CULTURAL NETWORK ANALYSIS OF SPANISH COLONIAL
SETTLEMENT PATTERNS IN SAN DIEGO, CALIFORNIA

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The colonial efforts by the Spanish and subsequent generations resulted in the formation of cultural networks that were based on the reliance and access to key ecological resources (such as fertile lands for ranching and agriculture or access to freshwater from the San Diego River) that ultimately influenced the settlement of the San Diego River watershed and the surrounding region. Utilizing a historical anthropological approach, this study examines these Spanish and Mexican Period cultural networks and compares them to the traditional Native American settlement networks that formed prior to contact. An analysis of ethnographies, historical journals, autobiographies, archaeological literature, and reports of previous archaeological investigations of Late Prehistoric, historical Native American, and early Spanish and Mexican Period archaeological sites establish a baseline for settlement patterns that developed during each of these time periods. Using geographic information systems, a series of maps including site densities, a suitability model, and cultural interaction diagrams were built compared. Viewing these comparisons through a behavioral archaeological lens, coupled with actor-network and world systems theoretical frameworks, the overlapping cultural networks were analyzed. The analysis of these networks resulted in identifying settlement patterns that informed the social stratification of the Spanish and Mexican Periods which in turn, influenced the future development of the city and region of San Diego.
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CHAPTER 1

INTRODUCTION

The San Diego River has served as a focal point in the development of the city of San Diego and the surrounding area. As the river meanders and cuts through mountains, valleys, and canyons before discharging into the Pacific Ocean at Mission Bay, it provides an essential lifeline for the region. The river has drawn a number of inhabitants to its banks to provide a vital source of fresh water in an arid climate. The diverse faunal and floral resources provided ample sustenance for Paleoindian, Archaic, and Late Prehistoric peoples. Additionally, geological formations surrounding the river afforded abundant lithic resources for these inhabitants.

In AD 1769, the Spanish monarchy, intent on settling the region and converting the indigenous population, chose its banks to colonize the area, forever changing the course of the river and the history of San Diego (Hyslop 2012). The natural defensive positions afforded by the surrounding mesas and the river’s centralized location within the local Kumeyaay population drew the Spanish to establish a presidio and mission for the colonization effort. The Spanish colonizers and subsequent generations also sought many of the same natural resources that were vital to the indigenous population. This colonial event put different cultural groups in contact with each other and created, altered, reinforced and entrenched cultural networks that influenced subsequent settlement patterns within the greater San Diego area.

As this cultural contact occurred throughout the coastal and inland areas in San Diego County, the amount of data to process would be too immense for the scope of this thesis. As a case study, the San Diego River was chosen because it was the location of the initial colonial episode in Southern California. This study will examine the cultural networks formed during and after the colonial event by focusing on a series of archaeological sites that span the pre-contact and historical Spanish and Mexican Periods through the material culture
This study will take a historical anthropological approach to analyze the archaeological data, associated historical documents, and ethnographic material to provide a multi-perspective view of historical settlement.

This multi-scalar approach incorporates geographic information systems (GIS) to visualize the effects of the settlement. By examining patterns that were formed in the Late Prehistoric, coupled with changes during the historical Native American period, a baseline of cultural networks and site densities is explored. These patterns are correlated to a suitability model that graphically presents the area’s most habitable regions for human settlement. The model is built on aspects of traditional archaeological site modeling, including ground surface slope, distance to water, and surrounding vegetation. Significantly, it highlights areas of potential cultural contact and interaction. Along with ethnohistorical documents, these ecological elements provide the basis for analysis of the cultural networks that were formed during the historical Native American and Spanish colonial periods. These networks were subsequently altered and became further entrenched, which resulted in advancing the causes of the colonists and provided the foundation for settlement in the San Diego River watershed. The pattern of network alteration and entrenchment continued through the Mexican Period and well into the occupation by the United States (U.S). In all, settlement of the region was not based on a single causality. Rather, this study suggests that settlement patterns were based on a symbiotic relationship between cultural networks and access to ecological resources.

In order to address this issue, four research questions guided the study. These questions include:

1. Is there a pattern to the overall density and distribution of archaeological and historical settlements within the San Diego River watershed?
2. Based on the concepts of actor-network theory and world-systems analysis, what networks are apparent in the archaeological record for historical Native American and Spanish Colonial periods?
3. How do these networks manifest themselves along the San Diego River in a frontier colonial setting in regards to the access to resources and social stratification?
4. What does the overlay of these cultural networks indicate about settlement patterns during the Spanish and Mexican Periods?
Each of these questions will require subsequent refinement of the data, beginning with the overall distribution of cultural resources.

Settlement patterning research has been an avenue of inquiry for archaeologists since the early 1900s. However, it is not confined to past populations, as it is still a relevant subject for many, especially in economic development and poverty reduction. For example, recent research has been conducted in Africa that has examined a modern population’s settlement pattern and their access to ecological resources (Linard et al. 2012). This particular study examines the way in which economically developing communities in Africa access resources. While current political and economic divisions and regulations influence modern settlement patterns, historical development of the settlement pattern is also important as it informs current patterning. Archaeologically inquiries into these patterns allow for a detailed examination of how settlement patterns in the past have carried into the present and inform current subsistence and economic development. An example of this work is seen in the Amazon rainforest in Peru and the archaeological examination of pre-Columbian subsistence and settlement patterns and how elements of those patterns have persisted into the modern period (Shepard et al. 2012). These examples show how a deeper understanding of historical settlement patterns provides an opportunity to examine how people historically and currently access resources. Furthermore, this deeper understanding might provide ideas for future management of vital resources that are important to settlement and subsistence for current populations.

Organization of the Thesis

The thesis will be presented in four major sections, or chapters, excluding the introduction and summary chapters. The second chapter contains background information relating to the San Diego River watershed, referred to from this point forward as the study area. Background information includes a description of the ecological setting, a cultural history background (which includes both prehistoric and historical time periods), and background on the archaeological sites used within the study. The first half of Chapter 3 will present a review of previous literature addressing prehistoric and historic settlement patterns. The second half will present the theoretical frameworks used in this study including world systems theory, actor-network theory, and behavioral archaeology. Methodology will be
discussed in Chapter 4, and will describe the GIS applications used for creating density, suitability, and network maps. The results of the GIS maps are presented in Chapter 5. The final major chapter is the interpretation of the maps, which is discussed in Chapter 6.
CHAPTER 2

BACKGROUND

As the San Diego River watershed provides the catchment area for this study, it is important to understand the environmental and cultural background that is contained within it. As portions of this thesis will examine ecological impacts on settlement, a general environmental description is provided. A cultural history is given to better place the watershed into its historical context. Finally, the chapter will conclude with a description of pertinent archaeological sites and the data they yielded that provide examples of the cultural material recovered during the Spanish colonial period.

LOCATION AND ENVIRONMENT

The San Diego River flows northeast to southwest from its headwaters in the Cuyamaca Mountains until it empties into the Pacific Ocean at Mission Bay. The river begins approximately five miles (mi.) northwest of Julian, California, and continues southwest through El Capitan Reservoir, then flows west, passing through the cities of Santee and San Diego before discharging into the Pacific Ocean (Figure 1).

The San Diego River lies within Fennemen’s (1931) Pacific Border Province. Specifically the river runs through the Lower California Province, which is bordered by the Pacific Ocean to the west and the Salton Trough to the east. Elevation along the river ranges from sea level where it discharges into the Pacific up to 3,500 feet (ft.) (1,067 meters [m]) at its headwaters. Elevations within the watershed can reach up to 6,512 ft. (1,985 m) in the Cuyamaca Mountains southeast of the river. Topographically, the river cuts through a granitic upland sloping towards the ocean. The area is composed of displaced fault blocks, some of which are continuing to move, and has formed small mountain ranges, mesas, and deeply incised valleys (Fenneman 1931). To the west of the upland area, isolated granitic hills decrease in frequency until intersecting a terraced lowland or plain, which has been
Figure 1. Location of the San Diego River, its major tributaries, and its watershed.
significantly altered by transverse streams from the mountains. Continuing west, the river crosses alluvial terraces until merging with the ocean (Fenneman 1931). The river is the primary drainage for the region, along with its numerous small and large tributaries, such as San Vicente Creek, Boulder Creek, Cedar Creek, Los Conejos Creek, and Alvarado Creek.

The river crosses two identified geological regions within San Diego County: the Peninsular Ranges Region and the Coastal Plain Region (Deméré 1999). The oldest identified geologic unit in the Peninsular Ranges Region is the Julian Schist formation, which is composed of Jurassic-aged schist (Walawender 1999). Due to erosion and uplift processes, however, only remnants of this geological unit exist (Walawender 1999). Much of the Peninsular Ranges Region consists of the western zone of the Peninsular Ranges Batholith, which is a Mesozoic unit that consists of marbles, schists, basalts, slates, quartzites, and gneiss (Deméré 1999; Walawender 1999). The Coastal Plain Region is dominated by Cretaceous and Tertiary sedimentary formations that have created a “layer-cake” pattern that overlay older Mesozoic rocks (Deméré 1999). This unit consists of sandstones, volcanic rocks (including the Santiago Peak Volcanics formation), shales, and claystones (Abbott 1999).

Soils within the study area cover a wide range of soil types and formations, but can be characterized generally. Within the higher elevations, soils consist of residual decomposed bedrocks, intermixed with exposures of bedrock outcrops (United States Department of Agriculture 2013). Along the slopes of the mesas and mountains within the study area, soils consist of primarily colluvial, alluvial, and eolian deposited coarse to fine sandy loams. Within the flood plain of the river, soils consist of a mixture of colluvial and alluvial deposited fine sands, sandy loams, cobbly loams, and some silt (USDA 2013).

Elevation, topographic setting, and air-mass movements all affect the modern climate of an area. As such, site-specific climates might be widely divergent due to the varying environmental factors within the watershed. Generally, the river flows through an area that is semiarid, with low precipitation. The region is dominated by a Mediterranean climate, which is defined by dry, warm summers and wet, mild winters (Moratto 1984). Typically through the region, precipitation increases with elevation, generally formed as rainfall; however, some snowfall occurs in the Cuyamaca Mountains, though with little accumulation. This
mild Mediterranean climate has allowed for prehistoric and historical occupation of the region year-round (Moratto 1984).

The study area is located in the California Coastal Sage and Chaparral ecoregion (Ricketts et al. 1999:320-324). This ecoregion includes a diverse range of habitats that include montane conifer forests, multiple woodlands (Torrey pine, cypress, southern walnut, oak, and riparian), chamise chaparral, inland and coastal sage scrub, grasslands, and both fresh and saltwater marshes. The dominant vegetation through the region though is primarily composed of coastal sage scrub, chamise chaparral, and oak woodlands. Along the river, the riparian community consists of species of willow, cottonwood, sycamore, coast live oak, ash, white alder, and a vast array of shrubs, vines, and herbaceous plants. In the higher elevations, conifer forests exists, that include communities of firs (Douglas and white), pines (sugar, ponderosa, Jeffrey, Coulter), cedar, oaks (black and canyon live), manzanitas, and Cuyamaca cypress (Ricketts et al. 1999). The area is home to a diverse group of animals that have been important to both prehistoric and historical inhabitants. Along the coast, resources include birds (great blue heron, osprey, and the California brown pelican to name a few), and marine animals such as crabs, clams, and various species of fish and marine mammals. Inland, the region is home to numerous small mammals and rodents, grey fox, bobcats, cottontail rabbits, golden eagles, mule deer, red-shouldered hawk, rattlesnakes, and California king snakes (Ricketts et al. 1999).

**Cultural History**

The San Diego region has been the home to human inhabitants since at least the Terminal Pleistocene and Early Holocene transition (see Randeau et al. 2007). However, given the scope and focus of this thesis, only the Late Prehistoric Period during the Prehistoric Era, and the historical Native American, Spanish and Mexican Periods during the Historical Era will be examined. The following sections provide a detailed account of the cultural history associated with those periods.

**Late Prehistoric Period**

The Late Prehistoric Period (2000–500 calibrate years before present [B.P.]) is marked by continual changes throughout the area in response to environmental adaptations
and cultural assimilation beginning in the Terminal Archaic (Moratto 1984). Due to
overexploitation of high-ranked resources, including shellfish, fish, sea and terrestrial
mammals, and plant resources, groups shifted subsistence strategies to more costly, but
abundant, resources (Byrd and Raab 2007). Lower-ranked, labor-intensive food resources,
such as smaller shellfish, small terrestrial mammals, and small plant seeds (such as acorns)
were primarily used. A result of these changes in subsistence strategies, settlement patterns
shifted away from the coastal region to upland areas to the east (Moratto 1984:154; True
1966:290). Sites indicate that settlement was dominated by a pattern of large residential
bases, short-term camps, and specialized activity areas (Byrd and Raab 2007). During this
time, major technological shifts also occurred, none bigger than the implementation of the
bow and arrow and the widespread use of ceramics. Byrd and Raab (2007:222) note that the
bow and arrow was adopted around 2000–1500 B.P. It is marked in the archaeological
record by the transition from larger dart points to smaller arrow points, which is determined
by shoulder-width or basal measurements of the projectile point (Shott 1997). Cottonwood
Triangular and Desert Side-notched projectile points are examples commonly found in Late
Prehistoric contexts. Another major technological adaptation, the widespread use of
ceramics, appears around 1000 B.P. (Byrd and Raab 2007). The most notable types, Tizon
Brownware and Lower Colorado River Buffware, appear to be a result from influences from

**Historical Native American**

It is generally recognized that cultural patterns formed during the Late Prehistoric
Period were still in practice at the time of initial European contact (Byrd and Raab 2007).
This is the case when examining the historical Native American groups that occupied the San
Diego River watershed region when Spanish explores first arrived. To the extreme north, the
watershed crosses into the southern region of an area traditionally occupied by the Luiseño.
The remainder of the watershed runs through the area historically occupied by the Tipai-Ipai,
also known as the Diegueño (in the northern region), and the Kumeyaay or Kamia (in the
southern region).

Luiseño occupations are identified in the archaeological record as the San Luis Rey
Complex (Moratto 1984:156). First identified by Clement W. Meighan (1954), the San Luis
Rey Complex is divided into two phases, San Luis Rey I (800–250 B.P.) and San Luis Rey II (250–100 B.P.) (Moratto 1984). Artifacts that are commonly found within San Luis Rey I contexts are millingstones, bedrock mortars, triangular projectile points (including Cottonwood Triangular and Desert Side-notched), bone awls, and ornaments (including stone and shell) (Meighan 1954:223). Additionally, burials are typically found as cremations (Moratto 1984:154). San Luis Rey II contains all of the above markers but incorporates pictographs, cremation urns, pottery vessels, and trade goods such as glass beads and metal knives (Meighan 1954:223; Moratto 1984:154). Historically, the Luiseño, a Takic-speaking group, organized into patrilineally based clan-tribelet villages, typically along valley bottoms, streams, or near coastal strands next to mountain ranges (Bean and Shipek 1978). Habitation structures were somewhat subterranean, conical brush, reed, or bark-lined structures (Bean and Shipek 1978:553). Luiseño groups first contacted European explorers around A.D. 1769, with the arrival of the Gaspar de Portolá expedition. After the destruction of the San Diego Mission in A.D. 1774 and its subsequent reestablishment in A.D. 1776, along with the founding of the San Luis Rey Mission in A.D. 1798, exposure to foreign diseases, forced labor, and other factors, fostered an environment that depleted the population of the Luiseño dramatically (Bean and Shipek 1978). Although some inland Luiseño groups were removed from traditional lands closer to the mission, the original policy of the mission was to maintain traditional settlement patterns (Bean and Shipek 1978). This policy was quickly abandoned, and with the influx of successive European, Mexican, and U.S. settlements of the region, the Luiseño were continually displaced from their traditional lands (Bean and Shipek 1978).

The Tipai-Ipai are recognized as the Cuyamaca Complex within the archaeological record, and are contemporaneous with both San Luis Rey I and II complexes (800–100 B.P.). Both the Cuyamaca and San Luis Rey complexes share many similar traits and items; however, the Cuyamaca Complex is recognized by an increase in the number of millingstones, a wide range of ceramic forms, specially made mortuary goods (i.e. miniature pots and elaborate projectile points), and cemeteries located away from living areas (Moratto 1984:156; True 1970:53-54). The Tipai-Ipai are closely related, Yuman-speaking bands that inhabit the extreme southern portion of California in the United States and the extreme northern portion of Baja California in Mexico (Luomala 1978). Specifically, the Tipai
represents the southern dialectical bands, while the Ipai represent the northern dialectic bands (Luomala 1978:592). The Tipai-Ipai are organized into autonomous tribelets that settled into seasonal village campsites, with smaller groups inhabiting temporary camps during foraging and hunting activities (Luomala 1978:597-599). The Tipai-Ipai moved seasonally within their territory: during the spring, summer, and fall they followed the ripening of major plants, ranging from the canyon floors to the mountain slopes, and during the winter settling within a sheltered valley or foothill (Luomala 1978:599). During summer months, habitation structures were likely simple, and needed only a windbreak, tree, or a cave. During the winter, structures were much more significant, being a constructed thatched brush structure, with a slightly subterranean floor (Luomala 1978:597). With the establishment of the San Diego Mission, the Tipai-Ipai where forced into a sedentary regimen, which disrupted their traditional semi-nomadic lifestyle (Luomala 1978:595). As a result, the Tipai-Ipai fiercely resisted Spanish control, and conducted multiple uprisings against the Spanish missionaries, the culmination of which was the burning of the San Diego Mission by 70 united bands in A.D. 1775 (Luomala 1978:595). As with their neighbors to the north, the Tipai-Ipai were continually forced from their traditional lands while under Spanish, Mexican, and United States control; the bands were forced into slums or on to the reservations of other tribes until the creation of their first reservations in A.D. 1875 (Luomala 1978).

**Historical Era**

European exploration of California began with the expedition of Juan Rodríguez Cabrillo in A.D. 1542. Cabrillo, sailing from Barra de Navidad, New Spain, entered what is now San Diego Bay in September of that year (Rawls 1988). As the overall purpose of the expedition was to explore the California coast, Cabrillo and his men remained in the harbor only briefly before resuming their expedition north (McKeever 1985; Rawls 1988). Sixty years later, Sebastián Vizcaíno led the next Spanish exploration of San Diego Bay; it was at this time that San Diego received its namesake when Vizcaino named the area San Diego de Alcalá (Luksic and Kendziorski 1999; McKeever 1985). As with the Cabrillo Expedition, Vizcaíno only stayed within the bay for a short time before continuing north. Throughout these voyages, the Spanish explorers made landfall to resupply and first encountered the Native Californian groups along the coast. It was during these frequent encounters that
European explorers first noted the native polities, who welcomed the Europeans to their villages and participated in the trade of food and craft goods (Lightfoot 2005). With the establishment of the Manila trade routes in the Pacific in the latter half of the 16th century, the Spanish empire began assessing the feasibility of establishing a full-time colony in Alta California. This colony was to be established as a port in a naturally deep harbor, such as that found at San Diego, to shelter the Manila galleons (which were stocked with numerous highly-valued goods, such as spices, silks, and gold and silver jewelry) during their voyage from the Philippines to Acapulco (Lightfoot 2005:50). The Spanish Crown, due to financial and political reasons, abandoned these plans, and would not return to San Diego until A.D. 1769 when they decided to formally colonize Alta California.

The initial colonization of California began in Baja California with the establishment of the Santa Cruz colony in A.D. 1535 by Fernando Cortés. However this colony was short lived and by A.D. 1536 the Spanish had abandoned it (Mathes 1989:410). The Spanish attempted to colonize the peninsula with either a colony or a mission several times over the next 160 years, with each attempt eventually failing. This failure was due mainly to the isolation of the peninsula, which incurred a steep cost to the Crown to fund and supply the missions. Led by the Society of Jesus (Jesuits), however, the first successful European settlement in Baja was established at Loreto in 1697 (Mathes 1989). The financial support of the Jesuits, along with support from the Crown, facilitated the establishment of the mission (albeit during the third attempt). To assist in supplying the new mission, the Spanish government established supply routes crossing the Gulf of California. This supply system in turn set a precedence for the mission system in the Californias to be initially dependent on a well-established supply structure to survive the initial colonial event (Costello and Hornbeck 1989). As such, these first missions in Baja served as a jumping off point for the future settlement of Alta California. The Jesuit missionaries would eventually establish 17 missions within Baja California, stretching from San José del Cabo to Santa María de los Angeles, before their expulsion from the Viceroyalty of New Spain in A.D. 1767 by the Spanish monarch, Carlos III (Mathes 1989). Carlos III elected to replace the Society of Jesus with missionaries from the Franciscan and Dominican orders (among others) to continue the mission system in the Spanish frontier.
Feeling pressure from the expanding Russian and English territories surrounding the Californias, and to protect their interests in the northern reaches of the frontier, the Spanish Crown elected to send a detachment of soldiers and missionaries to establish settlements and garrisons along the Alta California coast (Costello and Hornbeck 1989; Lightfoot 2005; Luksic and Kendzierski 1999; McKeever 1985). Under the direction of Carlos III, José de Gálvez constructed a colonization plan that reflected the Bourbon reforms of the monarchy. These reforms emphasized political and economic changes, including the restructuring of the colonial government, reducing costs, and fortifying the frontier.

Although the effectiveness of the mission as a colonization system was debated within the Spanish administration, it was ultimately decided that it was still the best choice (Lightfoot 2005:52). The Crown determined that the missionaries were the most cost-effective solution for colonizing the densely populated coast (Lightfoot 2005:53). Following the colonization plan proposed by Gálvez, Captain Gaspar de Portolá led an overland expedition northward from the settlements in Loreto, Baja California, to settle the northern reaches of the Viceroyalty of New Spain in A.D. 1769.

Portolá, along with the Franciscan Father Junípero Serra (Figure 2), entered Alta California with the instruction to construct three missions: one at San Diego, one at Monterey, and one between the two (Lightfoot 2005:52). Serra, on the other hand, envisioned a system of missions built along the coast that would facilitate more padres and create a unified system that would allow access between missions in only one day. Portolá and Serra reached San Diego in May of A.D. 1769 and proceeded to construct the presidio, a small mission church, and residences on top of Presidio Hill, just south of the San Diego River (Luksic and Kendzierski 1999). After the establishment of the Mission San Diego de Alcalá, Serra began establishing missions according to his vision, and continued northwards towards Monterey (Lightfoot 2005:52).

The Spanish mission system was built around three main elements, the mission, the presidio, and the pueblo (although it was not added until A.D. 1777). Each of these elements had a specific function in the colonial institution (Costello and Hornbeck 1989). The mission’s main purpose was to consolidate and advance the claims of the Crown in the new frontier settlement (Rawls 1988:46). The Spanish padres were tasked with converting the semi-sedentary coastal Indians to a sedentary lifestyle, one focused on agriculture and
ranching (Luksic and Kendziorski 1999; McKeever 1985). The mission served as the spiritual center for the Spanish and the neophyte population and was where the majority of agricultural and ranching activities were centered. In addition to ranching and agriculture, the missions were involved in other industries such as brick and tile manufacturing and cement production. Between A.D. 1769 and 1823 the Franciscan missionaries established 21 missions along the coast of California, reaching from San Diego to San Francisco (Figure 3).

The second element of the colonial institution, the presidio, served as the political, administrative, and militant arm of the colonial system (Costello and Hornbeck 1989:317). Alta California was eventually divided into four presidio districts: San Diego, Santa Bárbara,
Figure 3. Location of Spanish missions within California between A.D. 1769 and 1833.
Monterey (which also served as the territorial capital), and San Francisco. While each presidio was responsible for its own agriculture (e.g. croplands, orchards) and livestock, it did not have the other craft industries as those found at the mission. In A.D. 1777, the Spanish Crown established a pueblo at San José in the Monterey Presidio district. Two other pueblos, Los Angeles (A.D. 1781) and Banciforte (A.D. 1797) were also eventually established. Within the mission system, the pueblos were civilian communities that provided the presidio with cheaper agriculture and offered examples of proper Spanish citizens for the neophytes (Costello and Hornbeck 1989:317). The pueblos were not as successful as the Crown had hoped, as (1) they were not able to produce enough agricultural surplus needed to support the presidio and (2) the pueblos were not profitable and as such, were not desirable destinations for relocation (Costello and Hornbeck 1989:318; Lightfoot 2005:58). Between A.D. 1774 and 1815, the civilian population in Alta California at the three pueblos was approximately 1,800 residents. The next wave of immigration would not take place until the 1830s (Costello and Hornbeck 1989:318).

After its initial founding in A.D. 1769, the San Diego Mission, under the direction of Father Serra, was relocated further north in A.D. 1774. The relocation was to take advantage of a reliable water source and fertile soil along the river, and to be centrally located among the Kumeyaay population (Luksic and Kendziorski 1999). Shortly after the relocation of the mission, tensions that had been growing between the Kumeyaay and the Spanish missionaries came to fruition (Carrico 1997). In the six years since the establishment of the mission and the presidio, the growing number of conversions and the subsequent forced relocations, rapes, thefts, and diseases all severely impacted the Kumeyaay (and other Indian) populations in the region (Carrico 1997). As a response to the Spanish intrusion, a number of Kumeyaay bands revolted against the Spanish colonists in A.D. 1775. The Kumeyaay attacked the mission, setting fire to and destroying the wooden buildings. During the attack Father Luis Jayme and two other Spanish soldiers were killed, giving Alta California its first martyr. Following the attack, the remaining Spanish loyalists retreated to the Presidio. It would be over a year before Father Serra returned to San Diego to oversee the reconstruction of the mission in A.D. 1777 (Carrico 1997). Although the San Diego mission grew, it was never able to prosper as did other missions.
The Spanish responded to the attack to varying degrees. The Franciscan missionaries saw the attack as the work of the devil and not that of the Kumeyaay protecting their way of life (Carrico 1997). The padres petitioned the territorial government to pardon the Kumeyaay leaders charged with the attack. On the other hand, the administrative branch at the presidio saw the attack as the result of murderers and thieves and called for military action and the execution of the participants. The representatives of the Spanish Crown compromised and decided to continue to jail the thirteen Kumeyaay leaders charged with the revolt, and ultimately exiled them from San Diego (Carrico 1997). While some Kumeyaay bands chose to assimilate with the Spanish following the revolt, other bands limited the contact they had with the colonists. Rumors continued to spread through the region suggesting another revolt was imminent, however, no other attack came. Regardless, the Spanish never achieved autonomous control over the Kumeyaay as a result of the revolt.

During the first decades of settlement at San Diego, the Spanish Crown restricted trade with foreign powers to limit the influence on their colonies (Luksic and Kendziorski 1999). However, this did not stop foreign powers from coming to the region. Due to the growing profitable trade in the Pacific, especially with China, the California coast began to see more ships. In A.D. 1793, in response to the British sailing into the harbor, the Spanish constructed a garrison, Fort Guijarros, on the tip of Point Loma to protect their colony and interests (Luksic and Kendziorski 1999).

By the A.D. 1810s, Mexican citizens began a struggle for independence from Spain. As a result of the war, the Crown diverted funds from the missions to finance the on-going war (Weber 1988). As a result, the economy of the California missions suffered and began to decline. This marked the beginning of the end of Spanish control in the region. In A.D. 1821, Mexico gained independence from Spain; however, the effect of Mexican rule would not be felt for another year in San Diego. At that time, Spain relinquished control of the Presidio, and the lands to the west of Presidio Hill and south of the river began to be settled (Luksic and Kendziorski 1999). It was here that the first houses of what would become “Old Town” were built (Padilla-Corona 1997). The first land-grant rancho in San Diego (Rancho Los Penasquitos) was issued in A.D. 1823 to the former commander of the Presidio, Captain Francisco Ruíz (Luksic and Kendziorski 1999; McKeever 1985). The mission system was secularized in the early A.D. 1830s, and subsequently abandoned (Luksic and Kendziorski
The new government took control of lands that were held by the mission (and also lands held by the Kumeyaay), and subsequently either granted the land to new landholders or folded them into larger, established ranchos (Luksic and Kendziorski 1999; McKeever 1985). Under Mexican rule the area prospered in cattle ranching as a result of the demand for hides (Luksic and Kendziorski 1999). Consequently, San Diego became an ideal location for the trade of hides. By 1834, the draw of the economic boon provided by ranching and trade, had increased San Diego’s population enough for it to be granted the status of a civil pueblo (McKeever 1985). This prosperity did not go unnoticed. The United States, with the goals of expansionism, began to take a great deal of interest in annexing California to fulfill its “Manifest Destiny” (McKeever 1985).

Due to escalating tensions over territorial claims (most notable Texas and portions of California), the United States and Mexico entered into a state of war in A.D. 1846, with the United States first occupying San Diego in July of that year (Castillo 2003). As a result of conflicts with Californios that were loyal to the Mexican government, the United States military, under the direction of Robert F. Stockton, constructed an outpost, known as Fort Stockton, on top of Presidio Hill (Castillo 2003; Luksic and Kendziorski 1999). The Battle of San Pasqual, one of the bloodiest battles in California, was fought in December A.D. 1846, northeast of San Diego, near the present city of Escondido, California. This battle, pitting Californios against General Stephen W. Kearny’s Army of the West, was the last major skirmish in southern California during the war (McKeever 1985:61). With the ratification of the Treaty of Guadalupe Hidalgo in A.D. 1848, Mexico ceded portions, if not all, of the area that would become the states of Arizona, California, Colorado, New Mexico, Nevada, and Wyoming (Rawls 1988).

**Archaeological Site Background**

To best understand the impacts of Spanish colonial settlement, archaeological sites related to Kumeyaay, Spanish, and Mexican occupations need to be examined. These sites provide a baseline for settlement patterns and movement across the landscape. This movement highlights the resources that were highly sought for by both groups and as a result influenced cultural networks. Sites from four distinct archaeological time periods will be examined to form the basis of the settlement pattern reconstruction used for this study: Late
Prehistoric period sites, historical Native American period sites, and Spanish and Mexican Period sites (Table 1).

**Table 1. Archaeological Components and Phases for the San Diego Region**

<table>
<thead>
<tr>
<th>Archaeological Component</th>
<th>Phase</th>
<th>Calibrated Date Range (YBP)</th>
<th>Calendar Date Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Prehistoric</td>
<td>N/A</td>
<td>2000–472</td>
<td>A.D. 14–1542</td>
</tr>
<tr>
<td>Historical Native American</td>
<td>San Luis Rey I</td>
<td>800–250</td>
<td>A.D. 1214–1764</td>
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<tr>
<td></td>
<td>San Luis Rey II</td>
<td>250–100</td>
<td>A.D. 1764–1914</td>
</tr>
<tr>
<td></td>
<td>Cuyamaca Complex</td>
<td>800–100</td>
<td>A.D. 1214–1914</td>
</tr>
<tr>
<td>Spanish Colonial</td>
<td>N/A</td>
<td>472–193</td>
<td>A.D. 1542–1821</td>
</tr>
<tr>
<td>Mexican</td>
<td>N/A</td>
<td>193–166</td>
<td>A.D. 1821–1848</td>
</tr>
</tbody>
</table>


To reconstruct the settlement patterns, only a select few sites have been chosen for further analysis. These sites have been chosen that meet three criteria: (1) they date (either through relative or absolute dates) to the archaeological eras and periods in questions, (2) archaeology research has been conducted at the sites, through either survey or excavation, and (3) data recovery has resulted in a sufficient artifact assemblage to characterize the material cultural and association. In all a total of six historical Native American and 14 Spanish and Mexican Period sites have been selected (Table 2).

**Historical Native American Period Sites**

There are six historical Native American period sites that were utilized during this study. These include sites CA-SDI-41, CA-SDI-202, CA-SDI-901, CA-SDI-4515, CA-SDI-9538, and CA-SDI-17666.

**CA-SDI-41 – Cosoy Village Site**

Site CA-SDI-41 (SDM-W-291) is the destroyed historical Kumeyaay village site of Cosoy, on the southern banks of the San Diego River near the present-day Old Town State Park. The site was initially documented by N. C. Nelson in 1967 and was reevaluated twice during cultural resource surveys in 1975 (Cupples 1975) and 1991 (Pigniolo and Huey 1991). At the time of the original recordation, Nelson noted that there was little cultural material on the surface, although the site was within the flood plain of the San Diego River, and that
<table>
<thead>
<tr>
<th>Time Period</th>
<th>California Trinomial No.</th>
<th>San Diego Museum of Man No.</th>
<th>Site Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CA-SDI-41</td>
<td>SDM-W-291</td>
<td>Village site – Cosoy</td>
</tr>
<tr>
<td></td>
<td>CA-SDI-202</td>
<td>SDM-W-956</td>
<td>Village site – Nipaguay</td>
</tr>
<tr>
<td>Historical Native American</td>
<td>CA-SDI-901</td>
<td>SDM-W-263</td>
<td>Village site – Pisclim</td>
</tr>
<tr>
<td></td>
<td>CA-SDI-4515</td>
<td>SDM-W-562</td>
<td>Village site – Matamo</td>
</tr>
<tr>
<td></td>
<td>CA-SDI-9538</td>
<td>SDM-W-247</td>
<td>Village site – Cuyamaca</td>
</tr>
<tr>
<td></td>
<td>CA-SDI-17666</td>
<td>N/A</td>
<td>Village site – Japatai</td>
</tr>
<tr>
<td>Spanish Colonial</td>
<td>CA-SDI-35</td>
<td>SDM-W-956</td>
<td>Mission San Diego de Alcalá Site</td>
</tr>
<tr>
<td></td>
<td>CA-SDI-38</td>
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<td>Presidio Site</td>
</tr>
<tr>
<td></td>
<td>CA-SDI-6658</td>
<td>N/A</td>
<td>Dam</td>
</tr>
<tr>
<td></td>
<td>CA-SDI-6660</td>
<td>N/A</td>
<td>Flume</td>
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<td>CA-SDI-14074</td>
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</tr>
<tr>
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<td>CA-SDI-14292</td>
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<td></td>
<td>CA-SDI-14294</td>
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<tr>
<td></td>
<td>CA-SDI-14297</td>
<td>N/A</td>
<td>Historical residence</td>
</tr>
<tr>
<td></td>
<td>CA-SDI-14298</td>
<td>N/A</td>
<td>Historical residence</td>
</tr>
<tr>
<td></td>
<td>CA-SDI-18591</td>
<td>N/A</td>
<td>Historical residence</td>
</tr>
<tr>
<td></td>
<td>P-37-020914</td>
<td>N/A</td>
<td>Historical residence</td>
</tr>
</tbody>
</table>

There was potential for archaeological deposits (Nelson 1967). When Cupples visited the site in the mid-1970s, she noted that nothing remains of the site, but that there was a potential for midden soil within the boundaries (Cupples 1975:40). She also noted that some of the midden soil was used to cover the presidio (site CA-SDI-38), depositing Tizon Brownware sherds and lithics to the presidio site. During the 1991 reevaluation, the site was tested for buried materials (Pigniolo and Huey 1991). ERC Environmental and Energy Services Company (ERCE) excavated two backhoe trenches to examine subsurface conditions of the site. The excavation trenches resulted in identifying disturbed soil and construction infill 15 ft. deep. No prehistoric artifacts or cultural features associated with the village site were identified during testing. To date, no intact cultural deposits have been identified, and the location of the Cosoy village site is based on archival data and oral histories (Nelson 1967).
CA-SDI-202 – NIPAGUAY VILLAGE SITE

Site CA-SDI-202 is the historical Kumeyaay village of Nipaguay. The site is immediately southeast of Mission San Diego de Alcalá (site CA-SDI-35). Ethnographic records of the site by the Spanish indicate that the site was the village of Nipaguay (Moriarty 1969). It was originally identified as part of the mission in the early twentieth century, but not formally documented until Arnold Pilling visited the mission complex in 1949 and assigned it the number SDM-W-956 (Carrico et al. 1990). The site has since been spilt into two different trinomial designations in order to identify the Spanish and Kumeyaay periods. The area, including the mission complex and the village site, have been subjected to numerous excavations by the University of San Diego in the 1960s and by Regional Environmental Consultants (RECON) in the 1970s (Moriarty 1969; Moriarty and Brandes 1976). Given the proximity to the mission, thousands of artifacts associated with both cultural groups have been recovered. Prehistoric artifacts include lithic debitage, shell beads, bifaces, and flaked stone tools (e.g. drills, projectile points, knifes, and gravers, glass projectile points). Prehistoric ground stone tools include manos, metates, and pestles. Ceramic artifacts include Tizon Brownware and Lower Colorado River Buffware fragments and vessels such as ollas, canteens, plates, bowls, and lids. Ceramic gaming pieces and figurines were also recovered during excavations (Carrico and Kyle 1989; Moriarty 1969). Historic artifacts recovered at the site are described below in the site description of CA-SDI-35. Based on the artifact assemblage and the associated ethnographic records, the site is firmly dated to the historical Native American period.

CA-SDI-901 – PISCLIM VILLAGE SITE

Site CA-SDI-901 is the ethnographic village of Pisclim, a Kuyemaay village in the western Cuyamaca Mountains. A number of studies have been conducted at the sites over the last 70 years. Originally documented by the San Diego Museum of Man as SDM-W-263 during excavations conducted by George Carter in 1937 (Parkman 1981); Malcom Rodgers followed with a second series of excavations in 1937. D. L. True formally recorded the site in 1961 (Foster 1981). It also has been evaluated by California State Parks during a cultural resource inventory of Cuyamaca Rancho State Park in 1981 and once again during a cultural resource inventory for the post-Cedar Fire assessment in 2004 (Mealey 2004).
Site CA-SDI-901 is a combination of two sites, CA-SDI-901 and CA-SDI-11445. Originally recorded separately, the 2004 fire survey found additional artifacts and features to link the two sites together. The site is a bedrock milling complex with numerous features including mortars, slicks, basins, and cupules on a number of outcrops. Surface artifacts include ceramics (primarily brownware sherds), lithic artifacts (including debitage and lithic tools), ground stone artifacts (including manos and pestles), hammerstones, faunal remains, and shell (Foster 1981; Mealey 2004; Parkman 1981). The 1937 excavations resulted in the unearthing of a cemetery with 21 cremations, of which Carter excavated nine and Rodgers excavated the remainder. The excavations noted a “burned log house” comprised of oak and some cedar logs (Parkman 1981:37). Artifacts recovered during excavations included urn covers, cremation urns, Olivella disc beads, fish vertebrae beads, pendants, a shell gorget, quartz debitage, flaked stone tools (including projectile points, knifes, and scrapers), ground stone (including shaft straighteners, manos, and pestles), hammerstones, a small neck canteen, miniature ceramic cups, clay balls, burned shell, and faunal remains. Research has indicated coastal groups used gastropods for the production of beads, including the purple olive snail shell, or Olivella biplicata (Arnold 2012). In addition to the above artifacts, trade items were found during excavations and include numerous blue glass trade beads and “a Spanish-glazed” ceramic fragment (Parkman 1981:38). Despite the burned material and shell, there were no ancillary studies conducted on the site. Based on the artifact assemblage, including the presence of the trade items, the site appears to date to the end of the Late Prehistoric and into the historical Native American periods.

CA-SDI-4515 – MATAMO VILLAGE SITE

Site CA-SDI-4515, also known as SDM-W-562, is the ethnographic village of Matamo. The site was first documented in the early twentieth century in ethnographical and archaeological literature as Fredrick W. Hodge (1910) and Alfred L. Kroeber (1925) mention the village of Matamo in their ethnologies. The site was formally recorded in 1973 by Richard Carrico, and has been visited an additional three times by Fink (1974), Kaldenberg (1975a; 1975b), and Hofmeister (1975). The site was destroyed during the expansion of the Singing Hills Tennis Club in the late 1970s (Analytical Environmental Services 2009). Prior
to construction, RECON excavated a backhoe trench through a portion of the site to characterize the subsurface material (Kaldenberg 1975b).

The site was described as a large protohistoric village site (½-x-¼ mi.) that consisted of stone structure foundations, bedrock milling features, and a substantial surface artifact assemblage. Bedrock milling features included over 30 mortars and over 60 grinding slabs. The site deposits included debitage and flaked stone tools (scrapers). Other artifacts included Tizon Brownware sherds and ground stone artifacts, including mano and metate fragments (Kaldenberg 1975a; Analytical Environmental Services 2009). Subsurface testing at the site resulted in identifying additional debitage, flaked stone tools, Tizon Brownware sherds, ceramic pipe fragments, shell beads, faunal remains, shell fragments, and charcoal. Additional tools included projectile points (including small concave base, basal-notched, and triangular-shaped styles) and utilized flakes (Kaldenberg 1975b). Although the charcoal samples were not submitted for ancillary analyses, the artifacts are consistent with those typically associated with Late Prehistoric and historical Native American sites in area.

**CA-SDI-9538 – CUYAMACA VILLAGE SITE**

Site CA-SDI-9538 (SDM-W-257) is the location of a large Kumeyaay village site, Cuyamaca, located near Cuyamaca Peak. The site is a combination of three sites, CA-SDI-853, CA-SDI-859, and CA-SDI-912. Malcom Rodgers originally documented portions of the site in the 1930s when he excavated it for the San Diego Museum of Man (Bruce et al. 2004). D. L. True then examined the site during a survey for the Cuyamaca Rancho State Park in 1961 (True 1961). The site was evaluated twice more during cultural resource inventories by California State Parks in 1981 and 2003 (Bruce et al. 2004; Foster 1981).

The site is a large village site that has numerous bedrock milling features, a large dispersed artifact scatter, a separate midden area, and a cemetery (Bruce et al. 2004; Foster 1981; True 1961). Rodgers originally excavated a portion of the cemetery, recovering 17 cremations and artifacts from a 5-x-6-m excavation unit. No other substantial excavations have occurred, although testing occurred in 1998 and 2002, with only a hammerstone recovered (Bruce et al. 2004). Features consist of numerous bedrock milling areas with mortars, slicks, and basins. Artifacts include Tizon Brownware and Lower Colorado Buffware sherds, lithics, ground stone, faunal remains, and shell fragments. Lithic artifacts
include debitage, cores, flaked stone tools, and hammerstones. Flaked stone tools include projectile points (including Cottonwood Triangular and unidentified serrated and needle-like types), scrappers, utilized flakes, and generic bifaces. Ground stone tools include manos, pestles, metate fragments, and abraders. Other items include shell beads, steatite pendants, ceramic pipe fragments, and a possible incised ceramic effigy fragment. Historical items include hole-in-cap cans, bottle glass (amethyst and olive), and historical ceramics. The manufacture and use of hole-in-cap cans date between the 1820s and early 1900s, with use ending by 1914 (Rock 1984, 1989). The historical artifacts likely date to the late 1800s and early 1900s. Artifacts found on site conform to what is found on Late Prehistoric and historical Native American sites in the region. The presence of the historical artifacts from the end of the nineteenth century is likely attributed to use of the area by Euroamericans.

CA-SDI-17666 – JAPATAI VILLAGE SITE

Site CA-SDI-17666 is the location of a historical Kumeyaay village site, Japatai. The site, also known as the Stacked Stone Site, was expediently recorded in 2005 by California State Parks (Thomson 2005). It was evaluated and fully documented later in 2005 and reported on in 2009 (Schneider 2009). During the course of the inventory, it was determined that the site is related to CA-SDI-901, the Piscilm village site. This association was based on the similar artifact assemblages and the proximity of the two sites (Schneider 2009).

At the time of the original recordation, the site was noted as having a bedrock milling feature, but needed to be fully documented (Thomson 2005). As a result, California State Parks conducted an intensive recordation of the site. The site consists of cleared spaces within a boulder outcrop, constructed rubble walls, bedrock milling features, and a dense artifact scatter. During a 20 percent survey of the site, nearly 1,000 artifacts were identified. Artifacts included ceramics, lithics, and ground stone tools. Ceramic artifacts included sherds of Tizon Brownware and Lower Colorado River Buffware and pipe fragments. Lithic artifacts consisted of debitage, cores, and flake stone tools, which include projectile points (Cottonwood Triangular and Desert Side-notched), scrappers, and bifaces. Ground stone tools were comprised of manos, pestles, and metate fragments. A small amount of faunal remains also were noted on the site (Schneider 2009). The artifacts assemblage is consistent with assemblages associated with Late Prehistoric and historical Native American contexts.
Spanish Period Sites

All known Spanish Period sites within the San Diego River watershed were used for this study. These sites include CA-SDI-35, CA-SDI-38, CA-SDI-6658 and CA-SDI-6660.

CA-SDI-35 – Mission San Diego de Alcalá

Site CA-SDI-35 is a combined multicomponent site that includes the remains and current area of the Mission San Diego de Alcalá. The mission was originally constructed in A.D. 1774 and has been occupied since. During the Spanish and Mexican occupations, four temporal periods have been identified with the mission starting with the First Mission Occupation Era between A.D. 1774 and 1775. The Kumeyaay revolt in A.D. 1775 resulted in the destruction of the first mission and the abandonment of the mission area for a year. Father Serra returned to San Diego in A.D. 1776 and reestablished the mission, ushering in the Reoccupation Era (A.D. 1776–1780). Following this period, the mission entered the Secular Outlier Era (A.D. 1813–1834) and finally the Mexican Secular Era (A.D. 1834–1846) (Figure 4). The conclusion of this period saw the mission leave the ownership of the Roman Catholic Church, and used as a military outpost by the U.S. In A.D. 1862 the mission was returned to the Catholic Church and it has been an active parish since.

The mission site was originally documented in the early twentieth century, although a formal designation was not assigned at that time (Carrico et al. 1990). Arnold Pilling evaluated the site in 1949 and assigned it the number CA-SDI-35 (SDM-W-956). The site was excavated a number of times throughout the years. The University of San Diego, under the direction of Dr. James R. Moriarty, began field schools and excavations at the mission area in the 1960s (Moriarty 1969). Other excavations occurred in the 1970s by RECON under the direction of Dr. Moriarty and Dr. Raymond S. Brandes in the garden area of the mission (Moriarty and Brandes 1976), and by ERCE in 1989 around the general mission complex (Carrico and Kyle 1989).

As a result of the excavations, numerous artifacts dating from the Spanish colonial period and into the early part of the twentieth century have been recovered. Historical artifacts include wooden coffins, coffin nails, glass trade beads, medallions, crucifixes, tiles, buttons (bone, shell, glass, copper, and brass, including the English produced “Phoenix” style), clay and glass marbles, glass fragments, hand-wrought cut and wire-cut nails, coins, swords, hand forged wagon and horse harness parts, and miscellaneous forged metal items. Historical ceramic artifacts include Chinese porcelain, English pearl and cream wares, and Spanish Miaolica wares, each representing numerous plates, cups, and bowls. Other ceramic items include smoking pipes, water pipes, and clay fragments (Carrico and Kyle 1989; Moriarty 1969; Reck and Moriarty 1972). Prehistoric artifacts found in association with the mission and the ethnohistoric village were described above as part of CA-SDI-202.

**CA-SDI-38 – SAN DIEGO PRESIDIO**

Site CA-SDI-38 is the site of the Spanish colonial presidio on the northwestern end of Mission Hills, south of the San Diego River and Mission Valley. The presidio was the Spanish administrative and military center of the new colony. The presidio complex was originally constructed in A.D. 1769 and housed the Spanish fort and the original mission. In A.D. 1774 the mission was moved to its current location, dividing the influence of colonial effort into two different locations: the mission and the presidio. The presidio area served as the mission between A.D. 1775 and 1776, after the Kumeyaay had revolted and destroyed the mission. The presidio continued to be the administrative core of the Spanish crown in San Diego until A.D. 1821 when Spain ceded control of California to Mexico. In the early years
of Mexican occupation, the presidio served as the governor’s residence, but by A.D. 1835, the presidio had been abandoned.

Site CA-SDI-38 has been studied extensively over the last 100 years. Excavation at the site began as limited, informal, site testing in the 1920s and continued through the 1940s by Percy Broell, George Marston’s (the landowner) personal landscape architect (Beddow 1999). Controlled excavations at the presidio did not occur until Dr. Paul Ezell from San Diego State College (SDSC) began work at the site in the 1960s (Table 3). SDSC, in partnership with the San Diego Historical Society, focused on the excavation of the chapel, the associated habitation area, and a portion of the cemetery around the southern wing of the presidio (Beddow 1999; Myers 1970). Following the SDSC excavations, Mesa Community College, under the direction of Diane Barbolla focused on the western wing of the complex and uncovered the almacén (the warehouse), a portion of the outer defensive walls, a number of rooms, and a large artifact concentration, interpreted to be a disposal area. In 1987, San Diego State University (SDSU) returned to the presidio to complete excavations to define a complex set of architectural features in the northern wing. Between 1992 and 1998 the Center for Spanish Colonial Archaeology (CSCA) completed a number of projects focusing on assessing important archaeological deposits for the City of San Diego in the northern and eastern wings of the complex (Williams 1996).

Table 3. Excavations at the San Diego Presidio.

<table>
<thead>
<tr>
<th>Affiliation</th>
<th>Project</th>
<th>Excavation Years</th>
<th>Presidio Area</th>
<th>Presidio Time Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDSC (SDSU)</td>
<td>Chapel Complex Project</td>
<td>1965–1976</td>
<td>Southern Wing</td>
<td>Late Period: 1800–1834</td>
</tr>
<tr>
<td>Mesa College</td>
<td>Gateway Project</td>
<td>1976–1987</td>
<td>Western Wing</td>
<td>Early Period: 1769–1800</td>
</tr>
<tr>
<td>SDSU</td>
<td>North Wing Project</td>
<td>1987–1991</td>
<td>Northern Wing</td>
<td>Late Period: After 1810</td>
</tr>
</tbody>
</table>

In all, the excavations have produced over 250,000 artifacts dating to all known periods of occupation of the presidio (Cárdenas 2012). Artifacts include prehistoric and historical material culture, such as debitage, flaked stone tools, ground stone, and Native
American ceramics. Historic artifacts include numerous Spanish Colonial ceramics and trade wares including English, Chinese, Japanese, and later American ceramics. Other historical artifacts include structural items (such as plaster, tiles, and wood), glass, metal items, personal items (such as beads, buttons, textiles, and jewelry), religious items (i.e. crosses, medals, and crucifixes), burial items, and a large collection of faunal and shell remains (Cárdenas 2012). The collection also contains items that indicate a female presence, such as shell beads and copper earrings (Cárdenas 2012).

**CA-SDI-6658 and CA-SDI-6660 – Spanish Mission Dam and Flume**

Sites CA-SDI-6658 and CA-SDI-6660 are two sites that represent the location of the Spanish-built dam and flume that brought additional water from the San Diego River to the Mission San Diego de Alcalá (Figure 5). When the mission was moved from the presidio to its present location in 1774, the padres initially irrigated the fields through sump holes and the construction of simple brush dams (Green 1933; Hanna 1978). As further irrigation was needed, Spanish colonialists employed Kumeyaay labor to construct a masonry diversion dam and an associated ceramic tile flume. The diversion dam was approximately six miles northeast of the mission along the San Diego River and construction began in 1816 (Hanna 1978).

The dam, site CA-SDI-6658, and the flume, site CA-SDI-6660, were known about long before their official recordation; however, formal documentation was not completed until 1977 (Carrico 1977), when a segment of the flume was recorded. The dam was first recorded during a cultural resource survey in 1978 (Hanna 1978). Both sites have since been evaluated during cultural resources surveys at least two other times (Case 1991; Kyle and Gallegos 1995). In all, the remaining portions of the dam and five intact segments of the flume have been documented. Subsurface testing at the dam was undertaken in 1971 by Dr. Paul Ezell, with little buried cultural material encountered (Hanna 1978). Recently, the dam and flume were examined to study the overall influence the San Diego River had water use development in San Diego County (Brodie 2013).
Mexican Period Sites

All Mexican Period sites are historical structures that are either archaeological sites or reconstructed/refurbished adobes that were located in the original pueblo of San Diego, now known as Old Town. After Mexico had won independence from Spain in 1821, many of the ranking officials and soldiers assigned to the presidio began leaving the fort and settling the area to the west of the presidio. These adobes were the earliest incarnation of the town of San Diego. The area would continue to grow in the subsequent years, until being granted the designation of a civil pueblo. The archaeological sites represent structures that date to the period of Mexican occupation between 1820 and 1848; however, the occupation of the houses persisted well after the U.S. had acquired California. The bulk of the sites have been reported in different cultural resource inventory reports (Clement and Van Bueren 1993; Ezell and Broadbent 1967; Kupel 1982), but the summary provided by the California State Parks for Old Town State Park is the most cohesive (Davis 1996).
As a result of excavations that have occurred in and around the structures or structural remains, thousands of artifacts dating to the mid-nineteenth century have been recovered. Artifacts include ceramics, various colored glass fragments, glass and ceramic beads, metal fragments, and butchered faunal remains. Ceramic types consist of Mexican, English, Chinese, and American-made earthenware, pearl and creamware, porcelain, stoneware, and ceramic tiles (Ezell and Broadbent 1967). Prehistoric artifacts include Tizon Brownware sherds, lithics (including debitage and flake stone tools), ground stone, and shell.
CHAPTER 3

LITERATURE REVIEW AND THEORETICAL PERSPECTIVE

To adequately understand the history of the field and the direction that guides this study, a review of previous research was conducted. This previous research is important as it highlights the way in which the field has addressed settlement patterns and how it has reflected the changing theoretical perspectives of the discipline (Cooper 1989). This chapter presents the results of the literature review, as well as the theoretical frameworks employed.

LITERATURE REVIEW

Settlement patterning has been a topic of interest for archaeologists and anthropologists for well over 100 years. Some of the earliest work occurred in the late nineteenth century, such as Lewis H. Morgan positing a correlation between social organization and site layout or Cosmos Mindeleff’s method for settlement chronology based on the archaeological record in the Southwestern United States (Parsons 1972). Within the United States, the majority of settlement patterning research has focused on prehistoric societies; however, historical settlement patterns received more attention in the latter half of the twentieth century, focusing on the east coast region of the continent. The following literature review presents a summary of applicable settlement patterning research for both prehistoric and historical patterning.

Prehistoric and Historical Settlement Patterns

Julian Steward’s (1937) work on Yuman and Puebloan groups of the southwest and southern California suggested a correlation between social development, settlement patterning, and ecological factors. Steward attempted to dissuade the notions that southern Californian groups were a diffused extension of the Puebloan groups east of the Colorado
River.  Steward (1937) noted that population density in southern California was directly tied to the size of the territory that was occupied by a particular clan or band. He concluded that settlement patterning was determined by three factors: (1) population density was effected by the type of environment in which settlement was taking place – i.e. the better the environment, the higher the population density; (2) environmental factors (such as access to highly ranked resources) influenced the social organization of the territory – that is, bands or clans would stay separate and share the same large territory and resources, they would each occupy less territory, or they would integrate into a large multi-band village; and (3) multi-band villages would be created if a significant event occurred, such as forced relocation or increased populations in a decreased territory (Steward 1937:101-102).

By the middle of the twentieth century, settlement pattern research came to the forefront of archaeological inquiry. Gordon R. Wiley (1956) complied a volume of then current research, *Prehistoric Settlement Patterns in the New World*, which highlighted many of the different areas that settlement pattern research covered, both geographically and topically. For most of the articles in the volume, the classification of sites was of particular interest. For example, the ethnologist Evon Vogt (1956:174-175) called for interdisciplinary research which included archaeologists, geographers, and anthropologist that worked together to define some of the basic tenets of site classifications that would be encountered. These classifications included the camp, village, ceremonial center, town, and city (Oberg 1957:923). The impact of this edited work was immediately seen, as many archaeologists in the southwest (and other regions) applied the ideas outlined in this volume to infer socio-cultural domains from settlement pattern data (Parsons 1972:131).

In the early 1960s, Lewis R. Binford (1964:425) described how archaeological research should be designed to incorporate the regional scope so that the field would be able to study the processes of cultural change. Binford (1964:425) explained that a cultural system was composed of the repetitive joining of social, technological, and ideological parts, which manifested themselves in the archaeological record as “localities, facilities, and tools with specific tasks” at a “structured set of spatial-formal relationships.” Binford further elaborated that cultures were influenced by their surroundings both physically and socially. He postulated that as a cultural system changed and became more complex, that system would expand and come into contact with both new ecological and socio-cultural influences.
Binford called for archaeological research design to encapsulate regional scales so that these socio-cultural, environmental, and archaeological interactions would be properly studied. Through the remainder of the paper Binford laid out what he saw as appropriate sampling strategies that would address the basics components of material culture including artifacts, ecofacts, features, and sites.

Continuing with the discussion of culture and settlement pattern research, Bruce Trigger in the late 1960s defined this type of archaeology as “Settlement Archaeology.” He stated that the overall aim of settlement archaeology was to use archaeological data to better understand social relationships (Trigger 1967:151). This avenue of study included both the structure and developmental aspects of the relationship that included economic, political, and affective systems (Trigger 1967:151). Within this approach, settlement analysis occurred at three levels: the individual structure, the larger settlement, and the distribution of those settlements (Trigger 1967). The study of the individual structure and the larger settlement provided insight into family structure, community organization, and class divisions. A larger, regional, distribution analysis provided insight into the socio-cultural, political, and ecological relationships in the region. Trigger (1967:152) used the example that marginal areas might be settled due to either economic reasons (i.e. exploitation of natural resources) or political/socio-cultural reasons (i.e. group avoidance). Through these parameters, Trigger argued that inferences about social relationships would be gleaned from the archaeological record.

David Hurst Thomas (1973) placed many of these theoretical notions into practice with his work on the Reese River Ecological Project in the early 1970s. Specifically, Thomas was interested in testing the settlement and subsistence pattern hypothesis for the Great Basin Shoshone proposed by Julian Steward in the 1930s. As Thomas (1973:156) summarizes, Steward hypothesized that “Great Basin cultural ecology had a socially fragmenting effect” on the native population within the region. Furthermore, Steward suggested that elements of the group dynamic, including economic cooperation, the size and mobility of village groups, and population density were all influenced by ecological relationships (Thomas 1973:157). To test these theories, Thomas and others created a computer simulation to populate the types of artifacts that would fall into the different sites in different ecological zones. This resulted in the creation of a number of different assemblages
including butchering, hunting, plant procurement, and habitation related (Thomas 1973:162). These data were then compared to the archaeological record from the Reese River survey. The results of the comparison indicated that Steward’s theory was generally accurate. However, Thomas stressed that this particular example represented subsistence and settlement strategies for one region at one time. Furthermore, Thomas stated that these strategies were an interrelated system of human occupation for a region, not a culture. Given varying ecological factors in a overall landscape, subsistence and settlement strategies for any given culture would be adaptive to those specific ecological factors (Thomas 1973:173-174).

Thomas’ cautioning against generalizations about settlement patterns and culture was not the last. Throughout the next two decades, prehistoric settlement pattern research focused on accounting for many of these factors. Michael C. Robbins and Richard A. Diehl (1980) offered a method for measuring settlement pattern change or stability. Adopted from Bartholomew’s index for social mobility, Robbins and Diehl (1980) suggested that by calculating a change or stability index for an area allowed for meaningful comparisons to other regions and populations. In a slightly different avenue of research, Robert E. Dewar (1991) developed mathematical equations that accounted for contemporaneous site occupation. This work stemmed from the issues that settlement might be a cyclical pattern on a landscape, and that “phase-based” settlement patterns were not accurate (Dewar 1991). Dewar (1991) suggested that through this model, issues with site occupation should be addressed through frequency of population relocation through a given time period.

Many of the same questions addressed above in prehistoric settlement patterns were at the core of historical settlement pattern research, including addressing socio-cultural dimensions and ecological factors. Robert Paynter’s (1982) study on historical settlement patterns proposed ways in which archaeological studies were able to address some of the larger issues of sociocultural processes that were a primary concern of anthropology. Specifically, Paynter was concerned with the spatial distribution of a historical archaeological region and how that spatial patterning informed the social stratification that was apparent within that region. He noted that these same settlement patterns reinforced and maintained social stratification. He also suggested that the defined region would be a product of the region’s role within the larger colonial system. This system was defined as the
core and periphery, which was the foundational aspect of the study. Paynter (1982:3) noted that to adequately understand the settlement of a region, the term “region” needed to be defined clearly and concisely, be it topographic and geographic boundaries (such as a river watershed) or civil boundaries. Paynter (1982:113) argued that the spatial organization of a settlement limited access to resources and, in turn, created a stratified society that was reinforced by the overall system.

Colonial contact and influences had a major impact on the settlement of North America. Kenneth Lewis (1984) addressed this aspect of historical archaeology in his work on frontier settlement. Lewis examined both the effects of colonialism on the indigenous populations and the colonizers. For the latter part, Lewis discussed how examining the impact of colonialism on the settlers provides vital information about a particular population and their rapid adaptations to a new ecology. Referring back to Binford’s regional scale of research design, Lewis made a similar case. He stated that the frontier, in the colonial sense, is regionally organized. To adequately investigate a regional organization, all aspects of the region needed to be defined and studied (Lewis 1984:4). Lewis defined frontier settlement as that of an insular model, which is the expansion of colonial agriculture tied to the world economy (Lewis 1984:19). He noted that within this system, colonial settlement was strategically spatial organized so that the colony would access trade and communication locations, as well as propagate future population and economic growth. A important concept in the frontier model (as well as Paynter’s model) was the entrepôt—the initial location of colonization—that served as the economic, social, and political center of a colony (Lewis 1984:146-147; Paynter 1982:116-117). It is typical that, given the importance of the entrepôt, a town or village would see the most sustained growth over time (Lewis 1984:147). Following the entrepôt, the hierarchical settlement system was composed of frontier towns, nucleated settlements, and dispersed settlements, all of which provided data on the settlement of a region (Lewis 1984:180).

Robert L. Hoover (1992) outlined four complimentary models that archaeologists utilized to describe the material culture of colonial California. These models included ecological, frontier, economic, and acculturation studies. In the ecological model, Hoover drew on the work by Kenneth Lewis, who described colonization in the archaeological record through numerous human-ecological processes including simplification, competitive
exclusion, environmental diversity, progressive segregation, and systematization. In the frontier model, Hoover described Jerome Steffen’s two types of frontiers: insular and cosmopolitan. Hoover noted that each type of frontier is different in the type of settlement pattern and economic relationship to the core state. The third model described by Hoover is the economic model. In this model, Hoover discussed the use of world-system theory, as addressed by Immanuel Wallenstein, in interpreting the archaeological record. World-systems theory examines the way in which core states (such as England and France) utilized and exploited smaller periphery regions in the division of labor and goods to access surpluses. Finally, Hoover examined acculturation studies, by describing multiple ways in which to analyze artifacts and artifact groups. The analytical methods described by Hoover highlight the ways in which acculturation occurred within colonial sites.

**THEORETICAL PERSPECTIVE**

For this thesis, three major anthropological and economic theories will be used: world-systems theory, actor-network theory, and behavioral archaeology. These three theoretical frameworks are similar in that they all are concerned with a multiscalar approach tying individual items, landscapes, and populations to each other, along with larger internal and external forces. Taken together these theoretical frameworks provide a useful analysis of how Spanish and Native populations navigated each other in a larger regional frontier system.

**World-Systems Theory**

The diffusion of cultural ideals, practices, and norms and the subsequent response to that diffusion has been a topic in archaeological contexts for many years (Hall et al. 2011). Archaeologists have long noted that a single site or region cannot be studied in isolation and that the interplay between the surrounding cultural, technological, and economic factors that work upon each other need to be addressed. In historical archaeological contexts, one of these forces, the spread of capitalism, is fundamentally tied to colonial systems (Little 2007:57). Barbara Little (2007:57) stated that studying the spread of capitalism historically is a useful tool to understand how our modern world has developed. At the center of these
ideas is the use of world-systems theory developed in the 1970s by the sociologist Immanuel Wallerstein.

In his influential work, Wallerstein (1974) explains the rise of capitalism as the dominant world economic system after the end of medieval European feudalism. A primary concept of world-systems theory is that of the core and the periphery (Hall et al. 2011; Wallerstein 1974). The idea is based on Frank’s (1966) concept of metropoles and satellites. Both Wallerstein and Frank argue that core nations (Frank’s metropoles) extract raw resources from peripheral nations (satellites). A third type of state existed within the periphery: the semi-periphery. Core areas within the periphery (such as urban areas) siphon resources from the outlying periphery (such as villages), while still being in the periphery of the core state (Hall et al. 2011:236).

Wallerstein divides the world system into three modes: mini-systems, world empires, and world economies (Wallerstein 2000:139). Mini-systems are defined as a historical system that is a homogenous governing body that occupies a relatively small space for a brief temporal period (Wallerstein 2000:139). World empires, on the other hand, represent a large, cohesive polity that incorporates a number of socio-cultural entities. Wallerstein (Wallerstein 2000:139) expounds that the overall “logic” for this system is “the extraction of tribute from otherwise locally self-administered direct producers (mostly rural) that is passed upward to the center and redistributed to a thin but crucial network of officials.” Finally, a world economy is defined as a network of “production structures” that funneled surplus unequally to those at the top of the core political structures – in other words, a capitalistic economy (Wallerstein 2000:139-140).

Wallerstein argues that for a capitalist, or world, economy to function properly, the institutions of core and periphery states need to be established so that the economic system would continue to expand its boundaries (Hall et al. 2011:236; Wallerstein 1989:129). For this reason, it was impossible to separate colonialism from capitalism. In his work chronicling the use and consumption of sugar in Europe (primarily focusing on England), Sidney Mintz (1985) delves into this topic. Mintz (1985:55) explains how capitalism is a result of the destruction of the feudal economy and the subsequent creation of a world trade economy. He argues that the production of sugar, as a highly sought after “spice,” was a prime example of the establishment of this new capitalistic economy – one supported by
colonial institutions, such as resource extraction and slavery (Mintz 1985). Mintz notes that the plantation system established in the Caribbean for the production of sugar encapsulates many of the elements of the core-periphery binary. Plantation owners were, many times, absentee owners that received credit to finance the plantation from metropolitan banks. In turn, the plantation would export the final product to the core along with any acquired revenue to be distributed among a small group of people in the British government (Mintz 1985:56).

World-systems theory was not without its critiques however. While initially well received and heavily utilized by archaeologists, eventually many anthropologists saw it as a “reductionist” view of culture that did not account for individual actors and local processes (Galaty 2011:4). As a response to these concerns, some archaeologists and anthropologists have reinterpreted world-systems theory as more of a set of assumptions to guide research questions (Hall 2005). Hall’s (2005:90) “world-systems analysis” paradigm viewed a world-system as a “fundamental unit of analysis which all other social processes and structures should be analyzed.” He argues that this type of analysis is not meant to replace other social analyses, but rather, help place specific processes into a larger context. Hall (2005:90) clarifies the term “world” for the paradigm; he notes that the original Wallerstein concept of the term “world” does not necessarily equate to “global,” but rather a “self-contained unit of social organization.”

**Actor-Network Theory**

As the previous literature review has shown, an analysis of historical colonial settlement patterns is, at a fundamental level, tasked with exploring the socio-cultural impacts and complexity that occurs when two diametrically opposed cultural groups come into association with one another. Although archaeological evidence can provide an insight into these interactions by examining elements such as site occupation histories, artifact assemblages (noting items such as trade goods, annuity goods, etc.), the role of the social aspect is not as clear. Actor-network theory (ANT), examines how individuals associate with both objects and other groups through the concept of a web of networks and provides answers to the questions of cultural interaction during colonial settlement (Latour 2005). Actor-network theory has been used throughout archaeological research to examine social
interactions in the past (see Brughmans 2010; Hodder 2011; Schortman and Urban 2012; Sindbæk 2006; Webmoor and Witmore 2008).

Bruno Latour’s (2005) seminal work further elaborates on ANT. Latour initially addresses how sociologists in the past have defined society, its interactions, and its mechanisms. In an attempt to move away from using the social as “a ‘social explanation’ of some other state of affairs”, Latour outlines five “uncertainties” of the social world: (1) the nature of groups, (2) the nature of actions, (3) the nature of objects, (4) the nature of forces, and (5) the type of studies done (Latour 2005:21-22). Latour explains how ANT is a framework through which global versus local interactions are examined. These global and local interactions are studied by understanding the processes of social interactions, including how objects are intrinsically involved in the social purview. Latour (2005:75) argued that social interactions are not solely made of “human-to-human” or “object-to-object” connections, but “rather bounces back and forth between the two.” In studying the process of social interaction, Latour (2005:106-108) warns against taking a narrowed approach and that ANT is a “sociology of the translation.” That is, it is designed to trace these networks of the social by understanding the processes that occurred and how they led to interactions (i.e., the traceability of the social).

While in theory it can be easy to associate any object, person, non-human organic, or anything as acting upon each other and simultaneously being acted upon, this might be interpreted that inanimate objects carry a certain amount of agency. Rather, ANT cannot be reduced to a single element, but instead the network is a heterogeneous collection of elements (tools, pots, people, etc.) that work together to form the network (Sindbæk 2006:120). Examining archaeological remains through an ANT lens provides more complete anthropological analysis by identifying relationships within the material cultural and identifying similar relationships within the socio-cultural realm, both spatially and temporally (Brughmans 2010). This creates a multiscalar approach to understanding the site or the region.

Rob Inkpen et al. (2007) re-imagined ANT in terms of topography in a relational landscape as a means to conceptually map these networks. Inkpen and colleagues (following the concepts outlined by Latour), argue that the strength of a network is dependent on its “entrenchment” (Inkpen et al. 2007:537). That is, the stronger two points (or nodes) on the
network are connected, that particular connection becomes further aligned and entrenched. The entrenchment of this network then alters the surrounding landscape in that the closer something is to the entrenched connection, the harder it is to separate from that connection. Conversely, the further away something is from the entrenchment, while it is still related, it is easier to break away and become associated with other network connections (Inkpen et al. 2007). In other words (and to draw upon the examples of core and periphery outlined above), the closer an individual is to a core network, the harder it is to disengage from that network, whereas the closer to the periphery one is, the easier it is to disengage. Although network entrenchment occurs, the network is not static and is susceptible to change. The network can be altered in one of two ways: naturally over time as it develops, or it will be altered through a significant external event (Inkpen et al. 2007:538). Inkpen et al. (2007:538) identified three points that highlight an “insight” into the dynamics of the network: first, deeply entrenched connections in the network are more resistant to changes from the external event; secondly, the network will not change in a “uniform or predictable manner”; and three, the external event potentially creates new network connections, either positive or negative.

**Behavioral Archaeology**

The interpretation of artifacts and the inferences made about past cultural processes is a primary concern of archaeological theory (Johnson 2010). After decades of archaeological research, many frameworks have been developed to answer these questions, including culture-history, processual (or “new” archaeology), and postprocessual approaches. Influenced by processual and middle-range theories, behavioral archaeology attempts to link the gap between the past dynamics of a population and the archeological record.

First developed in the 1970s, proponents of behavioral archaeology argue that archaeologists are able to focus on the relationship that is formed between human behavior and material culture (Schiffer 2010). The development of the theory is a response to the notion that the archaeological record is a “static” record, and did not account for cultural and noncultural formation processes (Schiffer 2010:5). Behavioral archaeologists do, however, accept and support processual ideals such as the need for archaeology to be more scientific and artifacts were intimately involved in people’s daily lives. As the theory continued to develop, Schiffer (2010:6) postulates that archaeology “is the study of relationships between
human behavior and material culture in all times and places.” Behavioral archaeology developed four strategies that address questions that relate to human behavior and artifacts: (1) the use of material cultural to address specific (descriptive and explanatory) historical questions; (2) the use of present-day artifacts to infer laws about behavior (this is the basis for experimental archaeology); (3) the use of the archaeological record to understand the behavior of past people; and (4) the use of modern material culture to study the behavior of modern populations (Schiffer 2010:6-8).

In the last few decades behavioral archaeology has begun to address a number of topics that have been generally regarded as falling under the purview of postprocessualism, such as the symbolic or ritualistic aspects of human behavior (Schiffer 2010:154). Social power has also recently come under the scope of behavioral archaeology (Walker and Schiffer 2006). Walker and Schiffer contended that the acquisition of artifacts manifest social power. Social power, as defined here, is the tenet that select privileged individuals in a society are afforded “power over” others (however it might manifest itself) in a society (Walker and Schiffer 2006:68). Examples of this power would be the clergy over parishioners or law enforcement over the general populace. This social power is also indicated in the archaeological record as certain individuals having access to or control over particular artifact types (which could include material goods or ecological resources). By examining the correlations between those artifacts and groups, the dynamics of social power can be seen in the archaeological record.
CHAPTER 4

METHODOLOGY

In order to succinctly examine settlement patterns and cultural networks formed during the Spanish colonization and Mexican settlement of the San Diego River watershed requires a number of different methodologies. The methodology for this study pulls from a number of different disciplines and includes archaeology and anthropology, history, and geographic information systems (GIS), creating a multi-vocal approach to the study. Taken together, a historical anthropological analysis of settlement is sought. Given the interplay between Kuyemaay and Spanish colonists, historical anthropology allows for the analysis of diverse datasets. As defined by Kent Lightfoot (2005:13), historical anthropology is a holistic study that incorporates “archaeological data, archival documents, ethnographic observations, and native narratives” to analyze an aspect of the past.

In historical anthropology, archaeological data is the source in which poorly represented populations in the written record are given a voice (Lightfoot 1995, 2005:17). When coupled with ethnographic data (if available), the archaeological record can provide a detailed account of what life was truly like for a given population (Brumfiel 2003). In regards to documentary evidence, Lightfoot noted that while they contain their own set of analytical challenges, historical documents offer unique aspects to the colonial encounter. Be it the European records that describe day to day life and the views of the indigenous populations, the ethnographic accounts of observed behavior, or the autobiographical accounts of the native populations, each written account offers a unique world view and perspective (Lightfoot 1995, 2005). Through this historical anthropological analysis, agency is given to multiple groups and a true multiscalar analysis can be achieved. The following chapter outlines the data sources used in the study and the GIS functions.
DATA SOURCES

To adequately analyze the colonization and settlement of the San Diego region, a number of different data sources were examined. These datasets include archaeological sites, historical documents, ethnographic accounts, and spatial data. Archaeological site descriptions have been presented in Chapter 2. These data are also supplemented by their spatial locations, which provide the basis for the GIS analysis. To help with the interpretation of the GIS analysis and the archaeological data, this study uses a number of historical documents, including first-hand accounts of the early Franciscan missionaries to the region, and ethnographic and autobiographical accounts of traditional Kumeyaay settlement patterns. These documents are used to place what has been found during archaeological investigations into context and to help explain larger patterning.

In regards to spatial data, both vector and raster datasets were used in the GIS analysis. Vector data refers to spatial data stored as points, lines, and polygons that consist of stored coordinate lists. These coordinate lists also contain attributes specific to that point, line, or polygon. Raster data refers to spatial data stored as a grid of equal pixels (or cells) that represent a specific value related to an attribute. The main data set used within this study is the spatial location of the previously recorded archaeological sites within the San Diego River watershed. These archaeological shapefiles, which are stored as vector data, were acquired from the South Coastal Information Center at SDSU. Other vector data shapefiles used include water basin and catchment areas, major and minor streams, floral habitat areas, modern civil boundaries (including municipal, county, state and country), tribal reservation boundaries, historical land grant boundaries, water bodies, and highway and freeway data. These datasets were acquired through the San Diego Association of Governments’ online Regional GIS Data Warehouse (www.sandag.org). Raster datasets include a 10 m elevation grid Digital Elevation Model (DEM) acquired from the Regional GIS Data Warehouse. This DEM was used to create slope and hillshade functions used within the result maps.

GEOGRAPHIC INFORMATION SYSTEMS METHODOLOGY

The above source datasets were used to create the maps presented in the results section in Chapter 5. Maps were created through multiple functions provided through ESRI’s ArcGIS Desktop 10.2.2 GIS platform. Although some of the location and results
maps were created through simply overlaying data, other maps required more complex
manipulation of the data to achieve the presented map. Below is a description of the methods
used in the creation of the archaeological database, surface density maps, suitability model,
and network maps presented in the results section.

**Archaeological Attribute Database**

Aside from the spatial data, each point or polygon contained minimal attribute
information. A database was created that included the site name, site type (prehistoric,
historical, or multicomponent), time period (Paleoindian, Archaic, Late Prehistoric, etc.), and
cultural affiliation (Kumeyaay, Spanish, Euroamerican, etc.). This data was then joined to
the spatial dataset through the GIS platform based on the P-Number assigned by the state.
The resulting archaeological classification database allowed for the selection of specific sites
(or groups of sites) based on a number of attributes including site number, site name, site
type, time period, and cultural affiliation.

**Density Surface Maps**

To create the archaeological density surface maps a Kernel Density Estimation
function was used. The raw spatial data was stored as separate shapefiles: one being a point
feature class for historical structures and the other being a polygon feature class for
archaeological sites and isolated finds. The initial step was to create a new point feature
class for the archaeological sites by calculating the centroids for each site polygon through
the GIS platform. The resulting point feature class was then merged with the historical
structure feature class in a new shapefile that stored all known cultural resources as a point
feature class. The new shapefile was joined with the archaeological classification database,
which allowed for the selection of individual sites or groups of sites to create the maps.
Density surface maps were created for the entire watershed that depicted all known cultural
resources, prehistoric resources, historical resources, Late Prehistoric resources, and
historical Native American, Spanish Period, and Mexican Period resources.

Density surface maps assist in highlighting spatial clusters within a dataset. In an
archaeological context, these maps show the changing intensity (or density) of a particular
attribute within the same area that allow the archaeologist to compare attributes throughout a
number of areas (Conolly and Lake 2006:173). Simply, a density surface is created by calculating the number of points within a defined search radius (neighborhood), then dividing that total by the size of the search radius. In general, the search radius is the size of the raster cell in the GIS platform. A kernel density is a non-parametric smoothing technique that calculates the density to avoid “bulls-eye” type densities (Conolly and Lake 2006:175). The density is calculated similarly as above, but with two significant changes: (1) the search radius, or bandwidth, is calculated as a circular neighborhood for each point and (2) a quadratic function curve (the kernel) is placed on each point that creates an approximate distribution from the point outwards to the end of its search radius. The highest value of this curve is at the point center and gradually diminishes to zero at the edge of the search radius. The search radius (SearchRadius), or bandwidth, is calculated with the following:

\[
\text{SearchRadius} = 0.9 \times \min(\text{SD}, 1 \times \ln(2) \times D_m) \times n^{-0.2}
\]  

Where “min” indicates that the smallest calculated value is used of the calculated distance. \(SD\) is the standard distance of the point features, \(D_m\) is median distance (in a two dimensional plane) of the point features, and \(n\) is the value of the population field, in this case 1 (Esri 2014). Within the search radius is standard distance, which is a measurement of the compactness or dispersion of a distribution from a geometric mean center. The standard distance (\(SD\)) can be expressed as follows:

\[
\text{SD} = \sqrt{\frac{\sum_{i=1}^{n} (x_i - X)^2}{n} + \frac{\sum_{i=1}^{n} (y_i - Y)^2}{n}}
\]  

Where \(x_i\) and \(y_i\) are the coordinates for point \(i\), \(n\) is the total number of points, and \(X\) and \(Y\) are the coordinates for the geometric mean for all points (Esri 2014).

Once the search radius is calculated, the kernel density function is applied. ArcGIS 10.2.2 uses a quadratic kernel function to calculate the density surface map. The density function \((f(x))\) is expressed as:

\[
f(x) = \frac{1}{nh} \sum_{i=1}^{n} K_o \left( \frac{x - X_i}{h} \right)
\]
Where \( n \) is the total number of points, \( h \) is the bandwidth (or search radius), \( K_O (\bullet) \) is the quadratic kernel function, and \( x - X_i \) is the distance between the two points in question (Silverman 1986:76). The quadratic kernel function is defined as:

\[
K_O(x) = \frac{3}{4}(1 - X^2) \text{ where } |x| \leq 1
\]  

(4)

After calculating the kernel density for each point, the value for each output raster cell is calculated by the GIS by overlaying each kernel surface and summing the values of each of those surfaces that fall within the raster cell (Esri 2014). The resulting map shows the smoothed density for the selected features.

The GIS data used to create the density maps is composed of previously recorded archaeological sites and isolated finds. Temporal designations and cultural affiliations within the site data were used to create the density maps for specific time periods, and are based on relative and absolute dating methods. Temporal markers, such as projectile points and ceramic styles, and other relative dating methods are based on accepted artifact chronologies for San Diego County and other regional contexts (Byrd and Raab 2007; Justice 2002; Moratto 1984). A number of sites within the dataset have had archaeological materials subjected to ancillary studies, such as radiocarbon dating or thermoluminescence dating, which provide an absolute date for that particular site component.

**Suitability Model**

Creating the suitability model required a number of GIS operations and functions. The model was built with three variables: distance to water, vegetation coverage (land cover), and slope (Figure 6). The source data included a line feature class of all streams within San Diego County, polygons of land coverage within San Diego County, and a DEM (stored as raster data) of San Diego County. To make the data more manageable, only features contained within the study area were selected (or clipped in the case of the DEM). Furthermore, selecting only the major streams and rivers within the study area further refined the stream’s shapefile. As the final suitability model was created through a raster overlay method, each set of vector data (the streams and rivers and the vegetation coverage) were eventually converted to a raster dataset. Using the Euclidean Distance tool, a distance to stream raster was created from the selected stream’s shapefile. This served two purposes:
Figure 6. Conceptual model of GIS input layers used in the suitability model.

(1) this function calculated the Euclidean Distance (in ft.) to a major stream or river, and (2) the resulting map is stored as a raster. For the vegetation coverage, the polygon feature class (containing only those within the study area) was converted to a raster dataset. Finally the clipped DEM was run through the slope tool within the GIS to produce the calculated slope (in degrees).

In the GIS application, Euclidean Distance is the true distance from each cell in a raster to the closest chosen feature (in this case the major stream or river) in a two dimensional plane (Mitchell 2012). Euclidean Distance can be expressed as the following:

\[ d(a, b) = \sqrt{(a_1 - b_1)^2 + (a_2 - b_2)^2} \]  

(5)

Where \( d \) is the distance between two points, \( a \) and \( b \), and \( a_1, a_2, b_1, \) and \( b_2 \) are the X, Y coordinates for the two points.

As the resulting raster attribute maps contained different values, each raster was reclassified to have a similar cell value classification to make meaningful evaluations. In this case the represented attributes were reclassified between 1 and 5, with 1 being the most
suitable and 5 being the least suitable. The Euclidean Distance tool originally calculated ten value ranges that were reclassified into five suitability index values (Table 4). Likewise, six vegetation zones were reclassified from the land cover data and nine slope value ranges were reclassified. The resulting reclassified attribute raster was then entered into the Weighted Overlay tool in the GIS.

Table 4. Reclassification Index for Suitability Model

<table>
<thead>
<tr>
<th>Distance to Water</th>
<th>Land Cover</th>
<th>Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Calculated distance (in ft.)</td>
<td>Reclassified Index Value</td>
</tr>
<tr>
<td>0–11,512</td>
<td>1</td>
<td>Forest</td>
</tr>
<tr>
<td>11,513–23,025</td>
<td>1</td>
<td>Riparian</td>
</tr>
<tr>
<td>23,026–34,537</td>
<td>2</td>
<td>Grassland</td>
</tr>
<tr>
<td>34,538–46,049</td>
<td>2</td>
<td>Intertidal</td>
</tr>
<tr>
<td>46,050–57,561</td>
<td>3</td>
<td>Beach</td>
</tr>
<tr>
<td>57,562–69,074</td>
<td>3</td>
<td>Mudflats</td>
</tr>
<tr>
<td>69,075–80,586</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>80,586–92,098</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>92,099–103,611</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>103,612–115,123</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

The Weighted Overlay tool allows for the combination of multiple raster datasets (provided the values of the pixels are in similar classification) and allows weighting each raster input, based on their significance, to create a suitability index value for each pixel (Mitchell 2012). The suitability index value \( S \) for each cell can be summed with the following:

\[
S = \sum P_v \cdot \% 
\]  

The suitability index value is the summed value of each cell from each raster, where \( n \) is the number of rasters used in the model, \( P_v \) is the pixel value of the reclassified raster, and \( \% \) is the chosen weighted percent. Because the GIS only recognizes full integers, the number is rounded to the nearest whole number. For this suitability model, all three raster datasets where weighted equally. The resulting map is the combined and summed overlay of the three raster datasets.
The criteria chosen to create the suitability model are based on environmental variables that previous researchers have determined to be primary factors that contribute to habitation (Binford 1965; Chartkoff and Chartkoff 1975; Varien et al. 2007; Zeanah et al. 1995). Although human habitation is not contingent on one variable, only these three factors were chosen for the creation of the suitability model for a number of reasons. First, each of these datasets either required little manipulation, such as the distance to fresh water, or had been previously created, such as the DEM model used to create the slope. Second, these three factors cover general environmental conditions without creating a complex model containing numerous variables. Limiting the number of factors also restricts the subjectivity of the model and creates a generalized result. Finally, and related to the limited number of factors, fewer variables produces an equally weighted model. However, some subjective choices were inevitably made. These choices relate to the reclassification of the variables into five rankings. For distance to water, the ranking was based on the distance it would take to walk in a 10 to 12 hour day. As such, the rankings were based on 5 mi. intervals, which would allow for a round-trip of approximately 10 mi. in a day. As for vegetation cover, the ranking were based on what is representative of the watershed. That is, as riparian and forest ecotones compose the majority of the watershed, they were ranked higher than coastal regions, which accounts for a small portion of the watershed. Furthermore, the rankings of land cover reflects current, accepted settlement and subsistence patterns for the Late Prehistoric and historical Native American periods for San Diego County and southern California (Byrd and Raab 2007). Finally, the rankings for the slope variable are based on previous research for slope (Zeanah et al. 2004) and are distributed equally over slope changes between 7–10 degrees.

**Network Maps**

The network map was created through the GIS by creating a spider diagram. The source data for the map was the point feature class of each known cultural resource site (created for the density maps). From the data, all historical Native American sites were queried by selecting the appropriate site type attribute and exported into a shapefile that would display only these points. A similar method was employed to select and create separate shapefiles for known ethnographic Kumeyaay villages and for Mission San Diego
de Alacalá. The village points were entered into the spider diagram, which calculates the Euclidian Distance between the point features and creates a new line feature shapefile that depicts those lines. This technique was used to create both network maps.

**Other GIS Operations**

Aside from the specific functions described above, numerous other GIS operations were utilized to create the maps seen in the results section. These include merging functions (such as the merged point features), buffering (such as buffering for the study area), and multi-ring buffering. Multi-ring buffering was used to indicate the distance from a point (in this case Mission San Diego de Alacalá) at pre-designated intervals (in this case 10, 20, 30, 40, and 50-mile increments). This mapping technique was used to create a core and periphery map that shows the spatial layout of features to the core.

**SUMMARY**

To adequately understand the geographic layout of the Spanish colonial period and the resulting effects of settlement, numerous GIS methodologies were implemented for this study. Density surface maps were created using a kernel density function. A suitability model was created to show varying degrees of ecological suitability for human habitation by overlaying equally weighted ecological and topographical factors. Cultural networks were graphically created using the spider diagram tool and the impacts of core-periphery relations were created using a multi-ring buffering tool. The maps presented in the next chapter will show the results of the methods described above.
CHAPTER 5

RESULTS

The study area for this thesis focuses on the San Diego River watershed, which includes the San Diego River and its tributaries. As described previously, the watershed is located north of the downtown area of San Diego and extends from the Cuyamaca Mountains in the east to where the river discharges into the Pacific Ocean at Mission Bay in the west. To adequately cover the search area, a ½ mi. buffer was established around the watershed (Figure 7). The resulting study area encompasses a total area of 320,641 acres.

PREVIOUS ARCHAEOLOGICAL WORK

The watershed has been subjected to numerous archaeological undertakings throughout the last 100 years. Approximately 2,063 previous archaeological surveys and excavations have occurred within the study area. These investigations have occurred since the early twentieth century, starting with Howard O. Welty’s study of prehistoric mound sites around the San Diego and Mission Bay areas in 1913. Many of the investigations in the early twentieth century centered on academic-driven research and were focused on well-known sites, such as at known ethnographic Kumeyaay sites in the Cuyamaca Mountains. With the enactment of antiquities and cultural resource laws, the number of archaeological investigations increased substantially. Prior to the 1970s, approximately five known and reported archaeological investigations had been conducted in the San Diego River watershed. Beginning in the 1970s and continuing up to the present, reported archaeological fieldwork has increased exponentially. Much of this archaeological work has focused on infrastructure development including transmission line construction, oil and gas construction, reservoir and water conveyance systems, and housing developments. Academically driven projects within the watershed have occurred as well, such as the excavation of portions of the Presidio by SDSC, Mesa Community College, the San Diego Historical Society (in conjunction with
Figure 7. General location of the study area within San Diego County and the state of California.
SDSU), the Center for Spanish Colonial Archaeology or excavations at Mission San Diego de Alcalá by the University of San Diego.

The archaeological studies have resulted in 109,699 acres being surveyed through either a sample survey method or through intensive pedestrian surveys within the study area (Figure 8). Although well over half of the watershed has not been inventoried, a 34 percent sample of the area is an adequate sample to examine spatial patterning and to draw conclusions about that patterning. Within the study area there is one major area that has seen very little survey – the Capitan Grande Reservation of the Diegueno Mission Indians of California.

![Figure 8. Percentage of surveyed versus non-surveyed areas.](image)

As a result of the inventories, numerous archaeological sites and historical structures have been documented. These sites and structures span all periods of human occupation, beginning with Paleoindian sites approximately 13,000 B.P. to recent occupations of the San Diego region. The study area contains a total of 4,925 archaeological sites and historical structures that range from Paleoindian components to modern occupations. Of the 4,925
archaeological sites and historical structures, 2,069 are prehistoric sites, 86 are multicomponent sites, 500 are historical archaeological sites, 2,247 are historical structures, and 23 are sites that are not associated with a general time period or use.

**KEY AREAS**

To begin, Figure 9 depicts five specific areas that will be highlighted and continually discussed throughout this chapter. For ease of reference, these areas can quickly be identified on each density surface map and the suitability map. These particular areas describe specific regions within the study area that has seen continual human activity. Each of these areas is associated with a major topographic point, a major water source for the region (be it a tributary of the San Diego River or the river itself), or both (Table 5).

Table 5. Key Areas Discussed within the Study Area.

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Within the Cuyamaca Mountains centered on Cuyamaca Peak, near the headwaters of Boulder, Conejos, and King creeks, all of which are major tributaries of the San Diego River.</td>
</tr>
<tr>
<td>B</td>
<td>Within the Cuyamaca Mountains encompassing Spencer Valley and Juch Canyon, east of the head waters of the San Diego River</td>
</tr>
<tr>
<td>C</td>
<td>Encompassing portions of Slaughterhouse and Foster canyons near San Vicente Creek, a major tributary of the San Diego River.</td>
</tr>
<tr>
<td>D</td>
<td>Within the San Diego River Valley, encompassing the confluence of Forester Creek and the San Diego River.</td>
</tr>
<tr>
<td>E</td>
<td>Encompassing Mission Hills and Mission Valley along the San Diego River.</td>
</tr>
</tbody>
</table>

**RESULT MAPS**

The intent of this study was to not examine all known cultural resources within the study area, but rather to examine the consequences of colonialism on settlement patterns and the formation of cultural networks during the Spanish colonial period and immediately afterwards. Since only the last 500 years are being examined, only sites or structures that date to the Late Prehistoric, the historical Native American, the Spanish, and the Mexican Periods were considered. As such, a total of 401 sites date to this span of time. Of these sites, 334 sites are associated with Late Prehistoric components, 27 are associated with historical Native American components, four date to Spanish occupation, and 36 sites date to Mexican components.
The remainder of the chapter presents the maps that were created to examine the trends within the dataset. These maps include surface density maps of site distribution, a suitability model that visualizes key ecological factors, cultural network association maps between Kumeyaay settlements and between Kueyaay and Spanish settlements, and maps that indicate the trends that are established during the colonial period by the Spanish. The maps below present the overall site density (Figure 10), overall prehistoric site density (Figure 11), overall historical site and structure density (Figure 12), suitability model (Figure 13), Late Prehistoric site density (Figure 14), historical Native American site density (Figure 15), Spanish Period site density (Figure 16), historical Native American sites distribution to the core (Figure 17), conceptual models for Kumeyaay cultural networks (Figure 18) and Spanish cultural networks (Figure 19), Mexican Period site density (Figure 20), Mexican land grants (Figure 21), and Kumeyaay reservations (Figure 22).
Figure 9. Reference map areas within the watershed.
Figure 10. Total site density surface map of the San Diego River watershed with the highest concentration of sites in the southwestern portion of the watershed.
Figure 11. Prehistoric site density surface map with three areas of site concentrations within the mountains and in the north central portion of the watershed.
Figure 12. Historical site and structure density surface map with the highest concentration of sites along the northeastern coast of San Diego Bay in the southwestern portion of the watershed.
Figure 13. Suitability model of the San Diego River watershed. Note that the western portion of the watershed has the highest distribution of suitable areas.
Figure 14. Late Prehistoric site density surface map. Note that the highest density of sites is in the southeastern corner of the watershed, around Cuyamaca Peak.
Figure 15. Historical Native American site density surface map, with a similar distribution as to Late Prehistoric site density except for an increase in density in the central portion of the watershed.
Figure 16. Spanish-period site density surface map. Note the three areas of site distribution along the San Diego River flood plain.
Figure 17. Core-periphery map showing distribution of historical Native American sites to the mission at ten mi. intervals.
Figure 18. Spider diagram representing cultural networks between historical Native American sites. Note the heavy concentration of lines along the southern half of the watershed.
Figure 19. Spider diagram with Spanish cultural networks overlaying Kumeyaay networks in the southern half of the watershed.
Figure 20. Mexican-period site density surface map. Note the shift of density to the northeastern corner of the San Diego Bay in the southwestern portion of the watershed.
Figure 21. Mexican-period land grants during the 1840s, with distribution of grants throughout the watershed, but primarily focused in the southwest.
Figure 22. Reservations established within the watershed. Note the limited areas in where the reservations were established compared to the previous map.
CHAPTER 6

INTERPRETATION AND DISCUSSION

The previous chapter presented the results of the Kernel density function surface maps, the suitability model, a visualization of networks formed, and the resulting trends seen. In all, these maps indicate that movement on the landscape by both the Spanish colonists and the Kumeyaay were driven by two mechanisms: the formation and interaction of cultural networks and access to highly ranked resource areas. The creation of cultural networks was likely important in the formation of a stratified society during this time period and influenced the way in which future settlement of the area proceeded. This chapter will present the information depicted in each map and discuss how each map relates to the larger extent of settlement within the region.

OVERALL SITE DENSITY

The initial three maps presented in the proceeding chapter depict densities of the total distribution of cultural resources (Figure 10), the distribution of prehistoric resources (Figure 11), and the distribution of historical resources (Figure 12). These three maps tend to show a heavy concentration of sites in specific areas, which are discussed below. These three maps also indicate what the overall trend of settlement will eventually be in the study area. The following section discusses these three maps in more detail.

Figure 10 presents the overall site density within the study area for all known and documented archaeological sites and historical structures. This map shows primarily three hot spots – that is, areas where the density is higher than the surrounding areas. As seen on the map, Areas A and E show a higher density of cultural resources than the remaining study area. These regions correspond to areas in the Cuyamacca Mountains, specifically around Cuyamacca Peak (A), and farther west in Mission Valley and Mission Hills (E). One outlier is just east of Map Area E and south of Map Area D. This is a region within the mesas overlooking the San Diego River Valley. Map Areas B, C, and D represent areas that have a
higher concentration of sites than the surrounding areas, but not to the extent of Map Areas A and E. These areas represent mountainous regions (B and C) and along the San Diego River (D). The overall distribution of sites within all these areas indicates that both prehistoric and historical inhabitants were exploiting a number of ecological zones; including higher elevation areas, riparian settings, low mesas, valleys, coastal areas, and estuaries.

As would be expected, similar trends are seen in the prehistoric and historical site density maps. The distribution of prehistoric sites was presented in Figure 11. As with the overall site density map, there is a heavy concentration of sites within the Cuyamacca Mountains, specifically around Map Area A. Unlike the overall site density, Map Area B and Map Area C have numerous sites and sites within Map Area E are sparsely distributed. A few outlying areas are seen in the map, primarily southeast of Map Area D along the southern edge of the study area and west of Map Area D. Interestingly, site density drops off considerably closer to the coast. This decrease in site distribution is likely attributable to the destruction of prehistoric sites from the urban development of San Diego. Regardless, a small concentration is seen along the San Diego River, near the southeastern corner of Mission Bay. The distribution of sites within these areas indicates that prehistoric inhabitants settled numerous ecological zones, including high elevation, riparian, canyon and mesa tops, and coastal areas.

Although historical inhabitants undoubtedly took into account these same parameters, their distribution shows a starkly different pattern. Historical sites and structures are concentrated in the southwestern corner of the study area (Figure 12), although other areas of the map have a moderate distribution, (Map Area D). The distribution pattern should not be surprising, though, as this is an area that encompasses the historical settlements of San Diego. That is, Map Area E represents the original Spanish settlement and the location of the first pueblo established during the Mexican Period (i.e. Old Town). Historical structures and sites, such as refuse areas, infrastructure, and early adobes, were constructed near each other; as such, it is not unexpected that this settlement pattern would produce a dense concentration of resources that are spatially linked. This spatial distribution is a byproduct of the increasing population along the coast between the San Diego Bay, in the south, and Mission Bay to the north. Although these sites incorporated ecological factors in site placement, this
distribution is a result of the cultural networks that were established and reinforced through subsequent generations.

These three maps reveal that prehistoric settlement, in general, was spread throughout the study area, with the majority of sites centralized within the Cuyamaca Mountains in the west. Conversely, historical resources are primarily concentrated near the coast, around the historical settlement of San Diego. To understand how each of these patterns interacts with each other and with overall settlement, the ecological setting of the region is needed. This setting will provide a baseline of natural resources that were utilized and how those resources are dispersed throughout the study area.

Suitability Model

Settlement patterns that were formed during the Late Prehistoric, historical Native American, Spanish, and Mexican Periods, were influenced by the ecological resources of the region and the cultural networks that had developed. The first aspect, ecological resources, is discussed in the following section. Figure 13 presents a suitability model that ranks areas within the study area that are suitable for human habitation on a gradient scale.

The suitability model consists of three levels of suitability: high (indicated by the red areas), medium (indicated by the tan areas) and low (indicated by the gray areas). The suitability model ranked areas between 1 and 5 based on three factors (see Chapter 4 for a detailed explanation of the ranking system). The three factors include slope, distance to water, and vegetation. Within the model, four of the five map areas (A, B, D, and E) are primarily covered by the most suitable areas for habitation, interspersed with areas that are not as suitable. The most suitable areas are locations where the ground is level, is coupled with good access to water, and is within a vegetation zone that would be conducive to game or plant resources, such as grass seeds or acorns. Medium suitability areas account for large portion of the southeastern portion of study area and indicate that one of the above factors is not ideal. Finally, only a few areas are ranked as low, and are likely attributed to being along steep slopes within the mountains and in canyons. The San Diego River passes through one such area: a steep sided canyon in the northeastern corner of the study area, just southwest of Map Area B.
A suitability study provides an explanation for the patterns of movement on the landscape that is (and will be) discussed in this thesis. These areas are regions that would be the most hospitable for human occupation as they contain highly ranked resources. The study area consists of numerous suitable areas for habitation, which was likely a factor in the development of a prehistoric cyclical pattern of settlement that utilized the entire area (Byrd and Raab 2007). Cultural responses to ecological changes impact and influence the way in which a population interacts with their surrounding environment, such as a sustained cyclical pattern of land use (see Dufour 2006; Gravlee and Dressler 2005; Kuzawa and Sweet 2009; Leatherman and Goodman 2011; Thayer and Kuzawa 2011; Wells 2012).

Ecological adaptation is one factor in the cyclical pattern of settlement amongst prehistoric inhabitants in the region (Byrd and Raab 2007). When first arriving in the San Diego region, Father Juan Crespí wrote about the conditions of the landscape in San Diego. He noted that there was a “good flowing river” near the bay. He continued (Watson 1934:53):

We followed the course of this river, that runs through a cañada of good level land, which in places broadens out from a quarter to half a league [approximately 1½ mile]. The soil seems to be suitable for growing wheat; in some places there are marshes or irrigable land. All along the river-bed there are willows, poplars, and alder trees. But in many places we found the river dry; in some spots there are deep pools and in others scarcely any running water at all.

Crespi’s account of the surrounding landscape elucidates the priorities of the physiological concerns of the Spanish colonists. He identified the ecological settings that would factor in the location of the settlement, such as “good level land” (or ideal slope), the reliability of water, and areas where agriculture is suitable. The suitability model indicates those regions in which the Spanish might exploit for the colonization effort. Specifically these areas were focused along the San Diego River and the coastal areas. The interaction between the Spanish and the Kumeyaay over the access to these resources is a foundation for the settlement of San Diego.

**Late Prehistoric Density**

The Late Prehistoric period in San Diego County was defined by the transition to the bow and arrow, the emergence of ceramics, and a shift in subsistence practices and settlement patterns. Primarily, Late Prehistoric inhabitants shifted from exploiting marine
mammals to relatively abundant and nearby resources such as shellfish, fish, small terrestrial mammals, and plant resources including grasses and acorns (Byrd and Raab 2007). Exploiting these resources required a shift in foraging areas away from coastal areas to inland areas including higher elevation forests, riparian, and grassland vegetation zones. This shift in foraging areas can be seen in the density surface map presented in the previous chapter (Figure 14).

The Late Prehistoric density surface map, Figure 14, shows a fairly uniform pattern within the study area. Map Areas A and B evinces the densest clustering of sites and Map Area C indicates a slight decrease in clustering of sites. The map indicates heavier density of Late Prehistoric sites within the Cuyamaca Mountains and the density of sites decreases closer to coastal regions.

Density decreases significantly in Map Area D and sites are sparse within Map Area E. This clustering patterning can be attributed to the shift in subsistence strategies. In terms of the suitable model presented earlier (Figure 13), the clustering in Figure 14 is within areas of highly suitable areas for habitation, particularly Map Areas A and B. As Bryd and Raab (2007:223) point out, Late Prehistoric subsistence shifted to reliance on smaller terrestrial mammals and processing of grasses and acorns.

Researchers have found that Late Prehistoric settlements tended to be in ecotones, or the transition zones between biomes that contained many of the desired floral and faunal resources (Christenson 1990; Robbins-Wade 1992; Shackley 1980). As a result of the increase in the reliance on smaller, labor intensive resources, Byrd and Raab (2007) noted that the Late Prehistoric settlement patterns shifted. They noted that settlement began to focus on large residential camps linked to smaller ephemeral sites that typically were designated for specialized resource processing. In other areas of San Diego County, research suggests that these residential camps and associated satellite sites were primarily located on the edges of canyons or on mesa tops – both of which represent a shift to transition zones. Additionally, the clustering of sites in the Cuyamaca Mountains represents a regional shift in ecotones, from coastal areas to higher elevations.

In summary, the density surface map for Late Prehistoric sites indicates that settlement patterns within the San Diego River watershed conforms to previous research within San Diego County and within the broader southern California coastal region. It is
generally recognized that the settlement patterns and cultural behavioral patterns encountered by the Spanish missionaries were formed during the Late Prehistoric. As such, the density surface map indicates that the Late Prehistoric inhabitants were shifting away from the coast to access resources in the interior regions. Additionally, settlement began to focus on large residential camps and specialized satellite resource processing areas. This settlement pattern also contributed to the cultural networks that would form during the historical Kumeyaay period.

**Historical Native American and Spanish Site Density**

It is recognized that cultural patterns formed during the Late Prehistoric continued into and were noted by the Spanish missionaries and colonists. Many of the same rudiments of subsistence and settlement that have been discussed, including exploitation of smaller, labor intensive resources within the interior regions and the formation of larger residential camps and satellite sites, occurred during the historical Native American period. What defines this period compared to the Late Prehistoric period is the interaction between the Kumeyaay and Spanish. The interaction between the two is unique in that historical documents provide an account of the cultural contact. Documents include Spanish journals and archival data that address the colonization effort. Additionally, Kumeyaay individuals provided accounts of this time through autobiographies and journals.

The distribution of historical Native American sites is only similar to the Late Prehistoric in that the highest concentration of sites is located around Map Area A (Figure 15). Three noticeable differences are depicted on the map when compared to the Late Prehistoric map (Figure 14). First, density in Map Area B has decreased as compared to the Late Prehistoric period. Second, density has increased around Map Area C. Thirdly, density has significantly increased in Map Area D. These changes in density indicate that the settlement and utilization of the land appear to be shifting back to the coast. The utilization of this region is in highly suitable areas for habitation and fits the cyclical pattern of landscape use. Cyclical use of the land is described in the autobiography of a Kumeyaay woman, Delfina Cuero. Delfina Cuero was born in 1900 and experienced the traditional use of land and associated settlement of the Kumeyaay. In dictating aspects of her life and traditional Kumeyaay practices to the ethnographer Florence Shipek in the mid-1960s, she
recalls gathering acorns when she was a young girl. She states (Cuero and Shipek 1991:27-28):

I remember we walked a long way to get [acorns]. I know we went into the mountains. I think [Cuyamaca] and Laguna were the places. There were lots of big acorn trees there. We would gather a lot and pack them on our backs down the coast again...It wasn’t far from Mission Valley to the place for pine nuts. The men got fish and other things from the ocean when we got pine nuts. There were a lot of [vegetable or eating greens] all over near the ocean [sic].

Cuero is relaying how the traditional Kumeyaay practice was to utilize resources throughout the region, regardless of where those resources were located. The use of the entire region is seen in the density map presented in Figure 15. A heavy concentration of sites is located around Cuyamaca Peak, as the area was ideal for the gathering of acorns (Figure 23). The density of historical Native American sites shifting towards the coast also indicates the utilization of other resources, especially within the flood plains and canyons of the San Diego River and its tributaries. These suitable areas offered a plethora of resources that would have been exploited by the Kumeyaay.

Density of Spanish Period sites is presented in Figure 16. As is seen in the density map, there are only two areas that have Spanish Period sites: Map Area D and E. Map Area D, the highest concentration of sites, is attributed to the fact that it is the location of the Mission Dam and Flume sites. The other two areas of Spanish sites are depicted as lighter spots within Map Area E and represent the location of the Mission San Diego de Alcalá and the presidio. All three areas are similar in that they are all found along the San Diego River.

When the Spanish first arrived and surveyed the land, they noted the river and other areas that would be suitable for their uses. In a letter to Mexico City, Father Juan Crespí noted that the San Diego River was inconsistently wet throughout its course (Watson 1934:54). He noted that if the region received a good rainfall then “good crops could be produced during the season, for there is much land and good pasture for the cattle” (Watson 1934:54). Here Crespí notes two aspects that will be a major factor for Spanish colonization. First, the lack of a consistent source of water and the ephemeral nature of the San Diego River would plague the Spanish and subsequent generations. Lack of a consistent water source was one of the reasons that the mission was moved upstream to access more reliable sources of water. Initially the mission irrigated fields with sump holes and the construction
of simple brush dams (Green 1933:11; Hanna 1978). After this proved to be inconsistent, the mission dam and flume (sites CA-SDI-6658 and CA-SDI-6660) were constructed to bring additional water to irrigate the mission fields. The second aspect that Crespí mentioned was good pasture land that would be needed to run livestock, specifically cattle. The livestock industry would become a lucrative endeavor for not only the Spanish but also during the Mexican and U.S. occupations of the region.

Secondly, the mission was located away from the presidio to be centrally located among the Kumeyaay. This reason for relocation was not inconsequential. Rather, it was a culturally and politically strategic move that allowed the Spanish to access ecological resources and the cultural networks among the Kuemyaay. This access to the cultural networks allowed the Spanish to enact a power structure and create a stratified society.
Distance to Core and Cultural Networks Maps

As previously discussed, the Spanish missionaries relocated the mission from the presidio in A.D. 1774, four years after the establishment of the Spanish colony. The mission was moved to access and maximize the use of the San Diego River, but also to be centrally located among the Kumeyaay (Luksic and Kendziorski 1999). The following section will discuss how moving the mission permitted the Spanish to access cultural networks established by the Kumeyaay, which in turn spurred the stratification of the region.

Figure 17 shows the spatial distribution of historical Kumeyaay sites to the mission, which had become the core of the Spanish colony. The grouping of sites is fairly consistent as 12 sites are within 10 mi. of the mission (or the core), including two villages. Between 10 and 20 mi. there are 13 sites, with one village. Only five sites fall in the 20 to 30 mi. range, with most of the sites along the edge of the 20 mi. border. The remaining 12 sites are located within the 30 to 40 mi. range. These sites are all located within high suitably areas to allow for the access to highly ranked resources. As the Spanish needed to access the San Diego River, they relocated the mission to an area that was highly suitable, as well as being centrally located within the native population (Figure 24). The increased access to a water source permitted agricultural and ranching to prosper at the mission. In turn, this resulted in the mission producing crops and goods that the administrative branch (the presidio) relied upon in the early years (Hyslop 2012:66). Furthermore, this created the core of the Spanish colony to be centered on the mission and become the entrepôt, the center of the colony, that is described by Lewis (1984:146-147) in the frontier model of colonialism. The new colonial core became the economic and social center of San Diego through which Kumeyaay labor and natural resources were accessed from the periphery.

The Spanish colonization effort of California transpired in a frontier that was well north of the core of the Spanish crown. This core both refers to the center of the empire in a global scale (Madrid, Spain) and within the Viceroyalty of New Spain (Mexico City). As a result of this distance, the missionaries and colonialists were essentially responsible for themselves. Because of a lack of oversight from the Crown, disputes between the Franciscans and the Crown’s representatives were common, with each attempting to gain control of the colony. One such dispute was the differing ways in which the Spanish colonists were portrayed by the soldiers and the missionaries. The missionaries did not view
the Spanish soldiers as ideal model Catholic citizens, and were concerned with what this perception has on the Kumeyaay population. Relocating the mission was an attempt to eliminate this concern by removing the Kumeyaay converts from the influences of the soldiers (Hyslop 2012:66).

Figure 18 is a conceptual model that represents the cultural networks established by the Kumeyaay. The model is a spider diagram that extends lines from Kumeyaay village sites to other villages and to other resource processing or temporary camps. The map indicates that potential cultural networks are more frequent in east-west trending directions. As the San Diego River is a major water source for the region and provides suitable areas for habitation, it became a corridor for cultural networks to be established. However, the networks can also be attributed to familial relations among the Kumeyaay. Previous research has indicated that Kumeyaay family bands were strongly linked to east-west drainage.
patterns (Carrico 1997; Gifford 1919; Hedge 1975; Shipek 1982). This particular network pattern can be seen on the map. The heaviest concentration of spider diagram lines follows an east-west trend along the San Diego River. As a result, the cultural networks that were created by the Kumeyaay followed major drainage systems that accessed highly suitable areas. Previous maps have indicated that Cuyamaca Peak is a consistently occupied area through prehistory. The Kumeyaay likely avoided the steep canyon created by the San Diego River in the northeastern end of the river and rather followed Conejos Creek to access the flood plains and valleys to the east. This would have allowed the Kumeyaay access to numerous highly suitable areas. The continued use of these areas would create a cyclical pattern of use and further entrench the networks that had developed.

By establishing their colonial core among the Kumeyaay, the Spanish were able to exploit the cultural networks that had been developed. Figure 19 presents a second conceptual model in which the Spanish accessed the Kumeyaay networks. As is seen, by placing the mission near a previous established village, the Spanish accessed ecological resources, and asserted themselves into the middle of a concentrated portion of Kumeyaay cultural networks. The insertion of the Spanish among the Kumeyaay was vital for them to establish their power structure. As previously discussed, the stronger, or more entrenched, a cultural network is, the harder it is to alter that network, especially from the periphery (Inkpen et al. 2007:538; Latour 2005). As the Kumeyaay had likely established their cultural network during the Late Prehistoric period, a continual cyclical pattern of settlement had become entrenched. As such, the Spanish would be hardpressed to access the network and alter it for their purposes from outside, or on the periphery, of the network. By the end of the eighteenth century, the Spanish Governor of California, Pedro Fages, recognized that the California Indians did not easily forget their traditional customs and cultural tenents (Hyslop 2012:119). However, by establishing the core of the colony in the midst of the Kumeyaay, the Spanish forced interactions between themselves and the Kumeyaay. This forced interaction provided the Spanish access to the networks which afforded them an opportunity to enforce their ideals. This insertion was a significant event that altered the cultural network in more than one way.

By the mid-1700s, the Spanish Crown had nearly drained its treasury by operating colonies in the southeastern and inland southwestern North America, and, as result, had left
the colonization of California without many financial options and resources (Hyslop 2012:48). To counteract these financial constraints, the Spanish colonists and missionaries were more reliant on themselves and on other countries, despite the wishes and the laws enacted by the Crown (Hyslop 2012:145). Although Spain had specifically forbade exchange with foreign countries, the repercussion were so slight that many English, Russian, and American ships sailed along the California coast, trading and bartering with the Spanish colonists. As the financial hardships of the Crown were beginning to cripple the empire in the early 1800s, along with the remoteness of California, they did little to stop the forays of foreign traders (Hyslop 2012:149). Primarily these foreign traders were seeking sea otter pelts for trade across the global, especially in China, the United States, and Europe. The Franciscans recognized the value of these illicit trades and proceeded to use native labor to hunt the sea otter (Hyslop 2012:150). The sea otter trade proved to be a lucrative business for the California missions and allowed for the import of much needed goods (Costello 1992:65). These goods included clothing, agricultural and ranching tools and equipment, animal husbandry items, metal tools, tablewares, and many other foreign produced, but highly sought, items.

Previous archaeological research has indicated that ceramics within Spanish Period sites were a combination of both locally-produced and imported ceramics (Voss 2012). Imported ceramics included Spanish-made majolica and galera, which were manufactured in present-day Mexico. These ceramic types composed the majority of “imported” ceramics to the colonies in California. However, other imported ceramics included English- and European-made earthenware and Chinese porcelains. Archival and archaeological research indicates that the missions, pueblos, and presidios throughout California were mixed with the different ceramic types that were each used for a number of functions (Voss 2012).

English-made ceramics, such as earthenware (pearl and creamwares), stonewares, and porcelains, have been found throughout colonial California, including the presidio and mission sites (CA-SDI-38 and CA-SDI-35). Decorations and glazes on both creamware and pearlwares varied depending on the manufacturer (Hume 1969). Decorations included plain white with blue, green, or yellow hand-painted rims (Figure 25); however, elaborately decorated pieces have been found as well (Figure 26). English-made earthenware (and other
Figure 25. Example of English Pearlware fragments recovered from the Presidio site. Clockwise from the top right, catalog numbers SDI-0038-11598, SDI-0038-14033, SDI-0038-11906, SDI-0038-13146. Artifacts stored at SDSU, Collections Management Program.

European-made ceramics) was common throughout Spanish California. Although creamwares have been found in colonial sites dating to the mid-eighteenth century, and pearlwares have been found within early 1800s contexts, the majority of English and European earthenware have been found in contexts dating to the Mexican Period of occupation of California, when trade with foreign countries was officially sanctioned (Hume 1969). Research from the San Francisco presidio indicates that English-made earthenware found in contexts postdating 1800, was primarily a result of illicit trade that had become increasingly common along the California frontier to supplement the needs of the colonies (Voss 2012). This trade was primarily with American and British traders and associated with the sea otter pelt industry.

Chinese-made ceramics have also been recovered among the material cultural within the presidio and mission sites. Chinese ceramics include primarily porcelain tablewares (Figure 27). Specifically, these styles of Chinese porcelain date to the Ch’ing dynasty
(1644–1912) and were produced solely for trade on the European market (Hume 1969:261-263). Chinese porcelains have been found in archaeological assemblages from presidios across California, including San Diego, Santa Barbara, and San Francisco (see Cárdenas 2012; Katz 1977; Voss 2012). Research has shown that Chinese porcelains were likely obtained from the official Manila Galleon trade (Voss 2012:45). Spanish-era documents regarding purchasing patterns at the San Francisco and Santa Barbara presidios, indicate that “imported” majolica was a desired high-priced ceramic. However, archaeological and historical research completed throughout California has found that majolica was common throughout the mission and presidios and was associated with different socioeconomic levels, and was not as high-priced as was purported by the Spanish (Voss 2012). Chinese-made porcelains, on the other hand, and locally-made reproductions of Chinese styles, appeared to be a high-priced ceramic that did indicated a higher socioeconomic standing in the colonies (Voss 2012:51).

Another item that is commonly seen in colonial-period context is glass trade beads. The beads used throughout colonial North America primarily came from Europe, although
there is evidence that glasshouses within British America might have produced beads (Hume 1969:54; Spector 1976). In California, archival research indicates that glass trade beads where first used during the Cabrillo expedition in the mid-sixteenth century (Motz et al. 1986). The Spanish (and other European expeditions) carried beads to distribute among the indigenous population, as a method to gain favor with the native population (Motz et al. 1986). As such, glass trade beads are a common artifact in both Spanish-period and historical Native American sites.

Archaeological investigations at Mission Santa Clara de Asís in present-day Santa Clara, California, and Mission San Buenaventura in present-day Ventura, California, have resulted in the recovery of 1,000 and over 4,300 beads, respectfully (Gibson 1976). Similar high artifact counts have been recovered from the San Diego mission and presidio sites (Cárdenas 2012; Moriarty 1969). Glass trade beads continued into the mid-nineteenth century as an important economic and social item used within frontier settings throughout California.
The presence of trade goods, such as foreign produced ceramics and trade beads is important for two reasons. First, these artifacts suggest the Spanish colonists were interacting in a global market. As discussed in previous chapters, colonialism cannot be separated from the tenants of capitalism (Little 2007). The establishment of Alta California was a result of protecting the Spanish frontier from other countries, such as Russia and England. The reasons for colonization were to solidify the holdings of the Spanish Empire as well as to access resources (fishing, hunting, grazing lands, rich agricultural areas, etc.) afforded by the coastal and inland areas of California. Accessing these resources strengthened the purchasing power held by the Spanish, i.e. Wallerstien’s “production structure” (Wallerstein 2000:139-140). With the establishment of the California colonies, the Crown was able to siphon resources from the periphery (see Hall et al. 2011; Wallerstein 1989). By maintaining and exploiting these resources, Spanish colonists were able to bring goods (such as legally-acquired Chinese-made ceramics or glass trade beads) to the colony that furthered the colonization effort. The exploitation of natural resources also provided access to goods that were not supplied to them by the Crown (such as illegal English- and Chinese-made ceramics) or were produced locally.

The second reason for the importance of the presence of trade goods is that these globally traded goods suggest certain correlations to social power distribution. As Schiffer and colleagues (2010; Walker and Schiffer 2006) has pointed out, material cultural and control of highly sought items afford people certain social power over others. Goods acquired by the Spanish, such as trade beads, clothing, tools, and other items became leverage with which to barter with the Kumeyaay. Furthermore, the establishment of the colony among the Kumeyaay provided a mechanism for the Spanish to enact a certain amount of social power over the Kumeyaay. Edward M. Schortman and Patricia A. Urban (2012) have noted that the control of the manufacture and distribution of these types of goods are “crucial” components in social networks (see Latour 2005). Enacting social power allowed the Spanish to control suitable and desired areas for habitation by offering goods that were desired by the Kumeyaay. The control of additional areas continued to strengthen the purchasing power of the Spanish, which in turn allowed them to continue to purchase and obtain goods that were desired or needed. This supply and demand created a relationship among the use of native labor for the production of goods needed in the colony and for the
interaction with the global market. Overall this relationship further entrenched the social network that the Spanish had formed, allowing them to expand their colony. The expansion of the colony resulted in either bands of Kumeyaay assimilating and interacting with the Spanish or being driven further into the interior, away from the Spanish. This resulting interaction did not only have an influence on settlement at that time, but also established a pattern that would be continued.

**Mexican Period Density and Results of Settlement**

With Mexico gaining independence from Spain in 1821, along with the secularization of the mission system in the early 1830s, settlement of the region shifted once again. The core of the colony was firmly located at the mission during the Spanish Period; however, during the Mexican Period, the core of the area shifted to the site of the presidio. This shift is indicated in the distribution of site density in Figure 20. As with the Spanish density map, there is a limited distribution of sites throughout the study area and it is focused in Map Area E with a small distribution around Map Area D. However, the focal point is around the location of the presidio. After Spain abandoned the presidio, the land west and south was settled, and adobes were built, beginning the establishment of the town of San Diego (Luksic and Kendziorski 1999; Padilla-Corona 1997). The highest density of sites on the map is found within the modern “Old Town” and represents the early begins of the town.

With the establishment of the cultural networks formed during Spanish occupation, the colonial society formed a stratified society with the missionaries and Spanish administrators asserting their social power. The shift of the core to the presidio, and the secularization of the mission system, resulted in reorganization in the stratification that favored those in charge of the new government, many of which were California-born Spanish officials during the colonial period, and not the Franciscan missionaries. The resulting shift in power correlates to the distribution of land. Figure 21 presents the geographic distribution of Mexican land grants that are contained within or intersect the study area. A total of six land grants, dating between 1840 and 1843, intersect with, or are contained in, the study area. In addition to the land grants, the map depicts the lands designated for the pueblo of San Diego, which was established in 1834. The first land grant was issued to the former commandant of the presidio in 1823, beginning a trend in which higher-class citizens
received grants. The majority of the remaining land grantees were either former high-ranking Spanish officials or were influential members of the newly established community (Luksic and Kendziorski 1999; McKeever 1985). Many of the land grants continued ranching and running cattle, and as a result, San Diego became a center for the trade of cattle hides, further prompting settlement within the region (Luksic and Kendziorski 1999).

Continued prosperity of ranching and settlement resulted in the expansion of land grants, including the former mission lands and lands held by the Kumeyaay. These lands were either granted to new holders or were folded into larger, established ranchos (Luksic and Kendziorski 1999; McKeever 1985). When examining the location of these land grants in comparison to the suitability model, each grant occupied highly suitable areas. The acquisition of these lands was twofold: one, the land needed to sustain habitation would have been highly sought for good grazing lands and water for the cattle industry, and secondly, the cultural network formed privileged those in power (i.e. the Spanish/Mexican administrators). As such, those with social power and capital would be given the ideal locations first. Walker and Schiffer (2006) point out that social power that is enacted through the control of material cultural can also be used to control the access of resources. With this in mind, the acquisition of land by the California-born Spanish commanders under the newly formed Mexican government (many of whom also supported independence) is an extension of the social power formed through the cultural networks established during the Spanish colonial period. Although the cultural network was altered with Mexican independence, the stratification of the society and the core of the cultural network remained intact. It would shift again when the U.S. annexed San Diego, and the rest of California, following the Mexican-American War (1846–1848). The Treaty of Guadalupe Hidalgo in 1848 established that the U.S. would honor Mexican land grants; however, this was not the case. Grantees of Mexican grants were required to prove they had acquired the land and were not “squatters” in a court of law, which was time consuming and expensive (Hyslop 2012:403). If they were not able to accomplish this task (of which many were not), the land was free for U.S.-born citizens to settle. U.S. citizens were granted settlement of areas that were already occupied, indicating that the pattern of recognized social power continued with each successive polity.

The pattern is a progressively altered power structure built upon Spanish colonialism. That is, as the economic, social, and political boundaries changed, so did the power structure.
Those who had recently taken control of the cultural and economic networks held social power. Initially the Kumeyaay and their ancestors established the cultural network based on access to resources and familial bands. When the Spanish colonized the area, they appropriated the Kumeyaay network and established social power over them. Following the Spanish, the Mexican government reasserted themselves as in control, secularized the mission system, and established control over resources, forcing the Kumeyaay to adapt to or retreat further into the interior. Finally, when the U.S. gained control of California, they continued the same trend, favoring U.S.-born citizens above Mexican, and, well above, the Kumeyaay.

The power structure is depicted in the final map (Figure 22). The map presents the established reservations for the Kumeyaay within the study area. Of note is the marked contrast between the number of reservations and the area encapsulated by those reservations compared to the land grants. Only two reservations (one established in 1875 and one in 1932) were established within the study area. A total of 13 reservations have been formed for the Kumeyaay between 1875 and 1932. Both of the reservations within the study area are similar in size (if not smaller) than the smallest land grant. Additionally, when compared to the suitability map (and unlike the land grants), the reservations were established in areas that are not as ideal for habitation. These patterns depicted on the map indicate that land set aside for the reservations was not equal to those recognized land grants in both size and suitability. This discrepancy was a direct result of the U.S. policy and an extension of the stratified society that had formed.

**Summary**

The results maps indicate that a number of factors contributed to the settlement of the San Diego River watershed. The Kumeyaay had established cultural networks based on their interaction with the environment and each other. As a way to access those resources, subsequent colonial endeavors by the Spanish, and occupation by the Mexican and American governments, appropriated the cultural networks to establish a stratified society that favored each new occupant. This in turn allowed for the distribution of cultural goods and control of resources that entrenched social power over the previous inhabitants of the area.
CHAPTER 7

SUMMARY AND CONCLUSIONS

This study has presented a series of ecological and cultural networks that were formed during a span of 500 years that influenced and informed the way in which settlement of the region occurred. When studying the impacts that Spanish settlement had on the region, a number of factors had to be considered. First, colonialism and capitalism are intricately tied together and influenced the way in which the Spanish interacted with the Kumeyaay during their colonialization. Secondly, a study of the effects of colonialism on cultural networks and settlement cannot be achieved without examining the native inhabitants of the region prior to and during the colonial event. Thirdly, impacts to these cultural networks and settlement patterns had repercussions that lasted much longer than the initial colonial event. As a result of these factors, this study presented multiple facets to address these issues. Through the use of GIS in creating suitability models, density surface maps, and conceptual models of cultural networks, this study addressed how a cultural network and changes to that network altered settlement within the San Diego River watershed.

Cultural Network Analysis

The study began by addressing the distribution of sites during the Late Prehistoric period. The distribution was important as it indicated what traditional areas where highly sought by Late Prehistoric inhabitants, with the interior mountains containing the highest concentration of sites. Correlations were then made to a suitability model for habitation. The model, based on slope, distance to water, and vegetation, indicated that much of the study area was suitable for habitation, with a few exceptions. Furthermore, suitable areas conformed to the results of the Late Prehistoric density, indicating that numerous, well-suited, ecotones were exploited by Late Prehistoric inhabitants. Knowing that patterns exhibited by the Kumeyaay in the ethnohistoric period were formed in the Late Prehistoric
(see Byrd and Raab 2007), the study examined cultural networks that were formed during the historical Native American and Spanish Period.

When addressing cultural networks, the study initially asked a simple question of what cultural networks were apparent in the historical Native American and Spanish periods. The study showed that cultural networks established by the Kumeyaay were centered on east-west drainage systems, in this case along the San Diego River. This network allowed the Kumeyaay access to both familial bands and access to highly suitable areas within diverse ecotones. The network would have accessed high-elevation resources (around Cuyamaca Peak), riparian ecotones (along the creeks and river flood plains), and coastal regions. In terms of the Spanish networks, historical research suggests that the Spanish had multifaceted cultural networks, including interactions between the colony and the Spanish monarchy, between the missionaries and the representatives of the Spanish monarchy, between the Spanish and the Kumeyaay, and between the colony and foreign traders. Each of these networks had to be navigated and engaged for a successful colonization effort.

The next question addressed involved examining how the networks manifested themselves along the San Diego River. As discussed above, the San Diego River was a vital component for the Kumeyaay cultural network. The river also played a pivotal role in the establishment and enactment of the Spanish networks. The Spanish needed to access the river to be able to sustain agricultural and ranching activities, but they also used the river as a way to access the Kumeyaay network. By relocating the mission from the presidio to a location along the banks of the river, they strategically placed themselves in the middle of three Kumeyaay villages. By forcing the interaction among the Spanish and the Kumeyaay, they were able to access a larger breadth of the region and incorporate the Kumeyaay into a labor pool. This forced labor allowed the Spanish to increase agricultural and ranching activities, as well as the hunting of otters for the pelt industry. These actions allowed the colonists to provide goods for the Spanish Crown, but also interaction with foreign traders that brought much needed supplies. As the colony grew, other resource rich areas were needed, and the Spanish colonists’ access to the original network forced Kumeyaay bands to either assimilate or to retreat further into the interior. The control over natural resources and access to goods afforded the Spanish social power over the Kumeyaay, which created a stratified society, with the Kumeyaay at the bottom. The Spanish continued to access new
areas that would lead to expansion of the colony under Mexican rule, and an expansion of the stratified society.

The final question addressed by the study examined the result of these cultural networks had on the Spanish and Mexican settlement patterns. Spanish settlement, as discussed above, was centered on the access to resources in order to participate in a global economy. This was a similar goal during the Mexican Period. With Mexican independence came the establishment of a new government, not centered on the mission system. The cultural networks established during the Spanish Period carried over, with Californian-born officials taking control and granting land within the most suitable areas. Although some of these areas where inhabited by Kumeyaay, the Mexican government took control of these lands and granted them to either new landowners or incorporated them into larger, established ranches. As a result, the Kumeyaay were forced toward marginal lands, while Mexican landholders prospered through ranching and profitable cattle hide trade. This economic boon for Mexican ranches prompted an influx of people, achieving San Diego a pueblo status in the 1830s. Furthermore, additional lands were given to continue the hide trade. As a result, Mexican landowners held the majority of suitable lands by the late 1840s. This trend continued when the U.S. took control of San Diego, with American citizens being given privilege over both Mexican citizens and the Kumeyaay. It was not until 1875 that the Kumeyaay were given back some of their original, albeit marginal, lands.

The results of the study indicate that through the formation of the Kumeyaay’s cultural network, Spanish and Mexican colonists were able to access resources and create a stratified society. This social stratification was self-propagating and further entrenched the cultural networks that had been established. Because of these entrenched networks the settlement of the region was based on those at the top of the society and trickled down. As new colonization occurred, whether during the Spanish or Mexican Periods (and continuing into the U.S. occupation), the access to and control of resources was the goal for the colonization, and the utilization of the preceding cultural networks were the driving force to achieve those goals.
Limitations

Through the course of the study a number of limitations were encountered. These limitations are related to the scale of the project, the quality of archaeological data, and subjective choices within the dataset and in the project in general. These factors are described in more detail below, and might be resolved with an expansion of the project, which is discussed in the following section.

In terms of scale, when examining regional patterns, generally larger sample sizes reduce the margin of error. Although the study area covered over 300,000 acres, it was centered on a single watershed. As previously discussed in Chapter 3, a watershed provides a reasonable boundary for the purposes of an archaeological study; however, prehistoric and historical inhabitants where not bound by the constraints of the watershed. Settlement and subsistence patterns crossed multiple watersheds and regions. For example, while the watershed provides an excellent model for the diverse ecotones used by the Kumeyaay and the Spanish, other ecotones are not accounted for. The interior desert was a region that was important to Kumeyaay subsistence strategies but was not covered during the study. Settlement and subsistence patterns would have undoubtedly been influenced by access to the desert region. However, when examining an adjoining watershed within the desert, over 15,000 archaeological sites and historical structures were identified. The analysis of these sites and structures was outside the scope of this project. Cultural networks are also not limited to a single watershed. The study examined the connections between the Kumeyaay and the Spanish, providing an example of the cultural networks within a particular watershed. The study did not, however, examine the interactions between the Kumeyaay and the Spanish in adjoining watersheds to the south, nor did it examine other California tribes that were impacted by the mission in San Diego.

The data used within the study was derived from the cultural resources database from cultural resource surveys. Although 34 percent of studied has been surveyed, some areas have not been extensively inventoried. The main area is within the Capitan Grande Band of Diegueno Mission Indians reservation. As access is restricted here, limited archaeological work has occurred. Additionally, even though much of the urban core of the study area has been surveyed, many archaeological sites, possible dating to the Late Prehistoric and historical Native American periods might have been destroyed from urban development prior
to their recordation. While the presence of additional sites in these areas would likely not alter the outcome of the density maps and the network associations, other areas of use of natural resources might be highlighted. Furthermore, the data analysis is reliant on the interpretation of other archaeologists. While some of the sites have been subjected to absolute dating techniques, many of the sites have been dated through relative dating methods. Although projectile point and ceramic classifications have been refined for the region, there is still a subjective component to the identification of artifact chronologies. While errors in the identification of artifacts are generally minimally, the potential for assigning an errant temporal designation is possible, especially when distinguishing projectile points that transition between the Late Archaic and the Late Prehistoric periods.

Finally, as modern development has impacted archaeological resources within the urban and rural region of the watershed, development has also impacted ecological resources. Identifying ecotones within the urban areas, especially in the western third of the watershed, was limited to larger generic vegetation communities. While these vegetation communities provide a general description of the ecology of the area, further refinement was limited. As such, the suitability model is representative of larger vegetation communities, for example riparian or forests, and does not represent individual vegetation areas (i.e. coastal chaparral). Although these general vegetation communities provide the basis for suitable areas, the suitability model does not examine the differences in biomes and other ecological factors that might further influence settlement and inform cultural networks. Furthermore, as the scale of the project only examined a single watershed, the suitability model only accounts for a minimal number of ecotones. The model does not account for desert regions, as discussed above, nor are coastal areas adequately represented.

**Future Directions**

Future research in this topic is vast, and is tied to many of the limitations discussed in the previous section. Primarily, expanding the scope of the project would add greatly to the data presented here. Although the scale of this current work is large and encompass nearly 5,000 archaeological sites and historical structures, there are still gaps within the data. Additional archaeological datasets, including expansion of the surveyed areas, such as within the Capitan Grande Band of Diegueno Mission Indians reservation, would be beneficial in
“filling in” the blank areas on the maps. Additionally, including adjoining watersheds within the Colorado Desert to the east would provide data for settlement and subsistence patterns in a region that was important to the Kumeyaay. Research into creating a comprehensive reconstruction of the environment would also be beneficial. This would include a refinement of the ecological setting, which might identify specific biomes that were highly suitable for habitation. Furthermore, adding individual faunal and floral variables might identify traditional hunting grounds and gathering loci, both of which would inform settlement and subsistence patterns.

An expansion of comparative datasets would also be useful. Expanding the study to include cultural networks between the mission and the surrounding bands of Kumeyaay south of the San Diego River would provide an example of how networks further away from the mission were altered or impacted. Additionally, examining the cultural networks between the Mission San Luis Rey de Francia in northern San Diego County and the Luiseño tribe would provide an example of the interaction between the Spanish and another native Californian group. Comparing these studies, as well as incorporating the impacts of Spanish colonialism on cultural networks in northern California or in Baja Mexico would create a comparative analysis of that would examine the impacts of colonialism on multiple cultural groups. Finally, expanding the number watersheds in the suitability model would further strengthen the dataset. This expansion would identify coastal and desert areas that are the most suitable for habitation and, how consequential, those areas influences settlement. These potential topics address the concerns with scale of the project and expand the way in which the participants navigate cultural networks.
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