CHAPTER 2

BACKGROUND

Environmental changes and cycles have been responsible for the extinction and evolution of species, and have prompted the dislocations and relocations of various life forms since the beginning of life on this planet. When humans first set foot on the American continents the scene that they encountered differed significantly from that which the first European immigrants discovered.

THE LOCAL ENVIRONMENT

In southern California today, much as in the late prehistoric period, the topography varies considerably from the coastal strip to the inland deserts, and a huge diversity of environmental niches are represented in these differing environments. A day's walk in an east-west direction will take one through a plurality of ecological zones (Figure 4) with a huge diversity of floral and faunal life forms. Mild climates near sea level along the coast give way to the gradual elevation rise to inland valleys and foothills, with increased temperature, humidity, and precipitation variability. As we examine the topography further east and inland, one can see that the land gradually rises to the lofty summits of mountains where relatively cold winters commonly exhibit freezing temperatures. After reaching these summit elevations and still traveling east within San Diego County, we can gaze east, over and into the Imperial County lowlands where the land immediately plummets back to sea level and then slips further down to levels dipping to more than 200 feet below sea level.

Here in the rain shadow of the Peninsular Ranges, the prevailing winds that traveled across the Pacific Ocean have now lost their moisture to the rise in elevation up and over the mountains and the now desiccated air descends the steep eastern face quickly increasing in air pressure and therefore heating as it encounters the sub-sea level desert lowlands of the Salton Basin. This extreme change in climate and topography over a limited distance is not uncommon in the world and the living organisms that call these areas home have evolved unique and diverse methods for coping with the many differing, isolated niches.

Figure 4. San Diego ecological zones (data files from SANDAG 2007) rendered by the author in ArcGIS 8.0.

Additionally, at intermittent times throughout the summer and fall, another weather pattern comes into play. When a high-pressure dome hovers over the "Four Corners" region of the southwest, the clockwise motion of air draws up moist warm air from over the Sea of Cortez and into the desert and mountain areas of San Diego and Imperial counties. This monsoon phenomenon develops, aided with the desert heat, often forming large cumulonimbus cloud formations moving northwest as if following the San Andreas Fault line, creating thunderstorms as it increases in elevation against the east face of the peninsular range. This monsoon phenomenon wreaks havoc at times, spawning flash floods and debris flows in the mountains, on the desert floor and in canyons. It also sparks wildfires from numerous lightning strikes and is made worse when it is fanned by locally gusty winds. Additionally this severe weather produces locally heavy precipitation and sometimes, destructive hail (Ferrera and Yu 2003; NOAA 2004; Bordoni and Stevens 2005).

When a high-pressure system places itself over central California, Nevada and Utah, the Santa Ana wind pattern commonly occurs in the fall and early winter. This foehn wind transports heated and dried-out desert air from the Mojave and Sonora desert floors westward, up and over the peninsular range, blasting down and through the foothill valleys and canyons to the coast. As this air descends the west face of the mountains, it gains again in temperature and drops even more significantly in humidity, often into the single digits (Westerling et al. 2004). When the Santa Ana conditions prevail, the risks of rapidly spreading wildfires are drastically enhanced as we experienced in the Cedar Fire of 2003, and the Viejas Fire of 2001, and more recently, the devastating San Diego Wildfires of 2007, occurring as this writing takes place. This predisposition for wildfires is further enhanced by the volatile nature of the chaparral vegetation inherent on the western facing slopes of the mountains and foothills. Chamise or Greasewood (Adenostoma fasciculatum Rosaceae) has evolved to benefit from wildfires by producing highly flammable foliage and sap above ground and produces two forms of seed. The exposed growth quickly burns to ash but leaves the below-ground lignotubers, root-crown burls, or basal burls intact, allowing for rapid regeneration of the brush as soon as the winter rains arrive (Whitney 1985:399).

The low desert and the east face of the Peninsular range experience a wide variety of weather patterns causing stresses on all life forms eking out an existence in this harsh environment. The western face of the mountains and to a lesser extent, the coastal and intermediate zones also experience an inconsistency of weather patterns with short-term heat waves, alternating decade-long droughts and intervening years of heavy precipitation, and on rare occasions a weakening hurricane or tropical storm. Although we have only been recording climate data for a century at best, we have identified short-term cycles and patterns such as the El Niño and La Niña events. We have only scanty evidence of long period cycles through lake sediment core drilling, Greenland ice cores, and palynology. It is also of scientific (also consider the current polemic, politico-economic debate) note here that human activities have adversely effected the atmospheric composition significantly contributing to changes in climate since the onset of the industrial revolution.

Human populations have likely been present in San Diego County for an estimated 12,000 years and during that vast time-span, various groups have passed through the multifarious climate zones on seasonal rounds to hunt, fish, trap, gather, and seek out the plethora of resources necessary for life. We have ample evidence that the first visitors to the deserts of southern California encountered an entirely different visage than what we see today. The warming trend that began at the end of the Pleistocene has now taken on new vigor as we witness the further retreat of the now-far-northern ice sheets and glaciers. Greenland is becoming green again and the Italian Alps have returned Utzi, the “Ice-man,” to us from his five millennia cryostatic entombment.

We are witnessing a relatively rapid climate change within our own lifetimes. That we are seeing this occur before our eyes further enhances our ability to envision those changes that occurred millennia before. The bleak, dry deserts we tolerate today, hosted wetter and milder temperatures before the Holocene warming. When the Pleistocene climate patterns persisted, the entire spectrum of climate zones from coast to the desert experienced temperatures that were dialed back about 5 or 6 degrees on the Pacific Ocean’s natural thermostat (Barron and Bukry 2006; Hucklebarry and Fadem 2006; Porinchu et al. 2007).

The heated economic/political/scientific argument rages on as to the human or natural causes of global warming, but the economic-political debate as it pertains to this work is moot. The fact that change occurred before, numerous times, even predating human civilization, as well as before the Homo sapiens species evolved, suggests that we will be faced with these changes again and again. Our predecessors had to cope with climate change in an entirely different way, with cultural, technological, culinary, and geographical modifications. Our encounter with climate change will be no easier, but it will be entirely different, just as our culture, technology, and populations differ. Early Holocene populations had to gradually move their coastal settlements inland over generations as the sea levels rose. Moving temporary settlements would have been a regular occurrence for mobile peoples, however, we must accept the fact that our coastal cities and settlements will be inundated, and our concept of owned, deeded property will be seriously challenged. The recent devastation caused by Hurricanes Katrina and Rita in coastal Louisiana and Mississippi are only a hint of what could become a much more common and long lasting global normality.

The populations that procured resources and survived here in San Diego County during those late Pleistocene – early Holocene climate changes, were thought to be nomadic peoples who we currently believe followed large game herds and had little permanence attached to any particular geographical location. If they did return to a place regularly it was on a seasonal round and in a place where resources and water were dependable and ample enough to carry them through their stay. Still, little is known of these early people and our knowledge grows very slowly as bit by tantalizing bit of data is slowly added to the archaeological record (Kelly and Todd 1988; Kelly 1995; Anderson and Gillam 2000; Grayson and Meltzer 2002).

Lost Valley in the extreme northeastern corner of San Diego County was likely such a place to lure the Pleistocene nomad, the archaic period hunter, the late prehistoric seasonal settlement, or the typical city-living Boy Scout, to stay a while and partake of that which this serene mountain valley has to offer.

A day's hike up the steep boulder laden Palm Canyon, west from Borrego Springs on the desert floor, Lost Valley presents today's visitor with more than adequate resources to supply a modest population. Seven species of Oak (see Table 1, page 34) provide an abundance of acorns in any single year and the presence of bedrock mortar milling features suggest that this activity was commonplace in the late prehistoric to historic times. Lithic detritus, ceramic potsherds, discarded, broken, or lost items of body adornment, and an abundance of stone and bone tools found on and near the surface support this conclusion. Our efforts to document the archaeology of Lost Valley placed us in the position to watch the sun rise and set over the same ridgelines as those who lived here hundreds and even thousands of years before. Much of the same indigenous flora and fauna remains today, much as it was then. Fresh water continuously oozes forth from Shingle Spring, even after 12 years of drought, documenting the tenacity and dependability of this life giving resource. It is no surprise that the majority of archaeological evidence found on the surface lies within shouting distance of this spring.

When the climate was much cooler at the terminus of the Pleistocene, the scene was comparatively different. The few Incense Cedars were probably more numerous, Shingle Spring more productive, and other springs that are now only seeps would have contributed as well since the precipitation was surely heavier, and the groundwater was likely nearer to the surface. The vegetation community, at the 5,000 foot elevation, would have resembled a locale more akin to what we see today near the summits of the higher Laguna mountains farther south. The Oaks would have been found at much lower elevations, and species found at or near the 8,000 ft. elevations today, such as Incense Cedars, Sugar Pines, and Lodgepole Pines would have displaced the Oaks in Lost Valley. At the height of the last surge of the Wisconsin glaciations (ca 40,000 B.P.), vegetation communities were lowered by as much as 900 meters or about 3,000 feet (Anderson 2002:310).

Lost Valley would have presented an enticing environment for man or beast in the spring, summer, and autumn months, during the terminal Pleistocene – early Holocene, as it still does today. Temperatures would have been somewhat cooler, making the midsummer highs more tolerable, and the winter lows and the increased snow pack may have then hindered the year-round human habitation, but it would have kept the groundwater aquifers topped off at a higher level supplying life-giving spring water during the milder, non-winter months at an increased rate (Anderson 2002).

Just to the east of Lost Valley, down the steep eastern face of the peninsular range lies a low desert expanse now hosting the Salton Sea, an accidental body of dense saline water in the process of a century long intermittent evaporative desiccation. Water levels constantly fluctuate from agriculture runoff and occasional storm caused flooding. Salinity is increasing steadfastly as is the effect of agricultural fertilizers and pesticide pollution as there is no outlet for the water other than evaporation. Just before the human error that brought this body of water back into existence the Salton Basin had been dry. The mistake involved maintenance work on a dike on the Colorado River Delta (Carpelan 1961; Dowd 1960).

Numerous minor inflows and subsequent desiccations have occurred since the 14th or 15th century. During the Pleistocene and into the late prehistoric era, the Salton Trough was largely filled with fresh water to a point slightly above sea level, supplied from the shifting course of the Colorado River. Sediments freely cascading down from the southwestern slopes of the Rockies, and the southern great basin province were deposited in a delta formed at the present northern extent of the Sea of Cortez (Babcock 1974; Buckles et al. 2002; Waters 1981; Schaeffer ND; Laylander 1997). This delta served to inhibit the encroachment of the sea into the Salton Sink and as the climate warmed, the Salton Basin gradually dried. That ancient freshwater lake, referred to as Lake Cahuilla, filled and desiccated several times in historic and in prehistoric times, corresponding to course changes of the Colorado River and the various seasonal floods bearing huge amounts of sediment and dissolved minerals. These sediments gradually built a delta spanning the trough resulting in a natural dam separating the waters of the Sea of Cortez from encroaching in on the Salton Trough. Alternating course changes across the delta switched the flow of fresh water from the Salton Trough to the Sea of Cortez. When the Colorado River fed directly into the Sea of Cortez, the Salton Trough steadily desiccated and ultimately disappeared around the year 1600 (Dowd 1960; Downs and Woodward 1961; Buckels 1974; Wilke 1978; Waters 1981, 1983). When the Colorado River filled Lake Cahuilla to the point of overflow, the course switched back to the Sea of Cortez (synonymous with Gulf of California) and the basin began to desiccate, and these cycles repeated numerous times throughout the Pliocene, Pleistocene and the Holocene (Howard and Lundstrom 2005).

Lake Cahuilla supplied an environment rich in resources, such as fish and waterfowl that attracted human settlement. Late prehistoric fish traps are still evident along the ancient shorelines. These funnel-shaped stone emplacements corralled fish, making it easier for humans to catch them from the near shore shallows (Schaefer ND.). This lake dried up completely many times since 1400, until 1905 when a breach occurred while the Army Corps of Engineers were working on a levee (Carpelan 1960; Dowd 1961). It took several years to stop the flow into the basin, and thus created what we know today as the Salton Sea. When Lake Cahuilla finally evaporated, it left behind millennia of solidified minerals (salts), which quickly re-dissolved when the waters returned, giving us the relatively high specific gravity (salinity) of today’s Salton Sea.

In this work, I introduce new evidence of a Paleoindian presence in Lost Valley. This new evidence updates the archaeological record regarding late Pleistocene-early Holocene period as gleaned through the 1997 to 2003 excavations of the sites around Shingle Spring. These sites' boundaries are but arbitrary divisions applied for ease of our recording, future protection, and administrative purposes. Common sense dictates that we view the area around the spring as a single site with evidence of numerous occupations through time. The presence of Shingle Spring is likely the main attraction drawing humans to this locale, time after time. The presence of a dependable source of year-round water is responsible for the dense and diverse vegetation here as well. This in turn would draw in the wildlife, henceforth a source of meat, all of which adds to the attractiveness of this rich resource base locality.

The central meadow of Lost Valley is a feature deserving further research. This area could have once hosted a small Pleistocene lake. We can see the distinct and immediate change in vegetation along the "shoreline" where the flat meadow grasses give in to a periphery of chaparral brush, oaks, and pines as soon as the land rises a few inches above the pluvial/alluvial sediments.

GEOLOGY AND MINERAL RESOURCES

The Peninsular Ranges are the weathered and eroded remnant of a volcanic arc that runs the entire length of Baja California and terminates just north of the San Diego – Riverside County Border. Lost Valley is at the northern extremity of this range. What remains of this mountain structure, formed during the Late Cretaceous, deep within the earth's crust, in the form of batholiths or plutons. These magma chambers were the source of the lavas that periodically erupted out through ancient volcanoes that have long since eroded away. Those eroded sediments have been transported mostly into the Pacific Ocean and down the eastern mountain face into the Salton Basin and into the Sea of Cortez, but still some remains of these "Santiago Peak Volcanics" make up numerous scattered sedimentary deposits in the foothill basins, and along the coastal lowlands and mesas (Abbott 1999; McCulloch 1984). This Mesozoic volcanism also metamorphosed pre-existing igneous and sedimentary materials while still deep underground through contact, with the extreme heat and pressures of this environment. Over the last 95 million years, the volcanoes have eroded away, the magma chambers have cooled and solidified, and the land has been tectonically uplifted, exposing the remaining igneous batholiths and plutons of granitic composition (Abbott 1999; McCulloch 1984).

The geology of Lost Valley consists mainly of six geologic units, three of which make up the Lost Valley Pluton, one metamorphic unit, and two tonalite units (McCulloch 1984:3). For archaeological purposes, the deep-temporal origins of the geologic units are of less importance than are the numerous mineral resources they present at or near the surface, available for cultural material use, and as the matrix supplying the foundations and mineral environment for botanical and faunal life. In this section I will concentrate specifically on the geologic units as they might pertain to the landscape, botany, wildlife, and the applicable lithic usages of past, and present human cultures.

In later chapters I will discuss and compare several of the lithic tool-stone materials with references to their hardness. Rocks and minerals all possess diverse physical properties that lend them sufficient for a variety of human uses. Geologists use the Mohs hardness scale (Table 1) to compare these materials.

GEOLOGIC UNITS

The small, metamorphic unit exposed in two separate outcrops 1.5 (2.4 km) and 1.25 miles (2 km) almost due south of Shingle Spring, on the south side of Lost Valley, was formed from prebatholithic sedimentary rocks metamorphosed from contact with the Lost Valley Pluton and among other nearby batholithic contacts. This metamorphic unit may have provided local human populations with sources of lithic material to shape into various implements.. Additionally, this unit supports the densest vegetation in the immediate area (McCulloch 1984:5).

The north and northwest areas of the valley are composed of the hornblende-biotite tonalite of Chihuahua Valley. This unit is also in contact with the aforementioned metamorphics. Part of a Cretaceous pluton, this intermediate igneous unit exhibits both potassium and plagioclase feldspars, biotite and muscovite, and a variety of other minerals such as small garnets, black tourmaline (schorl), and the ubiquitous quartz (McCulloch 1984:6).

The largest unit making up the Lost Valley pluton is the muscovite-biotite leucoadamellite of Lost Valley. This unit contacts the metamorphics to the south and also the

Table 1. The Mohs Mineral Hardness Scale

Rating	Minerals of Mohs Scale	Comparable Common Objects
1	Talc, Steatite (soapstone)	
2	Gypsum	
2.5		finger nail
3	Calcite	copper
4	Flourite	
4.5		Iron
5	Apatite	steel knife blade
5.5	Obsidian	window glass
6	Orthoclase	
6.5		steel file
7	Quartz, Chert, Flint, Jasper, Chalcedony	
8	Topaz	
9	Corundum	
10	Diamond	

Note: The Mohs scale of hardness as shown above compares and relates the diverse minerals and their effects on and to each other. The hardness of a material is controlled by the bond strength between its individual atoms. For example, iron with a mhos hardness rating of 4.5 will scratch fluorite, but Apatite with a rating of 5 will scratch iron. Any material with a hardness rating higher than another, will scratch, or through purposeful intent, shape or form the softer material, thereby leaving minimal to no detrimental effects on the harder material (Thompson and Turk 1998:45-6; Boger, et al. 2003:47).

tonalite of Chihuahua Valley to the north and west. For tool quality lithic material, quartz is the only knappable stone commonly found in and among the dikes within this unit, but small crystals of schorl and garnet are present (McCulloch 1984:7-8).

The third of the three units that make up the Lost Valley Pluton is the biotite leucoadamellite of Lost Valley. This unit is exposed in the northeast contacting "the tonalite of Chihuahua Valley, the muscovite-biotite leucoadamellite of Lost Valley to the west, and the biotite leucogranodiorite of Cougar Canyon to the south" (McCulloch 1984:8-9). Lithic materials of use to humans within this unit are again, quartz, schorl, and garnet crystals that are sometimes found in inclusions of coarse-grained igneous (pegmatite) dikes. This rock unit is mainly represented to the surface viewer as a coarse grained granitic rock. "[B]iotite leucoadamellite weathers into large spherical boulders and a course grus" (McCulloch 1984:8-9).

The hornblende-biotite tonalite of Los Coyotes Indian Reservation is exposed in the southeast slopes of Lost Valley and contacts the metamorphic unit as well as the biotite leucogranodiorite. This unit is one part of a very large tonalite pluton consistent throughout the Los Coyotes Indian Reservation (McCulloch 1984:10-11).

GEOLOGIC HISTORY

The intrusive igneous units were formed at various times during the Mesozoic from the injection into previously eroded igneous strata causing the metamorphosis by near contact of heat and pressure (Gastil 1983). Additionally, these plutons contacted one other while still retaining heat, thereby mixing materials from both and causing foliation between the two units and forming xenoliths. This igneous geologic activity was ultimately caused from tectonic forces driving the subduction of the now exhausted Farallon plate under the North American plate, forming a volcanic arc, which during the vast expanse of geologic time since, has been drastically uplifted and eroded (Abbott 1999; Todd et al. 1983).

The slow cooling and long period of heat and pressure not only metamorphosed nearby rock units but also produced semi precious gems and other crystalline materials. Crystalline quartz is formed when it "grows" freely, developing its characteristic shape controlled by the slow arrangement of its molecules arranging themselves while transforming from a fluid state into a slowly cooling solid. The crystalline habit of this form of quartz is a prismatic hexagon (Thompson and Turk 1998). Most of the quartz artifacts and flaking debitage recovered from the Lost Valley excavations were of a cryptocrystalline form or masses of interlocking crystals with inclusions, intersecting planes, and water. This particular form of quartz appears milky or sugary white from the many inclusions or other flaws in the molecular crystal lattice.

GEOLOGIC FEATURES

Shingle Spring provides a dependable source of water as it issues forth from between the gradational contact of the biotite leucoadamellite of Lost Valley and the muscovite-biotite leucoadamellite of Lost Valley geological units. This tenacious spring was producing a constant trickle as we worked on the sites in the summer field seasons of 2002 and 2003. These two years were also the final years of a 12-year continuous drought that had severely impacted the arboreal life throughout the valley. The maintenance crew working for the Lost Valley Boy Scout Reservation was constantly engaged, felling and bucking the many dead and dying pines. The only surviving trees were those whose roots were still capable of reaching the falling water table, or were near enough to the spring to survive the drought. The month of June 2003 presented us with the constant day-long drone of chainsaws as they performed a daily dirge of doom for the valley's tallest and oldest pines, cedars, and oaks.

The valley floor is a flat meadow, which may have once been a small Pleistocene lake. Only grasses are growing in this meadow now, with the various trees and shrubs only growing around the periphery. The presence of near surface water would explain this phenomenon, or it may possibly be a clayey layer keeping water from penetrating deep into the sediments. Further geological research may answer this query. It is likely that this flat, broad central portion of the valley is made up of sediments both wind blown (aeolian deposition), and washed down (pluvial/alluvial deposition) from the hillsides, and deposited here in the form of sands, silts and clays. It is also likely that these clays form an impermeable layer preventing water from seeping down into the soil. This theoretical clay layer would hold water near the surface, preventing trees and shrubs from growing there since they prefer a well-drained soil.

Soils and Sediments

The soils and sediments of the lower northeastern slopes and valley edges are mainly decomposing granitic sands, silts, and clays, eroding from the igneous bedrock outcrops and upper mountain slopes. These poorly sorted sediments support a variety of botanical life forms as well as the fauna that is directly or indirectly dependent upon them. The presence of numerous, scattered rodent burrow mounds displays the likelihood of disturbed stratification or bioturbation.

The site at CA-SDI-2506 was named “The Bog Site” from the appearance of a dark midden soil component on the surface. To enhance this dark appearance, small, scattered nodules of charcoal from burning vegetation that could be of natural or human origin littered the surface. Phillip Brigandi, a local historian wrote of a fire in August of 1911 that started in the valley, burned down the original cabin, and swept through the Los Coyotes Indian Reservation to the south (P. Brigandi personal communication 2008). Charcoal near the Shingle Springs area could be attributable to this event.

Hydrology

The area of prehistoric occupation concentrated around Shingle Spring spans the topographical transition from the somewhat steep (10-15%) toe-slope to an almost level (2%) grade, where the more dense accumulations of archaeological deposits are visible. The northern side of CA-SDI-2506 is at the highest point where granitic bedrock is exposed in a large horizontal outcrop, featuring numerous mortars and grinding slicks. To the north and west of this feature, a gully carries off precipitation to the west and slightly south, eventually combining with the output of Shingle Spring. To the south of this bedrock exposure, water is carried down the more gradual slope aspect to the southwest through a series of small rills also combining with the gully produced from Shingle Spring.

Cultural materials, bedrock features, and midden soils are located to the northeast and south of Shingle Spring, to where it joins the drainage running from the north to the south of the valley. The local drainage pattern is shown in Figure 5.

The springs and seeps within Lost Valley combine to make up the headwaters of Agua Caliente Creek, which in turn contributes water into Lake Henshaw. Lake Henshaw

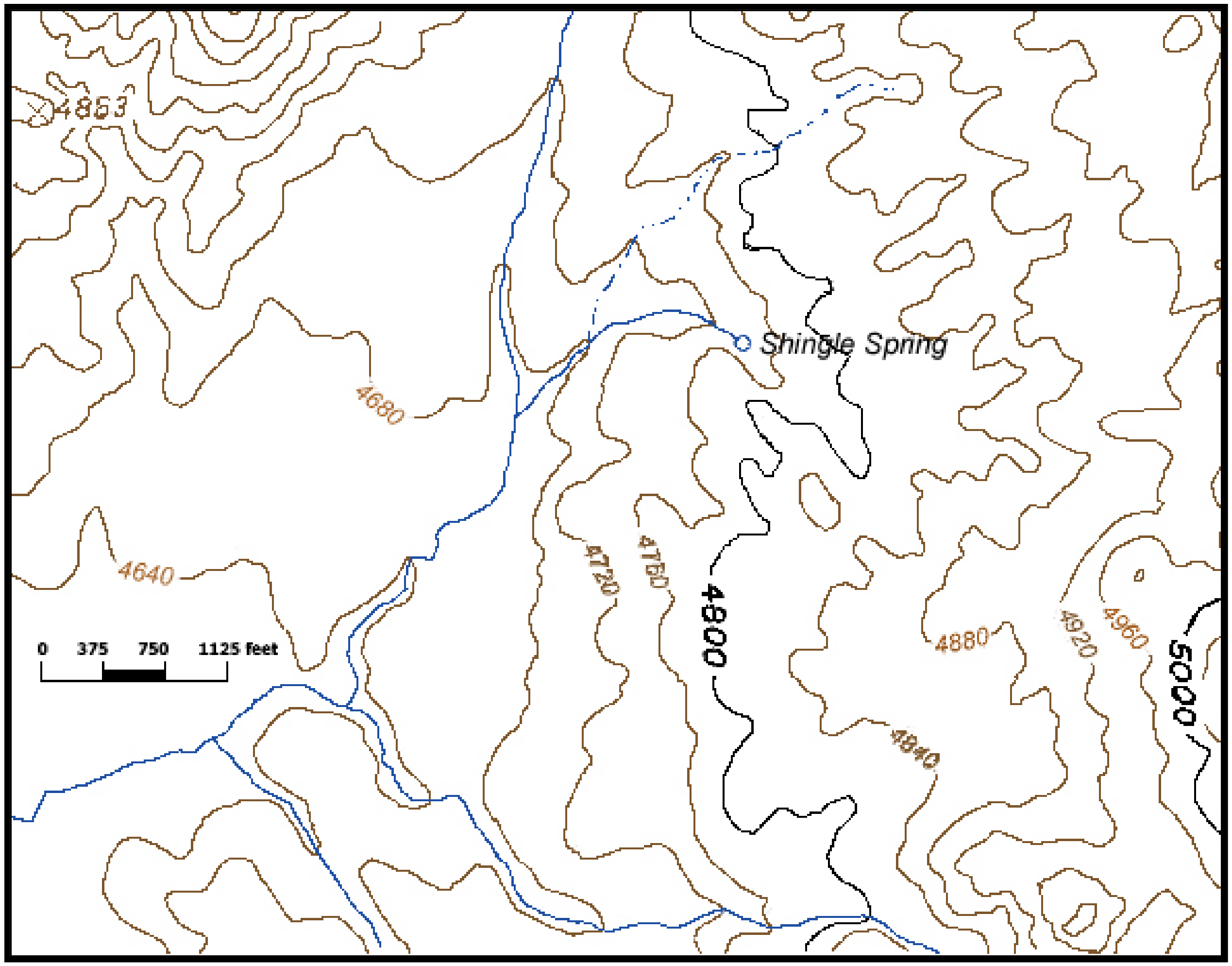


Figure 5. Natural hydrology of the northeast portion of Lost Valley where the focus of this work is concentrated.

is the body of water that forms the headwaters of the San Luis Rey River that eventually reaches the Pacific Ocean at Oceanside.

BOTANICAL ENVIRONMENT AND RESOURCES

At nearly 5,000 feet, the sites around Shingle Spring today host a wide variety of arboreal and shrub species. Oaks (Quercus sp.) are represented by seven distinct species, all producing acorns of differing qualities and quantities as the seasons vary in temperature, humidity, and precipitation, guaranteeing a reliable food source nearly every year (Table 2). Pinyon and Coulter Pines are the dominant tree species and produce cones containing edible pine nuts that could adequately supplement the available natural cuisine. Incense Cedars, Calocedrus decurrens, are present today near the spring but are showing increased stress from the ongoing drought. The younger Cedars that had sprouted farther away from the spring have recently died but the larger specimens nearer to the creek seem to be faring better. This tree species produces a wood that is well suited for construction of shelter and a wide variety of implements, and it also conveniently inhibits the proliferation of many species of insects. Shasta Gaughen presented her thesis, “The Ethnobotany of the Cupeño,” in the spring of 2001, giving us a keen insight into the quality and quantity of botanical resources available for human use in this local area and other Cupeño territories leading down the canyons to the west and south toward Warner Springs, formerly known as the village of Cupa from whence the latinized Cupeño name derived (Hill and Hill 1968; Hill 1972; Bright and Hill 1967, and Bright 1967). Gaughen’s work is an invaluable resource on which to reference and build additional theories relative to parallel subjects. There are copious species of plants and their products present in Lost Valley that were likely utilized by earlier human populations and Gaughen has covered them effectively in her work to refrain from repetition here (2001).

We are well aware that global climates have both warmed and cooled to varying extremes, cyclically in the past causing plant communities to rise and slip in elevation and latitude, and spawning evolutionary changes in other life forms, and in the extremes, extinction. It is an ironic opportunity that scientists are currently witnessing drastic climate changes within our lifetimes, officially documenting this climate change phenomenon so future generations will be made aware of this occurrence as a fact, thereby eliminating the

Table 2. Tree Species Present in or Near Lost Valley in Modern Times

Calocedrus decurrens	Incense Cedar
Juniperus californica	California Juniper
Pinus Coulter	Coulter Pine
Pinus monophylla	Pinyon Pine
Pinus quadrifolia	Pinyon Pine
Platanus racemosa	Western Sycamore
Populus fremontii	Cottonwood
Quercus agrifolia	Coast Live Oak
Quercus chrysolepis	Canyon Oak
Quercus dumosa	Scrub Oak
Quercus engelmannii	Engelmann's Oak, White Oak
Quercus kelloggii	Black Oak
Quercus morehus	Oracle Oak
Quercus wislezenii	Scrub Live Oak

global warming" economic/political debate we are currently witnessing. R. Scott Anderson, and his colleagues (2001) described the paleoecology of a valley in nearby Riverside County to the north, where they demonstrated that during the Middle Wisconsin glaciation, approximately 41,000 (^{14}C) radiocarbon years B.P., vegetation communities had lowered by 900 m. in elevation, to the temperature, humidity, and precipitation levels that they had previously evolved or adapted. It is probable that this climate change reverse would also gradually move the botanical species up in elevation or latitude, as climates cycle back to warmer and drier levels.

It is also within the realm of possibility that some form of agriculture was practiced such as the transplanting or introduction of botanical resources into Lost Valley from other locales. Neighboring groups along the Colorado River practiced agriculture and the concept could not have been alien to the Cupeño or their adjacent Cahuilla neighbors (Bean and Lawton 1972,1976).

LINGUISTICS BACKGROUND

The assignment of Lost Valley as a Cupeño permanent habitation site is mainly derived from oral histories of a historical nature. The ethnographic territories recorded by Kroeber and Strong in the 1920s place Lost Valley on the eastern border area separating the Cupeño from the Cahuilla (Kroeber 1925; Strong 1929). Since this inquiry delves into prehistory, linguistic data may lend evidence that may either support or contrast that knowledge which was previously known (or assumed) concerning the prehistoric use of this valley. A significant level of ethnographic territorial uncertainty exists with Lost Valley as to whether or when the Cupeño became a distinct separate "tribe" from their theoretical Cahuilla ancestry. As this thesis is proposed to analyze the artifact assemblage to glean what information exists and to follow the evidence trail, a linguistic line of evidence would strongly support a Cahuilla origin of the Cupeño people. Although it is likely that the Luiseño and the Serrano, as well as the Kumeyaay to the south, all exchanged genetic material through intermarriage, the Cupeño language is more closely related to the Cahuilla (Kroeber 1925).

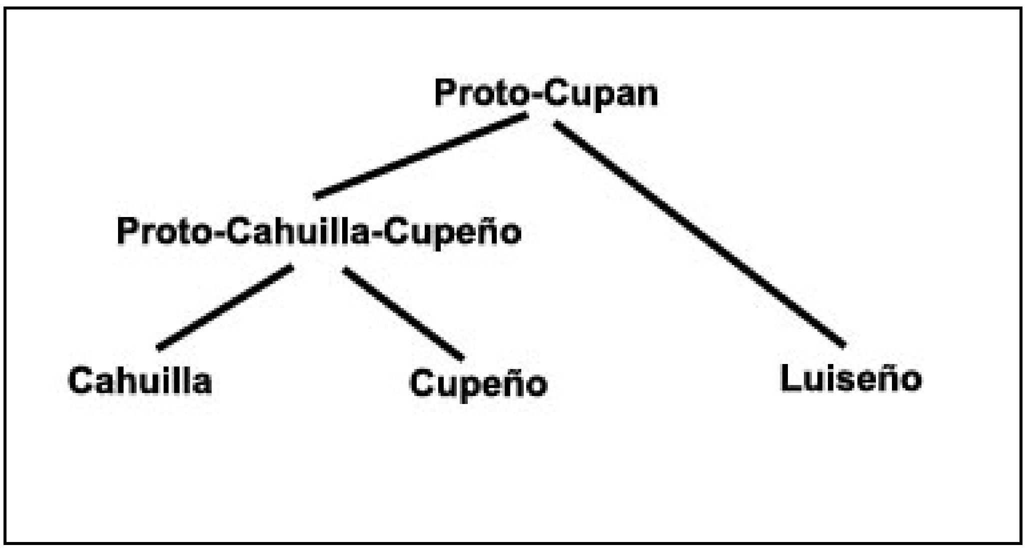
At around the turn of the twentieth century, California anthropologists with linguistic proficiency and opportunistic exposure, collected masses of data, including linguistic information on southern Californian indigenous peoples. Although the original language groups had been differentially exposed to Spanish missionization for well over four generations, the earliest possible collection of these data resulted in a relatively accurate reconstruction of the proto language. A. L. Kroeber (1925), and Edward Winslow Gifford (1918) among others, salvaged information on the culture, language (lexicon) and material culture of southern Californian native peoples as they saw it rapidly changing and/or disappearing through acculturation, forced enculturation, and regrettably, expiration.

In 1967 William O. Bright and Jane Hill presented "The Linguistic History of the Cupeño," thereby building on the information from the early works of those tireless individuals mentioned above, they also interviewed a contemporaneous speaker of Cupeño, Rosinda Nolasquez. That work primarily concentrated on stress patterns. A later article by Jane H. Hill and Kenneth C. Hill (1968), presented evidence demonstrating the levels of linguistic associations, also by comparing stress, but with the added approach of examining vowel length in the Cupeño, Cahuilla, and Luiseño, which are collectively known as the Cupan languages. This work demonstrated the relationship between proto-Cahuilla-Cupeño, and Proto-Cupan as shown in Table 3.

Historic linguistic studies of the three Cupan languages have been compared by various anthropological linguists since the beginning of the 20th century, and a substantial vocabulary remains available for study, even though the numbers of the speakers themselves are rapidly waning. Language death, as discussed in Jean Aitchison's "Language Change" (2001), is eminent in the case of Cupeño, and likely for Luiseño and Cahuilla. In 1903, all of the Cupeño people who were then residing in the Warner Springs area were forcibly sent to live on the Pala Reservation with the Luiseño. The Cahuilla, however, were at one time widely dispersed to the east, and scattered throughout the northeast San Diego County mountains and into the mountains and deserts of Riverside, San Bernardino, and Imperial counties. This dispersion historically manifested the language into a variety of dialects within the Cahuilla language, and since then, subsequent political and population pressure has forced the Cahuilla people into just a few small reservations, and although the dialectic diversity has been recombining, its exposure to, and pressure from the dominant English may soon seal its fate as a spoken language.

Pamela Munro (1990) takes the next logical step in reconstructing Proto-Cupan by including data from the other Takic languages. Takic languages are a subfamily of Uto-Aztecan that include those in the Cupan group, along with Gabrieleño, Fernandeño, Serrano, and Kitanemuk as demonstrated in Table 4. By collecting the clues from groups of words of the various Cupan languages and comparing these with other Takic languages, as Aitchison (2001) discusses, linguists are progressively narrowing down details of the Takic family tree.

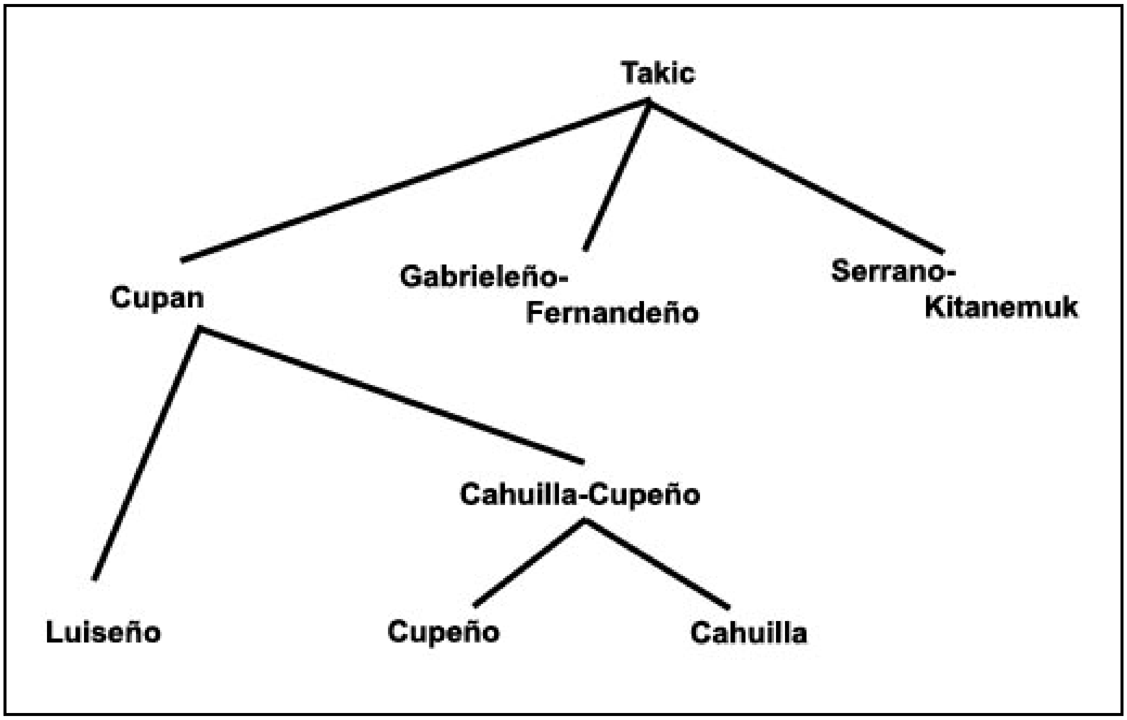
Table 3. Cupeño Linguistic Family Tree



Source: Hill, Jane H., and Kenneth C. Hill, 1968. Stress in the Cupan (Uto-Aztecan) Languages. *International Journal of American Linguistics* 34(4) p.236

Of course there are many mysteries and unexplainable ambiguities in nearly every study of prehistoric language analyses. The study of these particular language branches are complicated by the varying degrees of exposure with Spanish missionization, and contacts through the millennia with neighboring groups through inter-marriage, trade, and conflict, and of course, those puzzling mysteries. Munro hesitates to explain the details concerning these problems in her analysis, but simply refers to them as mysteries, or when known, as Spanish borrow words. She implies that these mysteries are expected and/or inherent discipline-wide, therefore only a casual mention is necessary (Munro 1990).

Table 4. The Takic Branch of the Uto-Aztecan Linguistic Family



Source: Munro, Pamela, 1990. Stress and Vowel Length in Cupan Absolute Nouns. In *International Journal of American Linguistics* 56(2):218.

Munro (1990) shows that by comparing cognates of Luiseño (Lu), Cupeño (Cu), and Cahuilla (Ca), Luiseño is the best indicator of what a Proto-Cupan word would have been. She provides us with a vowel chart demonstrating a reconstruction of Proto-Cupan with comparisons to Cu, Lu, and Ca. In addition to this, she explains the consonantal change of č to š after lengthened vowels in each language as being in "perfect complementary distribution" (Munro 1990:222). This seems to parallel the assumption Aitchison makes in "doing what comes naturally" (2001), where she believes that final consonants tend to disappear. Could the loss of its voiced character be a precursor to its total elimination?

Pamela Munro (1990:231) demonstrates, through multiple examples, how vowel length increased through 'h' deletion in Cupeño and Cahuilla, while Luiseño remained unchanged from the Proto-Cupan. The phenomenon of 'h' deletion is discussed by Aitchison (2001), where she believes that the 'h' is doomed to eventually disappear in languages where it has no voiced alternative as it has also disappeared in Cockney English. Aitchison attributes this type of action on the grounds that the 'h' sound has no voiced alternative and language has a tendency to "neaten up" loose ends by "repairing patterns" (2001).

ETHNOGRAPHIC BOUNDARIES AND RESOURCE AREAS

Our written history specific to the Cupeño area can only take us back to the Spanish Mission era, and when we include oral histories we can infer only slightly more. But in the case of oral histories we are dealing with incompleteness, and a lack of the everyday mundane events. Oral histories typically capture groundbreaking events that changed the lives of the individuals who experienced them in order to educate their progeny and pass on folk knowledge. These types of epistemologies dealt with crises such as conflicts, fires, floods, earthquakes and landslides, as well as documenting the lives and accomplishments of memorable and heroic individuals. Oral histories are repeated within the culture typically to teach the forthcoming generations all of the necessary lessons of life, and set examples on how to lead an honorable life (Hyer 2001).

Archaeologists are mainly concerned with the mundane, everyday routine actions that change slowly over time so as to go unnoticed from day to day, and hence remain ignored in the oral histories. Much like Charles Darwin's evolutionary theory of biological evolution, cultural evolution changes imperceptibly over short spans of time. Only in the last few hundred years have modern people been conscious of cultural changes in a literate civilization and considering that we now have the advantage and knowledge of literacy we are made aware of changes that have occurred outside of our own life spans. But still, little was written pertaining to the mundane everyday existences of our forbearers. Most of the knowledge of what we do have, we have recovered from fictional writings, as these literary resources were based on actual technologies and cultural norms of times long past.

We cannot always rely on the completeness and accuracy of our own written histories for that matter. When events are recorded in written form, it is through the eyes and experiences of individuals from their particular visage. Others involved may have viewed the same events from a quite different vantage point that never recorded the event, or did not survive to relate their experiences orally, or literally. Written history is usually composed by and for the society who sanctions it.

We have relied to a great extent on the work of the early California ethnologists (Kroeber 1925; Gifford 1918) and their work has been invaluable in relating to us - as well as the remaining native populations - the information they documented in recording oral histories, myths and legends, customs, languages and linguistic data, interactions with neighboring populations, and their observations in material culture, body adornment, and virtually all aspects of their existence. We are still using the maps, photographs, and sketches they provided today, almost a century later. The mapping technology we now enjoy can provide immensely more detail and accuracy that that of one hundred years before, and archaeological analysis of these territories can accurately support or add to this prior knowledge (Conroy 2006; Neubauer 2004).

Territorial boundaries of all peoples were never static in the long term. Conflict (Milner 1999), population densities (Graber 1991), extinction (Tainter 2006), migration (Malhi et al. 2003), and the vagaries of geography that provide indistinct, overlapping boundaries, and border changes over time. We are confident that past populations moved into territories, abandoned others, carried out warfare, occupied areas by displacing others, and even succumbed to extinction. Where we have no historic descendants, the only data we have is the archaeological record. Paleoindian remains are impossible to associate with historical native peoples due to the vast time span. Without evidence associating distinct populations with their cultural deposits, such as DNA or mtDNA, we can find no association other than the land they occupied separated by millennia.

The Cupeño people were identified as "owners of the resources in Lost Valley" (Strong 1929:245-48). The oral-historical data also suggests that the Cupeno population was nearly decimated at one time and that Luiseno and Cahuilla neighbors filled in culturally, linguistically, and genetically through intermarriages (Hill and Nolasquez 1973) and the cultural-linguistic influences of Spanish, Californios, and later American contacts (Hill 1972). This conundrum tended to further blur the separations between these neighboring, linguistically and genetically related populations. That language can change significantly in one generation is evident today with our global, mobile behavior, and longer life expectancies, and may be assumed in relation to Native American populations under territorial stresses from European encroachment and hostile neighbors (Atchison 2001). If language can change under these stresses, so too can cultures. Here in Lost Valley we now can document portions of the archaeological record back to the Paleoindian period and sporadically track human occupations into the historic period and the present.

Kroeber (1925) places the Cupeño at two villages near Warner Springs and as controlling resource areas to the north and east up to Lost Valley on the opposite side of Hot Springs Mountain as shown in Figure 6. Others (Bean 1978, and Strong 1929) agree on these territorial boundaries, and Strong specifically includes Lost Valley as inclusive of Cupeño territory.

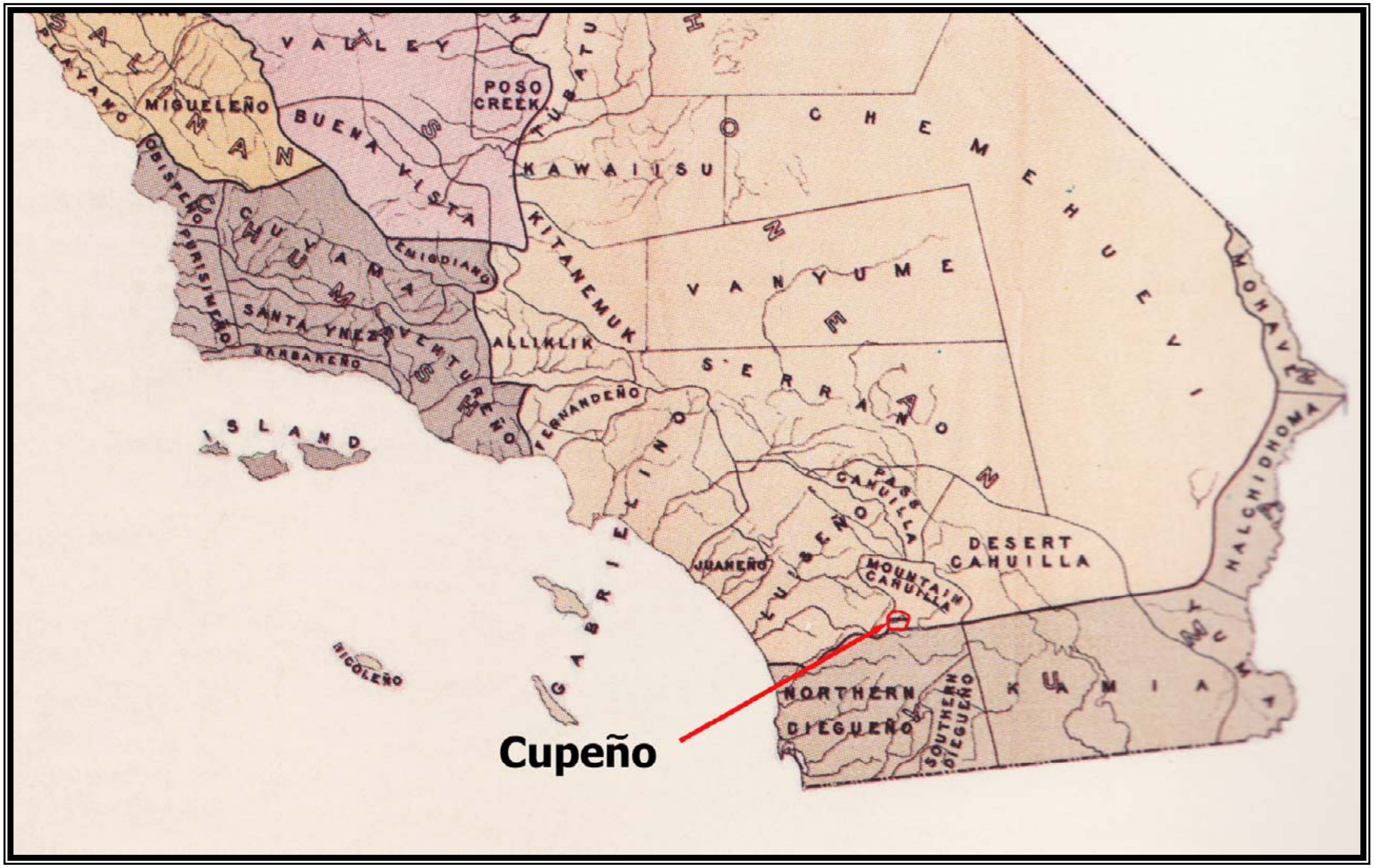


Figure 6. Southern California ethnographic territories as described by Kroeber in 1925. (Base map from Kroeber, Alfred L. 1925 Handbook of the Indians of California. *Bureau of American Ethnology Bulletin* 78. Washington. (New York: Dover Publications 1976).