lies under the waters of Shasta Lake (DuBois 1935). The pre-contact population of the Wintu is estimated at around 14,250 (LaPena 1978). Figure 2.1-1 shows the proposed historic extent of the territories occupied by these groups.

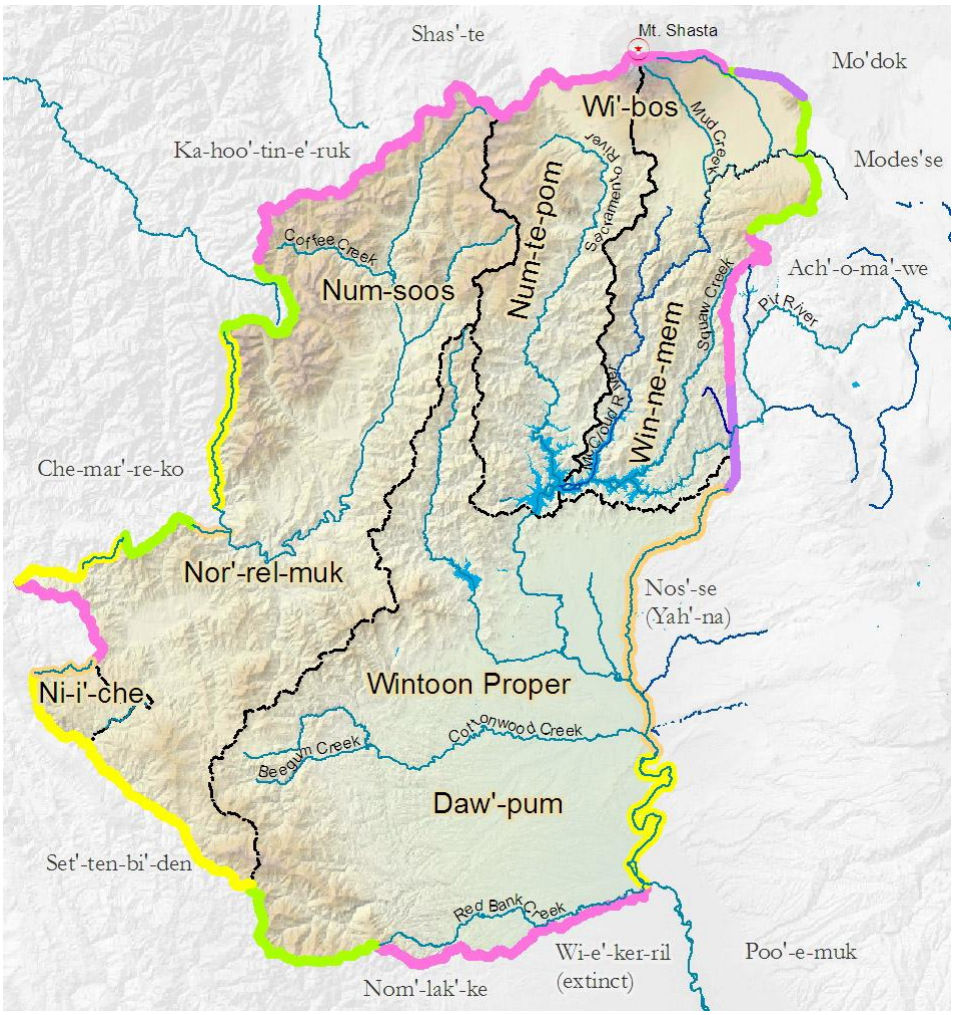

Figure 2.1-1. Wintu boundaries as described in *Studies of California Indians* (Merriam 1955), and depicted by McTavish (2010).

The primary diet of the Wintu consisted of deer, rabbits, and other small mammals; fish, including salmon, steelhead, Sacramento sucker, freshwater shellfish, and lamprey; grasshoppers, salmon flies, and other insects; acorns, pine nuts, and buckeyes; manzanita berries and other berries; *Brodiaea* sp. and other bulbs; clovers, miner's lettuce, and other greens; and grass seeds. In general, sturgeon, dog, bird eggs, and angleworms were not eaten (DuBois 1935). In addition to eating fresh fish, the Wintu preserved salmon by drying it for use throughout the year. Dried salmon was processed into salmon flour and used in a variety of ways.

Mortars and pestles were used to grind seeds, acorns, and pigment and to soften meat. Manos and metates were also used. Bone was used as awls for basketry, harpoons, and hooks, and wedges for wood cutting. Digging sticks for root retrieval, house excavation, and grave digging were made from sharpened hardwood. Soaproot fibers were used for acorn meal brushes, paintbrushes, and hairbrushes. Rope and cordage were usually made from iris fibers (DuBois 1935). Materials such as hazel, skunkbrush, willow, grapevine, redbud, pine root, poison-oak, maidenhair fern, porcupine quills, and some grasses were used to create baskets and traps, including sifters, seedbeaters, trays, bowls, hats, dippers, hoppers, cooking baskets, burden baskets, storage, and fish traps (DuBois 1935). Bows were made from yew and arrow shafts made from reed or lightwood with a hardwood tip. Arrow points were made from obsidian or basalt. Logs were used as bridges; rafts of lashed together logs were poled across streams; and at several locations along major tributaries "complicated bridges lashed together by grapevines" could be found (La Pena 1978). *Olivella*, abalone, and clamshell were used for adornment such as earrings and beads. Blankets and clothing were made from deer hide and rabbit skins. A moccasin-like shoe of deer hide was worn in the winter or for long treks. Snowshoes were used in the winter (DuBois 1935).

Ethnographically, Wintu mortuary customs involved primary burial rather than cremation (Du Bois 1935). The Wintu interred the dead in graveyards located near the village (approximately 100 yards away) in graves of a depth of about 4 feet (DuBois 1935). Some plots were inclusive of an entire village; some were reserved for a family. If during the course of excavation other human remains were encountered, they would be wrapped in a hide and re-interred with the new burial. The body would be bound by sinew or rope in a tightly flexed position, placed in the grave along with a basket of acorn-meal water and other items such as projectile points or beads. The grave was lined with and the body covered by pine bark, with stones placed on the bark, and then filled in with the excavated dirt (DuBois 1935). At times the graves were then topped with white sand; with the introduction of Euro-American burial practices, flowers were substituted (DuBois 1935).

Wintu religion and mythology were intimately connected with the environment, made concrete by all features of nature possessing historic, mythological, and religious importance. Places of unusual configuration such as distinctive outcrops of rock, caves, mountains, and whirlpools might be considered "holy," of special importance, or the dwelling places of spirits (Ritter and Burcell 1995; Burns personal communication) Many modern Wintu peoples believe very strongly in the sacredness of certain environmental features, although many locations have been lost to time, have been forgotten, or, for a variety of reasons, have not been revealed to ethnographers, archaeologists, or land managers (Ritter and Burcell 1995, Burns personal communication, Hayward personal communication, Sinclair personal communication, Root personal communication). A prime example of this sacredness is the importance of Mount Shasta. Mount Shasta dominates the horizon, provides a landmark, supplies a geographical reference for the delineation of territories, and is important in the

cosmological and mythological realms of the people living around the mountain (Henn 1994). Much of the information regarding sacred locations, Traditional Cultural Properties, and important use areas for the Wintu and other Native American groups in the watershed has not been recorded or is known to only a few people. This gap in information may be addressed through ethnographic and oral history work.

The first reported contact that the Wintu had with Euro-Americans occurred in 1826 and 1827 when expeditions of Hudson's Bay Company trappers and traders led by Peter Skene Ogden and Jedediah Smith made forays into the region (Quint 1960). The discovery of gold by Pierson B. Reading on Clear Creek and at the mouth of Reading's Creek on the Trinity River in 1848, and the creation and settling of Shasta County in 1850 and Siskiyou County in 1852 created a hotbed of culture clashes.

The massive influx of miners during the Gold Rush resulted in significant changes in the lifestyles and interaction patterns of the Indians in northern California. Miners drove Indians off their land; polluted the waters, destroying fishing grounds; and brought in livestock (Theodoratus Cultural Research 1981). After the initial wave of miners passed through, settlers moved in and set up homesteads. According to McTavish (2010), as settlers claimed the flat areas first, the Wintu found refuge in the mountainous areas of their territory for a time and were among the last tribes in the region to remain culturally viable. For a detailed discussion of Winnemem Wintu land claims within the watershed, see *The Role of Critical Cartography in Environmental Justice: Land-Use Conflict at Shasta Dam, California* (McTavish 2010).

2.1.3 Native Americans and Fire

In general, Native Americans in California used fire for hunting and insect collection (see Barrett and Gifford 1933, Faye 1923, Curtis 1924, Goldschmidt 1951); for management of pests and disease, especially in oak trees; for health of and underbrush clearing in forests and riparian areas to create a biotic mosaic and for ease of travel (Keeley 2002); for plant management for better yields of acorns, grasses, basketry materials, and so on (Anderson 1999); to create firebreaks and open areas around villages and clear cover vegetation from trails (Williams 2005); to aid in the felling of trees (Williams 2005); and as an element of warfare (Williams 2005, Dixon 1905).

Native Americans in the watershed actively managed the land to ensure that plants would reproduce and provide abundant food supplies. The historic record includes numerous accounts of the use of fire in the region as a means of propagating acorns and native grasses. Based on recorded uses of fire in the region and the abundance of berries, it is reasonable to suggest that Native Americans in the watershed also used fire to assist with the propagation of berries. In addition, while not referred to as "ranching" because the Native Americans were not raising domesticated animals, they did actively shape the land with fire in a way that assisted the wildlife populations that were essential to their diet. While fire management for the purpose of maintaining food supply may not be considered "agriculture" or "ranching," it does illustrate that Native Americans in the watershed actively managed resources with a purpose and end product similar to those of agriculture and ranching (Basgall and Hildebrandt 1989). Section 3.1.8, *Fire and Fuels*, provides more information on the effects of Native American fire use in the watershed.

2.1.4 Native American Fisheries

The Native Americans in the upper Sacramento River watershed used the vast variety of resources in the streams, rivers, forests, and meadows of the area. Fish, including salmon, steelhead, Sacramento sucker, freshwater shellfish, and lamprey, were an important part of their diet. Communal fish drives of salmon or steelhead were conducted at night in the McCloud and Sacramento rivers and entailed the use of large nets stretched across the river with people, bearing torches, wading and swimming downstream to corral the fish (Dubois 1935). The fish were then easily scooped up and hung on grapevines. The fish drives brought together many communities and provided opportunities for trade and social networking, including the parsing out of the catch among the people and villages involved (DuBois 1935). Individuals would fish for salmon with a harpoon usually tipped with bone from a small brush-covered platform extending over a stream (DuBois 1935). The brush disguised the presence of the fisherman and provided shade for better visibility. Smaller fish, such as trout, were captured by individuals with a hook and line or, in summer, pools were poisoned using soaproot (*Chlorogalum pomeridianum*) and the fish picked up by hand and net (DuBois 1935). Spring-run salmon were baked, allowed to dry, and then pounded into flour, whereas fall-run salmon were immediately dried and stored or pounded into flour (DuBois 1935). Small fish were roasted and eaten immediately or preserved by cooking, salting, and drying and stored in baskets. Fish preserved in this manner were boiled before eating (DuBois 1935). Mussels and freshwater shellfish were not as plentiful in the watershed as elsewhere in the state; however, there were several productive areas that were exploited by small groups of people (DuBois 1935). The shellfish were acquired by diving to the bottom of the pools, and then boiled or roasted to open the shells, and sometimes dried on flat trays for later use (DuBois 1935).

2.1.5 Native American Place Names

All people categorize, identify, mystify, and name their surroundings, be it the place where they reside or a geographic feature on the distant horizon. When people migrate, they bring with them their manner of naming. Places will be named for the owners or tenants (e.g., Mears Creek), figures or events in stories, physical descriptions (e.g., Castle Crags), persons of importance (e.g., Dunsmuir), home towns and regions (e.g., Lamoine), and so on. In the Spanish- dominated areas of California, many words of Native American origin have been Hispanicized and applied to land grants, towns, streams, etc. Unlike the colonization and settlement of the Sacramento Valley and Lower California by the Spanish, the large, rapid migration and settlement of Euro-Americans in the watershed after 1848 was not conducive to Native Californian place names continuing to present day. Several Native Californian terms and names have been applied to features in the upper Sacramento River watershed, and several terms of possible Native American origin, but not necessarily Californian terms have been applied to well-known features in the area.

Bohemotash Mountain is derived from the Wintun word for "large," *bohem:* the second half of the name has been discussed as of unknown meaning or perhaps deriving from the Wintun word *thoos* or "camp" (Kroeber 1916, Gudde 2004).

Bally or Bully is used in several place names in Tehama and Shasta counties and is derived from the Wintu word *boli* or "spirit" (Kroeber 1916). Bully Hill is the closest example to the watershed of use of this term, being located between the Pit and McCloud rivers near Shasta Lake.

Tauhindauli Park is named in honor of Grant Towendolly (whose Wintu name was Laktcharas Tauhindauli) a well-known Wintun who was born in 1873 at Upper Soda Springs (Masson 1966). The Towendolly family was originally from the Trinity River watershed near present-day Hay Gulch, and moved to the upper Sacramento River watershed after the discovery of gold and subsequent influx of miners to the Trinity area. Upper Soda Spring was a traveler's stop on the Siskiyou Trail and later a stage stop and resort on the Oregon-California Road. After 1855, it was owned and run by Ross and Mary McCloud, two early Euro-American pioneers in the watershed (Masson 1966). Grant lived at Upper Soda Springs working at the resort as a gardener until the resort closed in 1920 (Masson1966). He was chosen by his father to follow as the headman or chief of the Trinity Wintu, and so was taught the knowledge and the important stories of the group. He told many of the stories to Marcelle Masson, who later wrote them down and published them in *A Bag of Bones* (1966).

Although its origin has been lost in time, there are several proposed origins for the word *Siskiyou*. It has been proposed that *siskiyou* is a Cree or Chinook word for "bob-tailed horse" (Mackie 1997). While traveling through modern-day southern Oregon in 1829, a horse belonging to Alexander McLeod's trapping party died, and so the word *siskiyou* was applied to the pass (Mackie 1997). As to how a Cree or Chinook word came to be applied to a California county, one need only look to the Hudson's Bay Company fur trappers who employed many Native Americans from a wide region, several of whom were involved in trapping expeditions into California. The trapping companies were a mixture of French, Canadians, and Native Americans, with French as their common spoken language. However, in close contact, groups will adopt foreign terms creating a mutually understandable jargon. The other possible origin of *siskiyou* is credited to Michel Laframboise's 1832 trapping party applying the French term *six cailloux* or "six stones" to a ford on the Umpqua River in present-day Oregon (Gudde 2004).

The word *Shasta* did not appear in its modern form until 1850 when the State of California applied it to the northernmost county (Gudde 2004). Before the official naming of the county, the word was applied in various forms and spellings to Indian groups in present-day southern Oregon and northern California, and to landmarks and geological features, most notably Mount Shasta (Gudde 2004). Two of the earliest references to a word spelled in a similar manner are found in journals of early trappers and explorers. Alexander Henry and David Thompson mention a group of Indians who stated "they were of the *Wallawalla*, *Shatasla*, and *Halthwypum* nations" (Gudde 2004). Peter Skene Ogden, on a trapping expedition in 1826–1827, makes reference in his journal to a group of Indians as the *Sastice*, a name he then applies to a river (Rogue River), and a mountain (Mount McLoughlin), although in later entries he spell the word *Sasty* (Gudde 2004). Later expeditions to the northern California area would mistakenly apply Ogden's *Sasty* to modern-day Mount Shasta.

Lacking a complete place name study covering both the built and natural environment (creeks, mountains, towns, parks etc.), it is unknown how many words of Native American origin are applied to features in the watershed.

2.1.6 The Wintu and Land Ownership and Title in California

Section 2.1.6 was submitted by the Winnemem Wintu Tribe and was mainly derived from Anne Kathryn McTavish's 2010 Master of Arts thesis in Geography titled, "The Role Of Critical Cartography In Environmental Justice: Land-Use Conflict At Shasta Dam, California."

The Wintu and other tribes are sovereign nations as they were pre-contact. Historically, within their traditional aboriginal boundaries, the Wintu protected, tended, manipulated, utilized, revered, and named the land and those things that are now called resources. Natural systems continue to be respectfully cared for by the Winnemem Wintu with the recognition of mutual interdependence, equal in both the physical and the spiritual world. The belief is still held by the Winnemem Wintu that if life is carried on in this way, the continuance of both the people and those good things the Creator gave them to live and enjoy life will be guaranteed.

Europeans swept into the traditional cultural land of the Wintu in the 1800's and brought with them a social system based on the economic imperatives of land ownership and resource extraction. The physical manifestation of these opposing worldviews has been described by some historians, anthropologists, and aboriginal peoples of California as genocide, with the control of the land passing to the European Americans.

The history of legal land ownership and title in California begins with the conquest and removal of Native peoples from their aboriginal lands. The neutralization of California Indian tribes was a prerequisite for the aggressive utilization of the vast mineral, timber, agricultural and recreational wealth of the state. The new laws, legal precedents, and bureaucratic culture that were established because of this conflict favored the state and the federal governments and European Americans in general. These legal/bureaucratic constructs became the template for natural resource extraction and management, which, largely, are followed to this day.

California before Statehood

Spain claimed all of California, but the country was so vast that many areas, including the upper Sacramento River, were basically untouched by European influence. After the United States acquired the Spanish claims to the Pacific Northwest in the Adams-Onis Treaty of 1819, Hudson's Bay Company built Fort Vancouver on the Columbia River in Oregon. From there fur trappers began regular expeditions into California, following the Indian footpath that came to be known as the Siskiyou Trail. As the number of expeditions into California by fur trappers and military survey parties increased, hostilities and epidemics resulted in Indian deaths. However, Indian societies remained largely intact through this period because their culture, food sources, and trade networks were still in place (chase-Dunn et al. 1998, Cook 1943, Ellison 1974, Knudtson 1977, Sanchez 2003, Theodoratus Cultural Research 1981). [McTavish 2010. pg 48]

Spain tried to maintain full possession of California but did not have enough people in the area to defend against incursions by Russian, English, and American fur trappers. After the War of Independence from Spain in 1821, the Mexican government became increasingly concerned by the growing numbers of foreigners, especially Americans arriving from Oregon, who began to settle in the interior valleys of California. Many Americans settled as squatters, but some applied for land grants, which were given in exchange for becoming a Mexican citizen and pledging allegiance. Over 800 Spanish and Mexican grants were made in California. [McTavish 2010. pg 49]

With the Treaty of Guadalupe Hidalgo of May 30, 1848, the United States government assumed control of all of present day California, Nevada, Utah, most of Arizona, the western portions of New Mexico and Colorado, and part of Wyoming. The Treaty also called for the United States to recognize existing land titles and accept all people living in the ceded territory as citizens. William

Carey Jones was appointed Confidential Agent of the United States government and was to examine the land titles, and determine what rights the Indians held during the Spanish and Mexican regimes (Robinson 1948, Starr 2005). Jones's report was clear and direct. He confirmed that the Indians did indeed have secure title and right to their lands under the Treaty. [McTavish 2010. pg 53]

Squatters and Homesteaders

Though the Treaty of Guadalupe Hidalgo had promised continuous ownership of existing land grants, it conflicted with the view held by land-hungry settlers that California should be open to Americans (Robinson 1948). American squatters, impatient with the slow government process and contemptuous of the rights of the inhabitants already in California—be they Mexican, Indian, or American—organized into armed bands in an attempt to take over lands. Riots resulted; some of the worst were in Sacramento (Robinson 1948). Gwin sponsored "An Act to Ascertain and Settle the Private Land Claims in the State of California," which passed on March 3, 1851, Stat 631. The Act required that existing land titles had to be registered and affirmed by the Land Commission within a five-year period. If a claim was not filed with the Land Commission, the land was considered abandoned. Land from abandoned and rejected claims went back into the public domain to be surveyed and made open to settlement (Robinson 1948, Sanchez 2003). Very few claims were presented on behalf of the Indians. Many Spanish and Mexican land grants were also not presented. [McTavish 2010. pg 53]

Squatter troubles were not uncommon in California from the 1850s through the 1870s because so few titles had been confirmed by the Land Commission (Robinson 1948). Before any of this was settled, the Homestead Act was enacted in 1862, allowing any citizen or naturalized alien the right to claim 160 acres, provided they worked the land continuously for five years (Parsons 2003). [McTavish 2010. pg 54]

Un-ratified Treaties

In 1851, President Fillmore appointed three commissioners to conduct treaties with the California Indian Tribes. O.M. Wozencraft, Redick McKee, and George Barbour arrived in San Francisco in January 1851, with instructions to quickly conclude as many treaties as possible. Between March 19, 1851 and January 7, 1852 at various central meeting places throughout California, they met with 402 tribal heads – representing 139 tribes or bands of Indians, and entered into eighteen treaties (Ellison 1974, Heizer 1972, Robinson 1948). The designated reservations would have added up to 7,488,000 square acres of land, or 7.5 percent of the total area of the state. Wozencraft negotiated the treaty that included the Wintu. This treaty of peace and friendship was signed at Reading's ranch in Cottonwood on August 16, 1851 (Heizer 1972, Hoveman 2002).

The eighteen treaties were sent to the United States Senate on June 1, 1852. Most Californians were opposed to having the government sign treaties with the Indians. The Americans in California believed the reservations included valuable land that should be reserved for mining and farming instead of for Indians. Despite President Fillmore's recommendation that the treaties be confirmed, Congress not only rejected every one of the treaties, they also ordered them sealed in a secret file, where they remained for fifty-three years. The injunction of secrecy was not removed until January 18th, 1905 (Goodrich 1925, Heizer 1972, Hoveman 2002, Sanchez 2003).

Eventually some temporary reservations were set up, some of which were later given permanent status by executive order (Ellison 1974, Theodoratus Cultural Research 1981). Writing about the treaties, Heizer said,

> "Taken all together, one cannot imagine a more poorly conceived, more inaccurate, less informed: and less democratic process than the making of the eighteen treaties in 1851-52 with the California Indians. It was a farce from beginning to end" (Heizer 1972). [McTavish 2010. pg 58].

Railroad Expansion

The Railroad Act of July 25, 1866, authorized construction of a railroad and telegraph line through the Sacramento and Shasta valleys to Portland. With a right-of- way 400 feet wide, plus patents for twenty alternate sections per mile, the railroad was granted up to 12,800 acres per mile of completed line (Robinson 1948). The United States extinguished the Indian titles that conflicted with railroad titles, but did not extinguish homestead or mineral claims (Robinson 1948). The railroad patents created the checkerboard pattern of land ownership still seen in Shasta County, California. [McTavish 2010. pg 61]

The arrival of the railroad affected the Wintu as well, destroying Wintu transportation corridors, sacred sites, and historical villages. Colton's 1876 map shows Dog Creek, where as many as 1,500 Wintu assembled each year in July to gather salmon for the winter. Building the railroad destroyed this site (Hoveman 2002). Copper mining and smelting industries also grew, resulting in considerable damage to the landscape (Radcliff 1913).

In the United States as a whole, 9.5 percent of the public domain was patented to railroads (Robinson 1948). In California alone, between 1850 and 1880 over 16 million acres were patented to different railroad companies. Figure 2.1-2 shows that by 1880, railroads possessed sixteen percent of the land in California (Sanchez 2003, Short 2001, White 1983). [McTavish 2010. pg 63-64]

Extending the railroad north from Redding toward Oregon along the Sacramento River in 1883 fouled the water badly, reducing salmon egg production. [McTavish. 2010. pg 70]

Indian Allotments

Indians were prohibited from owning or leasing land, selling timber, mining, or pursuing other income-generating activities. By 1853, Indians were starving and begging for food. Congress appointed Edward Beale as the first Indian superintendent for California (Hurtado 1988). The administrations of Beale and his successor, Col. Thomas J. Henley, lasted over a decade and were rife with corruption and incompetency (Hoveman 2002, Sanchez 2003). Cattle for starving Indians wound up with subagents; reservation boundaries were changed, land was lost to squatters; vouchers were irregular; and the books were incomplete (Hoveman 2002, Sanchez 2003). It was not until the 1870s and 1880s that the efforts of humanitarians advocating reform of the living conditions and treatment of Indians began to make a difference. [McTavish. 2010. pg 65]

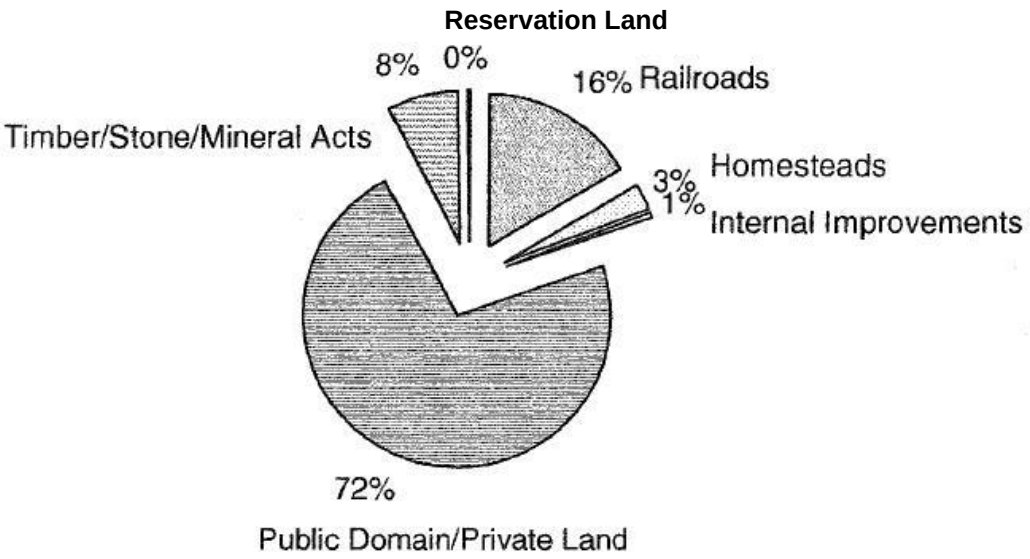

Figure 2.1-2. Ownership of California Land from the Public Domain in 1880 (Sanchez 2003).

From 1846 to 1884, Indians could not acquire land because they were not citizens. Jeremiah Curtin reported in 1889 that the conditions for the Wintu were such that "There was not a spot of land where they could build a hut without danger of being ordered away from it" (Theodoratus Cultural Research 1981). Moved by their plight, Curtin transcribed the Wintu and Yana petition and delivered it personally to President Harrison in May 1890 (Hoveman 2002). [McTavish 2010. pg 77]

Under pressure from influential social reformers, Congress struggled for two decades to develop a new Indian policy. Congress wanted to identify more land for white settlement, to reduce the cost of treaty obligations to tribes, and to satisfy the reformers. The reformers wanted more education, less abuse, and less poverty for the Indians. Both Congress and the reformers believed the best approach was to assimilate Indians into mainstream American society. The General Allotment Act of February 8, 1887, 24 Stat. 388, generally known as the Dawes Act, also referred to as the Indian General Allotment Act, the Committee on Indian Affairs Act, and the Severalty Act (*Dawes Act* 1887), provided for reservations to be divided and allotments be given to individual Indians. Less known is that Clauses Four and Five of the Dawes Act provided a means for providing allotments to landless Indians (Goodrich 1925, Sutton, 2003, Thomas 1971). [McTavish 2010. pg 79]

In 1891, the Bureau of Indian Affairs (BIA) appointed Special Agent Michael Piggott and the first allotments were made for the Wintu. The early letters between Piggott and the Commissioner (of the BIA) in Washington reflected efforts to efficiently carry out the goal of getting land for the homeless Indians. The bureaucracy balanced the will of the President, the laws of Congress (Dawes Act and PLSS), and the rules of the agency (appointment, budget, paperwork). Piggott appears to have made every effort to secure allotments. But, given the poor condition of the land, shortage of water, and lack of start-up farm equipment, animals, or seed, most Indians could not make a subsistence living from agriculture on the allotments. Because so much land had already been patented to the railroads, the allotments were discontinuous, which fragmented the Winnemem Wintu and made it difficult to maintain a tribal relationship with the BIA agents. Agent efforts to secure replacement land were

often half-hearted, underfunded, or blocked by private owners. Agents frequently supported the efforts of interested buyers to purchase allotment land because they believed the land was useless to the Indians. [McTavish 2010. pg 99]

If the Agents had bought land for a village, the act of purchasing land for the Wintu and the spatial nature of a village would have established the beginning of a tribal relationship with the BIA. While the agents wrote to people who inquired about land, no letters were found in the National Archive files to suggest the allottee was simultaneously consulted regarding the potential sale. Available land was rapidly disappearing from Shasta County. The effects of this failure to secure land and create a village for the Winnemem Wintu were compounded over time. [McTavish 2010. pg 94]

In 1906 C. E. Kelsey, a special agent for Indian Affairs, reported that 2,058 allotments had been made in California with 261 canceled, leaving 1,797 outstanding. The majority of these allotments were in Lassen, Modoc, Plumas, Shasta, and Siskiyou counties (Robinson 1948, Theodoratus Cultural Research 1981). [McTavish 2010. pg 79]

Shasta Dam

The site of Shasta Dam may have been a logical engineering solution but was selected without regard to Indian traditions or values. When Shasta Dam was completed, it created the largest man-made lake in North America, covering traditional Winnemem Wintu ancestral villages, homesteads, cemeteries, and sacred sites. It submerged most of the habitable terrain, including the Baird Fish Hatchery, Kennett, Copper City, and the Pit River Railroad and it blocked the salmon run that used to fill the rivers (Clark 2005, Franco 2007). [McTavish 2010. pg 105]

Among the many tasks required in order to build Shasta Dam, the USBR had to acquire the Redding Allotments and move the graveyards that were below the impoundment level of Shasta Lake. Of the 196 Wintu Redding Allotments (located for the McTavish study), 157 were in the Shasta Reservoir area. How much time and resources the USBR dedicated to acquiring title for the Indian Allotments from 1938 through 1941 isn't known. Each allotment case was unique. Determining the ownership and probate status, finding all the heirs, and completing the document search must have been time-consuming. Acquiring all the allotment titles was far from completed in 1941. Faced with the realization that lack of titles to the allotments might actually hold up progress on the project, the USBR turned to Congress for assistance. The Central Valley Project Indian Lands Acquisition Act of July 30, 1941, 55 Stat 612, gave the USBR "all the right, title, and interest of the Indians in and to the tribal and allotted lands within the area embraced by the Central Valley Project." The funds were to be deposited with "the superintendent of the appropriate Indian Agency." [McTavish 2010. pg 115] Given the issues with probate and the difficulty of finding all the heirs it seems unlikely all the money was distributed [McTavish 2010. pg 123]. The Winnemem Wintu Tribe considers this a justice issue and continues to press the federal government to fulfill all the CVPILAA provisions and to provide payment and/or like lands for the allotments now under the lake.

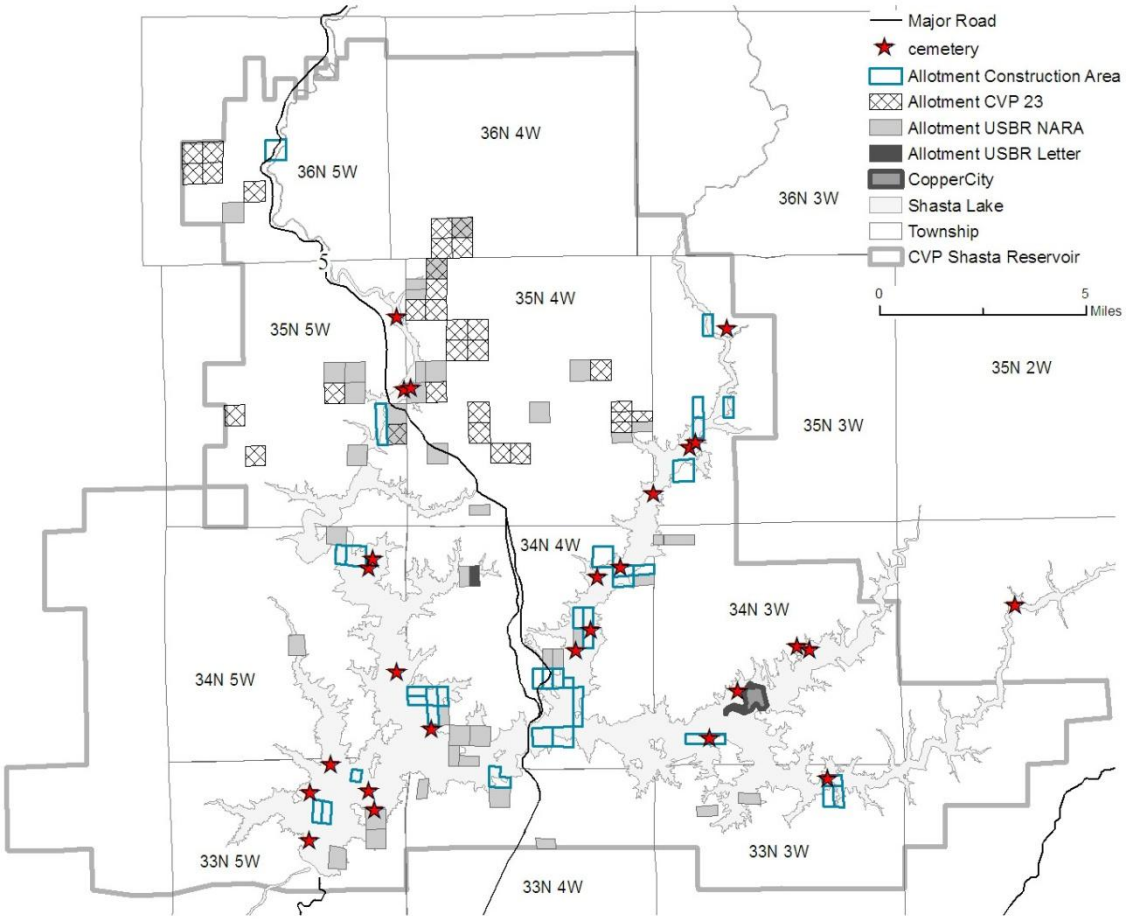

Figure 2.1-3. Shasta Reservoir area showing the 72 allotments the USBR needed to acquire for CVP Shasta Dam in relationship to the graveyards that had to be relocated. None of the allotments outlined in blue were identified in any of the available USBR documents, yet Calland wrote, "A considerable area of the lands involved have actually been taken for construction purposes." In order to confirm that the allotments were acquired by USBR, "appraisal report for Unit No. 6-S, Shasta Reservoir, appraised June 22, 1939" would need to be located (CVP Shasta Dam 2006a, 2006b; Bureau of Reclamation 1947). (Source: compiled from *CVP Problem 23* map, Letter from Young to Nash, Redding Allotments, USBR National Archive files, USBR Graveyard map, BLM PLSS, ESRI Data Disk, Cal-Atlas). [McTavish 2010. pg 118]

Continued Involvement of the Winnemem Tribe in Affairs of Their Aboriginal Lands

In 1924, in gratitude for their service during World War I, the federal government granted Indians citizenship and the right to vote. Equally as important, in 1926 they were granted the right to sue. This would give the Winnemem Wintu, along with other California Indians, a chance to get back on the map. Their struggle moved into the legislature and courtroom. [McTavish 2010. pg 95]

Generally, Indians learned to be guarded about the location of sacred sites because of the appeal they have to a variety of non-Indian groups. The Winnemem Wintu are no exception, but Panther Meadows on Mount Shasta became very public when they participated in a successful cooperative effort to stop plans to build a ski resort there. This $21 million project was to accommodate 5,000 skiers a day with seven lifts and three lodges (Beggs et al. 2003). The U.S. Forest Service completed

the EIS in 1990, found it to be in compliance with the multiple-use classification of the mountain, and approved the project. Opposition to the ski resort united diverse groups such as *Save Mount Shasta*, the *Native Coalition for Cultural Restoration of Mount Shasta*, two nonprofit Indian tribes and various other organizations. Using the 1966 National Historic Preservation Act, they succeeded in getting the U.S. Forest Service to reverse the decision in 1998 (Huntsinger and Fernandez-Gimenez 2000). The U.S. Forest Service found "Contemporary Indian uses of Mount Shasta are clearly rooted deeply in traditional values and beliefs. The spiritual and secular activities being practiced today on Mount Shasta are consistent with historic Native American activities" (Theodoratus et al. 1991 in Huntsinger et al. 2000).

Cultural conflict continued in various forms after the U.S. Forest Service withdrew the permit for the ski resort. Panther Meadows is an alpine wildflower meadow that attracts environmentalists, hikers, rock climbers, and New Age spiritual pilgrims. To provide visual and physical separation from the path and to protect the spring, U.S. Forest Service built a U-shaped rock wall that now surrounds it on three sides. [McTavish 2010. pg 132]

2.2 Euro-American Exploration and Settlement

In the early part of the 1840s, word of the apparent fertility and wealth of land and resources in California, accompanied by the weakening control of the territory by the Mexican government, prompted many people to emigrate (Cleland 1922). The watershed remained unsettled and relatively unexplored by Euro-Americans until after 1848, when the discovery of gold at John Sutter's sawmill in Coloma on the American River opened the floodgates of immigration. Nearly 100,000 people had moved to California by 1849 and nearly 250,000 people by 1852 (California State Parks 2007).

This section of Chapter 2 discusses Euro-American exploration, settlement, and development in the upper Sacramento River watershed and how, historically, Euro-Americans have interacted with and influenced natural resources and the landscape.

2.2.1 The Fur Trade and Early Exploration

The earliest known use of the watershed by Euro-Americans occurred in the early 19th century. The Hudson's Bay Company's Southern Brigade trappers and traders, led by Alexander Roderick McLeod, John Work, Michael Laframboise, Thomas Mckay, Peter Skene Ogden and others, worked their way through much of northern California between 1826 and 1845 (Mackie 1997). Headquartered in Fort Vancouver in modern-day Washington, the Southern Brigade was organized to focus the fur trapping endeavors of the Hudson's Bay Company on modern-day southern Oregon and California (Mackie 1997). Each expedition of the Southern Brigade was headed by one individual and included around 20 trappers and 60 auxiliary party members, including the usually Native American wives of the trappers, their children, and Native American men hired or enslaved as laborers (Mackie 1997, Hafen 1983). John Sutter, an early settler who received a Mexican land grant in 1840 at present-day Sacramento, recounted a visit of the Southern Brigade in the lower Sacramento Valley as being of sufficient size that "when they pitched their tents it was like a village" (Dana 1934, Mackie 1997).

Alexander Roderick McLeod led the initial expedition in 1828 into and through the Sacramento Valley, eventually reaching the San Joaquin River near present-day Stockton in 1829 (Galbraith 1955). He was followed by Peter Skene Ogden in 1829 and Michael Laframboise in 1834, both of whom trapped along the Sacramento River to the San Francisco Bay. Two trapping expeditions led by John Work from 1832–1833 and Thomas Mckay in 1836 also entered the area and concentrated on trapping along the Pit River, making occasional forays into the Sacramento Valley (Mackie 1997). The goal of the trapping parties was primarily beaver pelts, although they would take otters and other fur bearing mammals of economic value when encountered. The reason for this narrow focus on specific furs was in large part due to a fashion trend for felt hats that began in Europe during the 17th century (Ray 1999). As demand for felt hats increased, more and more regions and people became enmeshed in the fur trading economic system, and as animal supplies were depleted in a given area, more and more regions were exploited, thus drawing "diverse regions into a single economic network, which, in turn, was linked to the expanding world economic system centered in Western Europe" (Ray 1999: vi).

This "world economic system" became focused on the upper Sacramento River watershed by the early 19th century and brought with it extreme changes to traditional Native American ways of life, as well as habitat changes brought about by the wholesale removal of animals important in the functioning of the environment. In particular, beavers influence water and sediment movement along channels because of their dams. The dams create ponds that act as sediment traps creating swamps and meadows where different vegetation regimes can take hold (Wohl 2005). These areas also act as flood control, flattening out flows and slowing down the water velocity (Wohl 2005). When beavers are removed from stream systems, rapid incising of channels follows, leading to increased erosion and a less diverse habitat (Wohl 2005). The removal of beaver from the watershed had a profound effect of unknown extent on the environment, creating changes in plant and animal regimes.

2.2.2 Fisheries

The State of California was formed in 1850, and laws regulating the hunting and capture of various game and fish were immediately implemented (see Section 2.3, *Evolution of Laws and Regulations Affecting the Watershed*). However, early laws regarding game and fish were rarely, if ever, enforced, and unrestrained fishing, coupled with the environmental destruction caused by hydraulic mining and the construction of railroads led to a severe decrease in fish in the streams and rivers of California (Lufkin 1990). As a means of improving fisheries, especially commercial and game fish, and enforcing laws, the Board of Fish Commissioners was created in 1870 (Leitritz 1970). The Board was tasked with creating "fish breederies" for stocking streams and lakes and general habitat improvement (Leitritz 1970).

One of the earliest fish hatcheries in California was the Baird Hatchery built on the McCloud River near the confluence of the McCloud, Pit, and Sacramento rivers. Established in 1872, this was the first public salmon breeding station not only in California but also on the West Coast (Leitritz 1970). Egg collection for propagation was one of the many tasks performed at the Baird Hatchery, and the number of eggs available was found to fluctuate annually while exhibiting an overall decline. In 1893, the lowest number of eggs was taken since the founding of the hatchery. The low number was attributed to the construction activities of the Oregon-California railroad line (Leitritz 1970). The blasting and construction of the railroad disturbed the salmon and other fish and deposited debris in

the waterways. In addition, salmon were collected to feed the railroad workers, and still more fish were destroyed for amusement by the railroad workers (Leitritz 1970). In 1884, the hatchery was closed due to diminishing returns; however, it was reopened in 1888 to supply the new hatchery that had been established near the present-day City of Mt. Shasta, and remained in operation until 1935, when construction of Shasta Dam began (Leitritz 1970). In 1898, two smaller egg-collecting stations were placed near Sims in the Sacramento River canyon (Leitritz 1970). The stations were placed in Hazel and Mears creeks in an attempt to gather rainbow trout eggs, but, due to low water years and lack of fish runs, were removed in 1899 (Leitritz 1970).

The Sisson Hatchery (now the Mount Shasta Hatchery) was established near the present-day City of Mt. Shasta in 1888 on a tributary stream to the Sacramento River. It is reported that J. H. Sisson, the original owner of the land upon which the hatchery is located, had installed a trout pond on his property in an effort to provide fishing opportunities for the guests at the Sisson Tavern, a stage stop along the Oregon-California Road (Leitritz 1970). The location of the hatchery was chosen for its water supply and proximity to the railroad line, which facilitated shipping the fish throughout the state (Leitritz 1970). In 1950, the hatchery was modernized, the old ponds and several old buildings were removed, and at least 24 new ponds were created (Leitritz 1970). The hatchery has continuously propagated salmon and trout varieties and is still in use today

The building of Shasta Dam created a major change in the fisheries in the Upper Sacramento watershed. The salmon runs that accessed the many tributaries of the upper Sacramento River were now prevented from migrating upstream, and the flow of cool water downstream was curtailed (Bureau of Reclamation 1984).

2.2.3 Mining

Historically, mineral exploration and subsequent mining operations were conducted throughout the upper Sacramento River watershed. Mining activities began upon the arrival of the Euro-American settlers during the California Gold Rush (circa 1850) and were typically small- to medium-scale operations. Immigrants from China, Mexico, and South America also came to the area to find their fortunes. Historic accounts and news articles from that time speak of animosity between the Euro-American settlers who moved into the area to mine and Native Americans who inhabited the watershed. Tensions were also high between Euro-American settlers who were hungry for gold profits and settlers from other countries, who were viewed as unfair competition and outsiders who were not entitled to the bounty of these lands.

The earliest mining operations tended to be located in portions of the watershed that were accessible by wagon road. Subsequently, numerous transportation corridors were built to access and transport minerals, including trails, roads, and railroads, all of which provided access to the steep mountain terrain characteristic of the area.

Mining activity continued following the Gold Rush, but went through boom and bust periods as the focus shifted to other minerals, including copper, chromite, zinc, silver, limestone, and asbestos, which were mined extensively during the turn of the century era (circa 1890 to 1920). The surges in mining activity in the watershed typically ended as quickly as they started. For example, the rush to find gold was generally over in about 5 years. What started in the watershed in 1850 was nearly over

by 1855, by which time most of the easily accessible gold had been taken from the riverbeds. With the exception of Dog Town (Vollmers and Delta), most towns that had sprung up along the river and its tributaries had emptied, and many of the inhabitants headed on to other locales to seek their fortunes (Vaughn 2004).

The bulk of the mining activity in the watershed subsided by 1920. Although activity picked up during the Great Depression and again during World War II, the mining era that defined the watershed was over. Mineral production during the Great Depression increased primarily because it became cost effective due to cheap labor and the high prices paid for metals. The increased mining activity during World War II was due to the increased demand for mineral resources for the production of steel and other wartime materials. These needs coincided with government subsidies (Rawls and Orsi 1999, Orre 1999).

A discussion of specific early mineral prospecting and mining operations that occurred in the watershed is provided below.

Mining Operations

Gold Mining

In 1843, the Chiles-Walker party entered California, and Pierson B. Reading, a man who would have a significant impact on the history of Shasta and Trinity counties, was a member of this party (Cleland 1922). In 1844, the Mexican government granted Reading the 26,633-acre Rancho Buenaventura land grant located in the area of modern-day Redding, just south of the upper Sacramento River watershed (Bancroft 1890). Most of the early settlement in California was located along the Pacific Coast and in the Sacramento Valley, and Reading's land grant was the most northerly of the Mexican grants. In 1848, after visiting the land near Coloma, Pierson B. Reading realized the geologic similarity between his land along the Sacramento River and the gold bearing regions of the Sierra Nevada foothills (Hittell 1898). Reading began prospecting in the Redding area with a crew of Native Americans, discovering gold 5–6 miles up Clear Creek from its confluence at the Sacramento River (Bancroft 1888). Reading also discovered gold in 1848, at the mouth of Reading's Creek on the Trinity River near present-day Douglas City. Along with a crew of "three white men, one Delaware, one Chinook, and about sixty Indians from the Sacramento Valley," and a good supply of cattle and provisions, Reading worked the placer gravels for about six weeks, recovering 80,000 dollars worth of gold. He abandoned his diggings when confronted by parties of miners moving into the area who disliked his use of Indian labor (Federal Writer's Project 1939). Reading's discovery of gold in the foothills and mountains west of the Sacramento River signaled the opening of the northern mines and created the impetus for a large influx of miners and settlers into the watershed.

The discovery of gold sparked mass migrations to the watershed. As word spread across the world via explorers and merchants, Euro-American and foreign settlers hungry to make a fortune responded quickly. They traveled to the area by horse and wagon, and by sea. Foreign settlers came from as far away as Central and South America and China (Eidness 1997).

While there was some early gold prospecting done by Euro-American settlers in the northern portion of the watershed near Mount Shasta, these prospectors generally turned up empty handed. Most of

the successful early gold prospecting occurred in the southern portion of the watershed, which was more easily accessed via the shipping ports of San Francisco and Sacramento, as well as from wagon roads leading up through the Sacramento Valley. The deep river canyon, which separates the Sacramento Valley in the south from the Shasta Valley in the north, also acted as a physical barrier to the early gold prospecting efforts in the watershed (Vaughan 2004, McDonald 1979).

Historic accounts tell of the migrations of Euro-American settlers from Oregon, which were first led by Linsdsey Applegate in June 1849. He and six wagons traveled the route walked by McLeod's band of trappers; they headed south across the Siskiyou Mountains and down into the Shasta Valley in search of gold, but eventually returned to Oregon. There is no record of their success or failure in prospecting, but we can assume that their retreat to Oregon meant they did not find gold in the Shasta Valley or in the northern portions of the watershed (McDonald 1979).

Other early gold prospecting in the northern reaches of the watershed occurred shortly thereafter. In July of 1850, a posse of 40 prospectors, all men, joined a small group that was on a Klamath River expedition. Together they worked their way up the Klamath River and down the Sacramento River. These men had begun their prospecting expedition a month earlier on the north fork of the Trinity River (Helena), and from there made their way north and east over the mountains and through the riverbeds, until they worked their way up the Shasta River to Mount Shasta. The group then headed south through the upper Sacramento River watershed, where they met with Native Americans in the river canyon. In 1855, after years of bloodshed in the canyon, the Native Americans were outnumbered and outgunned, and they lost their holdout in the Castle Crags area. Gold prospectors immediately established claims and began gold mining operations in the Castle and Soda Creek areas (McDonald 1979).

Around the same time, the southern portion of the watershed was expanding because of gold mining activity. Shasta County was established in 1850 and the City of Redding, which lies several miles to the south of the watershed's southern boundary, served as the central supply center for gold miners in northern California. While the southern portion of the watershed did not produce the amount of gold areas due west and south did, several successful mining operations were established that produced notable amounts of gold. These gold mining settlements, which sprang into existence around 1850, generally fizzled out of existence by 1855. The operations were located in the Delta, Girard, and Tom Neal Creek areas, at Portuguese Flat (Pollard Flat) and other places adjacent to the Sacramento River (Parsons 2003b, Orre 1999).

Gold had been discovered on Dog Creek in 1850 (near Vollmers and Delta), but the area was not settled or mined by Euro-Americans and other nationalities until 1855, when the conflicts between Native Americans and settlers were ended. This area became the largest and richest gold-producing area of the upper Sacramento River canyon. In 1855 there were approximately 400 miners living in the area known as Dog Town or Dog Creek Place, located at the confluence of Dog Creek and the Sacramento River. However, by 1880, the Dog Creek mines were tapped out, and the boomtown became a town of only 25 (Vaughan 2004).

As noted above, gold mining activities in the watershed were sporadic and ended shortly after they began. In general, the easily accessible gold was taken quickly from riverbeds and exposed bedrock. The gold that remained was more difficult and more costly to access and produce. The more destructive methods of mining, namely hydraulic mining, were essentially stopped by legislation

initiated by angry farmers whose land was covered by dredge spoils and whose water was polluted by the sediments flowing downstream from the hydraulic mines. Legislation for clean water did not stop the practice, but the rules it set in place made the practice too costly. It is worth noting that a significant portion of the gold extracted from the watershed was mined primarily from 1880-1920, after the Gold Rush, as a byproduct of copper processing operations.

Copper, Chromite, and Other Mining Activity

The Gold Rush spurred additional mineral prospecting in the watershed. In the late 1890s to 1920s, copper and chromite replaced gold as the primary minerals produced in the area. While the early mining days saw individuals from the United States and foreign countries seek their fortunes in these mountains, the copper and chromite mines brought large-scale investment from national and foreign companies. The copper extraction and processing that occurred in the watershed was located in and around the area that is now the Sacramento arm of Shasta Lake. The principle copper deposits were located in a 30-mile crescent shaped copper-zinc belt extending from Iron Mountain (southwest of the watershed) northeast through Backbone Creek and beyond the watershed to Ingot in the east (Elliott 1991, Smith 1999). Most of the chromite mining took place on the west side of the Sacramento River between Pollard Flat and Castella (Parsons 2003b, Aubrey 1908, California State Mining Bureau 1915, Orre 1999).

Copper was discovered in the area in the 1850s, but was first mined at Copper City (which is now under Shasta Lake) in 1862. At that time, the copper was found in small quantities by miners who were exploring underground for gold and silver. It was shipped to San Francisco and beyond for quality inspection and processing, and was reportedly found to have high quality. However, not much was thought of it by the miners at that time. It was not even recognized by Shasta County as an important mineral resource of the county until 30 years later. Even if it had been, the price of copper dropped for a time and made it uneconomical to mine until the 1890s (Aubrey 1908, California State Mining Bureau 1915).

As soon as copper prices rose and people became aware of the potential money to be made, they again flocked to the area to stake claims for copper mines. Where previously there had been several attempts to mine for gold and silver, albeit not too successfully, a copper industry popped up overnight. Instead of shipping the ore out of town for processing, the mining companies built and operated large copper smelting plants in the mountains. To the prospectors' delight, the copper ore in the watershed also contained valuable gold and silver. Even though the amount of gold and silver was not large compared to the amount of copper, the profit from these metals was significant (Aubrey 1908).

The first copper smelter was built south of the watershed in Keswick. The area in and adjacent to the watershed became home to numerous large smelters (Parsons 2003b). The Iron Mountain District, which covered areas in and around the Sacramento arm of Shasta Lake, eventually became the most important copper district in Shasta County. It included the Balaklala, Keystone, Mammoth, Shasta King, and Sutro mines (Aubrey 1908, Smith 1999, California State Mining Bureau 1915). The town of Kennett served numerous copper mines in this area, but is now under the waters of Shasta Lake (Aubrey 1908).

Local mining of chromite was limited because the costs associated with processing the ore were often more than the profit that could be earned. While there was plenty of ore to be mined, it was done on an as needed basis. Accounts of the chromite industry note that it was only profitable to mine when the U.S. government subsidized the mining operation (Parsons 2003b, Orre 1999).

The decline of the copper and chromite industries in California occurred shortly after World War I, but like other mineral production, copper and chromite were mined sporadically during the Great Depression and World War II (Parsons 2003b, Elliott 1991).

Euro-American and foreign settlers also prospected for several other minerals in the mineral rich watershed. The areas mined and timeframes generally mirror that of copper and chromite (circa 1890 to 1950).

Although not documented as the Silver Rush, much of the early and later gold exploration in the watershed included silver prospecting and mining. Gold, however, overshadowed these efforts, which were ongoing throughout the mining era (1850 to 1950). As mentioned above, the quantities of silver found by the miners was not great, but the profit from the mines was significant (Aubrey 1908, California State Mining Bureau 1915).

Asbestos was another mineral that was discovered in large quantities throughout the watershed. Several asbestos claims were developed during the early 1900s near Castella and Mears Creek (California State Mining Bureau 1915). The Trinity Asbestos Mining Company was responsible for planning the road between Castella and Carville, which is located to the east in the Trinity River watershed. The company's plan was eventually carried out by the U.S. Forest Service (Forest Service). Asbestos from the watershed was used regionally in the manufacture of pipe covering, composition flooring, and plaster for stucco. In the 1950s, asbestos from the area was used by a Redding paint manufacturer in fire-resistant paint marketed under the name "Syl-a-bestos." The paint was used in US Plywood and R .L. Smith Lumber Company sawmills (Orre 1999).

Another mineral sometimes mined in conjunction with chromite was olivine**.** The Lucky Strike Mine near Castella produced both minerals. Olivine became an important material for steel manufacturing because it can withstand higher temperatures, is easier to clean off the castings, and does not crack or shatter. Its use also prevented steel foundry workers from contracting silicosis (Aubrey 1908, Orre 1999).

Although not a mineral, sand and gravel have been extracted along the Sacramento River and its tributaries for many uses throughout the years. For example, the river rock from Sims was mined by the state for several years and was used to build Highway 99. The river rock from this source was sufficient to meet strict engineering properties required for freeway construction. The material for the highway was processed locally in a temporary hot mix plant and crushing and screening plant (Vaughan 2004, Orre 1999).

Methods Used to Mine

Several different processes were used by settlers and later generations of residents of the area to separate the choice minerals from other materials. The processes ranged from the very simple, small scale, crude methods (panning and digging) to very technically advanced, large scale operations

(placer and hydraulic). Often times, techniques for extracting minerals were imported from other countries and adapted to local circumstances (e.g., arrastas[1] from Mexico and Central and South America), while other techniques used in the watershed were developed in California (e.g., hydraulic mining) (Vaughan 2004, McDonald 1979). The more complex placer mining operations would often involve groups of prospectors who would combine efforts to divert large amounts of water from creeks or rivers into a sluice alongside the river. They would then dig for gold in the newly-exposed river bottom (Praetzellis and Praetzellis 1993, Rawls and Orsi 1999). Hydraulic mining operations, which would hose off entire hillsides to get to ancient gold bearing veins and which was typically done by companies and individuals with large amounts of money, was not widespread in the watershed.

Miners also engaged in "hard-rock" mining, which entails extracting the gold directly from the rock that contains it. This was usually done by digging and blasting the land and then removing the exposed veins of the gold-bearing quartz (Praetzellis and Praetzellis 1993, California State Mining Bureau 1915). Once the gold-bearing rocks were brought to the surface, the rocks were crushed and the gold was separated out (using moving water) or leached out, typically by using arsenic or mercury (sources of environmental contamination). This method was used to a significant degree throughout the watershed (Aubrey 1908, Praetzellis and Praetzellis 1993, Rawls and Orsi 1999). Regardless of the method used, miners left an indelible mark on the shape and character of the watershed, remnants of which are still visible today.

The mining industry required large amounts of lumber to build and maintain its infrastructure. Milled lumber was used for housing, water flumes, support structures, and other constructs, and fuel wood was necessary to keep steam-powered equipment running. This spurred the development of the timber industry in the 19th century, which remained an integral part of the watershed area well into the 20th century.

2.2.4 Timber

Timber Use in the Early Years (1850-1945)

The amount of early logging in the watershed was quite modest, confined primarily to the selective "high grading" of mature ponderosa pine (*Pinus ponderosa*) and sugar pine (*Pinus lambertiana*) from the most accessible areas for localized use by early Euro-American settlers. Rugged, steep terrain with few access routes and only patchy stands of mature conifers throughout much of the watershed deterred many lumber companies from moving into the area. Rather, they favored the more easily accessible and somewhat gentler topography that supported contiguous stands of merchantable timber located in the upper watershed to the west and south of the community of Sisson (present day Mt. Shasta).

As discussed above, by the 1890s, mines and communities of various sizes dotted the watershed, primarily in its southern and northern ends. It was around this time that a number of lumber mills began operating in the watershed near the present day communities of Castella and Lamoine. This coincides with the advent of railway access between Redding and the Mount Shasta area via the

[1] *Arrasta is a method of crushing and recovering gold. The ore is placed in a hole and mercury added. The ore is ground and the mercury absorbs the gold into itself. At the end of the process, the amalgam is recovered and the gold extracted.*

Sacramento River canyon in 1887 (see Section 2.2.8, *Transportation History*). The presence of the railroad allowed for easier transport of logs and wood products out of the canyon, thus encouraging some lumber companies to expand their timber harvest operations further into the watershed. Flumes, steam donkeys (steam-powered logging engine), and narrow gauge railroads were used to move logs out of the surrounding mountains to mills or railheads. By 1896, the railroad had opened up the entire watershed to timber harvest, cattle grazing, and recreation (USDA Forest Service 2001). Virgin stands of ponderosa pine in the lower elevation drainages of the watershed accessible by narrow gauge railroads were nearly clearcut, leaving significant accumulations of logging slash (USDA Forest Service 2001). Often, these areas reverted to seral (intermediate stage) shrublands and knobcone pine (*Pinus attenuata*) following the occurrence of fire. Large stands of old growth timber in the Deer Creek, Castle Creek, Ney Spring, and North Fork Sacramento River drainages were harvested and burned. Old-growth dependent wildlife species populations declined as habitat became fragmented or was eliminated on the lower slopes of the Sacramento River headwaters. During this period, the logging practices of the day, which were generally conducted with little or no regard for its effect on riparian or aquatic resources, had a significant impact on streams (USDA Forest Service 2001) by contributing to erosion, sedimentation, and loss of biological habitat.

As logging in the watershed increased, the structure and composition of the forest began to change (USDA Forest Service 2000). However, such changes during this period were relatively minor in comparison to the years following World War II (which is discussed in the following section). Most logging during these pre-war years occurred in the low- to mid-elevation mixed-conifer zone (USDA Forest Service 2001) and consisted of selective harvest. Although prior to 1930, lands reserved under the National Forest System (established in 1905) made up only a very small portion of the watershed, one of the earliest records of active forest management in the watershed by the Shasta National Forest dates back to 1908. At that time, the Shasta National Forest conducted a timber sale on its lands in the Castle Crags area (USDA Forest Service 2001). Hundreds of thousands of trees (cedar, fir, and pine) were harvested and the brush was burned (USDA Forest Service 2001). Throughout the watershed, reforestation was slow and dependent on natural processes. Thus, seral shrubs often overtook lands that were once forested.

Increasing settlement of the watershed and increasingly active forest management by federal agencies and local landowners led to a rise in fire suppression efforts beginning around 1920. With the end of World War I in 1918, there was now the work force available to actively suppress wildfires throughout the western United States. After 1920, suppression of all fires on the Shasta National Forest and the adjoining Trinity National Forest lands was attempted as suppression forces grew and the ability to enforce aggressive fire prevention policies improved (USDA Forest Service 1999). However, fire-fighting efforts were primarily directed at the most accessible and heavily settled areas to protect human life and private property (Frost and Sweeney 2000). Some studies suggest that fire suppression efforts prior to the 1940s likely had little effect on the character of vegetation across large portions of the Klamath Mountains (Frost and Sweeney 2000, Taylor and Skinner 1998). Nevertheless, the effect of active fire suppression on forests adapted to frequent fires, such as the mixed-conifer forests of the upper Sacramento River watershed where the fire return-interval ranged between 3 and 7 years on average (USDA Forest Service 1999) and where selective logging was standard practice, was not necessarily conducive to sustainable forest health. Where frequent fire (or logging) did not reduce stand density and competition levels, changes in the composition and structure of the forest resulted in crowded, closed canopy stands over time. Old growth and less

shade tolerant species such as ponderosa pine and Douglas-fir (*Pseudotsuga menziesii*) were eventually replaced by the more shade tolerant white fir *(Abies concolor)*. In addition, significant accumulations of surface and standing fuels increased the risk of large stand-replacing fires within the watershed. Three significant fires (>600 acres) were recorded in the watershed between 1922 and 1939 (USDA Forest Service 2001). A discussion of the role that fire suppression has played in the watershed is provided in Section 3.1.8, *Fire and Fuels*.

In 1930, a major part of the cutover lands in the headwaters of the watershed, located at the base of Mount Shasta, came under federal ownership as a result of land exchanged with private timber companies (USDA Forest Service 2001). The Depression years of the early 1930s not only affected the private sector, but the Forest Service as well. As more and more lumber companies were forced to cease operations in the national forests, federal budgets for land management activities declined (Cermak 2005). During this era, conservation goals that had once seemed obtainable now appeared to be impossible. Claims by timber industry insiders and federal regulators alike insinuated that overproduction of lumbering had contributed not only to destructive lumbering, waste, and premature cutting, but had also resulted in the loss of land from tax rolls and unemployment (Steen and Guth 2004). Such claims led to the Presidential appointment of a Timber Conservation Board in 1930, which was charged with developing "sound and workable programs of private and public effort, with a view to securing and maintaining an economic balance between production and consumption of forest products" (Steen and Guth 2004). The resulting recommendations made by the Timber Resources Board resulted in the concept of "sustained yield." By definition, sustained yield was market oriented, whereby supplies would be kept level with demand by holding public timber unavailable as long as private supplies were adequate (Steen and Guth 2004). When private lands were diminished, public forests would provide needed timber while private lands regrew (Steen and Guth 2004). Thus, yield would be sustained in coordination with demand (Steen and Guth 2004).

Although in theory, the application of sustained yield to achieve a stable forest industry and, therefore, a stable local community was a desired goal of both federal and private timber interests, unsustainable logging practices continued on some private lands. Thus, federal regulation of private logging practices again became a major focus of forest policy (Steen and Guth 2004).

A discussion of the settlement of the watershed including sawmills and communities that arose during this period use is provided in Section 2.2.9, *Communities in the Upper Sacramento River Watershed*.

Timber Use in the Post-World War II Years (1950 to 1974)

The years following World War II mark a turning point in the federal government's management of forestlands in northwestern California. Increased demand for lumber and dwindling timber supplies on private lands made logging on federal lands more economically attractive (Frost and Sweeney 2000). Technological advances such as lighter weight chainsaws and yarding systems and construction of an extensive network of forest roads made logging possible in areas, including the watershed, once considered unprofitable or inaccessible (Frost and Sweeney 2000). The historical practice of selective cutting in which only commercially valuable trees were harvested was replaced by clearcutting as consumer demand for wood products led to an expansion of the acceptable size and species of merchantable trees. Throughout the 1950s and 1960s, the practice of clearcutting, followed by broadcast burning and replanting to desirable tree species, became standard practice. By the late-1960s, federal lands in the watershed and throughout the region were managed to promote even-aged

stands of merchantable timber. Thousands of acres of late-successional forests in and around the watershed had been converted to tree plantations (Frost and Sweeney 2000). Clearcutting of low- to mid-elevation forests allowed hardwoods to sprout and become established, dominating the vegetative community of the cut-over site for many years. Logging slash, flammable hardwood vegetation, and the uniformly dense canopies combined with high tree stocking densities put tree plantations at considerable risk of damage from wildfires.

Although the Shasta and the Trinity National Forests had been established as forest reserves in 1905, the Shasta-Trinity National Forest, as a unit, was not established until 1954 (USDA Forest Service 1999). The expanded network of roads and trails throughout the watershed not only made logging access easier, but attracted recreationists as well. Forest managers of the era no longer were simply custodians of the timber resource in the watershed, but now found themselves in the role of multiple-use natural resource managers. By the mid-1950s, a growing population of young, middle-class families flooded the forest. Development of outdoor recreation opportunities (discussed in Section 2.2.7, *Recreation and Tourism Management*) had to be integrated into forest management actions concurrent with the demand for increased timber yields.

Portions of the watershed, particularly in the south and along the Sacramento River corridor, were gradually inundated by water held back by Shasta Dam, which was completed in 1945. The effect of the newly created reservoir was two-fold: (1) increased recreational use of the watershed and (2) loss of some timberlands along affected drainages. The economic loss of these timberlands was offset by the increased economic opportunities afforded by the newly created recreational possibilities. The existing conditions of forest resources in the watershed are discussed in detail in Chapter 3.

2.2.5 Agriculture and Ranching

Historically, ranching and agricultural activities in the watershed have been limited by the steep mountainous terrain. However, wherever there were relatively flat lands or hills, there was often some sort of agricultural or ranching development to serve the small communities and travelers that passed through or stopped by the area on vacation. This section describes the development of agricultural establishments in the watershed.

Agriculture and Ranching Prior to 1850

Although the onset of agriculture and ranching activities in the watershed would not occur until the Gold Rush era (1850s), the area had contact with ranchers in the 1830s. Euro-Americans drove herds of horses and cattle from Mexican-controlled California to Oregon. Expeditions up the canyon were led by John Work in 1832–1833 and Ewing Young, who reportedly drove 700 head of cattle from Monterey to Oregon in 1837. This same route was used annually by the Hudson's Bay Company parties through the 1830s and 1840s. This cattle drive reportedly came up through the Sacramento River canyon and stopped at Upper Soda Springs (Vaughan 2007).

Agriculture and Ranching (1850–1950)

A comprehensive record of historic agricultural and grazing practices in the watershed is lacking. This is likely because much of the watershed is mountainous, so agricultural and grazing activities were scattered. It is generally thought that agriculture and ranching practices were brought into the

watershed by the early settlers around 1850. Agricultural activities began as small backyard vegetable gardens and often included a few dairy cows or chickens (Scanlon 1981). Later developments included small- and large-scale farming and ranching operations. The general trend was for agricultural activities to follow mining and mineral prospecting activities. While the earliest mining camps in the watershed were dependent upon food packed in from other areas, land in the Sacramento and Shasta valleys was soon used to raise dairy cows and cattle and to grow food crops and hay (around 1852–1855). Shortly thereafter, wheat, barley, and oats were being grown in the most northerly and southerly reaches of the watershed. Mills were built in the following years to grind the grain. Gradually, as settlements increased in size and expanded to serve the miners and their families, agriculture was incorporated into many areas and became another mainstay of the local economy (Parsons 2003b, McDonald 1979).

Up until the early 1900's, federal lands generally were open for public divestment and use, including grazing (Musgrave 1998). However, when the U.S. Forest Service acquired Shasta National Forest, it established regulations to limit grazing on the forest, which resulted in bitter disputes with the stockmen. Grazing also occurred on land allotted to Indians, and although Indians throughout California, including the Wintu, complained, it was to little avail (McTavish 2010).

Upon arrival to the Mount Shasta area, the early settlers noted the abundance of many wild berries, in particular, strawberries. Historic accounts tell how the local Native Americans would pick the strawberry flowers as they traveled through the area so that the berries would be larger upon their return (Brunmeier personal communication 2008). The area was so abundant with berries that it became known as Berryvale, and the area by Wagon Creek was referred to locally as Strawberry Valley. The town name was changed years later to Sisson, but not for lack of berries. Strawberries were cultivated around Mount Shasta for decades. Other berries were also cultivated and included raspberries, blackberries, elderberries, and logan berries. In the early 1900s, growing berries was a profitable business. Strawberries sold for $1.25 a crate and brought growers $375.00 per acre.

Large-scale development for agriculture came about in conjunction with the federal Homesteading Act (1862), abandoned mine claims, and the extension of the railroad line, which eventually made its way north through the steep river canyon to Mount Shasta. After gold fever subsided, Shasta and Siskiyou counties continued to grow because of homesteading or purchasing of fertile farmlands (Parsons 2003b, Siskiyou County Sesquicentennial Committee 2008), and many of the town names in the watershed come from ranch family names.

In 1881, in the area now known as Delta and Vollmers, the remains of the boom and bust gold mining town called Dog Town were purchased by Louis Autenrieth. At the time, it consisted of 160 acres, which Louis converted to agricultural land. The area was farmed by Louis, his wife Bertha, and their eight children. Louis died shortly thereafter at the age of 53, leaving the Autenrieth Ranch to be run by his surviving family. Accounts of the ranch note that cattle raising was likely its primary focus. Other ranch operations that were typical of the time were conducted by the family and included a cider mill, keeping a milk cow, and growing several types of crops (Vaughan 2004).

The Autenrieth Ranch changed ownership several times in the early 1900s. It was eventually acquired by William Vollmers in 1909. The ranch was also enlarged several times, growing from 160 acres to 660 acres. The additional acreage was located in the adjacent hills and was used for grazing up to 100 head of cattle. Horses were used for plowing the fields and a variety of crops, including

alfalfa, tomatoes, corn, peas, watermelons, and strawberries were grown. Commercial strawberry production on the ranch was big for a while in the 1920s, and provided local employment for as many as 25 laborers. The Vollmers also maintained an extensive orchard and kept a milk cow (Vaughan 2004).

Vehicular traffic in the area changed the face of the Vollmers Ranch and probably other ranches in the watershed as well. As car travel increased, resulting in the construction of Highway 99, the ranch's operations evolved to accommodate the latest trend. The Vollmers began operating a small summer resort and a combination store, gas station, garage, and restaurant. The commercial operation serving travelers was relocated and rebuilt several times on account of the construction, relocation, and widening of Highway 99. The ranch bought and operated the first Model A Ford tow truck, and worked in association with the American Automobile Association (AAA) (Vaughan 2004).

Around 1930, a small airport was constructed at the Vollmers Ranch that was used by the U.S. Army and for mail deliveries. The ranch also operated a weather station, which reported the local weather regionally. The historic records note that commercial airplanes would occasionally land at the Vollmers Ranch airport when the Redding airport was closed by fog. After World War II, the resort, airport, and restaurant closed. The Vollmers continued to raise cattle and grow strawberries until about 1960. The ranch sold in 1967, and records indicate that the remaining buildings were torn down shortly thereafter (Vaughan 2004).

A ranch operation was also recorded near Pollard Flat. Historic records note how the Baker Ranch, located west of Pollard Flat, used a ditch originally constructed for hydraulic mining to serve as irrigation for cattle (Orre 1999). The conversion of mining ditches to agricultural ditches exemplifies a common theme throughout the watershed and throughout the West.

Further north was the DeMarco homestead, located on Flume Creek. The family settled the property in 1863 and made a living raising goats and making goat cheese for local residents. This area is fairly steep, and while it was not suitable for crop production, it was well suited to raising goats. The ranch held between 700 and 1,000 of the animals, which ranged throughout the mountains in the vicinity. Although not in the record, the goat cheese was likely sold and traded to people living throughout the river canyon, and based on the size of the operation, the goat ranch probably employed several people to assist with milking chores. During those years, the landscape would have had far less brush than currently exists due to grazing by the goats. For a time, cabins on the ranch property were used to house sawmill residents and served as an office for a local sawmill operation. The property also had a bathhouse used by sawmill workers (Orre 1999).

In the 1880s, farming was taking place near Sims at a location known as Southern's Station or Sim's Resort. Like many commercial operations in the watershed at this time, the farming operation was run in conjunction with other business activities. The place was a popular hotel and stage stop along the Sacramento River, about 5 miles south of Sweetbriar (Vaughn 2007). Records show the area was farmed by C. C. Huffacre, who later moved north to Castella, another river canyon settlement to the north near Mount Shasta. While living in Castella and serving as the Leland postmaster, Huffacre reportedly grazed his dairy herd on land he owned along the south side of Castle Creek (near Castle Crags State Park). The self-proclaimed farmer also held numerous mining claims in the area (Vaughan 2007).

By the early 1900s, the area around Mount Shasta was full of farms and orchards. Much of the land was leased for the purposes of farming. Apple, cherry, plum, and pear trees were planted throughout the Mount Shasta area as early as 1887. Cattle grazing was also prevalent at this time on the lush grasslands west of the present day City of Mount Shasta. Historic records note that the young orchards and vegetable patches would thrive without much rain. This was because the area had plentiful water, including several wet and dry meadows. As a result, there was moisture enough in some areas to grow fruits and vegetables without resorting to irrigation (Brooks et al. 1987, Cutting 1997). Areas with wet meadows were partially drained to irrigate dry meadow gardens and orchards.

Farming and dairy cows played a great part in the economy of the Mount Shasta area in the early 1900s. The area had dairymen who would deliver milk to people's homes (Brooks et al. 1987). In the City of Mt. Shasta, the Sisson family owned a significant amount of land and raised much of the food in the area. It was served at the Sisson tavern, and the milk from their farm was sold locally (Brooks et al. 1987). There was also a large produce farm in town. It was known as George Ferraro's celery field and was located on Lake Street, about where Mt. Shasta Shopping Center is currently located. Historic accounts note that Ferraro also grew cabbage and became known as "The Cabbage King" because he won a gold medal for his cabbage at the Panama-Pacific International Exposition in San Francisco. Ferraro later bought an 80-acre ranch, which he farmed in North Sisson, off Ivy Street. The former ranch is now a housing development (Brooks et al. 1987). Produce, orchards, and animals were also raised south and west of the city in areas that were known as Azalea, Mott, and Shasta Springs.

While agricultural and ranching practices of the early settlers contributed to the current shape of the watershed, much of the land that was used for such purposes was later abandoned or developed for other purposes. Agricultural and ranching practices along the old Highway 99 soon gave way to forestlands or housing developments once Interstate 5 was constructed. Farms and ranches around Castella, Dunsmuir, and Mt. Shasta began to disappear in conjunction with the construction of Highway 99 and later I-5. In the industrial era, vehicular traffic grew, refrigeration and packaged foods became the norm, and small family farms and garden plots gave way to residential, industrial, and commercial developments.

In summary, portions of the watershed were used by inhabitants throughout history to cultivate and raise food supplies. Agricultural and ranching practices brought by the Euro-Americans and other settlers altered the shape and function of the watershed. Rather than relying upon fire and natural water and wildlife cycles for food supplies, the watershed's new inhabitants relied upon water diversions, hybrid seeds, and domesticated animals. The effects of abandoning fire as a means of land management and of diverting water from its natural course are still being studied. In general, agriculture and ranching practices introduced by settlers were more intensive than the previous land management practices used by the Native American inhabitants.

2.2.6 Water Resources and Infrastructure

The Sacramento River is the largest river system in California and accounts for an average annual discharge of 21.6 million acre-feet of water into the Sacramento/San Joaquin River Delta (Bureau of Reclamation 2003). The entire Sacramento River watershed encompasses 27,210 square miles, with

the upper Sacramento River portion of the watershed accounting for approximately 6,500 square miles of this total (Bureau of Reclamation 2003).

While other types of water infrastructure (e.g., wells, diversions, etc.) have surely been constructed throughout the history of settlement in the watershed, none have had the impact that Shasta Dam and Box Canyon Dam have had on not only the landscape of the local areas, but on the water supply, water quality, power supply, agricultural economy, and recreation opportunities for the state. Therefore, these two water infrastructure features are the focus of this section.

Shasta Dam

On March 25, 1936, the United States and the California Water Project Authority executed a cooperative agreement to coordinate the Central Valley Project (CVP) and the California State Water Project (Bureau of Reclamation 1984). The CVP is an ongoing federal water project implemented by the Bureau of Reclamation in 1935 as a long-term plan for the use of water in California's Central Valley. The purpose of the CVP is to redistribute water in the Central Valley from the more abundant supplies available in its northern portion to its drier southern portion. Such transference of water across the Central Valley allows for the production of hydroelectric power, flood control, and improved navigability of the lower reaches of the Sacramento River. The CVP also allows for the development of water supplies for cities and towns in the Central Valley.

At the time it was conceived, Shasta Dam was viewed by both the federal and state governments as the key to the CVP (Bureau of Reclamation History Program 1994). The location of Shasta Dam and the reservoir created by it would accomplish several goals, including water storage for irrigation and salinity control in the Delta; flood control to protect communities along the Sacramento River; and power generation. The resultant structure, completed in 1945, is the second-largest dam in the United States, behind the Grand Coulee Dam in Washington (Bureau of Reclamation 1984). It measures 602 feet in height and is 3,460 feet across. Feeding the Shasta power plant, the dam's spillway is the largest man-made waterfall in the world (Bureau of Reclamation 1984).

The construction of Shasta Dam had a tremendous influence on the watershed (USDA Forest Service 2000). With the onset of construction in 1937, thousands of workers poured into the area, settling primarily south of the project area; however, numerous work camps sprang up in the area ultimately inundated by the reservoir, as the CCC and various contractors cleared the area of timber and brush (Bureau of Reclamation History Program 1994). Although the watershed had been populated to some degree prior to construction of the dam, communities in the region (including those within the watershed) experienced staggering growth rates after the beginning of construction of the dam. Smaller increases have persisted over the subsequent years.

As discussed in Section 2.1.4, *Native American Fisheries*, fish resources in the upper Sacramento River and its tributaries were historically a vital part of the local Native American culture. Salmon, steelhead, Sacramento sucker, freshwater shellfish, and lamprey were gathered in communal fish drives, which brought Native American communities together, providing opportunities for trade and social networking. The building of Shasta Dam curtailed the movement of anadromous fish throughout the watershed and disrupted the traditions and utilitarian uses associated with fisheries resources that had been a part of Native American culture.

Construction of the dam also triggered the development of additional roads and transportation infrastructure throughout the lower portion of the watershed (USDA Forest Service 2000), including the double-duty Pit River Bridge. Completed in 1941, the bridge allowed for the continued passage of train and vehicle traffic along the upper Sacramento River corridor.

Shasta Dam first began spilling on May 18, 1952 (Bureau of Reclamation History Program 1994). In 1955, the Bureau of Reclamation temporarily stopped the flow of water from Shasta Dam. Subsequently, the state claimed the lowered water levels of the Sacramento River downstream of the dam allowed levee banks to slip (Bureau of Reclamation History Program 1994), setting a precedent for the continuous release of water from the dam. However, perhaps the greatest environmental effect that resulted from the construction of Shasta Dam is its impact on anadromous fish. Completion of the dam effectively blocked access to approximately 110 miles of spawning habitat historically used by salmon and steelhead and an unknown amount of habitat for white sturgeon (USDA Forest Service 2001). The rising environmental movement, which came into its own in the early 1970s, including the federal Endangered Species Act of 1973 (see Section 2.3, *Evolution of Laws and Regulations Affecting the Watershed*), created more controversy around the CVP, particularly with regard to salmon and trout (Bureau of Reclamation History Program 1994). Fish traps and hatcheries combined to move the migrating fish upstream or artificially breed them, but they could not keep pace with the decreasing population of migratory aquatic wildlife (Bureau of Reclamation History Program 1994). Shasta Dam not only blocked migration upstream, but it blocked the flow of cool water downstream, keeping water temperature above the maximum 56 degrees Fahrenheit (˚F) necessary for the spawning salmon (Bureau of Reclamation History Program 1994). A comprehensive discussion of the effects of Shasta Dam on fish resources of the Upper Sacramento River watershed is provided in Chapter 3.

The building of Shasta Dam and creation of Shasta Lake had social effects as well, both positive and negative. The creation of Shasta Lake led to a surge in recreational use of the lower portion of the watershed. Boating, fishing, swimming, and other water-based activities, as well as more passive uses such as picnicking, camping, and site-seeing continue to contribute to the regional economy. Although much of the land surrounding the lake is federally owned, many homesites have been developed on available private lands around the shoreline and throughout the extent of the upper Sacramento River Arm.

The construction of dams throughout the western United States has been a major cause of cultural disconnection from the landscape for many people. The Winnemem Wintu have experienced a serious disconnect from their traditional lands since the building of Shasta Dam and subsequent creation of Lake Shasta. Their traditional ceremonial grounds, family burial plots, resource procurement areas, villages and general connection to the Winnemem sense of place as it relates to the local natural environment have been and continue to be impacted by the existence of the dam, lake, and associated recreation.

Box Canyon Dam

In 1969, Box Canyon Dam was completed, creating Lake Siskiyou. The dam significantly affected processes controlling channel morphology and water quality (USDA Forest Service 2001). While the Sacramento River above Lake Siskiyou remains unregulated and subject to seasonal fluctuations, the reservoir and dam completely cut off the supply of sediments and bedload (i.e., the sand, gravel,

boulders, or other debris transported by rolling or sliding along the bottom of a stream) to the Sacramento River immediately below the dam (USDA Forest Service 2001, SHN Consulting Engineers & Geologists 2004). Lake Siskiyou serves as a kind of detention basin, blocking the traditional movement of bedload and suspended sediments downstream. Changes in flow and sediment transport affect the temperature and flow regime of the Sacramento River beyond the local watershed (SHN Consulting Engineers & Geologists 2004).

Siskiyou County is a significant landholder around Lake Siskiyou. These lands were acquired to facilitate construction and operation of the Box Canyon Dam and provide recreational opportunities, including water-based recreation and camping. Of the 2,240 acres owned by Siskiyou County, approximately 550 acres are below the ordinary high water mark of the reservoir, 1,390 upland acres are adjacent to the lake, and approximately 300 acres have been set aside as deer winter range (SHN Consulting Engineers & Geologists 2004). Flood control and water conservation in Siskiyou County is managed by the Flood Control and Water Conservation District.

2.2.7 Recreation and Tourism Management

The upper Sacramento River watershed area has a rich history of recreation and tourism. The rivers, lakes, and mountainous terrain create different venues for outdoor recreation enthusiasts, including hiking, camping, fishing, hunting, and boating. The beauty, mineral springs, and recreational opportunities in this area have been promoted by both private and public organizations since the late 19th century. In addition to the many publicly owned recreational facilities, there are many privately owned facilities, including boat ramps, boat rentals, RV parks, and campgrounds.

Resorts

The establishment of resorts in the Upper Sacramento River watershed was largely driven by the Southern Pacific Railroad (SPRR) and the belief that the mineral springs throughout the watershed offered healing powers for the sick and infirmed. The earliest facilities got their start as crude inns that opened along what was known as the Sacramento Trail. Soda Springs became a prime stopping point because it was the last time travelers would cross the Sacramento River if heading north and the first time if they were heading south. The Upper Soda Springs area included a large meadow and a mineral spring, making it an advantageous location to stop. The Lockhart Brothers, Harry and Samuel, recognized an opportunity and constructed a cabin for these early travelers in 1852. They operated their inn until 1855, when they sold it to Ross and Mary McCloud, who continued to operate the inn. In 1859, the widening of the Sacramento Trail created a road large enough to accommodate stagecoach and wagon traffic. As a result, settlers established numerous small inns along the road to accommodate the increased road activity (Masson and Masson 1985).

In the 1880s, the SPRR reached the Shasta Cascade area and it quickly created a tourism industry by making the area more accessible. More and more residents from the San Francisco Bay Area and Sacramento would take the train to enjoy the wonders of the Sacramento River canyon. To accommodate these travelers, innkeepers constructed larger and more elaborate resorts to replace the smaller, more rudimentary facilities. Perhaps the most successful of these large resorts was the Upper Soda Springs Resort. The Upper Soda Springs Resort was built by Isaac Fry, a former Mississippi riverboat operator who married Mary McCloud after her husband's death. Fry built the hotel with verandas that stretched the entire length of the building and resembled a riverboat. Enhancements to

the property continued into the 1880s. Because the resort was constructed on the main line of the SPRR and was located 15 miles from Mount Shasta, it served as a popular destination among railroad travelers. It was the place to visit for distinguished guests and functioned as a popular resort for thirty years (Masson and Masson 1985).

Shasta Springs Resort was another successful resort that catered to the railroad traveler. It was located on the upper Sacramento River, just north of Dunsmuir and Upper Soda Springs. It was billed as having many of the "finest springs" on its property and was promoted for its potential for improved health. Its "altitude, combined with the tonic effects of the balsamic air and the health-giving properties of the mineral waters" were ideal for a guest's health (Southern Pacific no date). Other amenities offered were scenic views, swimming, and croquet and tennis courts. The resort featured all the modern amenities available at the time, while still maintaining its quiet, natural surroundings. Historic photographs depict guests relaxing on the hotel's deck, drinking the mineral water, and strolling the hotel's grounds. The resort remained popular through the 1940s, eventually closing in the 1950s (Shasta Resorts 2008).

The SPRR played an important role in promoting the resorts and the Shasta Cascade's beauty. The company published brochures and offered excursion rates throughout the area. Its Pacific Improvement Company purchased the existing hotels and resorts scattered along the SPRR line and made improvements. The Castle Crag Tavern is one such example. The original hotel was destroyed by fire in 1890 and a second hotel was constructed in its place two years later. In addition to the hotel, there was a clubhouse and private dining room for children and their caregivers. The hotel could accommodate 300 guests and offered bridle paths and hiking trails. In 1900, the hotel was again destroyed by fire and was never rebuilt, but the Pacific Improvement Company continued to the lease the grounds and a hotel was operated, albeit unsuccessfully, for many years out of the former summer home of Charles Crocker, who had constructed his house across from the original hotel (Masson and Masson 1985, Schönewald no date).

Auto Camps

The automobile greatly changed the tourist industry in Shasta and Siskiyou counties. The resort hotels were located along the railroad, making it easy for visitors to reach their destination, but as automobiles became more popular, fewer tourists preferred to travel by rail. Because of varying road conditions, automobiles could not easily travel into the canyon, requiring travelers to seek out accommodations closer to the main roads. Auto travelers would often camp at tent sites or cabins, with water, wood, and cots or beds supplied by the campsite owners. Some of the older, established resorts closed rather than try to accommodate the new tourists, while others adapted and remained profitable (Masson and Masson 1985).

Brown's Auto Camp, built and operated by Clint and Ida May Brown, successfully adapted to accommodate the automobile tourist. In 1916, the Browns assumed management of Castle Crags Resort. However, as Clint aged, the responsibilities of maintaining the facility became too strenuous. In 1922, he and Ida May purchased land that was already being operated as a campsite for automobile travelers. The Browns moved there permanently in 1925. They added showers and toilets and set about making additional improvements to the facilities. Through their efforts, six cabins and tent platforms were added along the river, in addition to the construction of their own residence and a store closer to the highway. The following year, they replaced the tent platforms with double cabins

and constructed some small cabins at the top of the hill with a community bathroom and laundry facility nearby. By 1929, they had expanded their facility, and it was known as Brown's Auto Camp. The auto camp struggled through the Great Depression of the 1930s, and in 1946 Ida May sold the auto camp after her husband's death. In 1950, the facility became known as Brown's Modern Motor Lodge and featured modernized shower and laundry facilities. The name eventually changed to Cave Springs. By the late 1950s, the automobile and tourism industry continued to evolve. Increasingly, automobile travelers were drawn to vehicles providing comfort on the road, including large sleeping trailers. Cave Springs evolved, and by 1967 it was remodeled with a swimming pool and room for RV parking (Masson and Masson 1985).

Water Sports

Water sports became increasingly popular in this area with the creation of Shasta Lake, which continues to be one of the most visited recreation destinations in the area. Today people enjoy houseboating, boating, and waterskiing, in addition to fishing and camping at Shasta Lake. In 1968, Lake Siskiyou was created by the construction of Box Canyon Dam. This man-made reservoir is unique in that the primary purpose for which it was created was for recreation and fisheries enhancement. Its primary focus was fishing, and it is the only lake that offers anglers the opportunity to fish for both cold and warm water species of fish. Like Shasta Lake, Lake Siskiyou continues to be a popular recreation destination for tourists. Boat launches, campsites, RV parks, hiking trails, and a golf course were all constructed in the immediate vicinity of Lake Siskiyou (SHN Consulting Engineers & Geologists 2004).

Other Recreational Activities

Recreational activities in the watershed encompass a variety of winter and summer sports; mountaineering, skiing, hiking, camping, fishing, hunting, boating, and pleasure driving are but a few. The early resorts offered tourists opportunities to enjoy the great outdoors. The area was promoted as having an amiable climate with warm days and cool nights. All areas offered access to fresh water and plenty of fish and game. One publication promoted camping in the area as: "Exercise moderately; have games and music for the evenings around the camp fire; go to bed early; get up early; make life as wholesomely enjoyable as you can" (Schönewald no date). Fishing and hunting were particularly promoted in the early tourist years. The resorts, the SPRR, the counties, and the California Fish and Game Commission (Commission) created brochures describing the best places to hunt and fish. Since its inception in 1870, the Commission's goal was the preservation and protection of California's fishing population. This was the first wildlife conservation program in the United States, and it was responsible for setting sport hunting and fishing seasons in Shasta and Siskiyou counties.

Interest in preserving the natural beauty and the areas where outdoor recreation could be enjoyed has always been important in the region. In 1928, Californians approved bond money to begin buying lands for the creation of state parks. The newly established State Parks Commission completed a statewide survey, headed by Frederick Law Olmstead, for potential state park lands. Castle Crags was considered for acquisition and the Castle Crags Wilderness Association, created in 1930, raised half the money required to purchase Castle Crags and assist the state in establishing the park. In 1933, the State Park Commission authorized the purchase of 925 acres to establish Castle Crags Wilderness State Park. What has been described as a "…most picturesque glacier-carved mass of

pinkish-white granite" (Stahl 1989) that was historically enjoyed by many, today features 76 campsites, 28 miles of hiking trails, fishing, and swimming areas.

2.2.8 Transportation History

Transportation infrastructure in the Upper Sacramento River watershed was minimal prior to the 1850s. The area originally included incomplete makeshift mule and wagon trails used by Native Americans long before the California Gold Rush of 1848. During those years, Native Americans likely navigated the trails along the river for hunting and trade with other local Native American groups. By the mid-19th century, Euro-Americans began streaming into the state, often by way of the Sacramento River canyon. This influx initiated the development of roads and other transportation routes. Over time, wagon and trapper trails were reconstructed to create state highways, which were eventually renamed or reconstructed to form the interstate highway system. Additional transportation development in the area during the 20th century included tramways and the railroad. Because of the steep slopes and narrow canyon walls of the upper Sacramento River canyon, most of the transportation infrastructure had to be funneled through the canyon along the river. As a result, relatively few east-west routes intersect this north-south corridor (Giles 1949, Smith 1995).

Early Roads/Trails and Highways

One of the first major trails in the area was the Siskiyou Trail. During the 1810s, the trail consisted of a system of narrow pathways created by Native Americans that connected California's Central Valley to the Pacific Northwest, traversing through Shasta County along present day Interstate 5. In the 1820s, the trail was further defined by use from the Hudson's Bay Company fur trappers. In 1834, trapper Ewing Young of the Willamette Cattle Company led a herd of horses and mules from California to Oregon via this trail. Three years later, Ewing Young and his group traveled the trail with a group of 700 cattle. The 3-month journey resulted in the further widening of the Siskiyou Trail (Dillon 1975).

Early roads in the area included the Lockhart Road, the Walla-Walla Trail, and Ross McCloud's stage road. Native Americans established the Walla-Walla Trail by 1846, and Sam Lockhart opened the Lockhart Road in 1855 when he led a group of 35 wagons from Yreka in a southerly direction to the Pit River. Also during that year, Ross McCloud surveyed the McCloud road, which ran from Shasta to Soda Springs and was eventually widened and extended further north to Yreka (Giles 1949, Masson 1949).

Following the Gold Rush, incoming miners from out of state journeyed to Trinity, Siskiyou, and Shasta counties along the Siskiyou Trail at an increasing rate. The trail eventually served as a major transportation artery known as the California-Oregon Road. By 1856, the Central Pacific Railroad (CPRR) completed tracks from Roseville through Shasta County following the California Oregon Road alignment. Historic records indicate the California-Oregon Road was improved by 1901. Also by that time, an unimproved road extended along the Sacramento River, beginning at what was known as Gregory Bard (near present-day Dunsmuir) and ending at the Morley Wintun Lodge (near present-day Sims (Dillon 1975, Giles 47-4).

Creation of the Shasta and Trinity National Forests in 1905 began a period of significant road development throughout the watershed because development of the region's natural resources

required increased access. Road construction, particularly in the upper watershed, became a priority of federal land managers, with the most significant period of construction occurring between 1920 and 1945 (SHN Consulting Engineers & Geologists 2004).

U.S. Highway 99 and Interstate 5

The California-Oregon Road, also known as the Redding-Yreka Stage Road, and the Soda Springs and Pit River Turnpike, evolved over time with increased use. The advent of the automobile by the 1920s induced newly formed motor clubs to organize auto trails and various sightseeing routes. The Pacific Highway, which followed the Siskiyou trail closely, particularly from Stockton, California to Vancouver, Washington, was one such organized road. In 1915, the California State Highways Act resulted in the designation of the California-Oregon Road as the Pacific Highway/State Highway 3. Ten years later, the American Association of State Highway Officials created the U.S. Highway numbering system, and the Pacific Highway/State Highway 3 was renamed U.S. Highway 99. In 1956, Congress passed the Federal Aid Highway Act, thereby creating the Interstate Highway System. The state renamed existing highways interstates and began new construction to replace previous main roads. Construction of Interstate 5 over Highway 99 north of Red Bluff was primarily completed between 1960 and 1965, following a portion of Highway 99. Each time the route was upgraded, the alignment stayed roughly the same, following along the Sacramento River through the upper Sacramento River watershed. This route remains the primary north-south route in use to the present day (California Department of Transportation 2008).

Tramways

Tramways have also played a role in the transportation history of the Sacramento River canyon area through Shasta and Siskiyou counties. Tramways were triggered by local miners' need for hauling equipment. Tramways involved a cable and pulley system used to carry ore from local mines to nearby railroad lines, where it was then transported to nearby smelters. Constructed of heavy cables, tramways also included iron buckets and apparatuses affixed to a series of elevated towers the length of the tramway route. Frequently associated with ore bunkers, main line railway sidings, warehouses, and dwellings, tramways were difficult to build and expensive, often involving the erection of many high towers at inaccessible locations (Colby 1982, Finlay 1920, Smith 1995).

Specific tramways in the watershed included the Balaklala Mine Tramway, (closed in 1911), the Iron Mountain Mine Tramway, the Hornet Mine Tramway, and the Mammoth Mine Tramway. The Hornet Mine Tramway began operation in 1921, constructed by the Iron Mountain Copper Company to replace the deteriorated Iron Mountain Railway. The tramway was located close to the Hornet Mine south of Redding. It began operation in late 1921, was extended 1 mile in 1953, and operated intermittently into the 1970s. Balaklala Mine owners constructed the Balaklala Mine Tramway, which ran from Coram and traveled straight up the Sacramento River canyon. The Balaklala Mine Tramway operated from 1906 to 1911 (Colby 1982, Finlay 1920, Smith 1995).

Railroads

During the 1850s, California expanded its transportation infrastructure to include both major and minor rail lines. Railroad transportation in the Sacramento River canyon area began during the

1870s, when major transcontinental lines increased to include several small, local lines that were primarily used to haul lumber (Colby 1982, Parsons 2003b).

Early railroads in the watershed included the Iron Mine Railroad, constructed by the Iron Mountain Railway Company in 1895. The 11-mile railway ran from a local mine to a smelter via Spring Creek, connecting with the Southern Pacific mainline at the mouth of Spring Creek. A rail line known by the names "Old Diggings Railroad," "Quartz Hill Railroad," "Central Mine Railroad," and "Mammoth Mine Railroad" was established by the early 1900s. This rail line was used to haul copper ore out of the surrounding mountains for processing at smelters in the Redding area. The railroad once extended a narrow gauge line approximately 5 miles from the mine at Quartz Hill to the Central Mine Spur located between Keswick Station and Motion, just west of the Sacramento River canyon area (Colby 1982, Smith 1995).

By 1920, the Iron Mountain Railway Company was faced with the line's extreme deterioration. Additionally, new regulation by the Interstate Commerce Commission and the Railway Commission of the State of California resulted in the need to upgrade the line. However, rather than refurbish the line, the Company built an aerial tramway system, a form of transportation not subject to restrictions, taxes, and controls imposed on common carriers. In 1921, after railway operations were ceased, the Iron Mountain Railway machine shop was moved from Keswick to a location more convenient to both iron Mountain and the Hornet mines (Smith 1995).

The first railroad in the Shasta area traveled from Sacramento valley to Portland, Oregon. The line was provided for by the U.S. Congressional Act, which passed on July 25, 1866. By the 1870s, the California and Oregon Railroad Company incorporated and consolidated with the CPRR, led by Sacramento merchants Leland Stanford, Charles Crocker, Mark Hopkins, and Collis Huntington, also known as the "Big Four." The company's chief engineer was Theodore Judah, formerly with the Sacramento Valley Railroad. In 1872, due to financial difficulties, construction of the line stopped just south of the Sacramento River canyon at present day Redding. Work resumed in 1883 and approximately 2,000 manual laborers, many of them Chinese, constructed roadbeds, drilled and blasted rock, and laid ballast ties and rails. By 1887, laborers completed construction on the Sacramento River canyon route and express cars began running on the tracks (Parsons 2003b, Smith 1995).

The first passenger rail was constructed by 1888 and included express trains running between Portland, Oregon, and Oakland, California, passing through the Sacramento River Canyon Route, also known as the Shasta Route. The rail carried Pullmans, coaches, dining cars, and immigrant sleeper cars. In 1942, in order to avoid conflict with the construction of Shasta Dam, a section of the main line was relocated to its new location between Redding and Delta. Five years later, because the newly constructed Keswick Dam resulted in rising waters, SPRR laid tracks adjacent to Iron Mountain Road as a spur line to haul ore. In 1962, when Iron Mountain mine ceased operation, this line was closed. Tracks remained in place until the late 1980s, when they were dismantled and sold (Smith 1995).

In 1885, when SPRR assumed operation of the CPRR, it added tracks connecting the Sacramento Valley to California's northern border. That northern boundary eventually connected with an Oregon line, extending south from Portland. On December 17, 1887, the project was completed and the event was recognized with a local celebration at Ashland, Oregon. During the 1890s, the Union Pacific Railroad (UPRR) acquired SPRR. Today, the UPRR traverses the entire length of Shasta and

Siskiyou counties, paralleling both Interstate 5 and the Sacramento River (Parsons 2003b, Smith 1995).

2.2.9 Communities in the Upper Sacramento River Watershed

The upper Sacramento River watershed historically contained many small communities and towns built in support of lumber mills, mining ventures, recreational locales, or transportation hubs. These communities often contained nothing more than a few cabins for housing located near the main economic focus of the area, be it a sawmill, mine, railroad yard, stage stop, or gas station (Figure 2.2-1).

One of the earliest communities in the watershed, alternately called Dog Creek or Dogtown and later Delta, was located at the confluence of Dog Creek and the Sacramento River. Gold was discovered along Dog Creek in 1850, and by 1858, approximately 1,000 miners were living in the area (Vaughn 2007). By 1880, the gold mines had played out, and the community was reduced to 25 persons. With the northward construction of the railroad, many stops and stations were created. Some of these stops were for loading and unloading cargo, including agricultural products, lumber, or mining products. Therefore, they were rather insubstantial in infrastructure. However, many stations were more substantial because they were the end of the line at the time, or, like Dunsmuir, they contained yards and plants related to the railroad infrastructure. Delta, located at the confluence of Dog Creek and the Sacramento River, was the end of the line for the railroad until 1886, when construction on the California and Oregon Railroad in the Sacramento River canyon continued (Vaughn 2007). In 1875, a post office was established at Delta, which was renamed Bayles in 1884 for the first postmaster (Gudde 2004).

Delta was also a stage stop on the California-Oregon Road, also known as the Soda Springs and Pitt River Turnpike toll road and the Redding and Yreka Stage Road, and the beginning point of the Shasta and North Trinity River toll road leading to the mining regions of the upper Trinity River watershed (Vaughn 2007, Klein and Yin 1994). At its height, Delta contained hotels and saloons as well as two stores, but began to decline after the completion of the railroad through the canyon (Vaughn 2007). In the 20th century, after the construction of Highway 99 in 1914, the area had a small camp resort with facilities for six guests and a combined gas station/garage/store/restaurant near the highway. The remaining area was used for agricultural purposes, such as grazing and strawberry cultivation (Vaughn 2007). After 1945, the store and resort closed, and by 1967 the buildings were removed (Vaughn 2007).

Delta exemplifies the use of the watershed, especially in the steep walled canyon area. Communities arose around an industry, be it mining, lumber, or transportation, and declined when the industry moved, closed, or became unimportant. Declines were followed by a brief respite as a result of an interest in recreation fueled by the creation of the early 20th century highway system. However, this brief respite was followed by a steady decline in the latter half of the 20th century.

Kennett (Figure 2.2-2), named after a CPRR stockholder, was established in 1883 as a station on the California and Oregon Railroad line (Elliott 1991), and was a shipping center for the gold mines in the hills west of the Sacramento River. A post office was established there in 1886, and service continued until 1942 (Durham 1998). In 1886, copper mining began in earnest in the Hills

11x17 Figure

Figure 2.2-1. Communities

Blank back of 11x17 Figure

surrounding Kennett (Hayes and Lindgren 1910). One of the largest copper mines in Shasta County, the Mammoth mine, and several smaller but important mines were located west and northwest of Kennett. The infrastructure of these operations, however, was located in Kennett itself. The Mammoth mine operation included a sawmill, machine shops, railways to move ore, a smelter, worker housing, and other buildings all located at Kennett (California State Mining Bureau 1916). Partly in response to litigation over the loss of forests and environmental impacts caused by the toxic smelting process, a "bag house" (towers containing woolen bags to capture the fumes from the smelting process) was built at the smelter in 1910 (Department of Conservation 2000, California State Mining Bureau 1916).

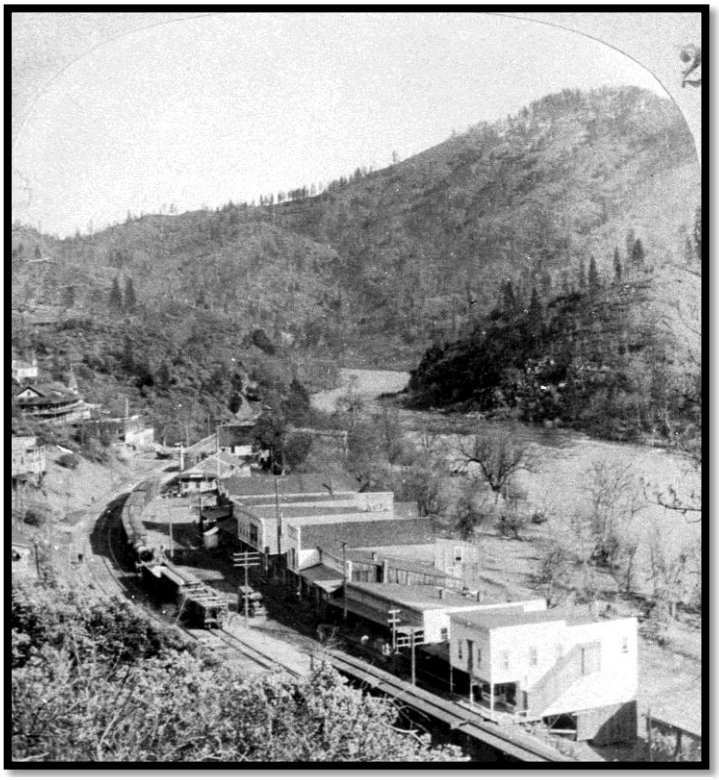

Figure 2.2-2. Photograph shows general view of Kennett, California, ca. 1907. Photograph by Earl A. McGarry. Photo Credit: California State University, Chico, Miriam Library, Special Collections. Donor: Harold Lapham.

The Holt and Gregg Limestone Quarry was also located near Kennett. The operation quarried limestone, which was then sent on an electric railroad to a kiln at Kennett for processing (California State Mining Bureau 1916). This quarry and several others like it in Shasta County provided an important ingredient, lime, needed for the copper smelting process. Kennett's copper production hit a high in the second decade of the 20th century, and the copper industry experienced a boom time during WWI, when copper was required for munitions and other materials associated with the war effort. After WWI, the decreased demand for copper, coupled with the litigation over environmental damage caused by smelting and the high cost of shipping the ore to other locations for refining, caused many of the copper mines to close. The smelter at the Mammoth mine was the last one in operation in the area, closing in 1924, and by the mid-1920s, copper mining as an industry in Shasta County had effectively ceased (Department of Conservation 2000). Kennett as a town continued until the Depression, but the town dis-incorporated in 1933 (Schuldberg 2005). In 1935, the Bureau of Reclamation began surveying the Kennett area to find a suitable location for a large dam, and in 1937, construction work on the infrastructure, including work camps and exploratory drilling, of Shasta Dam began (Bureau of Reclamation 1994). By 1950, construction on the dam and all related infrastructure was completed, and Kennett was buried under the waters of Shasta Lake (Bureau of Reclamation 1994).

Although it never achieved the status of community, the location of Sims, alternately called Sims Station, Southern's Stage Station, or Southern's Hotel and Stage Station, has a unique and important place in the history of California and the upper Sacramento River watershed. Originally the location

was the site of a log cabin built in 1859 by Simeon (Sims) Fisher Southern, who had settled in the area of Hazel and Mears Creeks, that was used as a trading post along the Siskiyou Trail (Smith 1999). He expanded his operation to include a hotel and corrals for fresh horses for the new stage line when the trail was improved to a road. The hotel became widely known as an early sportsman's resort perfectly located for hunting and fishing, and was visited by many persons prominent in California and United States history (State of California Office of Historic Preservation 2008). The United States Postal Service opened an office, the Hazel Creek post office, in the hotel in 1877, and Southern acted as postmaster until his death (Delay 1924). In 1887, Southern deeded over a right of way to the Oregon-California Railroad, and the railroad placed a station near the hotel. The location is now California Historical Landmark No. 33, Southern's Stage Station, and the monument marker is located on old Highway 99, near the Sims exit off Interstate 5.

Although copper and gold mines were located well to the south of Sims, other materials were found in the area. The Anaconda Mine, an asbestos mine owned by the Pacific Coast Asbestos Company, was in operation in the late 19th century and was still noted on an historical map of the Shasta National Forest in 1934 (USDA Forest Service 1934). With the interest in fisheries for sport and commercial use high in the 19th century, the Board of Fish Commissioners for California decided to place two egg-collecting stations in the Sims area, one on Mears Creek and one on Hazel Creek. Unfortunately, the water was too low during the years of operation for a good take of fish so the stations were abandoned and moved elsewhere. A sawmill was also located at Sims shortly after the turn of the 20th century, and the surrounding hills were heavily logged during that time (Smith 2007). Finally, a Civilian Conservation Corps (CCC) camp was placed at Sims in 1933 (Smith 2007).

One of the best-known projects of the New Deal of the 1930s was the CCC. The CCC was created in 1933 by Franklin Roosevelt as one of many programs designed to combat the unemployment and economic downturn created by the Great Depression. The focus of the work conducted by the CCC was restoration of forests, conservation and reclamation projects, and infrastructure construction, such as roads and communication lines (Oregon Coast Magazine Online no date). Approximately 150 camps were created in California, including three in Shasta County, with Company 978 stationed at Sims (Oregon Coast Magazine Online no date, California Genealogy and History Archives 1938). Company 978 constructed trails, campgrounds, and other infrastructure in the newly created Castle Crags State Park, and also built a cable suspension bridge spanning the Sacramento River at Sims (California Genealogy and History Archives 1938). With the start of World War II, attention and funds moved away from domestic conservation to support the war effort, and by 1943 the CCC had been disbanded (Oregon Coast Magazine Online no date). The camp at Sims was closed by 1939, and today only the suspension bridge and rock lined paths and stairs remain (Smith 2007).

Resorts

As discussed in Section 2.2.7, *Recreation and Tourism Management,* the upper Sacramento River watershed contains many mineral springs, some of which have been exploited in the past as healthful waters with resorts and spas built around them. Others have been used for commercial enterprises. One of the best-known mineral springs is Shasta Springs, located several miles north of Dunsmuir. In 1887, railroad construction had progressed to the area and the springs became a station and water stop for trains (California State Mining Bureau 1916). In 1889, the Mt. Shasta Mineral Springs Company was founded, and bottling of the mineral waters began. A resort soon followed (Figure 2.2-3). A

railroad station and gift shop, incline tram station, and bottling plant were all located along the Southern Pacific Railroad tracks, while the rest of the resort, including the main hotel, dining room, clubhouse, cabins and cottages, was located above the river canyon on the plateau (Drury and Drury 1913). The resort was open until the 1950s, when it was sold. The bottling plant remained in operation at least through the 1920s, shipping water in glass-lined redwood railroad cars to bottling plants in the western states (Shasta Soda Museum no date). With the introduction of ginger ale in 1931, the Mt. Shasta Mineral Spring Company became Shasta soda (Shasta Soda Museum no date).

Figure 2.2-3. Photograph shows the scenic railway, Shasta Springs, California, ca. 1907. Photo Credit: California State University, Chico, Miriam Library, Special Collections. Donor: Pioneer Museum, Oroville, California.

Other resorts that were popular during the late 19th and early 20th centuries and were centered on springs include Castle Crags Soda Springs and Upper Soda Springs. Castle Crags Soda Springs, owned by Pacific Improvement Company, consisted of log cabins, a dining room, clubhouse, social hall, and casino located near Castella (James 1914, California State Mining Bureau 1916). Waters from the mineral springs located at Castle Crags, alternately called Castle Rock, were sold on the market around the turn of the 20th Century (California State Mining Bureau 1916). Upper Soda Springs was originally a traveler's stop on the Siskiyou Trail. A toll bridge and inn were established in 1855 by Ross and Mary McCloud, and with the arrival of the railroad, the resort was established (California State Mining Bureau 1916). A larger inn and an improved spring were built, and the resort was open until the 1920s.

With the introduction of the automobile and the creation of Highway 99, the resorts and recreation in the watershed became more focused on camps and campgrounds rather than train access resorts. Auto and trailer camps along with gas stations and stores sprang up along the highway at such places as Shiloah Springs and Pollock (Federal Writer's Project 1939). In 1933, Castle Crags State Park was established. The CCC stationed at Sims worked on the infrastructure of the park, including roads and trails, campsites, and public restrooms, creating a popular camping destination (Dietzel 2008).

Stage Stops, Railroad Stations, Post Offices, and Homestead Ranches

The Southern Pacific Railroad was the main transportation corridor through the upper Sacramento River watershed from the 1880s until the construction of Highway 99 in the 1920s (the rail line is still used for cargo). Many of the earlier stage stops along the California-Oregon Road lay near the rail line and were selected as stations for cargo loading, water and fuel loading for the engines, and as

passenger stops. Other stops were placed near economically important areas such as mills or mines. These stations became important hubs in the commerce and social life of the watershed, often becoming small communities or resorts. Stations, water stops, and other stops from south to north include Kennett, Pitt, Elmore, Antler, Delta, Lamoine, Gibson, Sims, Conant, Castella, Castle Rock, Castle Crags, Dunsmuir, Upper Soda Springs, Shasta Retreat, Shasta Springs, Cantara, Mott, Sisson (modern-day City of Mt. Shasta), and Upton (Drury and Drury 1913) (see Figure 2.2-1).

Many of these railroad stops had started out as stage stops, travelers' rests, or homesteads that doubled as stops on the Oregon-California Road/ Redding-Yreka Stage Road. Many of them were named for the original owners of the property such as Sims and Smithson, and others were named for local pioneers like Gibson, or for investors in the railroad or stage road ventures like Dunsmuir. Several also hosted post offices for a period. Kennett was the southern-most post office in the watershed. The next post office location changed names and specific locations but remained within a small radius and was known alternately as Antler, Gregory, Halcyon, and Smithson. The post office at Delta was also known as Bayles (Dunham 1998). The Lamoine area was known as Pollock, Portuguese Flat, Slate Creek, and Slatonis, while Sims was known as the Hazel Creek Post office (Dunham 1998). Castella's post office is still in operation, although the next post office to the north at Eubanks no longer exists. Dunsmuir still operates a post office, while the Shasta Retreat office and the Mott office have shut down (Dunham 1998). The Berryvale post office has undergone several name and location changes and is now the City of Mt. Shasta office (Dunham 1998). At times, these offices have offered services to as few as 50 people; however, they usually marked a center of community for their areas.

Mill Towns and Mining Towns

The upper Sacramento River watershed has been exploited for mineral and timber resources since the earliest days of the State of California. Many small communities have risen and fallen with the mining and timber industries. The better known mining towns include Dogtown, a gold era town near present-day Delta; Kennett, a copper town now under the waters of Shasta Lake; Portuguese Flat, a gold era community; and Castella, with chromite deposits located in the nearby Castle Crags (California State Mining Bureau 1916, Vaughn 2007). The communities all experienced boom and bust cycles, with some towns disappearing altogether after the depletion of the ores and others changing industries and persisting to the present.

The mining industry spawned the timber industry in the watershed. Several sawmills and towns were advantageously located near large timber stands and along the major shipping corridor of the railroad. Lamoine, Castella, Dunsmuir, Mott, Soda Creek (Castle Rock), and Sims all housed sawmills and logging operations of varying sizes. Lamoine was the headquarters of the Lamoine Lumber and Trading Company created in 1898 by the Coggins Brothers (Gudde 2004). This operation harvested timber in the hills surrounding Lamoine using not only oxen and horses, but also using a railroad system (Orre 1999). Extensive tracks were laid through the forest to aid in bringing the timber to the mill. In 1917, a large fire destroyed much of the town and sawmill, and, in 1922, the logging equipment was sold to the Solinsky mill in Castella (Orre 1999). Mott experienced a similar bust and boom cycle. The Red Cross Lumber Company operated a sawmill at Mott until 1891, when a large fire "destroyed the mill and surrounding timber" (Orre 1999). The lumber company then transferred operations to Soda Creek near Castella (Orre 1999). Castella became the largest of the lumber towns

at the turn of the 20th century, supporting at least 10 different operations between 1800 and 1960 (Dietzel 2008).

A timeline of some of the major events in the recent history of the watershed is presented as Figure 2.2-4.

2.3 Evolution of Laws and Regulations Affecting the Watershed

2.3.1 Mining

Mining Claims

In 1848, gold deposits were discovered in California. This stimulated tremendous controversies as to how the minerals should be disposed of. Most of the controversy was between the federal government and the State of California.

The earliest governments and laws established by the Euro-American settlers in the watershed created mining districts and laid the ground rules for establishing a mining claim. Equally important to the miners were the rules of abandoning a mining claim. These rules were a means to settle disputes arising from gold fever and an attempt to curb the increasing chaos. Regardless of the fact that the land and the minerals taken by the early settlers was not legally theirs to take, they were being taken nonetheless. The land and its minerals were theoretically owned by the United States government, although even that ownership status was questionable in 1849.

Rather than establishing dominance over the settlers and all others in what became California, the federal government allowed the miners to develop the rules. As Davis put it, "the gold seekers were so firmly established on the land that it would not have been practicable to evict them, had the government so desired" (Davis 1937). The hands off approach of the federal government meant that much of the west's future was sculpted by the minds and hands of miners, a legacy that persists today.

Typically, the local governments would pass regulations or statutes that applied to several mining districts. While the various mining districts often had different regulations, the basic concepts were the same or very similar. The regulations typically made the right to hold a claim dependent on the discovery of the mineral (gold) followed by appropriation, and upon continuing to work or develop the ground. In practice, miners worked at a claim only long enough to determine its potential. If a claim was deemed to be of low value, and most were, miners would abandon the site in search for legendary "bonanza" sites. Where a claim was abandoned or not worked, other miners would "claim-jump" the land. "Claim-jumping" simply meant that a new miner began work on a previously claimed site (Rohrbough 1998).

Rules or no rules, disputes over gold claims and profits were often handled personally and violently. These disputes were sometimes handled by groups of prospectors acting as arbitrators (Rawls and Orsi 1999). However, this often led to heightened ethnic tensions. Numerous accounts tell of racial tensions between the Euro-American settlers and their foreign counterparts, and it was not uncommon for racial tensions over gold to end in bloodshed or lynching (Gonzales-Day 2006, McDonald 1979).

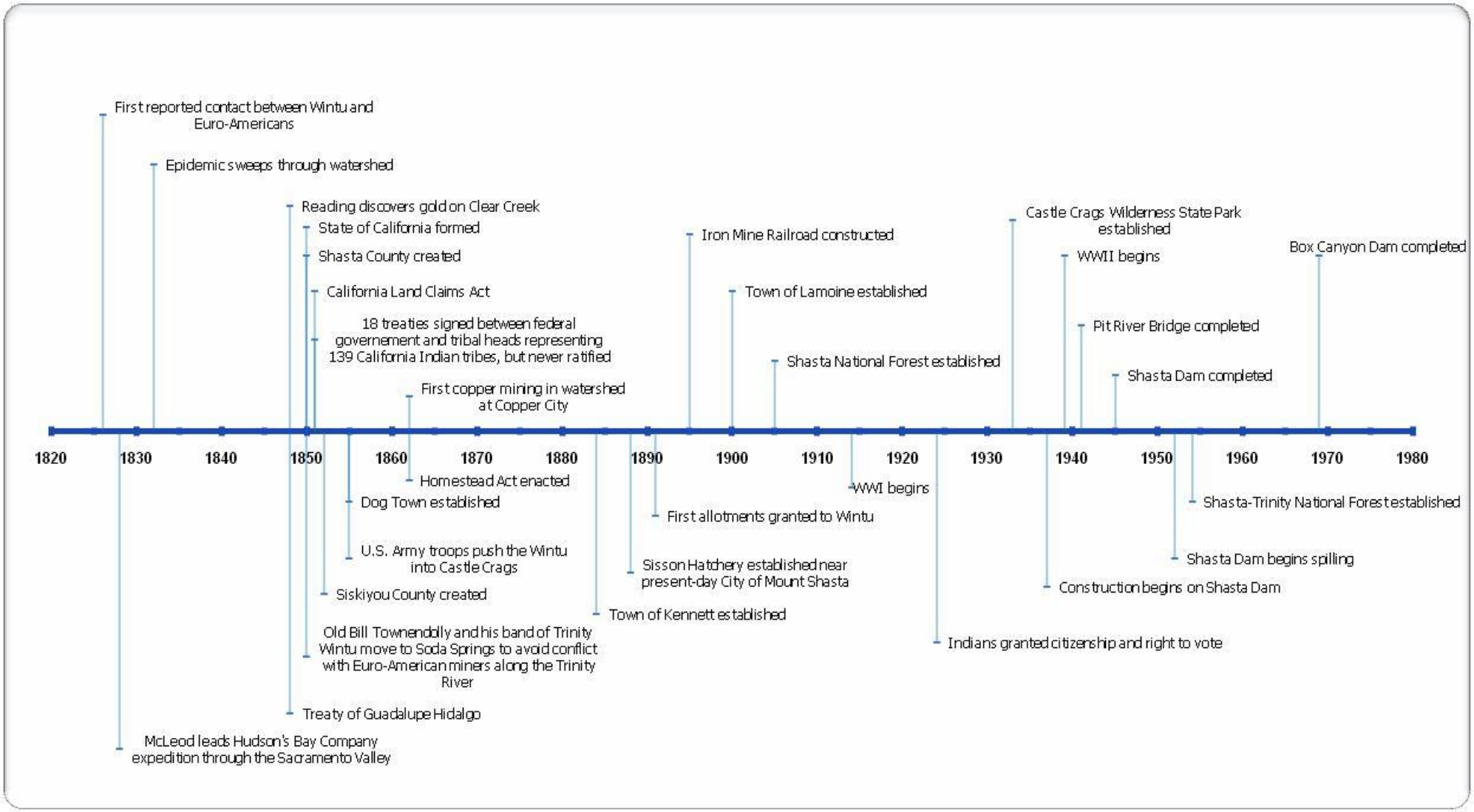

Figure 2.2-4. Timeline of Recent Major Events in the Upper Sacramento River Watershed

Almost 20 years later, in 1866, the U.S. Congress finally passed the "Chaffee laws." Congress tried to make the best of the situation by opening the lands of the United States to mineral exploration and occupation. The act recognized the validity of the local customs or rules of the miners so long as they were not in conflict with the laws of the federal government. The federal act both forgave and legalized the 18-year trespass. The law was later repealed and replaced with the 1872 Mining Act, which has governed mineral exploration and exploitation ever since (Davis 1937).

Mineral Rights

In addition to the mining claims that were akin to leasing land from the government for production, the federal government now recognized mining rights that were a kind of property, which could be owned by an individual or company. These newly granted mineral rights provided a legal right for settlers to explore for, and produce, resources on and below the surface. Ownership of mineral rights gave settlers the right to extract valuable commodities such as gold, silver, copper, and iron (Davis 1937).

Laws Governing Mining/Regulatory Context

Federal

The federal **Mining Act of 1872** still applies to mineral exploration in the watershed today.

The **United States Mining Laws** (30 U.S.C. 21-54) confer statutory right to enter upon public lands in search of minerals. Regulations found in 36 CFR 228, Subpart A, set forth rules and procedures to minimize adverse environmental impacts on National Forest resources. Access for mineral exploration and development is generally unrestricted, subject to the mitigation of adverse impacts to surface resources.

Access for mineral exploration on Shasta-Trinity National Forest (STNF) land is restricted in wildernesses, the "wild" portions of Wild and Scenic Rivers, botanical areas, Research Natural Areas (RNAs), National Recreation Areas (NRAs), and areas that have been withdrawn from mineral entry. Minerals in the NRA are not locatable but they are leasable (USDA Forest Service and USDI Bureau of Land Management 1994).

State

The primary state law regarding mining operations is the **California Surface Mining and Reclamation Act (SMARA) of 1975**. The intended purpose of SMARA is to reclaim mined lands to a condition that is readily adaptable for an alternative use. The law is a response to the previous era of mineral exploitation and the ensuing environmental degradation. SMARA provides a tool for the state to analyze potential impacts of mining operations, and a means to ensure that mined areas will be cleaned up and the surface of the land restored or reclaimed for another use. The law does not apply to mining operations that were abandoned or ceased prior to 1975; it apples to mining activities (operations and reclamation) that were in existence in 1975 or that started after that time. SMARA is enforced by the California Department of Conservation, Office of Mine Reclamation, as well as by county and city governments, which act on the state's behalf as lead agencies.

The scope of the law is unusually broad. It covers mining activities on both state and federal lands. By way of a Memorandum of Understanding with the California Department of Conservation, the BLM and U.S. Forest Service (USFS) have agreed that the statutes and regulations of SMARA are applicable to lands regulated by BLM and Forest Service. A focal point of the state's argument for jurisdiction on federal lands was the amount of abandoned mines on federal lands within the state that contribute environmental health and safety hazards, and the lack of federal requirements and action to remedy these problems. The upper Sacramento River watershed is no stranger to these problems. Several abandoned copper mines located on federal lands around Shasta Lake continue to leach acid mine drainage into surface waters, and countless abandoned mines with open shafts and abandoned equipment dot the watershed's landscape.

Under SMARA, mining operations that produce more than 1,000 cubic yards of material must provide a reclamation plan. These plans must disclose the type, scope, timeframe, and means of mineral extraction proposed, as well as a detailed plan for reclaiming the mined area to an agreed upon condition (e.g., open space, wildlife habitat, industrial site, etc.).

In addition to SMARA, the California Health and Safety Code requires covering, filling, or fencing abandoned shafts, pits, and excavations (California Health and Safety Code Sections 22440-03).

Local

Mining activities are also regulated and monitored by local governments through general plans and zoning ordinances.

2.3.2 Agriculture and Ranching

The **Homestead Act** was passed by the U.S. Congress in 1862. It provided for the transfer of 160 acres of unoccupied public land to each homesteader on payment of a nominal fee and after 5 years of residence. Land could also be acquired after 6 months of residence at $1.25 per acre. Prior to this act, the government had sold land to settlers in the West for revenue purposes, but as the West became politically stronger, pressure on Congress to guarantee free land to settlers was increased. Even so, several bills providing for free distribution of land were defeated before the Homestead Act was passed, including a bill passed by Congress in 1860 that was vetoed by President Buchanan. However, with the ascendancy of the Republican Party (which had committed itself to homestead legislation) and with the secession of the South (which opposed free distribution of land), the Homestead Act, sponsored by Galusha A. Grow, became law. In 1976, the Homestead Act expired in all states but Alaska, where it ended in 1986 (Parsons 2003b, Eidness 1997).

Many people who settled in the watershed took advantage of the Homestead Act and some turned over their land to others for a pre-arranged price. Many of the early large ranches were developed over previous mining claims. As homesteaders took up more and more land, the pressure continued to push the remaining Indians to local reservations (Parsons 2003b).

2.3.3 Timber Management

Federal

Simple laws to protect certain types of trees have been around since colonial times. However, the creation of the Department of Agriculture in 1862 marks the beginnings of a national effort to protect the nation's agricultural health. It wasn't until 1875, though, that Congress allocated $2,000 for the purpose of hiring a forestry agent to investigate the subject of timber management (Thornton 1995). This was unanticipated, since the discipline of forestry was new and there were very few trained foresters in America at this time (Thornton 1995). The Division of Forestry was created in 1881.

The **Weeks Act of 1911** marked the beginning of federal forestry assistance programs. The Act authorized federal purchase of forestlands in the headwaters of navigable streams, established the National Forest Reservation Commission, gave consent for states to enter into compacts for the purpose of conserving forests and water supplies, and authorized federal matching funds for approved state agencies to protect forested watersheds of navigable streams.

The **Clarke-McNary Act of 1924** was one of several pieces of federal legislation that expanded the Weeks Act. It enabled the USFS to enlarge the relatively new National Forest System through the purchase of lands predominantly within predetermined national forest boundaries. It authorized the Secretary of Agriculture to work cooperatively with state officials for better forest protection, chiefly in the areas of fire control and water resources, while providing for continued timber production. In addition, the Clarke-McNary Act encouraged a cooperative reforestation effort between the USFS and private forestland owners through the production and distribution of tree seedlings and forestry assistance. Because of this act, all 50 states have an established a state forestry agency or forestry extension agency. The Clarke-McNary Act is widely held as the first federal legislation that firmly established as its principle effort the promotion of forestry at the state level.

The **Multiple-Use Sustained-Yield Act (MUSYA),** first enacted in 1960, provides little in the way of legal standards, but does set forth policy guidelines for use by the USFS in its management of the nation's forests. According to the MUSYA, the USFS must give due consideration to the relative values of the various natural resources and multiple uses that occur on its lands, including outdoor recreation, range, timber, watershed, and wildlife and fish habitats. This act advocates a policy of "sustained yield and services," whereby the variable renewable resources of national forests will be maintained in perpetuity without impairment of the productivity of the land.

Although the need for cohesive forest management policies and directives for both private and public lands was not a new concept prior to the 1970s, decades of declining forest health and increasing public pressure demanded that previous management practices be reassessed and that significant changes be made to ensure forest sustainability. Since the 1950s, widespread clearcutting had converted tens of thousands of acres of mature and old growth forests in and around the watershed into young, even-aged tree plantations (Lininger 2003). It is estimated that by 1990, approximately 80 percent of the watershed had been logged (USDA Forest Service 2001). Mounting pressure for changes in forest management practices including logging, and an increased demand by the public for public lands to be managed for multiple uses, was felt not only on a national level, but at a local level as well. Numerous policies were enacted during this period by federal and state governments,

intended to encourage a broadscale assessment of the environmental consequences that could result from management actions.

The **National Environmental Policy Act (NEPA),** enacted in 1970, requires federal agencies, including the USFS, that manage public timberlands to integrate environmental values into their decision-making processes by considering the environmental impacts of proposed actions and reasonable alternatives to those actions. The primary purpose of NEPA is to promote informed decision-making by federal agencies by making detailed information concerning significant environmental impacts available to both agency leaders and the public. NEPA requires that federal agencies disclose the findings of their environmental analysis and the effects of project implementation on the human environment, and solicit comments from interested and affected parties.

The **National Forest Management Act (NFMA)** of 1976 was designed to balance the timber industry's interest in providing a steady supply of harvestable timber with those of the public and environmentalists in protecting forests for recreation and conservation purposes. Under NFMA, the USFS must develop specific land use plans (called Land and Resource Management Plans (LRMP)) in cooperation with state, local, and federal agencies and the public to govern the management of forests within its jurisdiction. The plans, which are binding, divide each forest into "management areas" and dictate how the forest will be managed over a 10- to 15-year period. NFMA prohibits harvesting under LRMPs where it may cause extensive or irreparable harm to resources, biological diversity, or watersheds; restricts the use of clear cutting; and limits the volume of trees that can be removed to the number that can be harvested annually in perpetuity on a sustained-yield basis. LRMPs must also be consistent with the MUSYA and be NEPA-compliant. The STNF completed its LRMP in 1995.

The **Northwest Forest Plan (NWFP)**, adopted in 1994, consists of a series of federal policies and guidelines governing land use on federal lands in the Pacific Northwest region of the United States. It covers areas ranging from northern California to western Washington and includes the upper Sacramento River watershed. The NWFP was originally drafted with the intent of protecting critical habitat for the northern spotted owl and the marbled murrelet, though the plan came to include much broader habitat protection goals.

The NWFP takes an ecosystem management approach to forest management, with support from scientific evidence, while adhering to the requirements of existing laws and regulations. The dual intent of management on affected federal lands is (1) to maintain a sustainable supply of timber and other forest products that will help maintain the stability of local and regional economies on a predictable and long-term basis to meet the need for forest habitat and forest products, and (2) to maintain a healthy forest ecosystem with habitat that will support populations of native species (particularly those associated with late-successional and old-growth forests), including protection for riparian areas and waters.

Concurrent with the NWFP, the 1994 Final Supplemental Environmental Impact Statement (FSEIS) on Management of Habitat of Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl and its associated Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (ROD) established a network of Late Successional Reserves (LSR), to include 100-acre

core areas and Managed Late Successional Areas (MLSA). The network of reserves are intended to provide old-growth forest habitat, provide for populations of species that are associated with late-successional forests, and to help ensure that late-successional species diversity will be conserved (USDA Forest Service 1999). This direction was incorporated into the STNF's LRMP, which provides for a multi-level approach to timber management (intensive, modified, minimal, and uneven-aged) on USFS lands within the watershed that will achieve the desired output for a given area with regard to yield, forest health, and cultural practices (USDA Forest Service 1995).

Adoption of the Northwest Forest Plan and the 1994 FSEIS on management of northern spotted owl habitat created a much more involved process, requiring more in-depth survey protocols and analysis for approving timber-harvesting projects in northern spotted owl habitat on National Forest and Bureau of Land Management (BLM) lands. The result has been a substantial reduction in timber harvesting on national forest lands within the STNF compared to prior levels of harvesting. It also created an additional set of standards that timber harvesting plans and operations have to meet, and new opportunities for projects to be challenged through appeals or litigation; thus, more timber harvest projects have been delayed and the total timber harvest acreage on national forest lands has been reduced. This reduction in timber harvest volumes contributed to economic effects in the local communities within and surrounding the watershed, such as reduced prices for logs, closing of mills, reduced competition for logs, and loss of jobs. In recent years, mills located in Mt. Shasta, McCloud, and Redding, which provided markets for logs from the upper Sacramento River watershed, have closed.

The **Healthy Forests Restoration Act of 2003**, often referred to as the Healthy Forests Initiative (HFI), was enacted to address the overcrowding of forests and excessive accumulations of fuels that have resulted from nearly a century of fire suppression and the effects that these conditions are having on forest health. The intent is to reduce the risk of catastrophic wildfires through the restoration of healthy forest ecosystems and watersheds on federal lands. The HFI also endorses a collaborative approach to watershed forestry management on nonindustrial private forest lands owned by any nonindustrial private individual, group, association, corporation, or other private legal entity (such as tribal lands) by providing federal technical assistance and cost-sharing (H.R. 1904—2, Title 3, Sections 302 and 303).

State

Founded in 1885, the California State Board of Forestry was the first state-appointed forestry board in the nation. The board was authorized to investigate, collect, and disseminate information about forestry. In 1887, the board members were given the power of peace officers to enforce compliance with the few laws that the state had enacted concerning brush and forest lands. However, a hostile political climate led to the abolishment of the board in 1893 (Thornton 1995).

In 1903, California Governor George Pardee stated his desire for a joint federal-state study and survey of the forest situation in California. The survey was conducted from 1903 to 1907. Commencement of the project set the stage for the establishment of a new Board of Forestry and the creation of the position of State Forester in 1905 (Thornton 1995).

In 1945, the original **California Forest Practice Act (CFPA)** was passed by the state legislature as a means to quell fears of an impending timber famine and to prevent any potential federal mandates on

forestry practices (Dicus and Delfino 2003). This act regulated the harvesting of timber on private lands in California by requiring that notification be given to the State Forester by any person who intended to cut merchantable timber. The original CFPA was much narrower in scope than its present-day successor (the Z'berg-Nejedly Forestry Practice Act, described below), focusing almost exclusively on timber resources and fire prevention. The original act was nullified in 1971 when a state appeals court found that it was "pecuniary interested in the timber industry" and subsequently declared void. The Z'berg-Nejedly Forestry Practice Act, which followed, was considerably modernized to reflect the public's growing interest in fish and wildlife conservation, water quality protection, and the general sustainability of the state's forest industry (Klamath Resource Information System No date).

The **Z'berg-Nejedly Forestry Practice Act (FPA)** of 1973 replaced the original California Forest Practices Act nullified in 1971. The FPA parallels the federal NFMA, but goes further in regulating forestry practices on private lands. Whereas the NFMA regulates federal forestlands, the FPA governs the management of non-federal timberlands in California including state and private timberlands. The FPA, in conjunction with the Professional Foresters Law, was established to address the public's growing concern over the environmental effects of timber harvesting.

To accomplish its goals, the FPA includes certain licensing provisions for persons cutting and removing forest trees on private property in order to sell the logs or to develop a building site on forest covered lands. A timber harvest plan (THP), prepared by a Registered Professional Forester, must also be submitted to the Director of California Department of Forestry and Fire Protection (CalFire) for review and approval prior to harvesting timber.

Following harvest, the FPA requires that logged areas be restocked according to proper standards. Under the authority of the FPA, the California State Board of Forestry and Fire Protection is responsible for oversight, maintenance, and revisions as needed in order to sustain forest productivity and protect the forest environment.

Prior to passage of the FPA, timber-harvesting regulations in California had already been on a path of improving forest practices. The FPA formalized the standards for forest practices by creating the THP requirement, which eventually was certified as a CEQA process functional equivalent for planning and harvesting operations on state and private timberlands. It incorporated public and agency review, analysis of environmental impacts, assessment of alternatives, inspections, and monitoring into the standards to protect public trust resources such as waterways and soils. It has also increased the costs of timber harvesting planning and operations. Some effects on resources that passage of the FPA has had in the upper Sacramento River watershed and throughout private timberlands in California have been the substantial reduction in the size of clear cuts, and increased protections for watercourses and riparian zones.

In 1975, a court decision mandated that forestry practices were subject to CEQA, which required that an Environmental Impact Report (EIR) be filed for any activity requiring state approval (e.g., authorization from the State Board of Forestry and Fire Protection) and that may cause a change in the environment. While NEPA primarily covers the federal lands and federal actions in California, CEQA applies to all state and private properties (California State Board of Forestry and Fire Protection 2003). In 1979, the Secretary of the Resources Agency certified the preparation of a THP, as applied under the state FPA is the functional equivalent to the environmental assessment process

required under the CEQA. Therefore, timber harvest activities carried out under the FPA are exempt from the EIR requirement. In order to meet functional equivalent status, THPs are subject to review by not only the State Board of Forestry and Fire Protection, but also by a multidisciplinary review panel that includes the California Department of Fish and Game, the appropriate Regional Water Quality Control Board, the California Geological Survey, and others.

2.3.4 Water Resources

Federal

The **Safe Drinking Water Act (SDWA)** of 1974 is intended to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources (e.g., rivers, lakes, reservoirs, springs, and ground water wells). SDWA does not regulate private wells serving fewer than 25 individuals. SDWA authorizes the Environmental Protection Agency (EPA) to set national health-based standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water. The EPA endorses a collaborative *watershed approach* between federal, state, and local water agencies to make sure that these standards are met.

USFS **Riparian Reserves and Key Watersheds.** Current management objectives within riparian areas are directed toward maintenance and improvement of the riparian ecosystem and protection of water quality and stream courses. Designated Riparian Reserves include streams and riparian systems as well as an upland buffer from the edge of the stream or riparian system. The width of the upland buffer included within a riparian reserve varies, depending on the type of system. The STNF can manage vegetation on its lands within the buffer if the activities maintain and/or enhance the riparian and aquatic habitats and are consistent with the Aquatic Conservation Strategy. The buffer for permanently flowing non-fish bearing streams is 150 feet on each side of the stream. For fish-bearing streams, the buffer is 300 feet on each side (600 feet total). For lakes and natural ponds, reservoirs, and wetlands greater than 1 acre, riparian areas generally comprise 300 feet of the high water mark (USDA Forest Service 1995). The LRMP also includes a directive for the minimum buffer needed for seasonally flowing or intermittent streams, wetlands less than 1 acre, and unstable and potentially unstable areas.

The LRMP strives to maintain the quality of riparian and aquatic habitats through the implementation of the Aquatic Conservation Strategy objectives and by implementing Best Management Practices (BMP) to protect water quality. The nine Aquatic Conservation Strategy objectives require that the maintenance and restoration directives for biological and hydrological systems be met within a Riparian Reserve.

The LRMP provides the following Standards and Guidelines for land management within Riparian Reserves:

- Identify in-stream flows needed to maintain riparian resources, channel conditions and fish passage.

- For activities other than surface water developments, issue leases, permits, rights-of-way, and easements to avoid adverse effects that retard or prevent attainment of Aquatic Conservation Strategy objectives.

Permits under **Section 404 of the Clean Water Act**, as amended, are required for the placement of dredge or fill materials into waters of the United States, including wetlands and "other waters." Projects are permitted under either individual or general (e.g., nationwide) permits. The specific applicability of a permit type is determined by the Corps on a case-by-case basis.

The **federal CWA** contains laws protecting navigable waters, and the California Water Code (CWC) is the state body of law protecting groundwater and fresh and marine surface waters. Section 303 of the CWA requires states to adopt water quality standards (water quality objectives and beneficial uses), and the 1987 provisions also mandated adoption of numerical standards for 126 "priority pollutant" toxic chemicals (33 U.S.C. 2002). CWA Section 303(b) requires states to submit water quality conditions of their navigable waters to the federal government on a reoccurring basis (33 U.S.C. 2002). The federal CWA requires states to provide a list identifying the waters, or water segments, that do not meet applicable water quality standards with technology-based controls alone. The California State Water Resources Control Board (State Water Board) and the Regional Water Quality Control Boards (Regional Water Boards) implement the federal CWA in California under the oversight of the U.S. Environmental Protection Agency (EPA), and as a result, statewide water quality results are submitted to the EPA (California Water Boards 2006).

Executive Order 11990 is an overall wetlands policy for all agencies managing federal lands, sponsoring federal projects, or providing federal funds to state or local projects. The order requires federal agencies to follow "avoidance-mitigation-preservation" procedures, provide the opportunity for public input before proposing new construction in wetlands, and avoid impacts on wetlands where practicable.

State

The **California Safe Drinking Water and Toxic Enforcement Act (CA SDWA) of 1986**, was passed to build on and strengthen the federal SDWA. The CA SDWA authorizes the state's Department of Health Services to protect the public from contaminants in drinking water by establishing maximum contaminants levels (MCLs) that are at least as stringent as those developed by the EPA, as required by the federal SDWA.

Any entity proposing an activity that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the California Department of Fish and Game (CDFG) must receive a discretionary **Lake or Streambed Alteration Agreement permit** from the CDFG pursuant to Section 1602 of the California Fish and Game Code. Typically, this requirement applies to any work undertaken within the 100-year floodplain of a stream or river containing fish or wildlife resources.

The **Porter-Cologne Water Quality Control Act (Porter-Cologne Act)** was established by the State of California, in part, to meet the requirements of the CWA. The Porter-Cologne Act is integrated with the CWA and authorizes the State Water Board to adopt, review and revise state water policy, which may include water quality objectives, principles, and guidelines (State Water Resources

Control Board 2010). In addition, the preparation and adoption of water quality control plans (Basin Plans) is required by the CWC and supported by the federal CWA. Basin Plans designate waters bodies and beneficial uses to be protected under the CWA and CWC. Water quality objectives are established to protect the beneficial uses, and a program of implementation necessary for achieving the objectives is included as part of the Basin Plans. State law also requires that Basin Plans conform to the policies set forth in the CWC and any state policy for water quality control. Since beneficial uses, together with their corresponding water quality objectives, can be defined as water quality standards, the Basin Plans are actually regulations for meeting the state and federal requirements for water quality control. One significant difference between the state and federal programs is that California's Basin Plans establish standards for groundwater in addition to surface waters (Central Valley Regional Water Quality Control Board 2009).

Local

The **Siskiyou County General Plan** (Siskiyou County Planning Department 1973) contains goals and policies designed to guide the future development of the County, based on current conditions. The Conservation Element of the General Plan, as defined in Section 653:Q2(d) of the Government Code, is "for the conservation and development and utilization of natural resources including water and its hydraulic force, forest, soils, rivers and other water areas, including harbors, fisheries and wildlife habitat" (Siskiyou County Planning Department 1973). It also covers minerals and other natural resources.

The objectives of the General Plan pertinent to water resources are as follows:

- To protect and conserve the lakes, streams and reservoirs of the county for potable and agricultural water, for recreation areas but more important as wildlife habitat which will be beneficial to the residents, present and future of Siskiyou County and the state.
- To conserve and maintain habitat for wildlife species and plant life.

The **Shasta County General Plan** (Shasta County 2004) identifies several policies to protect life and property from flooding or dam failure, including the reach of the upper Sacramento River between Box Canyon Dam in Siskiyou County and Shasta Lake, as well as areas that would be at risk in the event of failure of Shasta Dam. Relevant policies include:

- New development in floodplains shall be regulated through zoning regulations addressing land use type, density, and siting of structures.
- The impacts of new development on the floodplain or other downstream areas due to increased runoff from that development shall be mitigated.
- Known flood hazard information shall be reported as part of every General Plan amendment, zone change, use permit, variance, building site approval, or other land development applications subject to environmental assessment.
- Flood Hazard Maps shall be maintained by the County to aid in the project review process.

- Dam Failure Inundation Maps shall be maintained by the County to aid in the project review process.

- The Shasta County Emergency Plan shall provide for early warning and emergency evacuation routes in the event of dam failure.

The upper Sacramento River watershed is critical to the water supply for much of the state. Policies relevant to the maintenance of the quality and quantity of water produced by the watershed include:

- Sedimentation and erosion from proposed developments shall be minimized through grading and hillside development ordinances and other similar safeguards as adopted and implemented by the County.

- Septic systems, waste disposal sites, and other sources of hazardous or polluting materials shall be designed to prevent contamination to streams, creeks, rivers, reservoirs, or groundwater basins in accordance with standards and water resource management plans adopted by the County.

- The potential for cumulative water quality impacts resulting from widespread use of septic systems in poorly suited soil areas shall be periodically evaluated by the County for the need to provide greater monitoring and possible changes to applicable sewage disposal standards.

- The Shasta County Water Agency should encourage and promote interagency water planning efforts within the County, particularly in the Redding Basin.

The County shall encourage and participate in interagency planning efforts, such as the Redding Area Water Council, to protect and enhance the quality of all groundwater and surface water resources.

2.3.5 Fire Management

Federal

In the first two decades of the century, wildfire ran essentially unchecked through America's forests. Before 1930, from 20 to 50 million acres commonly burned each year and few forests were effectively protected (MacCleery 1992). In 1902, a series of catastrophic fires near Yacolt, Washington, burned more than a million acres and took 38 lives. These fires encouraged the forest industry to set up private fire protection associations (MacCleery 1992). In 1910, devastating fires in northern Idaho and northwestern Montana prompted Congress to pass the **Weeks Act**, which authorized federal matching funds for state fire-control agencies (MacCleery 1992). The **Clark-McNary Act** of 1924 augmented cooperative federal and state fire suppression efforts as well as existing funding under the Weeks Act (MacCleery 1992). By the end of the 1930s, these programs began to show results. However, of all the efforts to educate the public about fires, the introduction of Smokey Bear as a symbol of fire prevention was perhaps the most successful and widely recognized (MacCleery 1992).

In recent years, the role of fire in the environment has become increasingly valued as societal concerns for managing natural resources have grown. The focus of fire policy and management has

shifted away from the overall goal of removing fire from the ecosystem toward the much more complex goal of managing fire (Stephens and Sugihara 2006a). The challenge today is to develop fire policies, management actions, and budgets that recognize the need for both fire suppression and the management of fire as an ecosystem process and hazard reduction tool (Stephens and Sugihara 2006a). In response, several important fire management plans and policies have been developed by the federal and state agencies that are responsible for implementing fire suppression and fire management policies.

The **Northwest Forest Plan (NWFP)**, adopted in 1994, was intended to promote forest resource sustainability through an ecosystem approach. Although the NWFP helped stabilize the number of large-diameter forests in the Pacific Northwest, fire has since become the main reason for loss of these forests. The dense forest structure is not supported by the fire disturbance regime, and the greater propensity for large stand-replacing fires results in an increasingly elevated risk of long-term habitat loss (USDA Forest Service 2001a).

In 2000, President Clinton requested the Secretaries of the Departments of Agriculture and Interior to prepare a report recommending how to respond to severe, ongoing fire activity; reduce impacts of fires on rural communities and the environment; and ensure sufficient firefighting resources in the future. The resulting report (U.S. Department of Agriculture and U.S. Department of the Interior 2000) became the cornerstone of what was to become known as the **National Fire Plan**. A collaborative effort between the Departments of Agriculture and Interior, the Western Governors' Association, and other southern governors, counties, and tribes produced the two reports that compose the National Fire Plan: the August 2001 *10-Year Comprehensive Strategy* (U.S. Department of Agriculture and U.S. Department of the Interior 2001) and its subsequent May 2002 *Implementation Plan* (U.S. Department of Agriculture and U.S. Department of the Interior 2002b). The *Implementation Plan* was updated in 2004 to emphasize the importance of the collaborative framework between partners if the plan is to succeed.

The purpose of the National Fire Plan is to improve the resiliency and sustainability of forests and grasslands at risk of wildfire; conserve priority watersheds; protect and promote species biodiversity; reduce wildland fire costs, losses and damages; and ensure firefighter and public safety. Achievement of these goals is being met through increased firefighting preparedness, prevention through public education and collaborative stewardship, rehabilitation of watershed function, hazardous fuel reduction, monitoring, and applied research and technology transfer.

The 2002 **Healthy Forests Initiative** responds to the growing national priority for protecting communities and the environment from the risk of wildfire. President George W. Bush directed the Secretaries of the Departments of Agriculture and Interior and the Chairman of the Council on Environmental Quality to develop a plan that would improve regulatory processes to ensure more timely decisions, greater efficiency, and better results in reducing the risk of catastrophic wildfires by restoring forest health (U.S. Department of Agriculture and U.S. Department of the Interior 2002a). The resulting legislation emphasized administrative and legislative reforms to expedite the delivery of fuels treatments and post-fire actions.

In February 2003, Congress delegated long-term stewardship contracting authority to the USFS and the BLM, which was followed by passage of the Healthy Forests Restoration Act (HFRA) in December 2003. The purposes of this act are as follows:

- to reduce wildfire risk to communities, municipal water supplies, and other at-risk federal land through a collaborative process of planning, prioritizing, and implementing hazardous fuel reduction projects;

- to authorize grant programs to improve the commercial value of forest biomass (that otherwise contributes to the risk of catastrophic fire or insect or disease infestation) for producing electric energy, useful heat, transportation fuel, and petroleum-based product substitutes, and for other commercial purposes;

- to enhance efforts to protect watersheds and address threats to forest and rangeland health, including catastrophic wildfire, across the landscape;

- to promote systematic gathering of information to address the impact of insect and disease infestations and other damaging agents on forest and rangeland health;

- to improve the capacity to detect insect and disease infestations at an early stage, particularly with respect to hardwood forests; and

- to protect, restore, and enhance forest ecosystem components:

  - to promote the recovery of threatened and endangered species;
  - to improve biological diversity; and
  - to enhance productivity and carbon sequestration.

State

On March 18, 1905, the California State Legislature approved the establishment of a new Board of Forestry and the position of State Forester (see above) (Thornton 1995). The act granted to the State Forester the right to appoint local fire wardens. The State Forester could also "maintain a fire patrol at places and times of fire emergency." However, the fire patrol system was to be funded by the county in which the action took place. Although the California Department of Forestry and Fire Protection (CalFire) could be said to have started in 1905 with the creation of the position of State Forester, from 1905 until 1919, the State Forester and the "forestry department" were one-and-the-same.

As described above, in 1911 Congress passed the "Weeks Law," which provided fiscal aid for cooperative fire protection work between the USFS and qualifying states. In 1919, the California Legislature appropriated money for fire prevention and suppression work. The state's first four rangers or "Weeks Law Patrolmen" were hired for a four-month period covering the summer of 1919. They worked wherever needed but were individually headquartered in Redding, Oroville, Placerville, and Auburn (Thornton 1995).

In 1920, the ranger organization was restructured and expanded with 10 rangers overseeing 10 districts. The districts were: 1) Shasta County; 2) Butte and Yuba counties; 3) Placer and Nevada counties; 4) El Dorado and Amador Counties; 5) Tehama County; 6) Colusa County; 7) Lake County; 8) Mendocino County; 9) Napa County; and 10) Santa Cruz, Santa Clara, and San Mateo counties. Over the next decade, the district system and the ranger force slowly grew.

In April 1933, the Emergency Conservation Work (ECW) program was established. It became known almost instantly as the Civilian Conservation Corps (CCC). In California, the USFS's District Forester developed a plan of attack on how to use this new labor pool. The CCC was assigned three basic tasks: firebreak construction, lookout station building, and general improvements. The "Three Cs" cut fuelbreaks around the state, with particular emphasis on establishing the "Ponderosa Way Firebreak." This continuous fuelbreak extended the length of the Sierra Nevada, and into the Cascades, ending north of Redding. The firebreak was intended to be a permanent defensive line between the lower foothill regions and the higher elevation National Forest lands. The second project was the construction of an integrated, statewide fire detection network. The third task, general improvements, included the building of administrative and fire suppression bases, installation of roads, bridges, telephone lines, and many other conservation projects.

The ECW programs lasted from 1933 to 1942. All told, the laborers constructed over 300 lookout towers and houses; some 9,000 miles of telephone lines; and 1,161,921 miles of roads and trails; and numerous fire stations and administrative buildings in California. The CCC also planted over 30 million trees and spent nearly one million "man days" in fire prevention and suppression activity. Because the CCC was expected to fight forest fires, they constituted the single largest wildland suppression force ever assembled in American history. For the California Division of Forestry, a system of fire stations and lookouts now existed throughout many of the fire prone areas of California.

The **California Fire Plan** (California Board of Forestry and Fire Protection and California Department of Forestry and Fire Protection 1996) has been implemented by CalFire as a pre-fire management initiative designed to reduce wildland fires and the associated costs of suppression. Through the systematic application of risk assessment, fire safety, fire prevention, and fire hazard reduction techniques, the initiative is aimed at protecting assets at risk through focused pre-fire management prescriptions and increased initial attack.

Localized components of the California Fire Plan, specific to the watershed, are listed in the Siskiyou Unit Fire Management Plan (California Department of Forestry and Fire Protection 2005a) and the Shasta-Trinity Unit Fire Management Plan (California Department of Forestry and Fire Protection 2005b). These dynamic working plans provide for an ongoing assessment of the fire situation within their respective units. Specific to each region, these plans identify pre-fire management target areas based on the identification of such areas by those who live and work in the community.

Assessments of the units involve the analysis of four components: level of service, assets at risk, hazardous fuels, and severe fire weather. Computer-based modeling and data and Geographic Information Systems (GIS) are used to create maps that identify high-risk/high-value areas where large, damaging fires are most likely to occur. It is assumed that through the implementation of such proactive, pre-fire management actions, costs and losses during periods of severe fire weather (the period when most wildfire costs and losses occur) would be significantly reduced.

Local

Community-based **Fire Safe Councils** have been formed in Mt. Shasta, Dunsmuir, and Lakehead by consortiums of interested citizens, fire protection personnel, industry representatives, and government

agencies who have come together to address fire safety and natural resources issues in their communities.

Typical council duties consist of

- Preparation and administration of a Community Wildfire Protection Plan.
- Providing recommendations, as needed, to the private and public sector on matters pertaining to fire safety.
- Preparation of proposals and administration of grants for fire safe-related projects.
- Development and implementation of fire safe programs.

Council projects and activities are funded primarily through agency grant programs (e.g., USFS, BLM, EPA), although occasionally private foundation funding sources may be used.

In addition to the USFS and BLM, several other large-scale public and private landowners hold property in and around the watershed. These include the California State Lands Commission, the California Department of Parks and Recreation, the U.S. Bureau of Reclamation, Siskiyou County, Sierra Pacific Industries (SPI), and Roseburg Forest Products, in addition to numerous smaller land owners. Fire protection agencies in Siskiyou and Shasta counties work cooperatively through a mutual aid agreement with the USFS, CalFire, and other fire agencies to provide fire suppression resources and to reduce fire threats to communities in the region. Pre- and post-fire management activities on State of California lands are administered by CalFire under the California Fire Plan.

Both SPI and Roseburg Forest Products are relatively large-scale holders of private forestlands near or adjacent to the watershed, particularly in its northern half. Active forest management practices such as thinning and understory brush removal are routinely employed by these companies as a means of reducing potential loss of merchantable timber to wildfire. Other pre-emptive actions taken by these companies might include:

- The creation of shaded fuel breaks, or defensible space, through thinning, typically along ridges, near towns/communities, and along major roads.
- Routine removal of ladder fuels.
- Actively cooperating with nearby communities and agencies to make fire awareness a community issue.

2.3.6 Wildlife Management

By the 1800s, habitat destruction, a lack of wildlife law enforcement, and the assumption by early Americans that natural resources were limitless led to a severe decline in wildlife populations in America (Musgrave 1998). Since this time, the approach to wildlife laws in America have evolved from one reflecting the English tradition of restricting public access to royal forests, to one

acknowledging the importance of protecting wildlife for the benefit of future generations as well as aesthetic and moral reasons (Musgrave 1998).

Federal

At the turn of the century, President Theodore Roosevelt brought the ideals of conservation of nature, into his Administration, and the American public soon began to adopt his ideals (Musgrave 1998). A process that was, at least in part, spurred by the extinction of the passenger pigeon and the near extinction of the buffalo. The **Migratory Bird Treaty Act (MBTA)** of 1918 represented one of the first major federal legislative attempts to protect a particular type of wildlife. It prohibited the taking of migratory birds except under federal guidelines and provided strict civil and criminal penalties.

Franklin D. Roosevelt made land and resource preservation a cornerstone of his national economic restoration plan during his term in the presidency (1933–1945), and legislation during this period attempted to integrate many diverse natural resource concerns into comprehensive laws (Musgrave 1998). The **Fish and Wildlife Coordination Act** (1934) was enacted in the midst of the Great Depression. It authorized "investigations…to determine the effects of domestic sewage, trade, wastes, and other polluting substances on wild life," (ch. 55 § 2, 48 Stat. 401) and encouraged the "development of a program for the maintenance of an adequate supply of wild life" (ch. 55 § 5) on federal lands, and called for state and federal cooperation in "developing a Nation-wide program of wild-life conservation and rehabilitation" (ch. 55 § 1).

The Act was overhauled in 1946 and again in 1958 when Congress concluded that the results of the Act were inadequate (Bean and Rowland 1997). The 1946 revisions deleted the goals of establishing a nationwide program of wildlife conservation and of maintaining an adequate supply of wildlife on federal lands. However, it required consultation with the USFWS and with appropriate state wildlife agencies when authorization was provided for any water body to be impounded or controlled for any purpose by any public or private agency under a federal permit (Bean and Rowland 1997). The revisions in 1958 required that wildlife conservation be given equal consideration with other features of water resource development and introduced the goal of wildlife enhancement (Bean and Rowland 1997).

The **Bald Eagle Protection Act of 1940** was the first federal statute to prohibit the taking, possession of, or commerce in a particular species of wildlife.

In 1934, the **Taylor Grazing Act** was enacted to control overgrazing and overproduction on unappropriated public lands. The Act's establishment of grazing districts marked the final closure of public unappropriated lands to private divestment.

In the 1950s, post-war prosperity led to an unprecedented increase in highway and housing construction, which led to an increased demand for natural resources (Musgrave 1998). The Fish and Wildlife Act of 1956 set forth a comprehensive fish and wildlife policy. It emphasized the commercial fishing industry but also included direction to administer the Act with regard to the inherent right of every citizen and resident to fish for pleasure, enjoyment, and betterment and to maintain and increase public opportunities for recreational use of fish and wildlife resources (U.S. Fish and Wildlife Service 2010).

The 1960s marked the beginning of the transition into the modern era of wildlife regulation. President Lyndon Johnson cooperated with Congress to pass a series of federal public land and wildlife habitat protection laws, including the Wilderness Act, Wild and Scenic Rivers Act, and the National Trails System. The **Wilderness Act** was enacted in 1964 and set aside specific areas for preservation in their natural state. The **Wild and Scenic Rivers Act** and the provided a basis for setting aside additional public land for scenic and recreational uses, and simultaneously protecting wildlife habitat. In addition, the National Wildlife Refuge System was brought together under one administrative roof in 1966.

The **Endangered Species Preservation Act of 1966** represented the first federal attempt to preserve endangered species. It was followed by the **Endangered Species Conservation Act of 1969**, which strengthened protection of endangered species by authorizing development of a worldwide list of species and outlawing commerce in these species. The **Anadromous Fish Conservation Act** directed the Secretary of the Interior to study and make recommendations for the conservation and enhancement of anadromous (salt-to-freshwater migratory) fishery resources.

The **National Environmental Policy Act (NEPA)**, which President Nixon signed on January 1, 1970, was the broadest piece of Congressional legislation yet passed for protection of the environment. It requires federal agency consideration of impacts on the whole environment before major federal action is undertaken. Environmental assessments or environmental impact statements are required as part of that consideration. Its provisions declare as federal policy the use of all practicable means to administer federal programs in the most environmentally sound fashion.

The federal **Endangered Species Act of 1973** (ESA) replaced previous weaker acts. It not only requires federal consultation before major federal action impacting threatened or endangered species is undertaken, but it outlaws the taking of such species and provides for acquisition of habitat to protect threatened and endangered species. Federal support also is provided to states that enter into cooperative agreements for conservation of listed species.

State

In 1849, the California Territorial Legislature adopted the common law of England as the rule in all state courts. In 1851, the State of California enacted its first law specifically dealing with fish and game matters, a law dealing with the right to take and plant oysters. In 1852, the first game law was enacted. It protected elk, antelope, deer, quail, mallards, and wood ducks for 6 months of each year. Also passed in this year was the first law protecting salmon runs.

In 1870, the Board of Fish Commissioners, the forerunner of the Fish and Game Commission, was established "to provide for the restoration and preservation" of fish in California waters (California Department of Fish and Game 1999). This was the first wildlife conservation agency in the country, and in 1878, its authority was expanded to include game as well as fish.

After the turn of the century, the administration of fish and game laws was strengthened and expanded and the first bag limits were set (deer, ducks, doves, and quail.) In 1909, the name was changed from the Board of Fish Commissioners to the Fish and Game Commission to reflect the growing importance of game conservation. In 1927, the administrative functions of the Commission were assumed by the newly established Division of Fish and Game within the Department of Natural

Resources. In 1951, the Division of Fish and Game was elevated to the Department of Fish and Game, which became a component of the new Resources Agency of California in 1961.

In 1965, the **California Fish and Wildlife Plan** was completed. It was the first statewide master plan for fish and wildlife in the United States. California Fish and Game Code Section 2050, known as the **California Endangered Species Act (CESA)**, was enacted in 1970. Under CESA, CDFG is responsible for maintaining a list of endangered and threatened species. CDFG also maintains a list of "candidate species," which are species that CDFG formally notices as being under review for addition to the list of endangered or threatened species, and lists of "species of special concern," which serve as species "watch lists."

Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project area and determine whether the proposed project could have a significant impact on such species. In addition, CDFG encourages informal consultation on any proposed project that may affect a species that is a candidate for state listing as threatened or endangered.

2.4 References

2.4.1 Literature Cited

Anderson, R. S., S. J. Smith, R. B. Jass, and W. G. Spalding. 2008. A late Holocene record of vegetation and climate from a small wetland in Shasta County, California. Madrõno 55(1):15-25.

Anderson, M. K. 1999. The fire, pruning, and coppice management of temperate ecosystems for basketry material by California Indian tribes. Human Ecology 27(1):79-113.

Aubrey, L. E. 1908. The copper resources of California, edited by C. S. M. Bureau.

Bancroft, H. H. 1888. The works of Hubert Howe Bancroft, volume XXIII. Vol. XI, History of California. San Francisco, California: The History Company.

———. 1890. History of the Pacific States of North America, Vol. 14. California, Vol. 7, 1860-1890. The History Company, San Francisco.

Barrett, S. A. and E. W. Gifford. 1933. Miwok material culture. Bulletin of Milwaukee Public Museum 2(4).

Basgall, M. E. and W. R. Hildebrandt. 1989. Prehistory of the Sacramento River Canyon, Shasta County, California. Vol. Publication Number 9, Center for Archaeological Research at Davis. Davis, California: University of California, Davis.

Bean, M. J. and Rowland, M. J. 1997. The evolution of national wildlife law. 3rd ed. Praeger Publishers, Westport, Connecticut.

Beggs, M. and C. McLeod. 2003. The sacred land reader. http://www.sacredland.org/PDFs/SLReader.pdf (accessed May 13, 2007).

Brooks, D., D. Park, and L. Apperson. 1987. Sisson Mount Shasta, the early years, centennial edition 1887-1987.

Bureau of Reclamation. 1947. Central Valley Project studies: Payments for beneficiaries, problems 10-13. U.S. Department of the Interior Bureau of Reclamation.

———. 1984. The Central Valley Project (General Overview).

———. 2003. Shasta Dam and reservoir enlargement project: Lower McCloud River technical report. Prepared for the U.S. Department of the Interior, Bureau of Reclamation by North State Resources, Inc. September 2003.

Bureau of Reclamation History Program. 1994. Central Valley Project-Shasta Division.

California Department of Fish and Game. 1999. Department of Fish and Game celebrates 130 years of serving California. *Outdoor California* Nov-Dec.

California Board of Forestry and Fire Protection, and California Department of Forestry and Fire Protection. 1996. California fire plan. California Department of Forestry and Fire Protection. March 1996.

California Department of Forestry and Fire Protection. 2005a. Siskiyou unit-fire management plan. Siskiyou Unit Fire Prevention Bureau.

California Department of Forestry and Fire Protection. 2005b. Shasta-Trinity Unit fire plan.

California Department of Transportation. 2008. Interstate 5 transportation concept report. California Department of Transportation - District 2. June 2008.

California Genealogy and history Archives. 1938. Miscellaneous California records: Civilian Conservation Corps yearbook 1938. http://www.calarchives4u.com/misc/ccc1938/ccc2.htm (cited October 28, 2008).

California State Mining Bureau. 1915. Mines and mineral resources of Shasta County, Siskiyou County, Trinity County. California State Printing Office.

———. 1916. Gold mining history digital collection - mine list with brief history source http://www.snowcrest.net/siskiyoulibrary/gold/minefram.html (cited September 22, 2008).

California State Parks. 2007. Gold rush overview. http://www.parks.ca.gov/?page_id=1081 (cited May 3, 2007).

California Water Boards. 2006. Water quality assessment of the condition of California coastal waters and wadeable streams. Clean Water Act Section 305b Report.

Central Valley Regional Water Quality Control Board. 2009. *Water quality control plan (basin plan) for the Sacramento and San Joaquin River basin.* California Regional Water Quality Control Board, Central Valley Region. Fourth Edition.

Cermak, R. W. 2005. Fire in the forest-a history of forest fire control on the national forests in California 1898-1956 (R5-FR-003): USDA Forest Service, Pacific Southwest Region.

Clark, H. 2005. Environmental Justice Subcommittee report to Bay-Delta Public Advisory Committee: Winnemem Wintu and Shasta Lake enlargement. http://calwater.ca.gov/CBDA/AgendaItems_6-8-05/BDPAC_Meeting_6-8-2005_Agenda_Item_5D.pdf (accessed May 11, 2008).

Cleland, R. G. 1922. A history of California: The American period. New York, New York: The MacMillan Company.

Colby, W. H. 1982. A century of transportation in Shasta County: 1821-1920. Sacramento, California: Association for Northern California Records and Research.

Cook, S. F. 1976. The conflict between the California Indian and white civilization. Berkeley, California: University of California Press.

Curtis, E. S. 1924. The Achomawi. The North American Indian 13.

Cutting, S. 1997. Weekly stories from the north star, the newspaper of Mott, California.

CVP Shasta Dam. 2006a. Land acquired by the United States that was held in trust for the Indians by the federal government. Winnemem Wintu Library, Redding: Shasta Dam record group 115 land acquisition. Correspondence between Reclamation and BIA file code 2-440 and MP-420. Information pertaining to CVPILAA 55 Stat 612 Act of July 30, 1941. National Archives and Records Administration: Denver, Colorado.

CVP Shasta Dam. 2006b. Land acquired by the United States that was once Indian allotments turned fee patent, or land purchased in fee by individuals of Indian descent. Winnemem Wintu Library, Redding: Shasta Dam record group 115 land acquisition. Correspondence between Reclamation and BIA file code 2-440 and MP-240. Information pertaining to CVPILAA 55 Stat 612 Act of July 30, 1941. National Archives and Records Administration: Denver, Colorado.

Dana, J. 1934. Sutter of California. New York: Halcyon House.

Davis, B. G. 1937. Fifty years of mining law. Harvard Law Review 50:897-908.

Delay, P. J. 1924. History of Yuba and Sutter counties, California: With biographical sketches of the leading men and women of the counties who have been identified with their growth and development from the early days to the present. Los Angeles, California: Historic Record Co.

Department of Conservation. 2000. California's Abandoned Mines: A Report on the Magnitude and Scope of the Issues in the State, Vol II. Electronic document http://www.conservation.ca.gov/omr/abandoned_mine_lands/AML_Report/Pages/volume_2.aspx, accessed 10-20-2008.

Dicus, C. A. and K. Delfino. 2003. A comparison of California forest practice rules and two forest certification systems. California Polytechnic State University. April.

Dietzel, W. 2008. Castle Crags State Park. http://ww.aycsnetwork.com/castellacastlecragspark.htm (cited November 5, 2008).

Dillon, R. 1975. Siskiyou trail: McGraw Hill.

Dixon, R. B. 1905. The northern Maidu. Bulletin of the American Museum of Natural History 17(3):119-346.

Drury, W. and A. Drury. 1913. California: Tourist guide and handbook. Berkeley, California: Western Guidebook Company.

Du Bois, C. A. 1935. Wintu ethnography. Vol. 36, University of California publications in American archaeology and ethnography. Berkeley, California: University of California Press.

Dunham, D. L. 1998. California's geographic names: A gazetteer of historic and modern names of the state. Berkeley, California: University of California Press.

Eidness, J. P. 1997. California's archaeological heritage. Society for California Archaeology.

Elliott, D. R. 1991. A brief history of the Golinsky mine, Shasta County, California, edited by U.S. F. S. U.S. Department of Agriculture, Mount Shasta Ranger District.

Ellison, W. H. 1974. The Federal Indian policy in California, 1846-1860. Reprinted in Saratoga: R and E Research Associates. Original edition, Thesis, 1913, Berkeley: University of California.

Faye, P. 1923. Notes on the southern Maidu. University of California Publications in American Archaeology and Ethnology 20(3):35-51.

Federal Writers' Project. 1939. California: A guide to the golden state. New York, New York: Compiled and written by the Federal Writers' Project of the Works Progress Administration for the State of California. Hastings House.

Finlay, J. R. 1920. The cost of mining: A discussion of the production of minerals with remarks on the geologic, social and economic foundations upon which it rests. 3rd edition ed. New York, New York: McGraw Hill Book Company.

Franco, M. 2007. Winnemem issues and the journey to justice. http://www.winnememwintu.us/Documents/Winnemem%20Issues%20and%20the%20Journey%20to%20Justice.pdf (accessed May 4, 2007).

Frost, E. J. and R. Sweeney. 2000. Fire regimes, fire history and forest conditions in the Klamath-Siskiyou region: An overview and synthesis of knowledge. Prepared for the World Wildlife Fund, Klamath-Siskiyou Ecoregion Program by Wildwood Environmental Consulting. December 2000.

Galbraith, J. S. 1955. A note on the British fur trade in California, 1821-1846. The Pacific Historical Review 24(3):253-260.

Giles, R. A. 1949. *Shasta County, California: A history*. Oakland, California: Biobooks.

Goldschmidt, W. 1951. Nomilaki ethnography. University of California Publications in American Archaeology and Ethnology 42(4):303-437.

Gonzales-Day, K. 2006. Lynching in the west: Duke University Press.

Goodrich, C. S. 1925. Legal status of the California Indian. *California Law Review* 14:157.

Gudde, E. G. 2004. California place names: The origin and etymology of current geographical names. 4th ed. Berkeley, California: University of California Press.

Hafen, L. R. 1983. Trappers of the far west: Sixteen biographical sketches: University of Nebraska Press.

Hayes, C. W. and W. Lindgren. 1910. Contributions to economic geology: Part I. Metals and nonmetals except fuels. Washington, D.C.: Government Printing Office.

Healey, S., W. Cohen, M. Moeur, D. Pflugmacher, M. G. Whitley, and M. Lefsky. 2008. The relative impact of harvest and fire upon landscape-level dynamics of older forests: Lessons from the Northwest Forest Plan. Ecosystems 11(7):1106.

Heizer, R. F. 1972. The eighteen unratified treaties of 1851-1852 between the California Indians and the United States government. University of California, Berkeley, Archaeological Research Facility, Dept. of Anthropology.

Henn, W. 1994. Mt. Shasta now on the National Register of Historic Places. Society of California Archaeology Newsletter 28(5).

Hildebrandt, W. R. and J. H. King. 2002. Part 1. Projectile point variability along the northern California-Great Basin interface: Results from the Tuscarora-Alturas projects. Boundary lands: Archaeological investigation along the California-Great Basin interface, Anthropological Papers Number 24: Nevada State Museum.

Hittell, T. H. 1898. History of California. Vol. 3: N. J. Stone and Company.

Hoveman, A. R. 2002. *Journey to justice: The Wintu people and the salmon*. Vol. 18: Turtle Bay Exploration Park.

Huntsinger, L. and M. Fernandez-Gimenez. 2000. Spiritual pilgrims at Mount Shasta, California. *Geographical Review* 90(4):536-538.

Hurtado, A. L. 1988. Indian survival on the California frontier, Yale Western Americana Series. New Haven: Yale University Press.

James,G. W. 1914. California Romantic and Beautiful. The Page Company: Boston, MA.

Johnson, J. J., and D. J. Theodoratus. 1984. Dutch Gulch Lake intensive cultural resources survey. Report submitted to U.S. Army Corps of Engineers, Sacramento District.

Keeley, J. E. 2002. Native American impacts on fire regimes of the California coastal ranges. Journal of Biogeography 29(3):303-320.

Klamath Resource Information System. No date. The regulation of timber harvest on private lands in California. Available from http://www.krisweb.com/policy/forest.htm (accessed November 7, 2008).

Kroeber, A. L. 1916. California place names of Indian origin. University of California Publications in American Archaeology and Ethnology 12(2):31-69.

———. 1925. Handbook of the Indians of California. New York, New York: Dover Publications. Original edition, 1925.

La Pena, F. R. 1978. Wintu. In Handbook of North American Indians. Vol. 8. California, edited by R. F. Heizer. Washington, D.C.: Smithsonian Institution.

Leitritz, E. 1970. A history of California's fish hatcheries 1870-1960. Fish Bulletin 150.

Lininger, J. C. 2003. Fire history and need for fuel management in mixed Douglas-fir forests of the Klamath-Siskiyou region, northwest California and southwest Oregon, USA. Paper read at 2nd International Wildland Fire Ecology and Fire Management Congress.

Lufkin, A. 1990. California's salmon and steelhead: The struggle to restore an imperiled resource. Berkeley, California: University of California Press.

Mackie, R. S. 1997. Trading beyond the mountains: The British fur trade on the Pacific 1793-1843. Vancouver, British Columbia: UBC Press.

MacCleery, D. W. 1992. *American forests. A history of resiliency and recovery*. Durham, North Carolina: USDA Forest Service in cooperation with Forest History Society.

Malery, T. S. 1985. *Mining law from location to patent*. Boise, Idaho: Mineral Land publications.

Masson, C. and M. Masson. 1985. Early days inns of southern Siskiyou...and some history of the area. Originally published in The Siskiyou Pioneer, Vol. 3, No. 2, 1959. Reprinted in Dunsmuir Centennial: 1886-1986: Edited by Reva Coon. Walker Lithograph, Inc.

Masson, M. 1949. Alexander Roderick McLeod: Compiled by the Hudson's Bay Company. In *The Siskiyou pioneer in folklore, fact and fiction and yearbook*: Siskiyou County Historical Society.

Masson, M. 1966. A bag of bones: Legends of the Wintu Indians of northern California. Happy Camp, California: Naturegraph Press.

McDonald, J. 1979. Klamath National Forest overview part IV, edited by U.S. Department of Agriculture.

McGuire, K. R. 2002. Introduction. Late prehistoric resource intensification in the northwestern Great Basin. Boundary lands: Archaeological investigations along the California-Great Basin interface, Anthropological Papers Number 24: Nevada State Museum.

McGuire, K. R. and W. J. Nelson. 2002. Archaeological Evaluation Report for CA-MOD-3681/H, CA-MOD-3016, CA-MOD-3859/H, CA-MOD-3858, and CA_MOD-3856, along U.S. Highway 395 in Modoc County California, Alturas Road Rehabilitation Project. Report No. 5533.

McTavish, A. K. 2010. The role of critical cartography in environmental justice: Land-use conflict at Shasta Dam, California. Master's thesis, San Francisco State University, San Francisco, California.

Merriam, C. H. 1955. Studies of California Indians. Edited by Staff of the Department of Anthropology of the University of California. Berkeley: University of California Press.

Minnich, R. A. 2007. Climate, paleoclimate, and paleovegetation. http://earthscience.ucr.edu/docs/chapter2.pdf (cited July 15, 2008).

Morratto, M. J. 1984. California archaeology. Orlando, Florida: Academic Press, Inc.

Musgrave, R. 1998. Federal wildlife law of the 20th century. http://www.animallaw.info/articles/arusfedwildhistory.htm (accessed March 8, 2010).

Lufkin, Alan. 1990. California's Salmon and Steelhead: The Struggle to Restore an Imperiled Resource. University of California Press: Berkeley, CA.

Oregon Coast Magazine Online. no date. Civilian Conservation Corps (CCC): 1933-1941. http://www.u-s-history.com/pages/h1586.html (cited November 11, 2008).

Orre, E. R. 1999. Gutshot THP Archaeological Addendum. Report #4093. On file at California Historical Resources Information Service, Northeast Information Center, California State University Chico.

Parsons 2003. Goat Ranch quarry draft EIR; Cultural resources. http://www.co.shasta.ca.us/Departments/Resourcemgmt/drm/Goat%20Ranch%20EIR/Chapter%204/4.09%20Cultural.pdf (accessed January 2009).

Parsons. 2003b. U.P.R.R. concrete tie and bridge maintenance program valley subdivision cultural resources inventory and evaluation.

Praetzellis, A. and M. Praetzellis. 1993. Mining frontiers of the far west. In: There grows a green tree, papers in honor of David Fredrickson.

Quint, C. B. 1960. Jedediah Strong Smith. Covered Wagon 1:14-18.

Radcliff, P. C. 1913. Radcliffe and Randolph (Indian Land Agent) letters regarding smelter smoke damage on Tom Young allotment. Red #50, Redcliff, Paren C. Box 20. Cases 43-50. Land Transaction Case Records, 1950-1958. Record Group 75, Bureau of Indian Affairs, California Sacramento Agency. San Bruno: National Archives and Records Administration - Pacific Region.

Rawls, J. J. and R. Orsi. 1999. A golden state: mining and economic development in gold rush California, California History Sesquicentennial. Berkeley and Los Angeles: University of California Press.

Ray, A. J. 1999. Introductory essay. In The fur trade in Canada: An introduction to Canadian economic history, edited by A. Innis. Toronto, Ontario: University of Toronto.

Ritter, E. W. and J. Burcell. 1995. The 1995 Sheridan-Carr Creek proposed timber sale archaeological and ethnographical report, Trinity County, California. Bureau of Land Management.

Robinson, W. W. 1948. *Land in California*. Berkeley, California: University of California Press.

Rohrbough, M. 1998. Days of gold, California gold rush and the American nation: University of California Press.

Sanchez, S. L. 2003. The selling of California: The Indians Claims Commission and the case of the Indians of California v. the United States. Ph.D. in History, University of California, Riverside.

Scanlon, H. F. 1981. The Siskiyou pioneer, in folklore, fact, and fiction.

Schönewald, G. no date. Shasta and the crags.

Schuldberg, J. B. 2005. Kennett: The short, colorful life of a California copper town and its founding family. Chico, California: Stanbury Publishing.

Shasta County. 2004. Shasta County general plan as amended through September 2004.

Shasta Resorts. 2008. Shasta Springs historic photos. http://www.snowcrest.net/photobob/shspring1.html (cited November 12, 2008).

Shasta Soda Museum. no date. December 6, 1989 - In the beginning. http://www.shastapop.com/museum.html (cited November 3, 2008).

SHN Consulting Engineers & Geologists, I. 2004. Administrative draft, Lake Siskiyou Watershed assessment. Prepared for Siskiyou County Planning Department. January 2004.

Short, J. R. 2001. Representing the republic: Mapping the United States, 1600-1900. London: Reaktion.

Silver, S. 1978. Shastan peoples. In Handbook of North American Indians. Vol. 8. California, edited by R. F. Heizer. Washington, D.C.: Smithsonian Institution.

Siskiyou County Planning Department. 1973. The conservation element of the General Plan Siskiyou County, California. June.

Siskiyou County Sesquicentennial Committee. 2008. SiskiyouHistory.org. http://www.siskiyouhistory.org/ (accessed 2008).

Smith, D. 1995. Historical data inventory of the Shasta County interlakes special recreation management area. Report prepared for Bureau of Land Management.

———. 1999. The dictionary of early Shasta County. Second edition ed.

———. 2007. First historic monument in county found at Sims Camp. October 28, 2008).

Stahl, E. 1989. Mount Shasta Journal 1917-1923. Chico, California: Association for Northern California Records and Research.

Starr, K. 2005. *California: A history*. New York: Modern Library.

State Water Resources Control Board . 2010. Porter-Cologne Water Quality Control Act.

Statistical Research, Inc. 2004. Distant shores: Cultural resources survey at Honey Lake, Lassen County, California. U.S. Army Corps of Engineers.

Steen, H. K. and C. Guth. 2004. The U.S. Forest Service: A history: University of Washington Press.

Stephens, S. L. and N. G. Sugihara. 2006. Chapter 18. Fire management and policy since European settlement. In Fire in California's Ecosystems, edited by N. G. Sugihara, J. W. van Wagtendonk, K. E. Shaffer, J. Fites-Kaufman and A. E. Thode. Berkeley, California: University of California Press.

Sutton, I. 2003. American Indian territoriality: An online research guide. http://thorpe.ou.edu/treatises/AITExtra.pdf (accessed January 21, 2009).

Taylor, A. H. and C. N. Skinner. 1998. Fire history and landscape dynamics in a late-successional reserve, Klamath Mountains, California, USA. Forest Ecology and Management 111:285-301.

Theodoratus Cultural Research. 1981. Native American cultural overview: Shasta–Trinity National Forest. Theodoratus Cultural Research.

Thomas, C. 1971. Indian land Cessions in the United States, introduction. In *The first American frontier*. New York: Arno Press.

Thornton, M. V. 1995. General history. http://www.fire.ca.gov/about/about_calfire_history.php (accessed March 11, 2010).

U.S. Department of Agriculture. 1994. Final environmental impact statement Shasta–Trinity National Forest Land and Resource Management Plan. 1994.

U.S. Department of Agriculture and U.S. Department of the Interior. 2000. Managing the impacts of wildfire on communities and the environment: A report to the president in response to the wildfires of 2000

———. 2001. A collaborative approach for reducing wildland fire risks to communities and the environment. 10-year strategy implementation plan. August 2001.

———. 2002a. A collaborative approach for reducing wildland fire risks to communities and the environment. 10-year strategy implementation plan. May 2002.

———. 2002b. Healthy forests - an initiative for wildfire prevention and stronger communities. August 22, 2002.

———. 2006. A collaborative approach for reducing wildland fire risks to communities and the environment. 10-Year strategy implementation plan.

———. 2007. Wildland fire management: The national fire plan (2007 budget justification).

U.S. Department of Interior and U.S. Department of Agriculture. 1995. Federal wildland fire policy and management. Final report. December 18.

U.S. Fish and Wildlife Service. 2008. Final recovery plan for the northern spotted owl (Strix occidentalis caurina). U.S. Fish and Wildlife Service.

———. 2010. Digest of federal resource laws of interest to the U.S. Fish and Wildlife Service. http://www.fws.gov/laws/lawsdigest/fwact.html (cited May 11, 2010).

U.S. Geological Survey. 2007. Physiographic provinces of California. http://education.usgs.gov/california/maps/provinces_B&W1.htm (cited November 5, 2008).

USDA Forest Service. 1934. Shasta National Forest, California. http://cricket.csuchico.edu/scripts/PortWeb.dll?query&field1=Filename&op1=starts+with&value1=CA_2235.JPG&template=mapsSIDsearch&catalog=catMaps (cited October 13, 2008).

———. 1995. Shasta-Trinity National Forest land and resource management plan. U.S. Forest Service, Shasta-Trinity National Forest.

———. 1999. Shasta-Trinity National Forest forest wide LSR assessment.

———. 2000. Shasta Lake West watershed analysis. Prepared for USDA Forest Service, Shasta-McCloud Management Unit. October 11, 2000.

———. 2001. Headwaters Sacramento River ecosystem analysis. USDA Forest Service, Mount Shasta Ranger District. January 01, 2001.

USDA Forest Service and USDI Bureau of Land Management. 1994. Record of decision for amendments to Forest Service and Bureau of Land Management planning documents within the range of the northern spotted owl and standards and guidelines for management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl. USDA Forest Service and USDI Bureau of Land Management.

Vaughn, T. 2004. Archaeological reconnaissance for the proposed Friedli parcel split (APN 19-220-008) on Dog Creek Road, Shasta County, California. Coyote & Fox Enterprises.

———. 2007. Archaeological reconnaissance for upgrades to the Castella water district treatment plant (Shasta County service area #3) Castella, California. Coyote & Fox Enterprises.

West, G. J. 1989. Late Pleistocene/Holocene vegetation and climate. In Prehistory of the Sacramento River Canyon, Shasta County, California. Davis, California: University of California, Davis.

White, C. A. 1983. *A history of the rectangular survey system*. Washington, D.C.: U.S. Dept. of the Interior Bureau of Land Management.

Williams, Gerald W. 2005. References on the American Indian use of fire in ecosystems. USDA Forest Service: Washington D.C. http://www.fs.fed.us/fire/fmt/Bibliography/Introduction.doc, accessed 11-17-2008.

Wohl, E. 2005. Compromised Rivers: Understanding Historical Human Impacts on Rivers in the Context of Restoration. Ecology and Society 10(2). Electronic document http://www.ecologyandsociety.org/vol10/iss2/, accessed 10-8-2008.

2.4.2 Personal Communications

Brunmeier, P., Staff archeologist North State Resources. November 2008 - conversation with K. Hitt, North State Resources.

Burns, R., Wintu Educational Council. 2008 - conversation with P. Brunmeier, North State Resources.

Hayward, J., Sr., Redding Rancheria Cultural Resources. 2008 - conversation with P. Brunmeier, North State Resources.

Root, M., Wintu Native American Heritage Contact. 2008 - conversation with P. Brunmeier, North State Resources.

Sinclair, C., Wintu Native American Heritage Contact. 2008 - conversation with P. Brunmeier, North State Resources.