

information on the ancient past through an ethnographic perspective, but tangible archeological resources and their context within sites and cultural landscapes are the primary source of data on several millennia of human occupation by Native American groups in the distant past. The record of occupation extends back more than 10,000 years in the Channel Islands, with limited indications that a comparable timespan is represented in the Santa Monica Mountains (NPS 2013b).

Archeologists classify most of the prehistoric past in California in very general terms as the Early Period, but the last two millennia before historic European contact fit into the Middle and Late periods. In addition to a Clovis projectile point that was reportedly found at Point Dume, surface evidence from the Paleo Coastal Tradition is derived from numerous sites documented on surveys in the Santa Monica Mountains. Recent excavation at the Talepop site (CA-LAN-229) uncovered part of a probable house floor that is estimated to be 7,000-8,000 years old, as well as an archeological deposit that was considerably deeper and older than the house (King and Parsons 2012). These very ancient occupations are distinguished from the majority of the Early Period timeframe during which an abundance of groundstone tools such as manos and metates used to process plant seeds led archeologists to refer to this time after 7,000 years ago as the Millingstone Horizon. The Little Sycamore site (CA-VEN-1) and the Tank Site (CA-LAN-1) on the Santa Monica Mountains coastline both played a key role in identifying and dating the Millingstone Horizon (Dallas 2013; Wallace 1954). For the Santa Monica Mountains, a later phase of the Early Period is when mortars and pestles began to accompany milling stones. These new forms reflect intensive use of acorns during the past 4,000-5,000 years.

The Middle Period is dated from roughly 800 B.C.-A.D. 1250 (King and Parsons 2010). The Chumash Tradition emerged as an identifiable archeological complex during this time throughout most of the Santa Monica Mountains and areas to the west and northwest, as well as the adjacent Channel Islands. This interval can be subdivided into finer increments based on the types of shell beads which were common and important items of manufacture

and exchange linking the Channel Islands and other coastal sites with inland areas during the Middle Period (King 1990; King and Parsons 2010). Long-distance exchange including trade with the Southwest became increasingly common during this period, along with increases in population, conflict, and subsistence intensification coinciding with significant warming in climate and environmental stress during the last 400-500 years of the Middle Period (Jones et al. 1999). An important maritime innovation dating to the first millennium A.D. was the creation of large sea-going canoes made by lashing large planks together and caulking the seams with asphaltum (natural tar deposits which are common in the Santa Barbara Channel and adjacent areas). These canoes were essential for obtaining sea mammals and large pelagic fish in much greater quantities than possible previously. Hunting of terrestrial mammals was facilitated by the transition from the spear/atlatl to the bow and arrow approximately 1,500 years ago. This is seen in the appearance of small projectile points.

Disruptions in trade and rapid changes in bead styles and technology occurred during the 1200s (King 1990). The Late Period followed these shifts and lasted until European colonization in the late 1700s. Groundstone tools indicate the continued importance of plant foods in addition to hunting, fishing, and collecting of shellfish. Rock art, primarily pictographs painted in protected rockshelters but also including petroglyphs pecked into stone, is potentially quite ancient, but the easily eroded types of bedrock suggest that surviving Native American rock art in the area is associated with the Late Period (King and Parsons 2010; Knight 1999). Abstract, anthropomorphic, and other naturalistic representations are most common, frequently depicted in very stylized fashion that is characteristic of Chumash art (Knight 1999; King and Parsons 2010). At the time of European contact, the Chumash resided in large permanent villages in coastal and valley settings. They lived in substantial dwellings built of wood, brush, rushes, and other perishable materials that do not normally survive well in archeological sites. Chumash “tomols” (sewn-plank canoes) were some of the largest, most seaworthy maritime vessels observed during early European explorations along the West Coast.

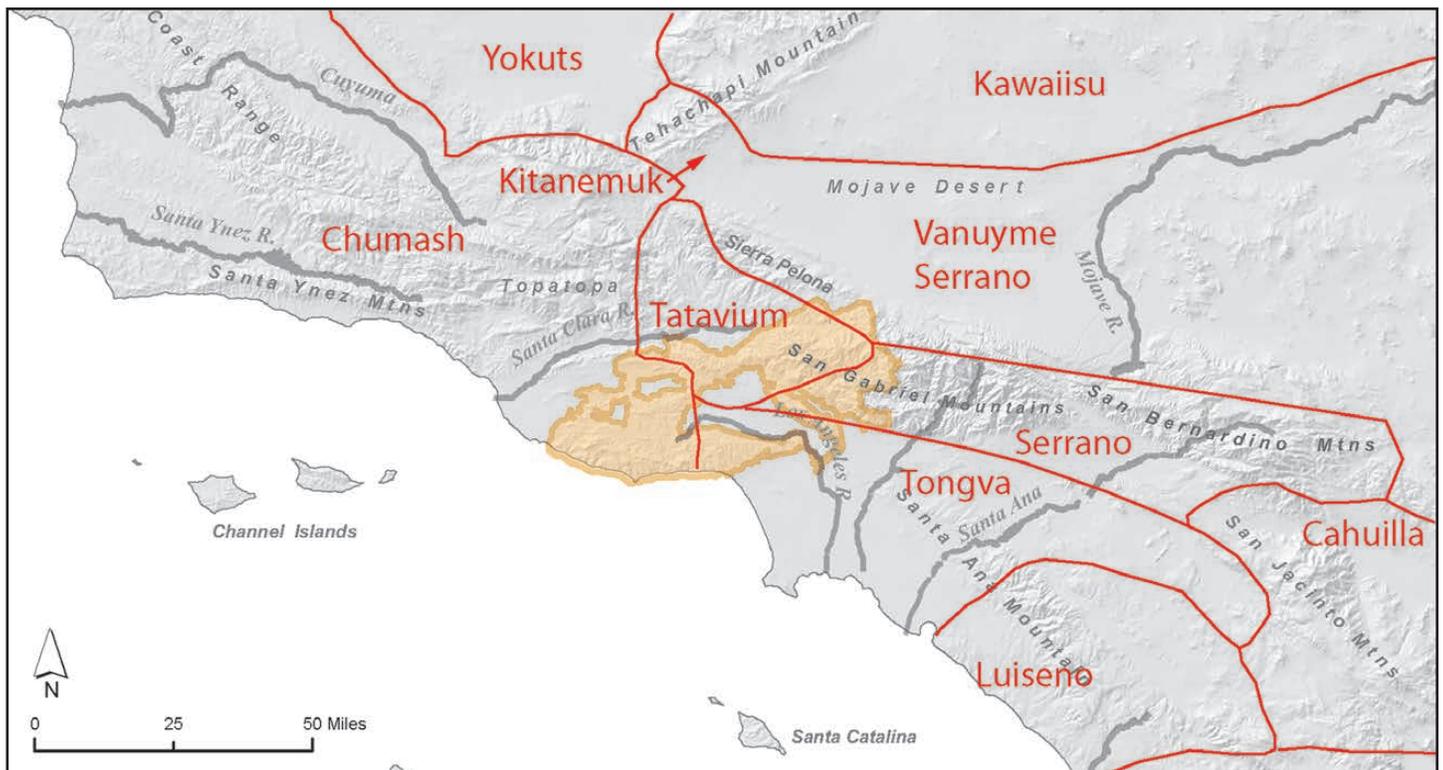


Figure 2-11: Ethnographic Native American Territories

Native American populations of the Los Angeles basin are believed to have been relatively numerous, even by California standards.

In applying this chronology to the study area it is important to remember that some pre-historic sites will show evidence of more than one period, while others will not.

Native American Groups

Native American populations of the Los Angeles basin are believed to have been relatively numerous, even by California standards. Despite the absence of elaborate infrastructure, the relationship of these native peoples to their environment was highly sophisticated. Local sources of fresh water were sufficient to support these cultures and permanent villages were situated close to such water sources. They developed technologies and social structures over many generations which allowed them to live comfortably within the natural limitations of the southern California environment. Examples of these indigenous technologies can provide interesting and instructive counterpoints to the strategies of later cultures, which have relied far more heavily on engineered solutions to overcome the natural limitations of their environment.

The study area lies within portions of the traditional territory of the Chumash, the western Tongva/Gabrielino, the Tataviam, and the Serrano as indicated in *Figure 2-11: Ethnographic*

Native American Territories (Heizer and Sturtevant 1981, USFS 1986, King and Parsons 2010).

Chumash

The Chumash are typically associated with coastal areas from Malibu to San Luis Obispo, as well as the northern Channel Islands and mountainous areas as far inland as the Carrizo Plain. The area inhabited by the Chumash measured approximately 200 by 70 miles. In size, this compares to the smallest states of the eastern United States. The total Chumash population included between 15,000 - 20,000 people (King and Parsons 2010).

The Chumash were one of the first major groups of Native Americans to be encountered by Europeans on the west coast. Juan Rodriguez Cabrillo noted the names of many Chumash settlements upon an exploring trip up the coast in 1542. Later Captain Gaspar de Portola passed through Chumash territory on a quest to find Monterey Bay in 1769. Each of these expeditions provided early historical accounts of the Chumash (Grant 1981).

Tongva/ Gabrielino

Areas associated with the Tongva include the Los Angeles basin in southern Los Angeles County, northern Orange County, extreme

The study area has an impressive archeological record with more than 1,700 documented sites, most of which are associated with the prehistoric period.

western Riverside and San Bernardino Counties, and the southern Channel Islands. The Tongva were also known as Gabrielinos because of their incorporation into Mission San Gabriel (McCawley 1996, Bean and Smith 1978; Kroeber 1976, King and Parsons 2010).

The Tongva became, with the exception of the Chumash, “the wealthiest, most populous, and most powerful ethnic nationality in aboriginal southern California” (Bean and Smith 1978, Robinson 1991). According to some estimates, the Tongva population exceeded 5,000 at the time of contact (Johnston 1962; Bean and Smith 1978; Robinson 1991).

Tataviam

The Tataviam territory, located to the north of the Tongva, would include the Upper Santa Clara River drainage east of Piru Creek, extending over the Sawmill Mountains to the north to include at least the southwestern fringes of the Antelope Valley. Mount Gleason in the San Gabriel Mountains at 6,500 feet was the highest point in their territory (King and Blackburn 1978; Robinson 1991). Tataviam villages varied in size from large centers to small settlements. At the time of contact, the Tataviam population was probably less than 1,000 people (King and Blackburn 1978). Tataviam are one of the least known groups in all of native California (Johnston 2006).

Serrano

Serrano are associated with the San Gabriel and San Bernardino Mountains, the eastern San Gabriel Valley, and eastern Los Angeles basin. The Vanyume Serrano within the study area are associated with the Mojave Desert floor, north of the San Gabriel Mountains (Northwest Economic Associates and King 2004, USFS 1986).

Associated Resources (Prehistoric period)

Archeological resources in the study area date to more than 10,000 years. Most sites, and especially the largest villages that were inhabited, were located in mountain passes, at the mouths of creeks, and along the seashore, where there was an abundance of food. The range of sites documented within the study area include pictographs, special use sites, village sites, camp sites, cemeteries, organic remains, and other sites which contain evidence of trade systems and subsistence, including hunting, fishing, and plant resource extrac-

tion. The presence or absence of specific artifact types, and changes in their material, form and manufacturing technique can provide valuable evidence of cultural and economic changes through time, as can changes in burial practices. Objects or artifacts of exotic origin provide evidence of trade networks. Pieces of Hohokam pottery from southern Arizona for example, have been found at a prehistoric site in the vicinity of Big Tujunga Wash (CA-LAN-167), and pottery from the Anasazi area of Arizona and New Mexico has been identified at Century Ranch (CA-LAN-227) in the Santa Monica Mountains. Midden sites at coastal sites have abundant shellfish remains, while those inland often contain floral and faunal remains such as carbonized seeds, and mammal, bird and fish bones that provide valuable information on prehistoric environments and food procurement strategies. The analysis of these resources can provide valuable information on the cultural heritage of the region (Moratto 1984).

The study area has an impressive archeological record with more than 1,700 documented sites, most of which are associated with the prehistoric period. More than twenty recorded sites have been formally listed or determined eligible for listing in the National Register of Historic Places (*Table D-8: Cultural Resources Related to the Prehistoric Period (Prior to 1542) in Appendix D*). Most of the documented sites (more than 1,000) are located within Santa Monica Mountains National Recreation Area (which includes portions of the Simi Hills); while nearly 200 more are located in the western San Gabriel Mountains and foothills. The remaining sites are primarily located in the Simi Hills, Santa Susana Mountains and Conejo Mountain/Las Posas Hills areas.

Santa Monica Mountains

The Santa Monica Mountains include important sites that reflect more than 10,000 years of human occupation and use. Many archeological sites in the Santa Monica Mountains have also been listed or determined eligible for listing in the National Register of Historic Places. Some sites are located on private land while others are on NPS or other agency-owned lands. Archeological sites and investigations have contributed to scientific understanding of the Chumash and Tongva cultures that inhabited the area (NPS 2002). One such site, the Chumash settlement of Talepop (CA-

Santa Monica Mountains National Recreation Area's 26 known Chumash pictograph sites are among the most spectacular in the world.

LAN-229), is so well-preserved that it can be used to discern the spatial organization of the village through time, including the identification of past cemeteries and public spaces used for ceremonies and festivals. It also contains the remains of residences that show clear differences in material wealth and economic roles of the former inhabitants. These contrasting household remains can be used in the comparative study of economic and social developments over time (King 2012).

Another major village site in southern California, Humaliwo (CA-LAN-264), is located in the Santa Monica Mountains at the lagoon in Malibu. The site, which was listed in the National Register of Historic Places in 1976, represents more than 3,000 years of use, through the Spanish mission period of the early 19th century. Chumash inhabitants of the site were recorded in the archives for the San Buenaventura mission. The site contains a historic cemetery, Late and Early Middle period deposits, and a Middle Period cemetery (Merrick 1976, Gamble et al. 1996).

The Point Mugu and Calleguas Creek areas to the west of the mountains also contain several important sites. Point Mugu was an important Native American trade route. Located at the western foot of the Santa Monica mountains adjacent to the Oxnard Plain, both areas include some of the few remaining sites that represent Native American occupation and use of former delta environments in southern California (Wessel 1975; NPS 2002). A shell midden and burial site at Calleguas Creek in Ventura County was listed in the national register (CA-VEN-110) for its potential to yield information about inhabitants during the transition from the Middle to Late Periods (McIntyre 1975).

Also of significance is a multi-component coastal site on Point Dume (Farpoint Site, CA-LAN-451) where a projectile point was reportedly uncovered that may be of Clovis origin. Clovis is the name archeologists have given to the earliest well-established human culture on the North American continent. The site was determined eligible for listing in the National Register of Historic Places, largely for its potential to yield data critical for the scientific understanding of the first inhabitants of California and the western United States (Stickel 2006).

Santa Monica Mountains National Recreation Area's 26 known Chumash pictograph sites are among the most spectacular in the world. These pictographs are sacred to American Indians (NPS 2002). The privately owned Saddle Rock Ranch Pictograph Site (CA-LAN-717), also known as the "Cave of the Four Horsemen," is considered to be of national significance. The site consists of a rockshelter (a shallow cave or rock overhang occupied by humans) and a midden (an accumulation of debris and domestic waste accompanying a human habitation site). Nearly 100 painted figures and abstract elements (pictographs) were probably added to the rockshelter after 500 A.D. Not only are the extensive and well-preserved pictographs characteristic of the final development of the distinctive Chumash style, but they include the only depictions in Chumash art of human figures in profile and of mounted horsemen. The horsemen portrayed in the pictographs are considered to be a representation of Gaspar de Portola's exploring party, which journeyed through the area in 1769-70. The Saddle Rock Ranch site will probably continue to yield information of major scientific importance about Chumash life, including data on settlement patterns, trade, religion, cosmology, and the possible use of the site for astronomical observation.

The Saddle Rock Ranch Pictograph site was listed in the National Register of Historic Places on February 12, 1982. The site was determined to be potentially eligible for designation as a national historic landmark on March 16th, 1990 by the Secretary of the Interior (NPS 2012b).

San Gabriel Mountains

Sites in and around the San Gabriel Mountains have been determined eligible for listing in the National Register of Historic Places, including 12 within the study area. The western San Gabriel Mountains area was primarily the territory of the Tongva, Tataviam, and Serrano. The Aliso-Arrastra Special Interest Area located south of the town of Acton near State Highway 14, and the Chilao Flats area near the Angeles Crest Highway are two areas of note in the Angeles National Forest. The Aliso-Arrastra Special Interest Area provides strong evidence of regional trade networks during the Late and Middle Periods, including steatite objects from the Channel Islands and



Saddle Rock Ranch Pictograph site in SMMNRA includes extensive and well-preserved pictographs characteristic of the final development of the distinctive Chumash style. They include the only depictions in Chumash art of human figures in profile and of mounted horsemen. Photo: E.P. Tripp/NPS.



The Burro Flats Painted Cave in the Simi Hills includes a series of pictograph panels that appear to have included at least some astronomical significance, since it is aligned with the solstice. Burro Flats lies within the traditional territory of the Chumash. Photo: NPS.

obsidian objects from the Owens Valley. Sites here range from long-term occupation sites to seasonal encampment, resource procurement, and processing and storage sites. The area also contains rock art features (cupules) determined eligible for National Register of Historic Places nomination. The Chilao Flats area, in the eastern most portion of the study area contains documented sites that include service centers, habitation, processing, and production sites (USFS 2006). The village site here was an important political capital for the Serrano. Located in the San Gabriel Mountains foothills, just south of the Angeles National Forest, the village of Tujunga covers a larger area, both above and below the Hansen Dam and has potential for scientific discovery (CA-LAN-167). Excavations at this site have uncovered Hopi pottery, evidence of trade networks.

Other Areas

Outside of the Santa Monica and San Gabriel Mountains, archeological resources in the study area have not been extensively surveyed, but provide great potential for scientific discovery. One exception is the Santa Susana Pass area where 23 prehistoric sites have been documented. The Santa Susana Pass is the junction between the Simi Hills and the Santa Susana Mountains and served as a transition zone between the territories of Chumash, Gabrieleno/Tongva, and the Tatavium (CSP 2005). A recent survey of the Santa Susana Pass State Historic Park uncovered 31 new sites

in addition to the area's 12 previously recorded sites. One site is listed in the National Register of Historic Places (CA-LAN-448/449). This multi-component site includes a prehistoric rockshelter with petroglyphs and artifacts, a prehistoric village site, a historic sandstone quarry, and a historic trash dump. Historic features related to the stage route that traversed this area are also included in the national register listing (CSP 2005). A village site uncovered in the park is thought to be the Tongva village of Momonga (CA-LAN-449) (Mealy and Brodie 2005). Other notable sites include rock art displays at Oat Mountain (Santa Susana Mountains), Conejo Mountain, and Castle Peak (Simi Hills).

The Simi Hills contain petroglyphs distinct from those found in the Santa Monica Mountains. Rock art sites in the Santa Monica Mountains are primarily red pictographs transcribed onto Miocene volcanic rocks. In the Simi Hills and Santa Susana Mountains rock art includes red pictographs, polychrome pictographs, and occasionally petroglyphs (Knight 2001). The most spectacular rock art site outside of the Santa Monica Mountains is the Burro Flats Painted Cave in the Simi Hills (CA-VEN-1072). This site includes at least eleven distinct loci, or concentrations, of cultural activity and their resultant deposits, all of which are suspected to belong to a single, unified settlement. Among these deposits are a series of pictograph panels located within a shallow concavity of a natural sandstone

The most spectacular rock art site outside of the Santa Monica Mountains is the Burro Flats Painted Cave in the Simi Hills (CA-VEN-1072).

outcrop. The site appears to have included at least some astronomical significance, since it is aligned with the solstice. Burro Flats lies within the traditional territory of the Chumash, whose interest in astronomical phenomena was observed and recorded by ethnographer J.P. Harrington. The site was also noted for its astronomical significance in E.C. Krupp's *Echoes of the Ancient Skies: The Astronomy of Lost Civilizations*. The coincidence of this prehistoric astronomical site with the location of NASA's Santa Susana Field Laboratory test areas which helped to develop the earliest manned and unmanned exploration of deep space is notable and should be the subject of both preservation and interpretive efforts. Burro Flats was listed in the National Register of Historic Places in 1976.

Although just outside of the study area boundary, it should be noted that at the northern base of the Santa Susana Mountains, a site known as Bowers Cave near Val Verde reportedly yielded a diverse assemblage of American Indian religious and ceremonial artifacts following its discovery in 1884 (City of Santa Clarita 2011). Also of note are Tatavium rock art examples in Vasquez Rocks County Park, located just outside of the study area near Soledad basin.

Initial European Encounters/Spanish Period (1542-1822)

The earliest recorded European encounter with southern California and its indigenous inhabitants dates from 1542, when Juan Rodriguez Cabrillo sailed from New Spain (present-day Mexico) to explore the unknown Spanish colonial frontier to the north. Over the next two centuries, numerous European ships passed along the coast of California. Beginning in 1565, (more than twenty years after Cabrillo's visit), Spain opened a trade route from its recently acquired colony in the Philippines to the west coast of Mexico.

The extension of Spanish settlement into Alta California was largely the idea of the Spanish visitador general (royal deputy) José de Gálvez, who arrived in New Spain in 1765 to oversee the reorganization of its governmental and economic affairs. Gálvez proposed a northward expansion of New Spain's frontier as a means of reinvigorating the colony's stagnating fortunes, or at least of giving it the appearance of reinvigoration. By 1769, Gálvez's

ambitious plans achieved their culmination with the departure of a combined military and religious expedition from the frontier of New Spain in Baja California. Led by Captain Gaspar de Portolá and Father Junipero Serra, the expedition traveled overland up the coast to San Diego, where the first presidio (military garrison) and mission were established in Alta California. It then continued to Monterey where a second presidio and mission were founded. On its way north, the Portolá expedition traveled through the Los Angeles basin, the San Fernando Valley, and the Santa Clara Valley. They passed near the Tongva village of Yangna on the Los Angeles River, which they named El Rio de Nuestra Señora de los Angeles de Porciúncula, from which the present name Los Angeles is derived. They entered the San Fernando Valley by way of Sepulveda Pass and stopped at the large Tongva village of Siutcabit, which lay near the spring-fed pool at present Los Encinos State Historic Park. The expedition named the San Fernando Valley El Valle de Santa Catalina de Bononia de los Encinos after the many large valley oaks (encinos) which grew on its broad savanna. Following the recommendations of the Tongva, the expedition left the valley on an existing Indian trail through San Fernando Pass to the Santa Clara Valley and from there continued north along the coast by way of Ventura.

Over the next fifty years, the Spanish settlement in Alta California would expand to a total of twenty-one missions, four military presidios and three civilian towns (or pueblos). The region would remain isolated from colonial population centers and would never be able to attract many Spanish settlers. Anticipating this problem, the Spanish authorities chose instead to Hispanicize the Indigenous people, acculturating them to Spanish ways of life and baptizing them in the Catholic Church. The missions were an essential element in this plan. They were to serve as cultural and spiritual training camps, where the Indians would all be gathered in one place (reducidos) and taught how to live like Christian Spaniards, albeit as peons, the lowest class in Spanish society.

Missions were generally established near existing native population centers. These native population centers were typically located near water sources. Missions constructed open canals (zanjas) to irrigate agricultural fields

Located at the Tongva village site of Yanga along the present-day Los Angeles River, west of Mission San Gabriel, missionaries and neophytes established the first town of Los Angeles (El Pueblo de Nuestra Señora la Reina de los Angeles de Porciuncula or El Pueblo) in 1781.

and to provide for domestic use. Mission San Gabriel, for example, the fourth mission to be established in 1771, was located at the north end of the broad Los Angeles basin (southeast of the study area) near several large Tongva villages (Engelhardt 1927a). Mission San Fernando Rey de Espana was established in 1797 (the seventeenth in the system), considerably later than others in the area, and was located at the northeastern end of the San Fernando Valley (Engelhardt 1927b). This placed it close to several large Tongva villages but also near the border of the Tataviam territory which began just over San Fernando Pass to the north and west.

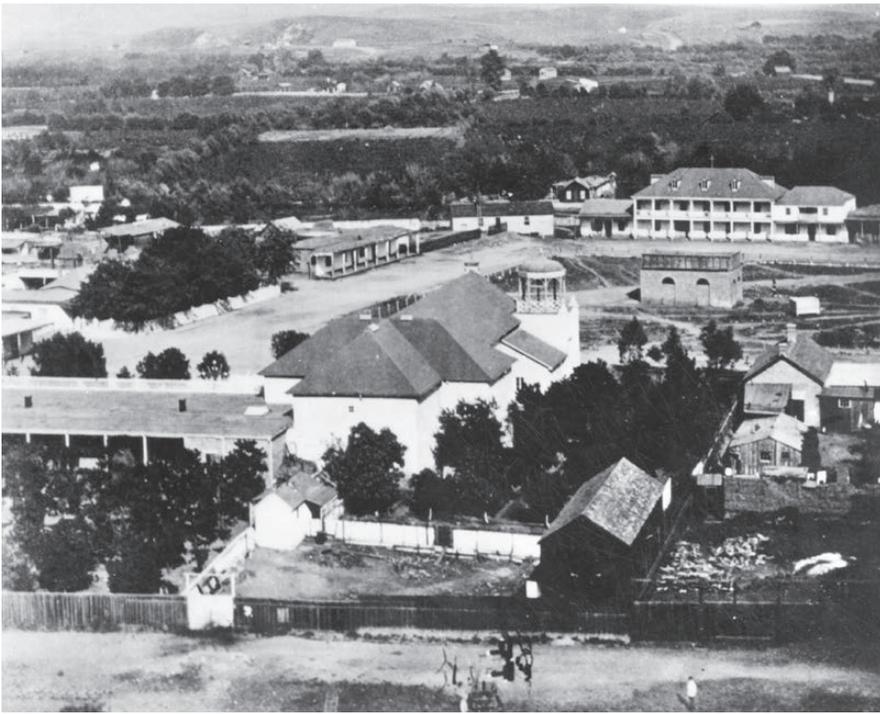
Each mission recruited Indians from the region immediately surrounding it using a variety of both coercive and persuasive means. Owing to the difficulty of supplying the Alta California settlements from New Spain, the missions had to be largely self-sufficient. By 1811 the neophyte (baptized Indian) labor force was not only supporting the missions but the entire military and civil government of Alta California. This represented the earliest significant economic activity in European California. During the Spanish and early Mexican periods (from 1769 to about 1833), the missions were the principal source of economic production.

The Spanish colonies of Alta California were physically isolated and difficult to resupply from the principal population centers of colonial New Spain (today's Mexico). Although most of the Alta California settlements lay on or near the coast, the prevailing winds and currents from the north, as well as frequently heavy fogs, made the ocean journey difficult and extremely dangerous for the small, square-rigged ships used by European mariners of that time. But the alternative of traveling overland by a direct route up the coast was equally daunting on account of the rugged mountains and dense brush which extended nearly the entire distance. As the Spanish government faced increasing competition from rival European nations over control of California, however, it continued to seek an effective means of reaching its northern-most settlements and linking them more closely with New Spain. Among the likeliest possibilities was an alternative overland route from the east, which Juan Bautista de Anza, captain of the small presidio of Tubac in present-day

Arizona, proposed in 1773. Juan Bautista de Anza successfully made this journey in 1774, passing through the Colorado Desert to reach San Gabriel Mission near Los Angeles. He repeated his journey the following year, this time leading a party of approximately 240 colonists, along with their cattle, horses and other equipment. The expedition entered southern California from the southeast, continuing west and north along the now-established path of El Camino Real. Its route passed through the study area along the northern slope of the Santa Monica Mountains west of Cahuenga Pass. The Anza Expedition had far reaching consequences for the development of an important region of the United States. It helped to establish a strategic northern Spanish military outpost that eventually evolved into the city of San Francisco.

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Despite the success of the missions in achieving their immediate practical goals, the larger Spanish objective of creating an indigenous citizenry ultimately proved a failure and was a profound tragedy for the Indians themselves. The native population of California declined by as much as a third during the 65 years of the missions' active existence, with most of this loss suffered by the Indians of the coastal regions who were most directly affected by the mission system. Exotic diseases introduced by the Spanish occasionally resulted in epidemics which not only devastated the mission communities but often spread throughout the surrounding country. The most notable of these outbreaks occurred in 1806, when measles



This 1869 photo of El Pueblo, viewed towards the southeast, shows the Plaza with a brick water reservoir in the center that was built in 1858 to hold water conveyed via the Zanja Madre. In the foreground is the back of the Plaza Church and in the background the Lugo House. Photo: Security Pacific National Bank Collection/Los Angeles Public Library.

The Zanja Madre, or “mother canal,” would remain the principal source of fresh water for El Pueblo into the twentieth century.

reduced some mission populations by as much as a fourth. However, for most of the mission period, population decline was the result of a more gradual attrition resulting from factors which included high infant mortality, poor nutrition and hygiene, and psychological stress. In many missions, the death rate exceeded births, and the neophyte population had to be maintained by bringing more Indians in from the surrounding country. Eventually, the Spanish resorted to using military raids to capture Indians from the interior valleys and foothills.

Associated Resources (Spanish Period)

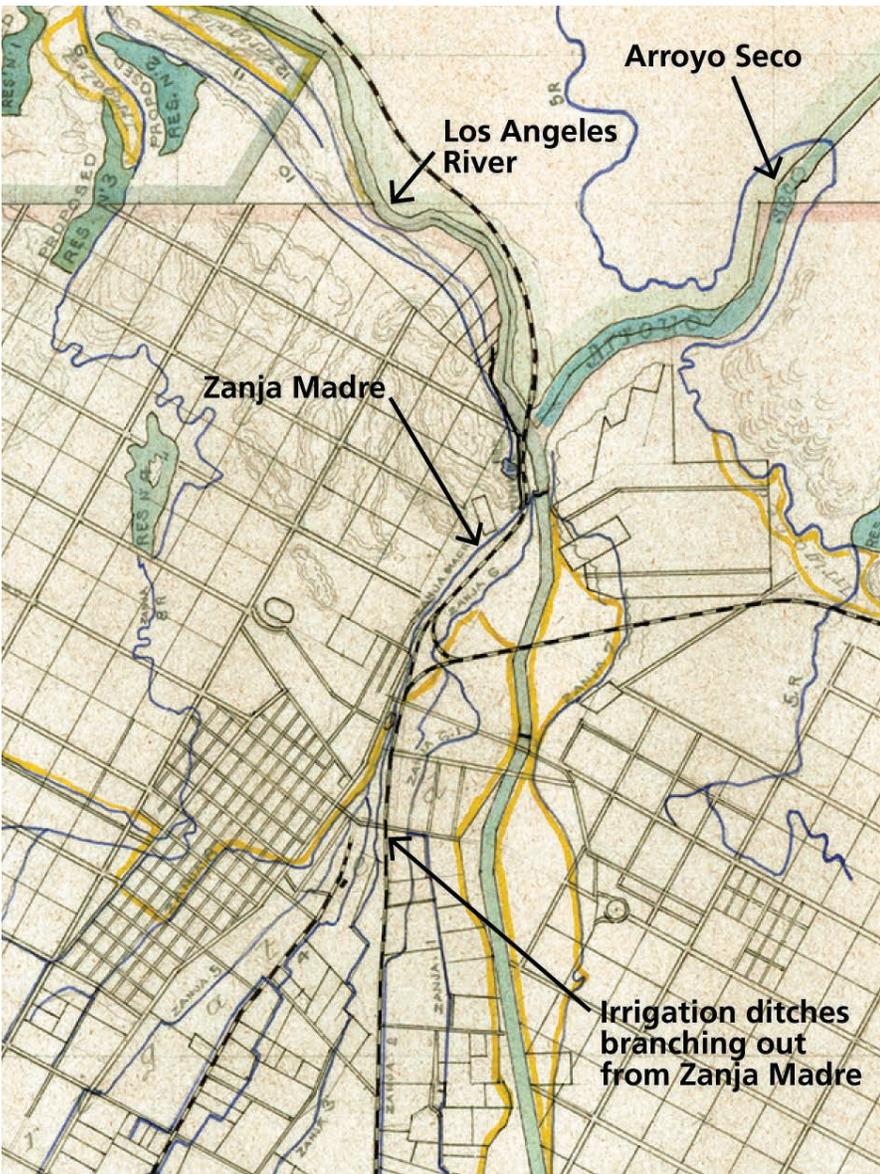
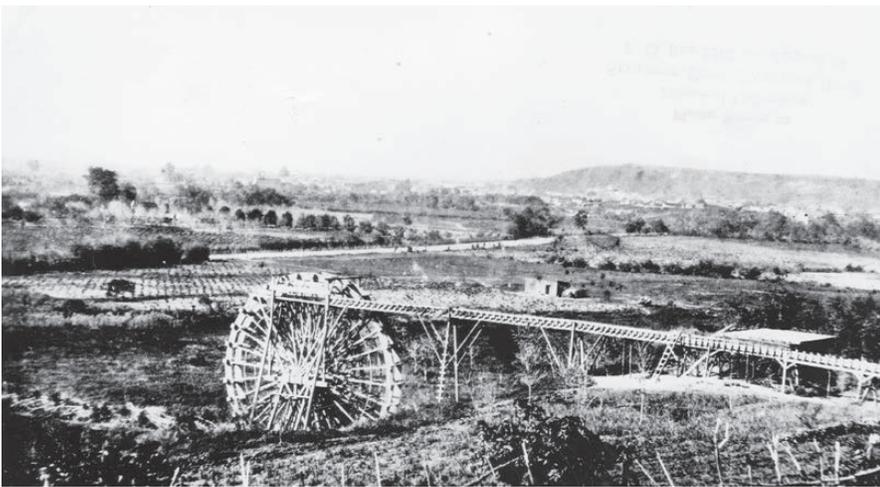
Study area resources associated with the Spanish Period include Portola and Anza expedition campsites, portions of El Camino Real, and El Pueblo de Los Angeles Historical Monument, the site of the original pueblo established in 1781 (*Table D-9: Cultural Resources Related to the Spanish Period (1542-1822) in Appendix D*). Campsite locations for the Portola expedition include Los Encinos State Historic Park (listed in the National Register of Historic Places in 1971) and Elysian Park (California Historic Landmark).

The Juan Bautista de Anza expedition is commemorated by the national historic trail,

established in 1990. The study area includes approximately 22 miles of the 1,200 mile long Juan Bautista de Anza National Historic Trail, managed by the NPS which is significant for its role in the early settlement of California by the Spanish. The trail, designated in 1990, represents the route taken by Juan Bautista de Anza in 1775–1776 when he led a group of colonists from Mexico into the northwestern frontier of New Spain (present-day San Francisco). The trail provides opportunities for visitors to experience landscapes similar to those the expedition encountered and to visit sites associated with the expedition. The national historic trail is interpreted at several sites within, or in close proximity to, the study area where the character of the landscape and associated structures convey the significance of the historic period. These sites include Solstice Canyon and Malibu Creek State Park (within SMMNRA) and Los Encinos State Historic Park (San Fernando Valley).

El Pueblo de Los Angeles Historical Monument includes Los Angeles’ oldest and most historic structures clustered around the pueblo’s old plaza. Notable buildings of significance during this period include Nuestra Señora La Reina de Los Angeles Church (1822) and Avila Adobe (1818); the city’s oldest surviving residence. Archeological excavations here have also uncovered artifacts from the indigenous period (before 1781), the Spanish colonial era (1781–1821), the Mexican era (1821–1847), and the first century of the American era (1850s–1940s). Portions of the pueblo’s water system, Zanja Madre have been uncovered near the Los Angeles State Historic Park and in present day Chinatown. Although artifacts associated with the Zanja Madre date to later modifications of the canals, the alignment in many areas remains consistent with the Spanish Period alignment (Crawford 2000; Cogstone Resource Management, Inc. 2003).

Among the significant Spanish-era transportation corridors was El Camino Real, which loosely connected the early colonial establishments of Alta California. Present Highway 101 follows the approximate route of El Camino Real throughout southern California, passing through the study area where it parallels the northern slope of the Santa Monica Mountains from Cahuenga Pass west. El Camino Real is ambiguous as a historic property, since it was poorly defined (if well-used) during the



The Los Angeles River provided the original water source for El Pueblo and then the City of Los Angeles. The Zanja Madre, or “Mother Ditch”, conveyed water from the river to El Pueblo. The photo, dated 1862, shows the water wheel which lifted water from the river into the Zanja Madre. The Zanja Madre conveyed water into a network of other irrigation ditches that were developed over time as shown in the map (ca. 1880s). Portions of the Zanja are still being unearthed today. Photo: Security Pacific National Bank Collection/Los Angeles Public Library. Map: Detail Irrigation Map Southern California-Los Angeles ca.1880s, William Hammond Hall Papers, 91-07-04, 91-06-10/ California State Archives.

historic period with which it is primarily associated. Much that remains or is commemorated today is more closely connected with early twentieth century attempts to encourage tourism. This does not diminish its historic significance but places it within a different context with a different period of significance. In this respect, El Camino Real reflects Anglo-American romanticization of Hispanic California more than it does Hispanic California itself.

Mission San Fernando Rey de Espana is located in close proximity to the study area in the San Fernando Valley community, Mission Hills. The mission was restored from ruins in the first half of the twentieth century and reconstructed again in 1974 after it was severely damaged in the 1971 San Fernando earthquake. Listed in the National Register of Historic Places in 1988, the mission remains an active Catholic Church.

The Mexican Period (1822-1848)

In 1821, the Spanish viceregency in colonial New Spain was overthrown and the Republic of Mexico was established in its place after more than a decade of fighting. With legalization of foreign commerce under the new Mexican government after 1821, trade in cattle products (hide and tallow) quickly grew and soon created a strong incentive for the establishment of secular ranches. In late 1829, Mexican trader Antonio Armijo led a commercial caravan from Abiquiu, New Mexico (near Santa Fe) to Los Angeles, opening the Old Spanish Trail. This was the first attempt by Europeans to reach Alta California from the inland southwest since the Yuma uprising had closed the Anza Trail nearly fifty years earlier. Armijo avoided difficulties with the southern tribes by going north to cross the Colorado River above the Grand Canyon before heading south and west across the Great Basin to California. This route led him into southern California through Cajon Pass between the San Gabriel and San Bernardino Mountains. Among the principal goods which were carried over the Old Spanish Trail were horses and mules obtained from the Mexican ranchos in Alta California—often illegally—to be sold in Santa Fe and other points east.

The Old Spanish Trail had wide-ranging effects on the economy of the Mexican Southwest, helping to establish Santa Fe as a com-

By 1840, rancho pastoralism had replaced mission agriculture as Alta California's principal economic activity.

The impact of the Mexican period of the rancho, short though it was in years, has been disproportionately significant in terms of the patterns of land ownership and management practices which have characterized California—especially southern California—subsequent to the period of Mexican political hegemony.

mercial hub in a continental trade network linking Mexico and the United States. The illicit trade in horses which this network supported may have had a significant negative impact on the rancho economy of Mexican California. The commercial importance of the Old Spanish Trail quickly diminished after the United States took control of the Southwest in 1848, altering the balance of economic relations throughout the region, but segments of the Old Spanish Trail continued to be used and remained significant within other contexts. For example, the route which the trail took into Los Angeles over Cajon Pass and along the foot of the San Gabriel Mountains would later be used by U.S. Route 66.

The secular ranches of this period, known as ranchos, were actively encouraged by Mexican authorities with the Colonization Act of 1824 and the Supplemental Regulations of 1828, but little good land was available for prospective rancheros because most was already taken up by the missions. As a result, the rancho economy was not able to develop until after the Secularization Act of 1833, which redistributed mission lands and other material assets of the religious establishments. Although most of these resources were supposed to go to the Christianized Indians, who were now considered Mexican citizens, the vast majority went instead to a handful of Hispanic Californians with ties to the new liberal government.

By 1840, rancho pastoralism had replaced mission agriculture as Alta California's principal economic activity. More than 800 private grants were issued by the Mexican government during the brief fifteen years of the rancho period (from secularization in 1833 to the conclusion of the Mexican-American War in 1848). Fewer than twenty had been granted during the previous period under Spanish rule. The Mexican grants averaged many thousands of acres each and supported herds of cattle which numbered in the thousands. These cattle ranged over more than ten million acres of grant lands between northern California and San Diego (Burcham 1957).

Mexican-American War (1846-1848)

The Mexican-American War, which lasted from 1846 to 1848, resulted in the annexation of Alta California by the United States and brought to an end the period of the Mexican

rancho's dominance. Southern California played an important, though largely peripheral, role in these military events. It was the site, for example, of the only battle lost by U.S. forces, when General Kearny's troops were defeated by a small band of Mexican Californios at San Pascual (near present-day Escondido) in December of 1846. The Treaty of Cahuenga, which brought an end to fighting in California on January 13, 1847 (though the war continued elsewhere), was signed at Rancho Verdugo near the foot of the Santa Monica Mountains. These events, collectively known as the Battle of Los Angeles, would have little consequence on the ultimate outcome of the war, though the temporarily successful resistance of local Californios may have influenced their standing in the aftermath.

Associated Resources (Mexican Period)

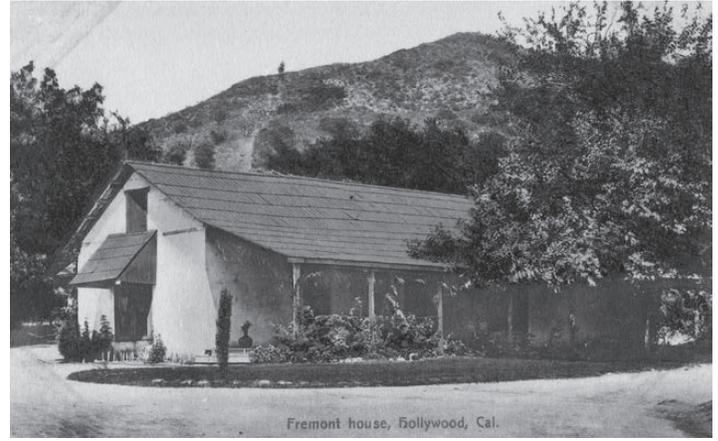
The impact of the Mexican period of the rancho, short though it was in years, has been disproportionately significant in terms of the patterns of land ownership and management practices which have characterized California—especially southern California—subsequent to the period of Mexican political hegemony. This significance has expressed itself in the large landholdings of companies such as the Irvine Company, Tejon Ranch, and the Simi Land and Water Company, among others.

Many historic properties associated with this period and its economic activities are still at least partly extant throughout southern California (*Table D-10: Cultural Resources Related to the Mexican Period (1822-1848)* in *Appendix D*). Some of the most noteworthy of these properties lying within or adjacent to the study area are Rancho Simi (Simi Hills), Rancho San Rafael (Verdugo Mountains), and Rancho Los Encinos (San Fernando Valley).

Rancho Simi at 113,000 acres took its name from the Chumash village of Shimiji which was located here. Most of the original rancho is now part of the incorporated Simi Valley. The ranch headquarters, however, and approximately six acres of surrounding land remain protected within the Strathearn Historical Park and Museum, managed by the Rancho Simi Valley Recreation and Parks District. The property, which includes a Mexican-era adobe and a Victorian-era wood frame



The site of Rancho Los Encinos includes a natural spring that provided a year-round source of water for the ancient village of Siutcanga, home to the Tongva people. Structures from the 1800s remain and are protected as part of Los Encinos State Historic Park. Photo: NPS.



This exterior postcard (n.d.) shows the Tomas Feliz adobe at Campo de Cahuenga where John C. Fremont and Andres Pico signed the treaty ending the fighting of the Mexican American War in California on January 13, 1847. Photo: M. Rieder/Los Angeles Public Library.

house from the subsequent American period of ownership, was listed in the National Register of Historic Places in 1978.

Rancho Los Encinos originally occupied the southern end of the San Fernando Valley. The site is currently protected within Los Encinos State Historic Park and includes the original adobe built by Vincent de la Osa, who acquired the rancho in 1849, as well as a two-story limestone farmhouse built in 1872 by later residents Eugene and Philippe Garnier, who were of Basque origin. Rancho-era adobes also include the Sepulveda Adobe in the Santa Monica Mountains, the Catalina Verdugo Adobe (Rancho San Rafael), and the Lugo Adobe at El Pueblo de Los Angeles Historical Monument.

Sites relevant to the Mexican-American War are Campo de Cahuenga where the Treaty of Cahuenga was signed between Mexican and American commanding officers. The site of the Oak of Peace at Rancho San Rafael is where Mexican General Andres Pico last addressed his troops before retreating to Mexico.

The nearby Rancho Camulos (Piru), although outside of the study area, is noteworthy. Rancho Camulos was designated a national historic landmark (NHL) in 1996 for its historic significance in association with the literary figure of Ramona. The publication of *Ramona* in 1884 propelled the rancho into nationwide notoriety romanticizing the mission and rancho era of California history. As the NHL nomination explains, “No other extant site

is more strongly associated with Helen Hunt Jackson’s novel *Ramona*, and the resource possesses exceptional value in interpreting the fictional ‘Home of Ramona.’”

The study area also includes the western terminus of the Old Spanish Trail, which served as an important commercial trade route during the Mexican period. The Old Spanish Trail has been determined to have national significance and was designated a national historic trail in 2002 (managed by the NPS).

It is difficult to see traces of the trail in the modern landscape because most of the routes of the Old Spanish Trail have been reclaimed by nature or changed by later use. However, some of the landmarks along the trail can be seen today. El Pueblo de Los Angeles Historical Monument within the study area was the final destination of the Old Spanish Trail and is now part of the Old Spanish National Historic Trail visitor experience.

The American Period (1848-Present)

The American Period brought significant change to the Los Angeles region which grew from a small agricultural enclave to a large metropolitan area. The arrival of the transcontinental railroad made the region more accessible and many Americans and other immigrants relocated here, lured by the mild climate and pastoral landscape. Growth was further fueled by the discovery of oil and the burgeoning film industry. Major public works efforts, such as the importation of water, were employed to overcome resource limitations. Although many communities flourished dur-



This image (ca. 1860s) shows adobe housing along a street known at the time as "Calle de los Negros" east of the Plaza of El Pueblo, which was the site of the Los Angeles Massacre of 1871. This street eventually was integrated into Los Angeles Street a few years later and this block of housing was demolished in the 1880s. These properties were initially owned and occupied by the Mexican owners of the various Los Angeles area ranchos and later occupied by Chinese people. Photos: Security Pacific National Bank Collection/Los Angeles Public Library.

ing this time, some residents were displaced or deported as a result of discriminatory laws and policies.

Gold Rush and Pastoralism (1848-1875)

The discovery of gold in northern California brought a flood of new immigrants to California from the eastern United States and other countries. Gold had been discovered in Placerita Canyon as early as 1842. This discovery may have contributed indirectly to the more famous and consequential discovery in northern California in 1848. Over the next decade, California's non-Indigenous population increased from approximately 15,000 in 1848 to nearly 380,000 by the 1860 census. But the majority of these newcomers went to northern California and to the goldfields in the foothills of the Sierra Nevada. During the first three decades of the American period, only a small but steady stream of new immigration flowed into southern California, where the population remained predominantly Hispanic and relatively small. The population of Los Angeles grew from about 1,600 to more than 11,000 (during the same period San Francisco grew from a population of less than 1,000 to nearly 250,000).

The most significant impact of the Gold Rush on southern California was economic. It created a lucrative market for beef and mutton which stimulated the pastoral industries and resulted in their greatest expansion. The ranges were intensively stocked and overgrazed, a

fact which contributed to their collapse following a catastrophic drought in 1863-1864.

Following the collapse of cattle-dominated pastoralism by the mid-1860s, sheep would become the most important livestock industry in California. At the same time, agriculture, dominated by American immigrants from the east, began to replace pastoralism in economic importance. The earliest period of American agriculture in California was characterized by extensive dry farming, primarily of wheat. The majority of this activity took place in the Central Valley, but southern California was also a major producer. The pastoral economy would continue to define the region's principal commerce and industry up until the late 1870s or early 1880s.

Although Los Angeles at this time was comprised of many ethnic groups (African Americans, Hispanics, Asians, Euro-Americans and others), it was far from a harmonious existence. Vigilante justice mixed with the racist and nativist ideologies of the times sometimes had tragic results for ethnic groups. (CDPR 2012).

Beginning in 1848, Chinese immigration to California was encouraged to provide inexpensive farm labor. Chinese immigrants also played a significant role in the completion of the transcontinental railroad system. The first permanent settlement in Los Angeles was established in 1856. Despite the contributions made by Chinese to the growth and expansion of the west, immigrants were greatly affected by discriminatory laws which prevented them from becoming naturalized citizens until 1943. The Chinese Exclusion Act of 1882 banned immigration by Chinese laborers into the United States for the next 60 years, and barred immigrants already here from becoming naturalized citizens or having their spouses join them (Garcia, Flores, and Ehrlich 2004). The study area includes the site of what is considered one of the most savage and brutal events involving Chinese immigrants. The Los Angeles Massacre of 1871, which began with a quarrel between two Chinese who shot at each other, escalated into a violent riot when a white spectator was accidentally killed by the gunfire. Homes and businesses were looted and 19 Chinese were killed in the riot (CDPR 1988). The location of the riot is within the study area, near the site of the El Pueblo.

By the first decade of the twentieth century, California's economy was fueled almost entirely by southern California oil, while the rest of the nation continued to use coal.

Discriminatory practices also had a significant effect on Hispanic communities. During this period Mexican-era landowners were forced to go through lengthy legal processes to prove their land ownership (Land Act of 1851). Judges were often unfamiliar with the Mexican land tenure system on which the land grants were based. The process of establishing existing claims and newly imposed land taxes bankrupted many Californios (Mexican land grantees) and eroded their economic base. Many were only able to obtain poorly paid jobs as laborers. The pattern of dislocation from losing land, ensuing neighborhood segregation, declining political influence, and discrimination created many challenges for the Hispanic community in Los Angeles during this time (CDPR 1988).

Many prominent Pobladores who founded El Pueblo in 1781 were of African descent. Francisco Reyes, for example, served as mayor of El Pueblo in 1873. Later, a number of African Americans settled in California after it was declared a free state with the Compromise of 1850. Some also came as slaves but were later emancipated. Biddy Mason, who came to California as a slave in 1851, was emancipated with legal assistance from the black community in Los Angeles, when her owner tried to leave with her for Texas. Biddy Mason went on to become a successful businesswoman in Los Angeles. Mason's former homesite, located on Spring Street just south of El Pueblo, is now Biddy Mason Park (CDPR 1988, Garcia, Flores and Ehrlich 2004).

Oil Development

Energy was a precondition of southern California's successful economic development which at first posed a limitation. Although the Sierras had numerous streams of falling water to supply hydraulic power to the gold miners, most of the state was too far removed from this source of energy to take advantage of it. Where hydraulic power was absent, nineteenth century industry was accustomed to rely on steam, which was produced through the burning of either wood or coal. The eastern United States had abundant supplies of both, but these fuels were scarce and expensive in California. A local source of inexpensive fuel was therefore highly desired. This interest explains the enthusiasm which accompanied the discovery of oil in the early 1860s. In southern California, much of this ac-



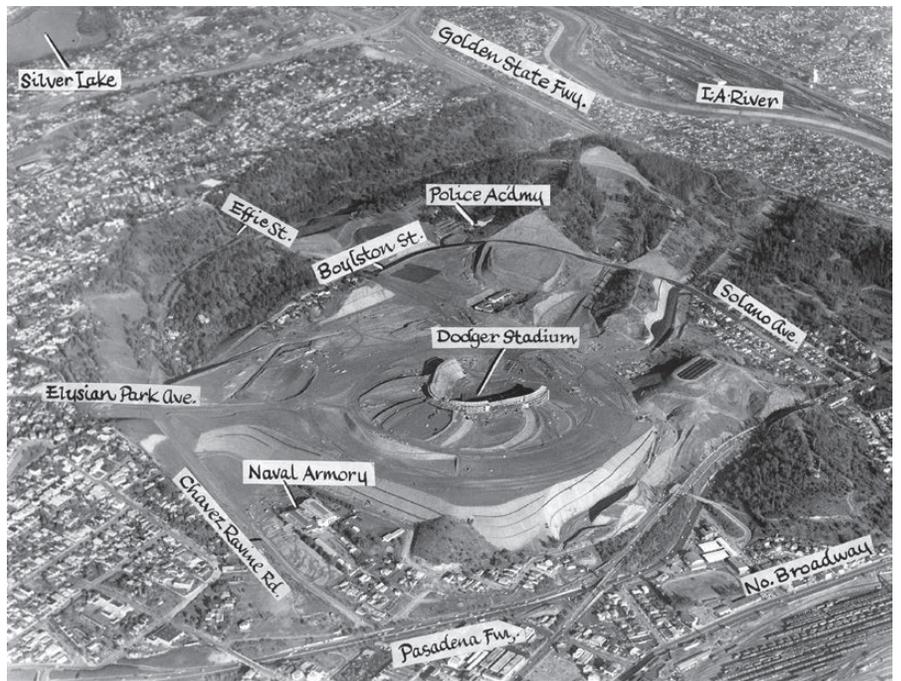
Well No. 4 in Pico Canyon near Newhall was the first commercially successful oil well in California. The Oilmen's Hotel, shown above in 1961, was built ca. 1880 to house oil men. Photo: NPS.

tivity took place around the natural oil springs and seeps of Pico Canyon along the northern slope of the Santa Susana Mountains.

By the first decade of the twentieth century, California's economy was fueled almost entirely by southern California oil, while the rest of the nation continued to use coal. California's average per capita oil consumption was about twenty-eight barrels, compared to a national average of two. For the next forty years, southern California would remain energy self-sufficient and even export oil and natural gas to other regions. Oil would help tie the entire region together and support the early development of a transportation system based predominantly on highways and automobiles. The individual mobility which these technologies made widely available would facilitate the recreational development of the mountains surrounding Los Angeles where road houses, weekend retreats and summer camps proliferated during the early twentieth century (Williams 1996, White 1970, White 1968).

Overcoming Isolation (1876-1900)

The Butterfield Overland trail, created by the United States Congress on March 3, 1857 and operated until June 30, 1861, closed the travel gap between California and the Mississippi Valley. The route entered California at Fort Yuma, Arizona stretching into Mexico before re-entering the United States near the New River. From Los Angeles, the stage crossed Cahuenga Pass into the San Fernando Valley, stopping at Los Encinos (present Los Encinos State Historic Park) on the northern foot of the Santa Monica Mountains. It then turned north again to leave the San Fernando Valley



Chavez Ravine, as shown in the top photo in 1952, was a vibrant Latino community northeast of downtown Los Angeles. In the 1950s, the Housing Authority of the City of Los Angeles, with plans to redevelop the area, condemned properties in Chavez Ravine. Community members and supporters protested the condemnation. The lower right photo (1959) shows a World War II veteran protesting with his aunt, who displays his Purple Heart and Bronze Star medals. Eventually, Dodger Stadium was built in the ravine (lower right photo). Top Photo: Leonard Nadel, Housing Authority Collection/Los Angeles Public Library. Lower Photos: Herald-Examiner Collection/Los Angeles Public Library.

Many homes were constructed in a wide range of architectural styles popular at the time. Such styles included Monterey, which featured adobe walls and second floor wooden balconies, Italianate, Greek Revival, Romanesque, and Spanish-Colonial Revival. This period also saw the emergence of the regionally adapted California bungalow which stayed warm in the winter and cool in the summer (Kaplan 1987).

Early Twentieth Century Growth and Development (1901-1939)

Rapid growth continued in the twentieth century, supported by the nascent film industry,

the importation of water, abundant oil, and the evolution of the world's largest interurban transportation system, the Pacific Electric Railway which connected cities throughout the Los Angeles area. Another wave of immigration to southern California began in the 1920s. These events would ultimately transform the region from a sparsely populated, largely rural Hispanic settlement, to a predominantly Anglo-American metropolis by the middle of the twentieth century.

During this time several ethnic enclaves emerged in and around the study area, largely



Warner Bros. National Picture studio was built along the Los Angeles River in the San Fernando Valley. This image, looking north towards the Santa Susana Mountains, was taken in 1924. Photo: Security Pacific National Bank Collection/Los Angeles Public Library.

Movie production companies were eventually drawn to the Los Angeles area by the mild climate and wide range of landscapes and architectural styles all of which could depict many settings (urban, suburban, rural) and locales.

as a result of exclusionary laws and zoning. Although such enclaves somewhat marginalized groups from the larger social sphere, they also reinforced a local cultural experience distinct to those places. The original Chinatown, which was located just south of the new Los Angeles State Historic Park, was destroyed in the 1930s to make way for Union Station. Residents relocated just north of the area to form today's vibrant Los Angeles Chinatown. By 1910, Los Angeles had become the most populous Japanese settlement in California which remains to this day. This community formed what is now Little Tokyo Historic District, located just south of the study area in downtown Los Angeles. Chavez Ravine was a vibrant Latino community that was dislodged in the 1950s for construction of what is now Dodger Stadium. African Americans who had been part of the original pueblo settlement were slowly pushed out of the El Pueblo area and began concentrating in southern Los Angeles (Garcia, Flores, and Ehrlich 2004; CDPR 1988).

Population change would also shift the political balance of power within the state as a whole from San Francisco in northern California to Los Angeles. Southern California would also become a leading innovator in new technologies and engineering solutions which provided essential resources for regional economic development but also dramatically transformed the natural environment.

Film Industry

Although the film industry originated on the east coast and in Chicago, movie production companies were eventually drawn to the Los

Angeles area by the mild climate and wide range of landscapes and architectural styles all of which could depict many settings (urban, suburban, rural) and locales. Production companies were also enticed by inexpensive land available at the time. Film companies first began to locate in Los Angeles in 1907. At the time electric power was very expensive and sunlight was primarily used to develop film. In eastern locations, rain and snow would halt film production. The Los Angeles Chamber of Commerce capitalized on this factor and actively lobbied filmmakers beginning in 1909, boasting 350 days of sunshine. By 1920, roughly 100,000 residents were employed in the film industry (Kaplan 1987, Bible, Wanamaker, and Medved 2010).

The first permanent film studio was established in 1909 by William Selig and Francis Boggs (Polyscope Company). Many new studios followed suit, initially established in the Echo Park and Silver Lake neighborhoods and later in Hollywood. The eastern Santa Monica Mountains were used early on for location filming. Popular sites included Bronson Canyon, Runyon Canyon, Griffith Observatory, Hollywood Bowl, and the Hollywood Hills. The industry also moved to Malibu in 1926, establishing the Malibu Beach Motion Picture Colony (Kaplan 1987; Bible, Wanamaker, and Medved 2010). The Santa Monica Mountains and San Fernando Valley's ranches and inexpensive land also attracted major studios. Paramount Ranch, established in 1927 in what is now Santa Monica Mountains National Recreation Area, is one of the best remaining examples of a movie ranch from this era. Additional locations within the study area also

attracted film production companies. Porter Ranch, a 500-acre site in the Santa Susana Mountains, was heavily used for filming, as was Iverson Ranch in Chatsworth, Corriganville in the Santa Susana Pass area, and Ahmanson Ranch in Upper Las Virgenes Canyon (Bible, Wanamaker, and Medved 2010).

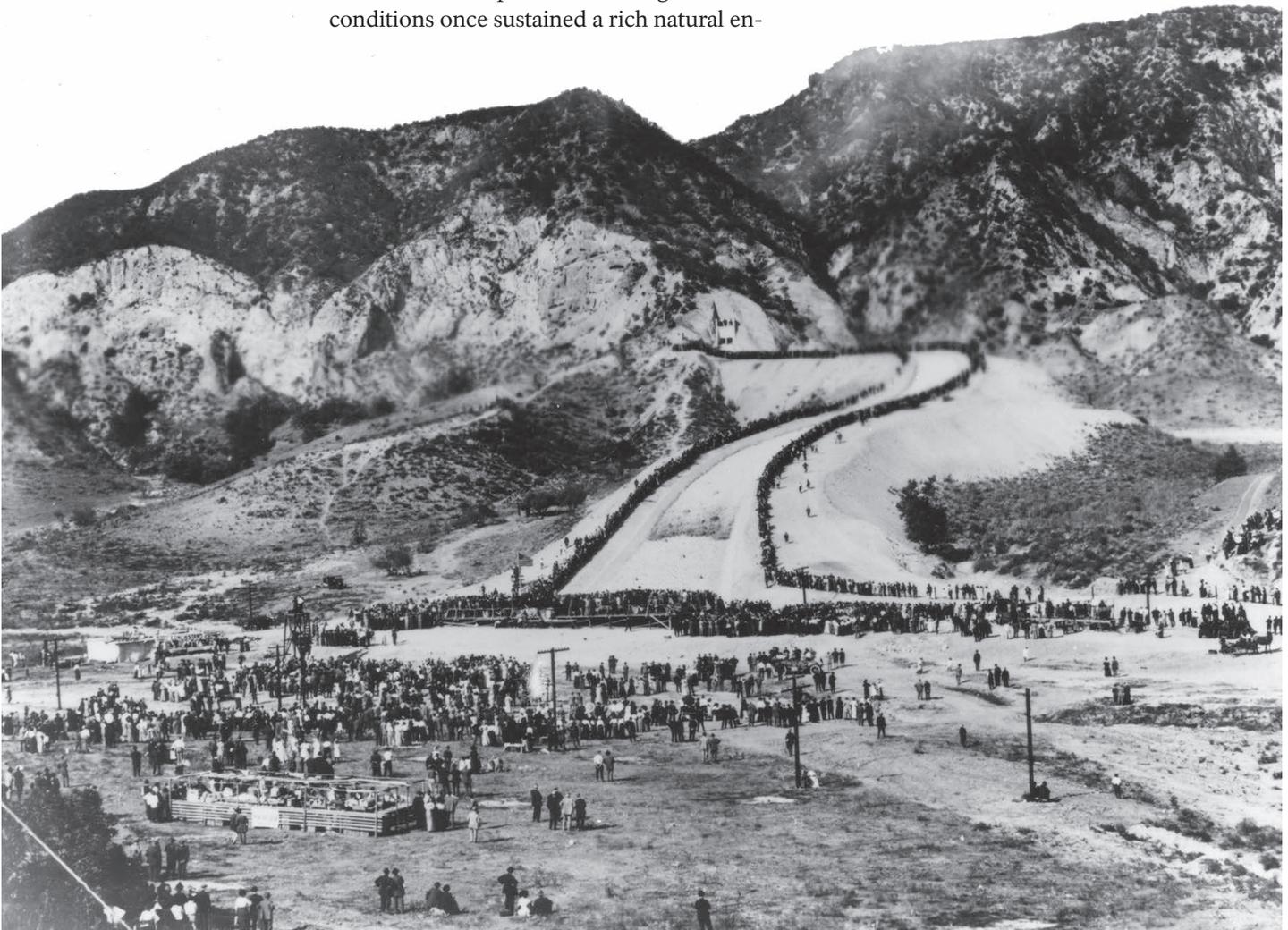
The Re-Engineering of Los Angeles

The dramatic growth of Los Angeles in the late 19th century drew increasing attention to its need for more water and the need to control the superfluity during the seasons when there was too much water. Inadequate water supply was among the most significant resource limitations which southern California faced. The arid region has an average annual rainfall of only 13 to 20 inches. Much of this precipitation falls in isolated winter downpours, creating floods which quickly drain down steep mountain slopes, moving a considerable amount of erosional sediment with them in the process. Although these conditions once sustained a rich natural en-

vironment, they posed significant obstacles to the city that was eventually built here. In 1902, Los Angeles residents voted to grant the city authority to manage and develop its water resources. At that time, the Los Angeles population numbered approximately 160,000, while city engineers estimated that existing water resources were sufficient to support a population of no more than 250,000. At the city's current rate of growth, municipal leaders estimated that Los Angeles would exceed its local water supply within five years, and they began to look for other sources of water beyond the Los Angeles River watershed for the first time. The alternative of not growing beyond the limits of what local resources could support was not considered.

Los Angeles Aqueduct

In 1904, William Mulholland, the superintendent of the city's newly created water bureau, publicly announced his intentions to bring



In 1913, a celebration event marked the delivery of the first water to Los Angeles via the Los Angeles Aqueduct. The aqueduct continues to convey water from the Owens Valley in eastern California to the City of Los Angeles. Photo: Security Pacific National Bank Collection/Los Angeles Public Library.

supplemental water to Los Angeles from the Owens Valley, a watershed located more than 230 miles northeast of Los Angeles on the western edge of the vast Great Basin. It would be one of the first major inter-basin water transfers in the nation's history and would artificially alter the natural resource base of Los Angeles for the remainder of its modern history. William Mulholland began surreptitiously buying land alongside the Owens River until the City of Los Angeles owned most of the riparian parcels and much of the rest of the valley. In 1905, the plan to build the Los Angeles Aqueduct from the Owens Valley to Los Angeles was publicly announced. The resident farmers and ranchers of the Owens Valley violently opposed the construction of the aqueduct, but there was little they could actually do to stop it. The Bureau of Reclamation and President Theodore Roosevelt endorsed the project in the interest of the larger public it would ultimately serve in Los Angeles as opposed to the relatively small population of the Owens Valley (Hundley 1992, Kahrl 1982).

The Los Angeles Aqueduct was constructed over a period of five years, from 1908 to 1913. The terminus of the aqueduct was at Sylmar on the north side of the San Fernando Valley. The water exited the pipeline through gates located part-way up the slope of the foothills and cascaded down a steep, concrete-lined canal—known aptly enough as “The Cascades”—to a storage reservoir located on the valley floor into the Los Angeles Reservoir, now known as Van Norman Lake. With the arrival of abundant water from the newly completed aqueduct, the value of land rose dramatically. The San Fernando Valley was incorporated into Los Angeles and began developing rapidly. Within a decade of the aqueduct's completion, the city's population went from approximately 500,000 to nearly one million (Hundley 1992).

During the intervening years, larger storage reservoirs were also constructed in or near Los Angeles to increase the long-term capacity of the system. The Saint Francis Dam, located north of the study area in San Francisquito Canyon, collapsed in March 1928, killing more than 400 people. Thousands of buildings were also destroyed in towns and farmlands located downstream within the Santa Clara Valley. It was one of the worst disasters in-

volving a man-made structure in the nation's history (Hundley 1992). By 1940 a second aqueduct that drew water from the Mono basin, a separate watershed north of the Owens Valley, was completed to supply additional water to the rapidly growing city.

Colorado River Supplements

In 1924, William Mulholland successfully lobbied Congress for a share of the Colorado River in anticipation of the pending Boulder Canyon Act, which would authorize the construction of Hoover Dam in 1928. That same year, southern California cities united to form the Metropolitan Water District (MWD) in order to improve regional planning and increase the influence of local lobbyists. In 1931, MWD voters approved a \$220 million bond to fund construction of an aqueduct from the Colorado River, and work began shortly afterwards on Parker Dam, which impounded Lake Havasu, and diverted water through a 242-mile aqueduct to southern California. The entire system was finished and operating by 1941 (Hundley 1992).

State Water Project

Growth subsidized by imported water eventually created the need for still more water. In 1960, southern California voters overwhelmingly supported a state-wide bond measure to construct the State Water Project, an elaborate system of dams, reservoirs and aqueducts designed to transfer water from the humid north to the arid south. The California Aqueduct extended 444 miles from the San Francisco Bay Delta south as far as Lake Perris, a storage reservoir located near the city of Riverside. A western spur of the California Aqueduct brought water to Castaic Lake, in the Sierra Pelona.

Flood Protection

Controlling water was as important to the urbanization of Los Angeles as importation of water from other regions. Despite the generally arid climate, floods occur in Los Angeles with periodic regularity, if not frequency. These events are the result of storms which can drop as much as thirteen inches of rain, sometimes more, in a matter of days. When this happened, much of the Los Angeles basin, and associated valleys, can become inundated in water or buried under mud and debris washed down from the encircling foothills.



The winter storms of 1913-1914 resulted in floods and loss of property near waterways, such as this home constructed along the banks of the Los Angeles River. Photo: Los Angeles Public Library.

The Los Angeles basin is essentially a vast alluvial fan, or upland delta, created over millennia by successive storms depositing sediments eroded from the steep mountain slopes onto the valley floors and coastal plain below. The rivers which flow through this basin—the Los Angeles, San Gabriel, the Rio Hondo, and the Santa Ana, as well as numerous smaller streams—had no permanent channels but instead wandered considerable distances from one side of the basin to another establishing entirely new channels after major floods.

The Native Americans and early colonists were largely unaffected by the floods which occasionally inundated the region. The few buildings constructed during the Spanish and Mexican periods were located on high ground—or were soon moved to high ground—while the agricultural or pastoral basis of their economy benefitted from the introduction of nutrients brought down with the flood waters without suffering any significant destructive effects from the flooding itself. This benign relationship to the periodic occurrence of storms and floods would continue well into the American period. In 1884 when southern California experienced a flood that inundated most of the Los Angeles basin, it was greeted with amusement, if not outright gratification for the improvement of soil qual-

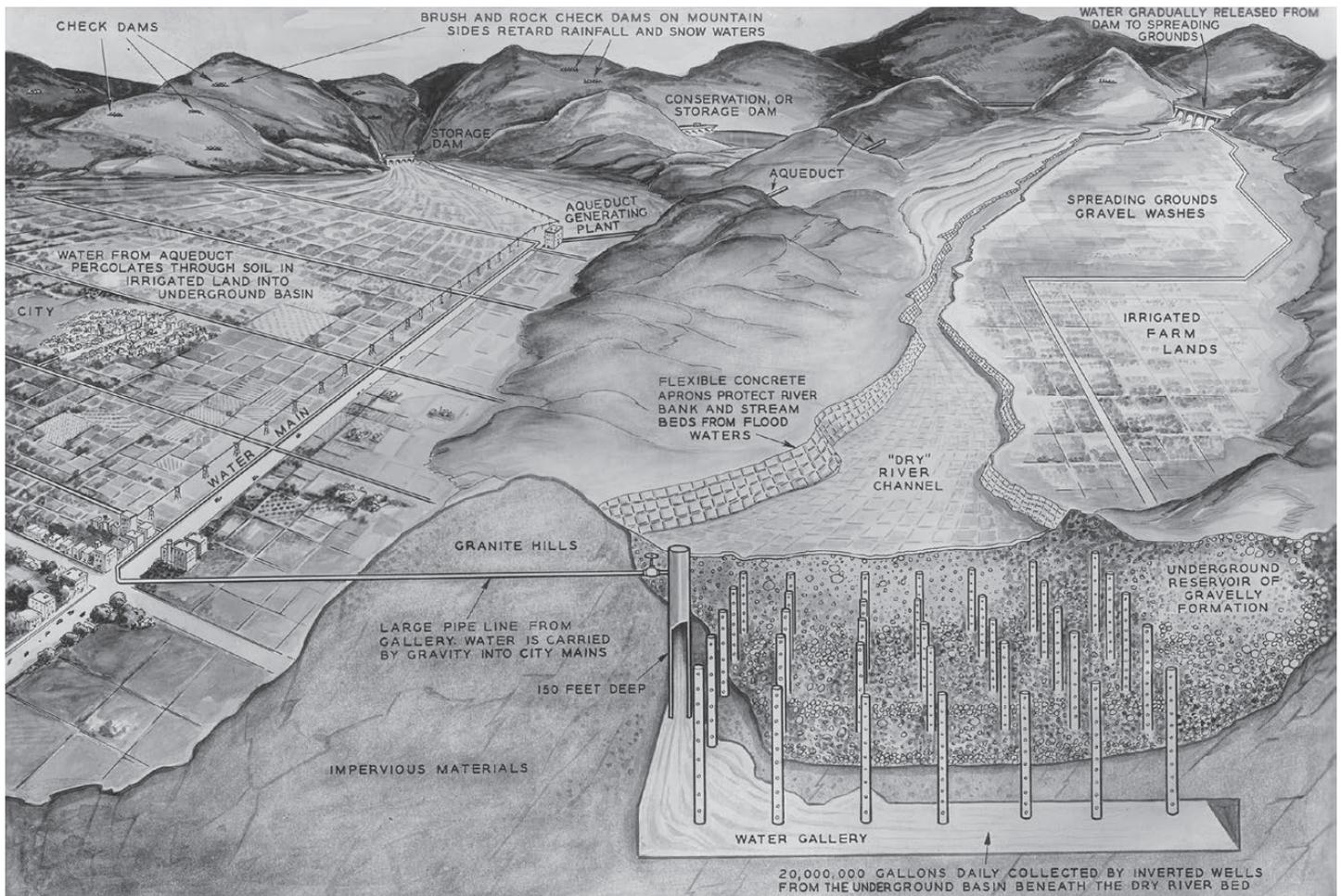
ity that would result in greater agricultural production (Orsi 2004, Fogelson 1967).

Over the following years, the outlines of the modern city of Los Angeles were established and much of its essential infrastructure was built. Unfortunately, the pattern of this early infrastructure was laid during an atypically static moment in the region's otherwise dynamic climatic history and was therefore built on a mistaken assumption that the present natural regime would remain unchanged into the future. Nothing could be further from the truth. During the winter of 1913-1914, rains fell in a concentrated deluge, and the valleys filled with sediment and debris as they had in the past. However, unlike past floods, this one caused considerable damage and loss-of-life, not because it was greater in magnitude but because now there was more to destroy. Instead of relocating vulnerable infrastructure, or moving the young city out of the floodplain on which it was built, city leaders contemplated how to re-engineer the floodplain itself so that its natural dynamics would pose less of a threat to the city which lay upon it. For the next two years, a board of engineers was convened by the county to study the 1914 floods and propose recommendations to prevent or mitigate future disasters of this kind (Orsi 2004).

Local Flood Protection Efforts

In June of 1915, the Baker Bill was passed, establishing the Los Angeles County Flood Control District (LACFCD). Over the next two decades, a number of comprehensive plans for flood control were devised. Portions of these plans, including small check dams in the mountains, channelization of rivers and streams through the cities, spreading grounds on the valley floors, and flood control basins (broad, shallow reservoirs that would remain empty until flood waters arrived) were built and formed the basis of subsequent flood-control development. An early proposal to build high dams in the San Gabriel Mountains was abandoned following the St. Francis Dam disaster and delays due to scandalous contracts (Orsi 2004).

In late December 1933, more than three decades of relatively dry conditions came to a sudden and dramatic end when fourteen inches of rain fell in only two days. The floods



Following devastating floods of the 1930s, a countywide flood control strategy for Los Angeles County was created. This 1938 newspaper graphic illustrates the flood control system and network of dams, groundwater basins, etc. designed to work together to control flood water and augment groundwater supplies. Image: Herald-Examiner Collection/Los Angeles Public Library.

In late December 1933, more than three decades of relatively dry conditions came to a sudden and dramatic end when fourteen inches of rain fell in only two days. The floods on New Year's Day of 1934 damaged or destroyed hundreds of homes and claimed more than forty lives, illustrating the inadequacy of existing flood control measures.

on New Year's Day of 1934 damaged or destroyed hundreds of homes and claimed more than forty lives, illustrating the inadequacy of existing flood control measures. Despite the obvious need for new solutions, however, voters refused to fund a new plan, largely in response to the previous dam scandals and Great Depression, which was at its nadir when new bond measures were proposed. The same political and economic environment which discouraged local investment in capital improvements, however, supported greater federal intervention by agencies such as the U.S. Army Corps of Engineers. The Corps' involvement after 1935 represented a decisive shift away from localism in the management of natural resources toward greater federalism (Orsi 2004, McPhee 1989, Turhollow 1975).

Federal Assistance for Flood Control Engineering
Under an emergency relief appropriation made through President Roosevelt's Works Progress Administration (1935) and the national Flood Control Act (1936), the U.S. Army

Corps of Engineers (and other federal agencies) constructed civil engineering projects such as dams, levees, dikes, etc. for the purpose of mitigating or preventing the destructive impacts of natural floods. Los Angeles County was the first region to be designated for funding under the act, since the county already had a comprehensive plan ready for implementation. Approximately \$70 million was eventually appropriated under the act for projects on the Los Angeles, the San Gabriel, and the Rio Hondo Rivers (Orsi 2004).

In the three decades to follow, the U.S. Army Corps of Engineers would construct more than 30 small debris basins on canyon mouths at the foot of the mountains, construct three large flood control basins on the Los Angeles River, pave approximately 48 miles of river channel, and construct more than 100 bridges. It would also construct two large flood control basins on the San Gabriel River, pave nearly 150 miles of that river's channel, and build more than 200 bridges. Similar improvements



Built in 1920, Devil's Gate Dam in the Arroyo Seco in Pasadena was the first dam in what would become an extensive flood control system built by the Los Angeles County Flood Control District. Photo: Cross Aerial Photos, Security Pacific National Bank Collection/Los Angeles Public Library.



This 1948 image shows the US Army Corps of Engineers' open-air hydraulics laboratory in Griffith Park. The structures shown were built to model the Los Angeles River and proposed flood control facilities. Photo: Herald-Examiner Collection/Los Angeles Public Library.

were made within the Ballona Creek watershed southeast of the Santa Monica Mountains. The total cost for all of this work by the end of the initial period of development was more than \$440 million, but would later come to more than \$2 billion with supplemental improvements. It represented one of the largest public works projects in history and would completely alter the hydraulic landscape of the Los Angeles basin (Turhollow 1975, Orsi 2004).

It should also be noted that local, state, and federal agencies and local organizations have worked collaboratively in recent years to explore opportunities to revitalize the Los Angeles River, restoring habitat and creating recreational amenities while continuing to provide for flood protection. The U.S. Army Corps of Engineers is conducting a study that evaluates opportunities to re-engineer an 11-mile stretch of the Los Angeles River within the study area to provide more habitat and recreational value. Implementation of such proposals would greatly transform the river as it extends from Glendale Narrows to the confluence with the Arroyo Seco.

Highway System Development

The automobile had a significant impact on modern settlement patterns of the greater Los Angeles metropolitan area. Just twenty years after the Los Angeles Region completed the world's largest interurban transit system, the automobile emerged as the primary mode of

transportation. By 1924, Los Angeles had the highest percentage of car ownership in the world. The region was well suited for automobiles because the mild climate meant unpaved roads could be driven on year-round (Fogelson 1967).

Following the popularization of the automobile by the early twentieth century, major highways were constructed which further dissolved the isolation of distance. One of the nation's first transcontinental highways—Route 66—terminated at Santa Monica. These ambitious new technologies allowed people and wealth to flood into the region.

Recreation and Tourism

With the arrival of the transcontinental railroad in the late 19th century, Los Angeles began to widely promote the area's mild climate which afforded many health and tourism opportunities. With year-round outdoor recreation possible, many areas developed facilities to provide recreational opportunities. The late 1800s saw a rise in popularity of hiking as a recreational activity. Hiking was inexpensive, allowing individuals from all social classes and economic backgrounds to participate in what was early on recognized as a great source of exercise and enjoyment. The San Gabriel and Santa Monica Mountains provided an endless amount of trails wandering through scenic mountain passages and quickly became prime destinations. The Pacific Electric Railway, established in 1901, expanded various lines with-



In the fall of 1936, a group of young men including Rudolph Schott, Apollo Milton Olin Smith, Frank Malina, Ed Forman and Jack Parsons conducted the first rocket tests at the Jet Propulsion Laboratory. These tests were conducted in the Arroyo Seco next to the present day site of JPL. Photo: JPL/NASA.

By the end of the war, southern California would be an important center not only for advanced aeronautical design, but also for rocketry and guided missile technologies.

in easy walking distances of numerous San Gabriel mountain trail heads and to coastal beaches. The introduction of the automobile inspired the construction of scenic roads and byways such as the Pacific Coast Highway, the Arroyo Seco Parkway, Mulholland Drive, and the Angeles Crest Highway. Wealthy Los Angeles residents purchased large “pleasure ranches” in the Santa Monica Mountains. Purchase of these tracts for leisure and recreation kept much of the mountains undeveloped and many such lands have since been conserved by federal, state, and local park agencies.

War and Urban Transformation (1940-Present)
 During the 1940s, the region would go through another dramatic change as defense-related jobs associated with World War II would cause the population to swell yet again, but this time with a far more diverse demographic. Post-war immigration continued to fuel growth in the region while highway construction spread out development. The area continued to diversify and saw important social movements in labor, civil rights, and conservation.

Aerospace and Cold War Research and Industry

World War II would have other important implications for the development of southern

California, attracting substantial federal subsidies for research in new technologies with potential military applications. Chief among these was aeronautics, which already had a substantial foundation in the region as a result of the many early pioneers of aircraft design and production—such as Lockheed, Douglas Aircraft, and North American Aviation—which had located here to take advantage of the favorable weather conditions which made it possible to fly at nearly any time of the year. These companies would be supported by the research of local universities such as the California Institute of Technology (Caltech), which operated a special laboratory dedicated to aeronautical engineering. The precedent which was established by this relationship between theoretical research and practical development proved extremely fruitful, especially when it was encouraged by generous federal funds.

By the end of the war, southern California would be an important center not only for advanced aeronautical design, but also for rocketry and guided missile technologies. As World War II ended, the world entered what has become known as the Cold War—a term that financier and presidential advisor Bernard Baruch first used in a speech on April 16, 1947, to describe the increasingly chilly relations between the Soviet Union and the United States. The United States as well as the Soviet Union created a vast infrastructure to support a complex of offensive and defensive weapons systems during the Cold War. This infrastructure included facilities and sites for developing, testing, manufacturing, and storing weapons; expanded military installations for use as staging and training centers; a network of defensive radar and communications stations; and a host of command and control centers. These military technologies (as well as Cold War politics) would contribute to the development of the American space program, and southern California would play a crucial role in these activities as well.

Jet Propulsion Laboratory (JPL)

The Jet Propulsion Laboratory (JPL) played a significant role in Cold War and rocketry. JPL originated in the early rocketry experiments of Frank Malina, a graduate student of Dr. Theodore von Kármán, who was a professor of engineering at the California Institute of



This newspaper photo shows Rocketdyne employees filming a movie of their rocket engine testing at what is now Santa Susana Field Laboratory. The caption, dated June 13, 1963 reads, "Film crew moves up on a Rocketdyne static test - Canoga Park aerospace firm has produced 500 motion pictures". Photo: Valley Times Collection/Los Angeles Public Library.

“Santa Susana’s Bowl Area” was the first liquid-fuel, high-thrust rocket engine test facility in the continental United States with multiple, permanent test stands.

Technology (CIT or Caltech) in Pasadena and the director of the school’s prestigious Guggenheim Aeronautical Laboratory (GALCIT) from 1926. The original GALCIT experiments were conducted on a shoe-string budget and usually took place in the wide sandy wash of the Arroyo Seco where it exits the San Gabriel Mountains near La Cañada Flintridge. The site is now occupied by the vast, campus-like facility of the present JPL. Malina’s work represents some of the earliest systematic research on rocketry in the United States.

Although Kármán and his students were primarily interested in basic research—designing rockets to investigate the upper atmosphere and possibly extraterrestrial space—the U.S. Army soon recognized the military potential of their efforts. The outbreak of World War II and the Nazi’s militarization of the far-more advanced German rocket program soon led the U.S. Department of Defense to support similar research in this country, and Kármán’s fledgling rocketry program at GALCIT would eventually receive substantial Department of Defense funding for small, solid-fuel rocket boosters and later, long-range guided missiles. The GALCIT rocket scientists began referring to themselves at this time as JPL.

Toward the end of the 1950s, JPL began working on a number of non-military rocketry projects. In 1958, JPL produced Explorer I,

the first U.S. satellite to orbit Earth. Later that same year, the National Aeronautics and Space Administration (NASA) was established, marking the formal beginning of the nation’s civilian space program. JPL’s contractual obligations to the U.S. Army were immediately transferred to NASA, and the laboratory assumed an entirely new mission, assisting NASA with the development of unmanned planetary and deep space research vehicles. Among the earliest of these ventures were the Pioneer probes, which made lunar flybys, and the numerous Ranger and Surveyor missions, unmanned lunar landers which helped prepare the way for the manned Apollo flights which followed. After these early lunar missions came the Mariner and Voyager deep space probes, the two Viking Mars landers, and the later Pioneer missions. In addition to playing an important role in developing all of these lunar and deep space vehicles, the Jet Propulsion Laboratory has had the primary responsibility for tracking and monitoring their data transmissions through its Deep Space Network.

North American Aviation and the Santa Susana Field Laboratory

By the end of World War II, the U.S. Department of Defense had committed itself to the development of rocketry and guided missiles, recognizing that this new technology would inevitably comprise an integral part of the nation’s future military forces.

In 1947, North American Aviation (later Rocketdyne) selected a site in the Simi Hills for construction of large rocket-testing stands. The first test stand was completed in 1949. It was located within a natural, bowl-shaped depression of the rocky topography of the Simi Hills in what was referred to as Area I. Company histories describe “Santa Susana’s Bowl Area” as the first liquid-fuel, high-thrust rocket engine test facility in the continental United States with multiple, permanent test stands. A new complex would include four clusters of three Vertical Test Stands—twelve in all—each with accompanying blockhouses for observation and a workshop facility, or Component Test Laboratory, as well as associated utilities. These sites were given the sequential names Alfa, Bravo, Coca, and Delta.

Rocketdyne also went on to support rocket engine development that would eventually be



In 1941, President Franklin Delano Roosevelt signed Executive Order 9066 forcing Japanese Americans into temporary detention camps or relocation centers. Above, Japanese Americans are shown boarding buses in March, 1942 at Maryknoll School in the Little Tokyo district of Los Angeles. Little Tokyo is now a national historic landmark district. Photo: Herald-Examiner Collection/Los Angeles Public Library.

Although World War II brought additional industry and wealth to the region through the defense industry, it had a negative impact on Japanese Americans who were forcibly removed from their homes to live in relocation centers or internment camps following the attack on Pearl Harbor in 1941.

used to launch JPL's Explorer I satellite. Immediately following the successful launch of the Explorer I satellite, the newly-established National Aeronautics and Space Administration (NASA) committed itself to developing a manned mission to the moon. In 1961, NASA contracted with Rocketdyne to develop its Saturn rocket engines, which would be used in the Apollo program.

By 1969, NASA had begun planning on the Space Shuttle. In 1971, it awarded Rocketdyne the contract to develop the Space Shuttle Main Engine. Static fire testing would continue at SSFL throughout the 1980s and 1990s in support of NASA's space program, but during the following decade the test facilities at SSFL were gradually deactivated. The last engine tests were conducted at the Alfa site in 2006.

Nuclear Energy Research

Southern California was host to one of the earliest nuclear reactors to be constructed in the United States for the purpose of providing a civilian energy source. This was done on an experimental basis rather than for full-scale production, but the project contributed valuable technical knowledge and experience toward the development of civilian power reactors. The Sodium Reactor Experiment

(SRE) conducted at the Santa Susana Field Laboratory was developed to test the feasibility of a high-temperature, liquid sodium-cooled, graphite-moderated reactor for electrical power generation. This was one of several alternative reactor designs being tested simultaneously around the country with the encouragement and support of the Atomic Energy Commission in response to President Eisenhower's "Atoms for Peace" initiative (Parkins 1955, Hewlett and Holl 1989, Sapere Consulting, Inc. and Boeing Co. 2005).

In 1957, Shippingport became the first civilian nuclear power plant in the United States to initiate full-scale power production, supplying more than 12,000 kilowatts of electricity to the local grid. Several months earlier, however, the SRE at Santa Susana provided electrical power to the nearby city of Moorpark, though on a more limited, demonstration basis. Although this was not the first example of an American city being powered by nuclear-generated electricity—that distinction goes to the small town of Arco, Idaho, which was briefly electrified two years earlier by a military reactor from the National Reactor Testing Station—it was the first time this was done by a reactor designed specifically for civilian purposes. In 1959, the SRE may have earned a more dubious distinction by becoming the first civilian reactor to suffer a serious accident when more than a third of its fuel rods overheated and melted through their protective cladding, releasing a plume of radioactive gas into the atmosphere (Lochbaum 2006).

Japanese American World War II Confinement
 Although World War II brought additional industry and wealth to the region through the defense industry, it had a negative impact on Japanese Americans who were forcibly removed from their homes to live in relocation centers or internment camps following the attack on Pearl Harbor in 1941. By 1910, Los Angeles was the most populous Japanese settlement in California, and it has remained so to this day. This was in spite of anti-Japanese laws restricting opportunities to lease or purchase land or obtain citizenship. During World War II, Japanese Americans were affected by the most widespread discriminatory action yet when President Franklin Delano Roosevelt signed Executive Order 9066 in 1941 forcing Japanese Americans into temporary