The Palomar Tradition and Its Place in the Prehistory of Southern California

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Abstract

Sometime between about 1,300 and 1,000 years ago, Encinitas Tradition groups north of central San Diego County in southern California were replaced by a new archaeological entity, heretofore generally subsumed under the Late Period, a time that includes the span of the San Luis Rey Complex. The changes seen in the archaeological record include new settlement systems, new economic foci, and transformations in artifact types. The Late Period in this region has traditionally been presumed to represent the ancestors of the various Takic groups that occupied the region in ethnographic times. It is proposed herein that this broad cultural assemblage be named the Palomar Tradition. Within the Palomar Tradition, two regional expressions, the San Luis Rey and Peninsular patterns, each with several phases, are defined and discussed. Finally, it is proposed that the Palomar Tradition represents people of Yuman biological background who adopted "Californian" traits, including Takic languages, late in time. It is hoped that the concept of the Palomar Tradition, patterns, and phases will illuminate a much more dynamic prehistory than was possible by the use of the simple temporal designation of Late Period.

Introduction

In his synthesis of southern California prehistory, Wallace (1955a) proposed four cultural periods: I, Early Man; II, Milling Stone Assemblages (which was commonly referred to as the Millingstone Horizon, but see Sutton and Gardner [2010]); III, Intermediate Cultures; and IV, Late Prehistoric Cultures. The latter period, also referred to as the Late Period, began about 1,000 BP (read as years ago) and has been characterized as being more complex than the preceding period, with the appearance of elaborate artifact inventories and "distinctive local complexes" that lasted until contact (Wallace 1955a:226).

Warren (1968) proposed the Encinitas Tradition to supplant the Millingstone Horizon (Wallace's [1955a] Period II) throughout southern California (also see Sutton and Gardner 2010). For the Los Angeles Basin, it has been proposed (Sutton 2010a; also see Sutton 2009, 2010b) that the Encinitas Tradition was itself replaced by the Del Rey Tradition, thought to reflect the entry of Takic groups into that region after about 3,500 BP. It was argued that the Del Rey Tradition persisted until contact and so eliminated the need to distinguish the Intermediate and Late periods in the culture history of the Los Angeles Basin (Sutton 2010a).

However, the Encinitas Tradition persisted elsewhere in southern California after 3,500 BP, and its last phases, Greven Knoll III (formally the Sayles Complex, see Sutton and Gardner [2010]) in the northern interior, Pauma II in the southern interior, and La Jolla III along the coast, continued until sometime after 1,300 BP (Sutton and Gardner 2010:37). They were then replaced by assorted "Late" cultures believed to be ancestral to the regional ethnographic groups, a period commonly called the "Late Prehistoric." Sufficient data now exist to formally recast the "Late Prehistoric" period of interior southern California from a time period into an archaeological tradition that better reflects the lives and actions of people and the development of cultural entities.

Thus, it is proposed here that the archaeological materials of the Late Prehistoric Period in southern

Orange County and the northern portion of the interior of southern California south of the Mojave Desert (see Figure 1) be included within a newly designated Palomar Tradition. It is argued that the Palomar Tradition began as "Californian" influences and traits (including Takic languages), expanded into southern Orange County beginning sometime about 1,250 BP, replacing Encinitas (La Jolla III or Topanga III) groups in that area, possibly indicating that the Encinitas Tradition in that area lasted a bit longer than was proposed by Sutton and Gardner (2010). Palomar further expanded into the northern portion of interior southern California after 1,000 BP, replacing Greven Knoll III groups in those regions.

Two patterns within the Palomar Tradition, San Luis Rey and Peninsular, are proposed (see Figure 1). These patterns can be broadly viewed as archaeological cultures, constructs that serve as models of extinct cultural organizations, including all facets of human behavior as reflected in the archaeological record. Thus, patterns are modeled as the equivalent of "cultures" and their phases as more specific expressions of those cultures through time. Each of the patterns would generally be related to each other through the tradition (akin to a European tradition with an English pattern having feudal, imperial, and democratic phases).

The Palomar Tradition is named after the Palomar Mountain area where the San Luis Rey Complex was first identified, a name reinforced by the presence of Tizon Brown Ware pottery (then called Palomar Brown) at many San Luis Rey sites (e.g., Meighan 1959:36-38). In order to avoid directly applying linguistic terms to archaeological entities, the continued usage of the "Shoshonean Tradition" (e.g., Wallace 1962:178; Warren 1968) is discouraged.

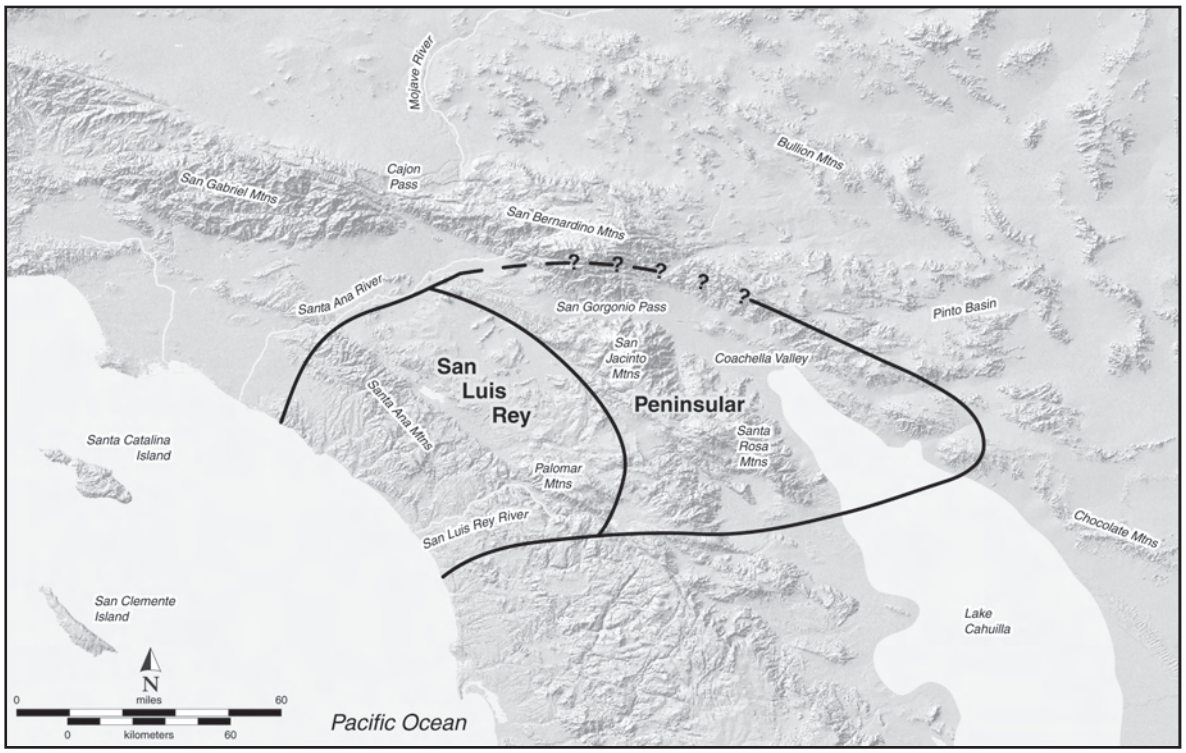

Figure 1. The proposed general geographic extent of the San Luis Rey and Peninsular patterns of the Palomar Tradition in southern California.

A Review of the Late Period in Southern California

The Late Period in southern California has been loosely and poorly defined, but it is generally marked by the appearance of materials that were "more complex" than before (Wallace 1955a:226). More recently, the appearance of small projectile points (e.g., Cottonwood Triangular), reflecting the introduction of bow and arrow technology some 1,500 years ago, has become the defining trait for the beginning of the Late Period (e.g., Koerper et al. 1996:277).

"Late" cultures in southern California were first defined in the Santa Barbara region and named Canaliño by D. B. Rogers (1929). Canaliño was viewed as the archaeological manifestation of the Chumash and was subsequently divided into early, middle, and late (Orr 1943; Harrison 1964; also see Olsen 1930; Curtis 1959), with Late Canaliño beginning about 2,000 BP. For the Los Angeles region, Wallace (1955a:223, 226) suggested that the Late Period consisted of "a number of distinctive local complexes" characterized by a variety of traits that generally dated after 1,000 BP. Walker (1951; also see Wallace 1955a:Table 2) used the term "Malaga Cove IV" to categorize these "late" materials. Warren (1968:2-3) did not specifically define a "Late Period" in southern California, but he did posit the entry of a "Shoshonean Tradition" into the Los Angeles area, perhaps beginning at about 1,350 BP (Warren 1968:Figure 1). At that time, insufficient information was available to characterize the Shoshonean Tradition (Warren 1968:5).

Many archaeologists in southern California have subsumed the Late Period within the Late Holocene that began approximately 3,500 BP. As such, the Late Holocene tends to be employed as a single analytical unit lasting between 3,500 BP and contact, making it very difficult to separate post 1,500 BP materials from earlier materials. Others continue to use the Wallace (1955a) chronology that includes a Late Period, often with little modification or explanation (e.g., Mason and Peterson 1994:18-20; Altschul et al. 1998; Stoll et al. 2003; Ciolek-Torrello et al. 2006; Cleland et al. 2007). Most recently, the Late Period in the Los Angeles Basin has been replaced by the latter three phases (IV-VI) of the Angeles Pattern of the Del Rey Tradition (Sutton 2010a), believed to represent the ancestors of the Takic Gabrielino.

Away from the Los Angeles Basin, several "late complexes" have been defined in southern California, generally believed to be the ancestors of the ethnographic groups in those areas. In northern San Diego County, the San Luis Rey Complex was thought to represent the ancestors of the Takic Luiseño (Meighan 1954; also see True 1966; True et al. 1974). In the northern portion of interior southern California, occupied by the ethnographic Cahuilla, late materials were unnamed and were simply called "Late Prehistoric." In eastern southern California, the Patayan sequence has often been used to designate a late Yuman presence (Waters 1982a, 1982b; also see Rogers 1945; Weide 1976; Schroeder 1979; Warren 1984), and in southern San Diego County, the Cuyamaca Complex (True 1970; also see McDonald and Eighmey 2008), perhaps more broadly known as the Yuman Tradition, is considered to have been ancestral to the ethnographically known Yuman groups of that region.

The Palomar Tradition: A Cultural Context

The Late Prehistoric complexes and assemblages immediately south and east of the Los Angeles Basin (see Figures 1 and 2) are herein combined into the Palomar Tradition. In this article, the term "tradition" is used to denote a "whole culture" tradition consisting of a suite of traits or a cultural assemblage, rather than a "trait tradition" (*sensu* Willey and Phillips 1958:37). The Palomar Tradition is marked by a series of changes in the archaeological record, including differences in technology, settlement and subsistence systems, and perhaps ideology. Under this proposal, the Palomar Tradition replaced the existing Encinitas Tradition in those areas.

Two patterns of the Palomar Tradition are herein defined, San Luis Rey and Peninsular, each with several phases (see Figures 1 and 2, Table 1). A pattern denotes units of cultural similarity in traits that include technology, settlement systems, and mortuary practices, among others. These two patterns are intended to reflect the geographic and trait variability within the Palomar Tradition (see Figure 1), although it is important to note that the boundaries between these patterns are only generally understood at this time. A phase designates subdivisions within a pattern as identified by specific changes in cultural assemblages through time. Phases are identified by their archaeological signatures in components within sites (see Figure 3).

It is argued here that the Palomar Tradition represents the movement of what Meighan (1954:220, 224) called "Californian" traits (e.g., the late artifact assemblage typically associated with the coast) south and east from the Los Angeles Basin beginning sometime about 1,250 BP. This suite of traits includes bow and arrow technology, new rock art styles, new settlement and subsistence systems, and Takic languages. It is proposed that these traits first moved south along the Orange County coast into northern San Diego County, then inland up the San Luis Rey River into the Palomar Mountain area, and then north into the interior portion of southern California (Figure 4). The adoption of these traits by existing Encinitas Tradition (e.g., La Jolla III and Greven Knoll III) groups

<table>
<tr><th>General Dates (BP)</th><th>Tradition</th><th>Southern Orange County</th><th>Interior Valleys</th><th>Peninsular Ranges</th><th>Northern Coachella Valley</th></tr>
<tr><td>to contact</td><td rowspan="5">PALOMAR</td><td colspan="2" rowspan="2">San Luis Rey II</td><td colspan="2">Peninsular III</td></tr>
<tr><td>to 300</td><td colspan="2" rowspan="2">Peninsular II</td></tr>
<tr><td>to 500</td><td colspan="2" rowspan="3">San Luis Rey I</td></tr>
<tr><td>to 750</td><td colspan="2">Peninsular I</td></tr>
<tr><td>to 950</td><td rowspan="3">Greven Knoll III/ Pauma II</td><td colspan="2">Patayan II</td></tr>
<tr><td rowspan="4">ENCINITAS</td><td colspan="2">Patayan I</td></tr>
<tr><td>to 1,250</td><td>La Jolla III</td><td colspan="2">Late Archaic</td></tr>
<tr><td>to 3,000</td><td>La Jolla II</td><td>Greven Knoll II/ Pauma I</td><td colspan="2">Middle Archaic</td></tr>
<tr><td>to 5,000</td><td>La Jolla I</td><td>Greven Knoll I/ Pauma I</td><td colspan="2">Early Archaic</td></tr>
<tr><td>to 8,500</td><td>unknown</td><td colspan="4">San Dieguito</td></tr>
<tr><td>to 10,000</td><td>unknown</td><td>Paleocoastal</td><td colspan="3">Paleoindian</td></tr>
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Figure 2. Proposed new cultural sequence for southern Orange County and interior southern California.

Table 1. Patterns, Phases, Traits, and Linguistic Correlates of the Palomar Tradition of Southern California.

Pattern	Phase	Dates (BP)	Material Culture Traits	Other Traits	Proposed Linguistic Correlates
San Luis Rey	San Luis Rey II	500 to 150	ceramic pipes definitely present; addition of Tizon Brown pottery and ceramic figurines San Luis Rey style of rock art addition of Euroamerican material culture (e.g., glass beads and metal tools)	change of settlement pattern to fewer villages closer to Euroamerican settlements; use of domesticated species from Euroamericans; apparent adoption of the *Chingichngish* religion loss of territory in the interior valleys to Peninsular III groups moving west from the northern Coachella Valley primary pit cremation as the principal mortuary practice, no formal cemeteries	Luiseño (and Juaneño) and Cupeño
	San Luis Rey I	1,250 to 500	transition from La Jollan technology, including a decrease in the use of scrapers and increase in the use of mortars and pestles; appearance of bow and arrow technology (e.g., Cottonwood points), bone awls, stone/shell ornaments, and perhaps ceramic pipes; Obsidian Butte glass; "recognizable" middens; absence of pottery and ceramic figurines Rancho Bernardo style of rock art	small temporary camps, the establishment of a relatively small number of major villages; some focus on coastal resources mortuary customs unclear; perhaps some inhumation in early San Luis Rey I with primary pit cremation increasing to be the principal method by late San Luis Rey I	initial diffusion of proto-Cupan south into Orange County and its adoption by local Yuman groups split of proto-Luiseño and proto-Cupeño and their subsequent development
Peninsular	Peninsular III	300 to 150	loss of lacustrine subsistence technology; greater emphasis on terrestrial resources; continued use of Cottonwood and Desert Side-notched points and Tizon Brown pottery; loss of Tumco Buff and Salton Buff, addition of Colorado Buff; primary use of Obsidian Butte glass; addition of new figurine types loss of San Luis Rey style of rock art, addition of "Cahuilla B" style of rock art addition of some cultigens and Euroamerican material culture (e.g., glass beads and metal tools)	adoption of terrestrial-based subsistence system; full-time villages near springs; movement of some people west into the northern Peninsular Ranges as Lake Cahuilla became desiccated; use of domesticated species obtained from River Yumans and Euroamericans primary pit cremation as the principal mortuary practice, retention of mourning ceremonies	Cahuilla, with three dialects reflecting diffusion east
	Peninsular II	750 to 300	addition of Tizon Brown pottery, ceramic pipes, and ceramic figurines (rare); Tumco Buff and Salton Buff pottery important along the lakeshore; use of glass from the Coso Volcanic Field, Obsidian Butte, and some unknown sources addition of stone fish traps as lake levels fluctuated/declined loss of Rancho Bernardo style of rock art and addition of San Luis Rey style of rock art	three possible settlement models to be tested appearance of the Peninsular Funerary Complex, with secondary cremations placed in "containers" and associated mourning ceremonies	proto-Cahuilla, possibly with Desert Cahuilla splitting off and moving east into the northern Coachella Valley
	Peninsular I	900 to 750	appearance of Cottonwood points, augmenting the existing bow and arrow technology (e.g., Desert Side-notched points) in the northern Coachella Valley; shaft straighteners; retention of existing Patayan II LCB pottery (Tumco Buff and Salton Buff); few stone ornaments or stone pipes; appearance of shell ornaments; use of glass from the Coso Volcanic Field, Obsidian Butte, Bagdad, and unknown sources; bedrock metates but few mortars and pestles; addition of lacustrine subsistence technology Rancho Bernardo style of rock art	movement of people into the northern Coachella Valley from the interior valleys as Lake Cahuilla filled; establishment of major villages along the Lake Cahuilla shoreline; adoption of a lacustrine-based subsistence system primary pit cremation as the principal mortuary practice	split of proto-Cahuilla from proto-Cupan; with proto-Cahuilla moving eastward

in those areas transformed them into San Luis Rey groups. Later, after about 900 BP, Peninsular I groups carried these traits east into the northern Peninsular Ranges (e.g., San Jacinto and Santa Rosa mountains) and northern Coachella Valley. The addition of pottery transformed both the San Luis Rey I and Peninsular I phases into the San Luis Rey II and Peninsular II and III phases.

Sutton (2009:40-51) argued that the movement of "Californian" traits eastward late in time was not the result of a population migration, but rather a diffusion of material culture, ideas, and Takic languages to existing Encinitas Tradition people of Yuman biology. However, it is suggested here that the movement of the Peninsular Pattern still further eastward represents a migration of people of Yuman biology speaking Takic languages into the northern Peninsular Ranges and northern Coachella Valley, a movement whose impetus was the filling of Lake Cahuilla after ca. 1,070 BP. Thus, the prehistory of the proposed Palomar Tradition is complex, and only a broad model of its development can be offered at this time.

The San Luis Rey Pattern of the Palomar Tradition

The initial pattern of the Palomar Tradition is San Luis Rey, marked by a number of changes from the earlier Encinitas Tradition (see Tables 1 and 2), including the appearance of Cottonwood projectile points at about 1,250 BP. San Luis Rey extended from the southern coast of Orange County to the northern coast of San Diego County and into the interior regions from northern San Diego County as far north as Corona (see Figure 4).

San Luis Rey was originally defined as a "late complex" in inland northern San Diego County (Meighan

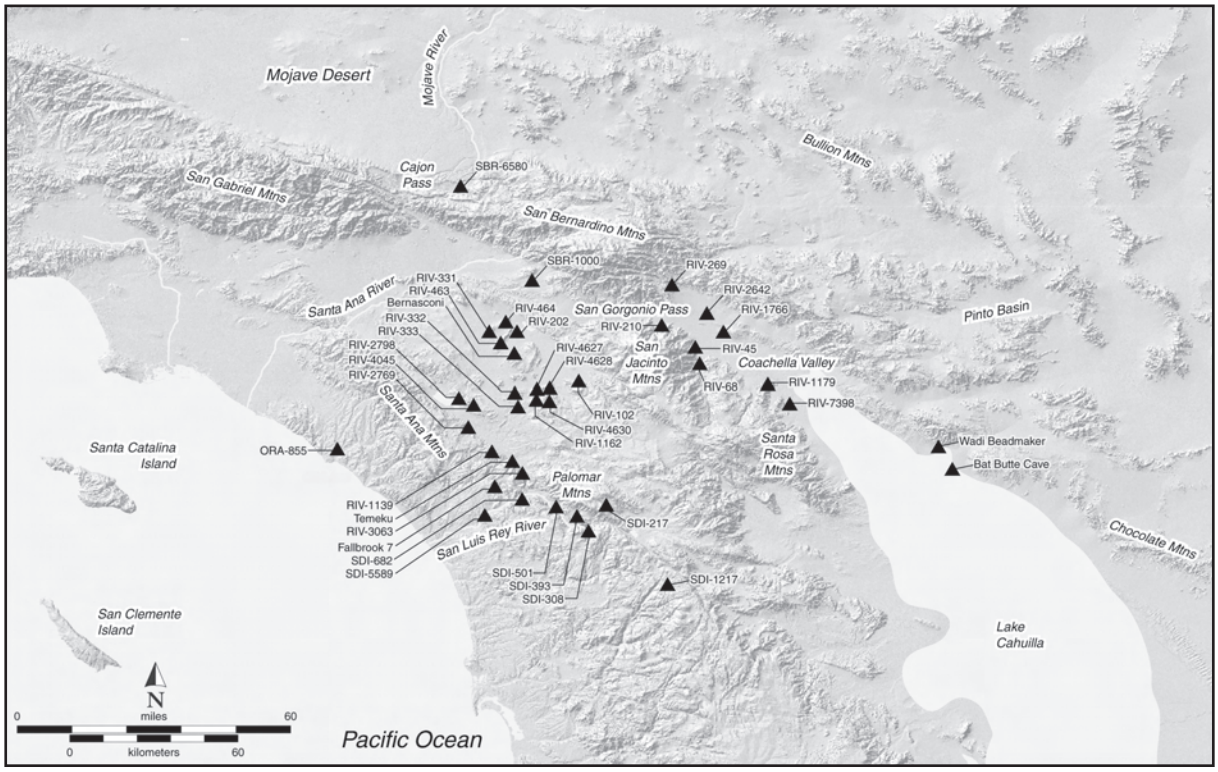

Figure 3. Location of sites and geographic features noted in the text.

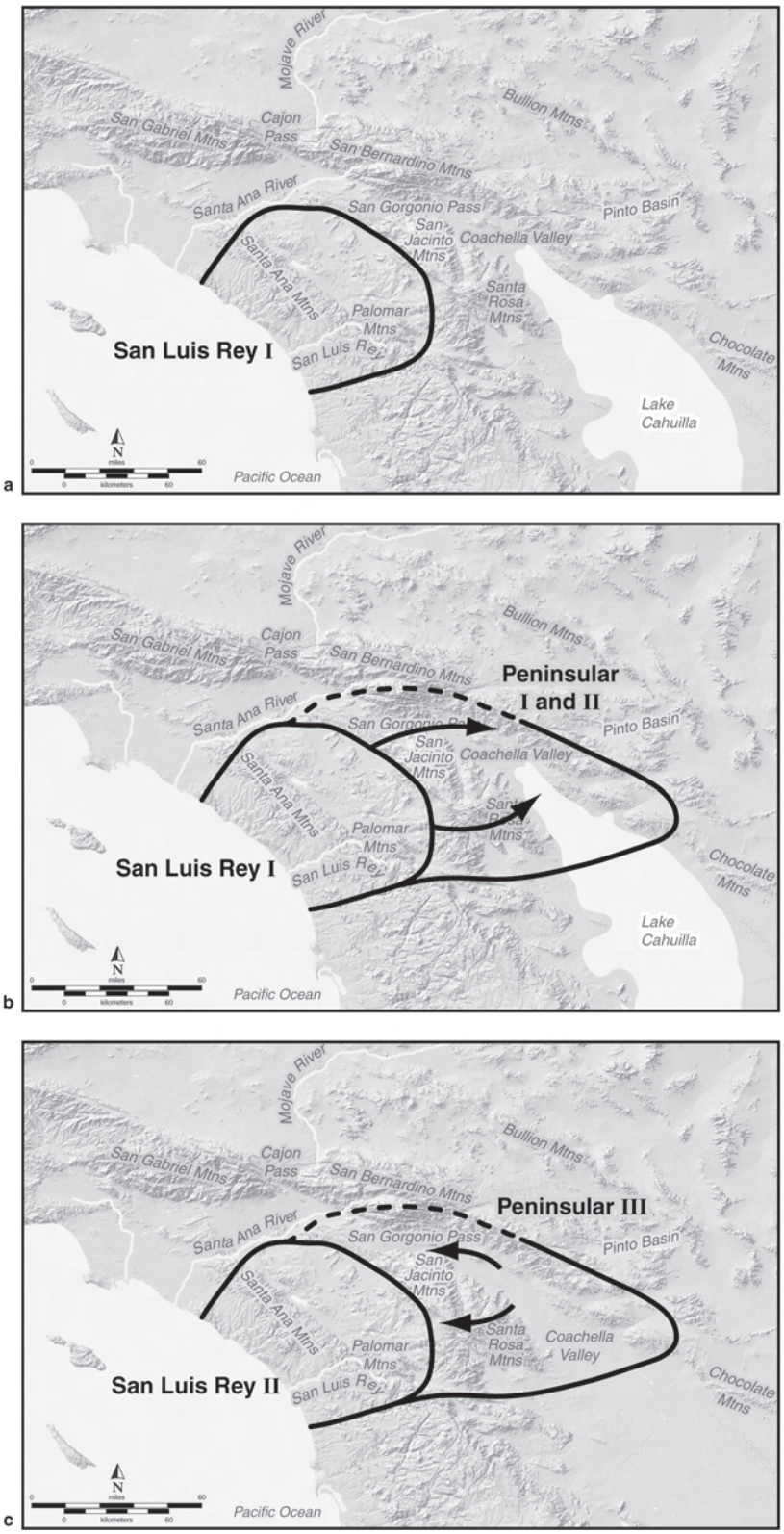

Figure 4. Geographic model of the development of the Palomar Tradition: (a) the initial spread of the San Luis Rey Pattern; (b) the movement of Peninsular I people eastward (arrows) as a result of the formation of Lake Cahuilla and the subsequent development of Peninsular II; (c) the "rebound" (arrows) of Peninsular III (Cahuilla) populations westward into the northern Peninsular Ranges after the desiccation of Lake Cahuilla.

Table 2. General Archaeological Traits of the San Luis Rey Pattern of the Palomar Tradition.

Trait	"Initial" San Luis Rey (cf. Late Encinitas)	San Luis Rey I	San Luis Rey II
Material Culture			
portable slab metates	yes	yes	yes
portable basin metates	yes	yes	–
bedrock metates (slicks)	–	–	yes
flat-surfaced manos	yes	yes	–
rectangular-shaped manos	–	–	yes
convex-shaped manos	yes	yes	yes
edge-ground cobbles and handstones	–	yes	yes
bowl mortars	yes, but rare	yes	yes
bedrock mortars	–	–	yes
pestles	yes, but rare	yes	yes
scraper planes	yes	unclear	–
irregular scrapers	yes	yes	–
small domed scrapers	yes	yes	unknown
large bifaces	yes	yes	yes
projectile points	cf. Elko, but very few	Cottonwood	Cottonwood
hammerstones	yes	yes, but decreasing	yes, but decreasing
anvils	yes	yes	yes
bi-pitted stones	yes	unclear	–
comals	yes	yes	–
shaft straighteners	–	yes	yes
modified bone	yes, but rare	yes	yes
pottery vessels	–	–	yes
stone beads	yes, but rare	yes	yes
shell beads	–	yes	yes
crystals	yes	yes	yes
stone pipes	–	yes, but uncommon	yes, but uncommon
ceramic pipes	–	perhaps	yes (straight type)
ceramic figurines	–	perhaps	yes
Conspicuous Middens	–	–	yes
Rock Art	perhaps some petroglyphs	Rancho Bernardo style (?)	San Luis Rey style
Obsidian Sources	Coso Volcanic Field	Obsidian Butte	Obsidian Butte
Mortuary Customs	primarily inhumation	inhumation, some cremation	primarily cremation
Settlement System	forager-like	forager-like	collector-like
Subsistence Practices	mostly valley resources	increasing use of upland resources	focus on acorns

1954; also see True 1966; True et al. 1974). Meighan (1954) based this assignment on his work at the SDI-501 site near Pala (also see True and Waugh 1983). Prior to Meighan's (1954) reclassification, this cultural assemblage had been considered part of Yuman III (Rogers 1945).

Meighan (1954:224) argued that the San Luis Rey Complex was clearly affiliated with the Californian cultures along the coast to the north and west. Later excavations at Molpa (SDI-308) (True et al. 1974), Tom-Kav (also known as Pankey) (SDI-682) (True et al. 1991), and SDI-593 (Karst 1974) further distinguished the San Luis Rey Complex and equated it with the ethnographically known Luiseño (also see True 1966; Warren 1968:5; True and Waugh 1981, 1982).

Two phases of San Luis Rey (I and II) were defined by Meighan (1954). The beginning of San Luis Rey II, with Tizon Brown pottery (cf. Palomar Brown) (Meighan 1959:36-38; True et al. 1991:24) as its principal marker, was originally dated to about 250 BP (Meighan 1954:Table 2), although Meighan (1954:221) thought pottery could have been introduced as early as 500 BP. True et al. (1974:97) also argued that pottery may have been as early as 500 BP and placed the inception of San Luis Rey II at that time.

The earlier pre-pottery San Luis Rey I was originally thought to span a time between about 600 and 250 BP (Meighan 1954:Table 2), but it became apparent that if San Luis Rey II had begun at about 500 BP, then San Luis Rey I must have begun at some time before 600 BP, perhaps as early as 1,000 BP (True 1993:19), if only to allow time for the development of San Luis Rey I midden deposits (see True et al. 1974:96-97). True et al. (1974) also postulated the existence of a third, still earlier, San Luis Rey phase, called either "Early San Luis Rey" (True at al. 1974: Figure 1) or "proto-San Luis Rey I" (True and Waugh 1982:Figure 2). Waugh (1986:300) also proposed an earlier San Luis Rey entity, calling it "Initial San Luis Rey" and dating it as early as 2,000 BP, as a way to fill the "gap" between the Archaic (Encinitas) and San Luis Rey I and II sequence (see True et al. 1974: Figures 2 and 3; also see True and Waugh 1982:35; Waugh 1986:310). However, it is argued here that this putative "initial" San Luis Rey phase was actually late Encinitas in character (e.g., Sutton and Gardner 2010), as suggested by its artifact assemblage (e.g., scraper planes and a few large points) (see Waugh 1986:Table 6.11).

The San Luis Rey Complex was originally identified only in the upper San Luis Rey River Valley (Meighan 1954:222; also see True et al. 1974; True and Waugh 1981; Fulmer 1985; True 1993). Subsequent investigations at Temeku (McCown 1955), Fallbrook 7 (McCown 1964), and Cole Canyon (CA-RIV-1139) north of Temecula (Keller and McCarthy 1989) expanded the range of San Luis Rey north into the southern Santa Ana Mountains.

Research in the interior valleys east of the Santa Ana Mountains further extended the range of San Luis Rey, with San Luis Rey components identified at the Christensen Webb site (CA-RIV-332) near Sun City (Kowta et al. 1965), CA- RIV-2769 south of Lake Elsinore (McCarthy 1987), Locus A at the Lake Elsinore site (CA-RIV-2798) (Grenda 1997), the CA-RIV-4045 site near Lake Elsinore (Hampson 1992), and possibly the Bernasconi site near Perris (Goodman and Raskoff 1964). Excavations in the Lake Perris area also identified several sites that were considered part of the San Luis Rey Complex, including CA-RIV-463 (Wilke 1974a), CA-RIV-331 (O'Brien 1974), CA-RIV-202 (Bettinger 1974), and CA-RIV-464 (Robarchek 1974). In nearby Hemet, additional sites containing components attributable to San Luis Rey I and II have been investigated, including CA-RIV-1162 (Williams 2001),CA-RIV-4627 (Robinson 2001), CA-RIV-4628 (Horne 2001a), CA-RIV-4930 (Horne 2001b), and CA-RIV-102 (Demcak et al. 1992; also see Langenwalter 1980). Interestingly, CA-RIV-4930 also contained a "maze" pictograph

thought to be of the Rancho Bernardo style (see Smith and Freers 1994:74), and RIV-102 contained apparent San Luis Rey style pictographs and a few petroglyphs (see Smith and Freers 1994:48, 49, 84).

To the south of Palomar Mountain, San Luis Rey materials appear to be present at Williams Ranch (CA-SDI-1217) (Fritz et al. 1977) and in Rancho Bernardo (Kyle 1988). The boundary of San Luis Rey was extended further west to the coast of northern San Diego County (Robbins-Wade 1988).

Several other archaeological entities have been associated with the prehistoric Luiseño and by extension, the San Luis Rey Complex, including the Intermontane Phase in the northern Santa Ana Mountains (Hudson 1969) and the Irvine Complex in the San Joaquin Hills (Ross 1969, 1970). Sutton (2010a:25) argued that both the Intermontane Phase and Irvine Complex are part of the Del Rey Tradition linked to the Gabrielino and are not part of the San Luis Rey Complex.

The San Luis Rey Pattern, Phase I

San Luis Rey I reflects a number of changes in the archaeological record over the earlier Encinitas Tradition (see Sutton and Gardner 2010). The transition from Encinitas technologies (see Table 2) includes the possible appearance of bedrock metates (slicks), although this may represent either an increase in their use or just a shift from portable to stationary metates. Other changes include a decrease in the use of scrapers, the appearance of occasional mortars with associated manos and pestles, the appearance of Cottonwood Triangular arrow points, bone awls, and stone ornaments (Meighan 1954:Table 2; also see True and Waugh 1981:87); in essence, this marks the arrival of late coastal southern California material culture (see Meighan 1954:224). In addition, "markedly conspicuous" (e.g., presumably black from charcoal) middens appear (True and Waugh 1981:102). The Encinitas forager-like settlement/subsistence system continued, at least for a time, but upland resources were increasingly used.

The San Luis Rey I pattern is earliest in southern Orange County, coincident with the diffusion of Cottonwood points into the region at about 1,250 BP (e.g., Koerper et al. 1996). San Luis Rey I sites appear to date a bit later in the interior, perhaps reflecting the diffusion of Cottonwood points into that region later in time. In addition to the San Luis Rey I sites identified by Meighan, others are known along the San Luis Rey River (Fulmer 1985; True 1993:Table 3; Moratto et al. 1994), along Frey Creek (True and Waugh 1981), at Palomar Mountain (Waugh 1986), in the Camp Pendleton area (see Rosenthal et al. 2001: Table 8), and along the northern coast of San Diego County (Koerper et al. 1992; also see Rosenthal et al. 2010:Table 10). Waugh (1986:317) suggested that the evidence from the Relleno (CA-RIV-3063) and Silver Crest (CA-SDI-217) sites on Palomar Mountain could reflect the entry of the "Takic" into the area. It seems possible that the initial expansion of Palomar traits into southern Orange County could be reflected in the distribution of the Juaneño, whose ancestors may have been the initial San Luis Rey I people.

San Luis Rey I Material Culture

Perhaps the major technological marker for San Luis Rey I is the Cottonwood Triangular projectile point. This point series is assumed to reflect the arrival of bow and arrow technology into the region, replacing (or at least augmenting) the preexisting atlatl/dart system. As projectile points are relatively rare in preceding Encinitas components, the bow and arrow reflects a major change in technology and probably in subsistence systems as well (see below).

It is generally believed that the bow and arrow diffused into coastal southern California from the Mojave Desert, probably beginning about 1,600 BP (but see Koerper et al. 1996:276). The Rose Spring series has

been identified as the initial arrow point in the Mojave Desert (see Sutton et al. 2007), and it appears that the earliest arrow points in the Los Angeles Basin were Rose Spring or Marymount points (Sutton 2010a:17). Very few of these point types have been found in the San Luis Rey region, supporting the idea that the appearance of Cottonwood points indicates the initial appearance of the bow and arrow and not just a change in arrow point types.

The Cottonwood series (Lanning 1963:252-253; also see Riddell 1951:17; Riddell and Riddell 1956:30; Heizer and Hester 1978:11; Thomas 1981:16-17) consists of small, thin, unnotched points that are generally triangular or lanceolate in shape. Lanning (1963:252; also see Riddell 1951:Figure 1; Waugh 1988) further divided the triangular type into three major base forms: (1) straight, (2) concave, and (3) convex.

The three basic Cottonwood types may vary sequentially in time. The leaf-shaped type, Lanning (1963:276) argued, was earlier than the triangular type and ranged in size, with the smallest of the type dating to protohistoric and historic times. Koerper et al. (1996:269-271) later made the same argument for coastal southern California. Lanning (1963:276) suggested that the triangular type, "especially the concave-base variety, is limited to protohistoric and historic times on the south coast" of California. Based on examples from northern San Diego County, Waugh (1988:112) proposed that the "deep" concave-based Cottonwood variant dated later than the other triangular forms. In summarizing a possible sequence of Cottonwood types in southern California, then, the leaf-shaped type would have originated first, followed quickly by both the straight-based and shallow concave-based forms, and finally by deep concave-based forms. Each of the types and varieties would have persisted until contact. Thus, it is possible that the presence of the leaf-shaped type in isolation could be a marker for San Luis Rey I components.

Heizer and Hester (1978:11) noted that Cottonwood points tend to co-occur with Desert Side-notched points in the Great Basin. However, the two series have an uneven distribution in southern California, with Cottonwood types being the dominant and perhaps nearly exclusive types found in ethnographic Takic territory (True 1966; Koerper and Drover 1983; Sutton 1989, 2009; Koerper et al. 1996:294), with Desert Side-notched points being associated with Numic populations in the Great Basin (see Sutton 1987:52-57; Delacorte 2008).

South of the Los Angeles/Orange County region, where Cottonwood types dominate, small side-notched points (cf. Desert Side-notched) do commonly occur and were proposed, along with other traits, as a marker to separate the Takic Luiseño from the Yuman Ipai (Diegueño) (True 1966:280). True (1966:280; also see Koerper et al. 1996:274) noted that such small side-notched projectile points "turned out to be practically nonexistent in the Shoshonean 'Luiseño' components and were significantly diagnostic in the Yuman 'Diegueño' components." This is essentially the same pattern that had been observed in other Takic areas (e.g., Keller and McCarthy 1989; Sutton 1989). Since that time, however, small side-notched projectile points have since been recovered from sites within ethnographic Luiseño territory on Camp Pendleton (Reddy 1997, 2000; Byrd 1998) and elsewhere, suggesting that this idea should be reexamined.

A more recent study of the distribution of Desert Side-notched points in San Diego County (Pigniolo 2004) showed general agreement with True (1966) but also documented a paucity of such points along the coastal zone of Yuman territory. This suggests that Desert Side-notched points may be less of an ethnic marker and more of a functional and/or temporal marker. It also suggests that Desert Side-notched points may have entered the region from the east.

Thus, it is argued herein that a dominance of Cottonwood points and a paucity of Desert Side-notched points consititute a marker for the Palomar Tradition. The near absence of earlier (Rose Spring and Marymount) arrow points in the San Luis Rey area suggests bow and arrow technology was not present before about 1,250 BP.

San Luis Rey I is also marked by a change in other technologies that appear to reflect new subsistence practices from the preceding Encinitas Tradition (see Table 2). This includes a significant decrease in the use of scrapers, an apparent increase in the use of bedrock milling features and pestles, and the appearance of bedrock milling features that contain multiple milling elements (slicks and mortars) on the same outcrop (True and Waugh 1981:107-109). In addition, San Luis Rey I mortars tend to be shallower than those found in San Luis Rey II components (True and Waugh 1981:107-109). Some portable milling tools, such as manos and metates, are also known (True and Waugh 1981:102).

Bone awls also begin to appear in greater numbers during San Luis Rey I (e.g., Meighan 1954:Table 2; Ross 1969), perhaps reflecting a greater reliance on basketry. Ornaments of stone (e.g., pendants) and shell (e.g., *Olivella* beads) typical of "Californian" culture also begin to appear in significant numbers (Meighan 1954:220, Table 2). Shaft straighteners may also be present in San Luis Rey I assemblages (Waugh 1986:Table 6.11).

Ceramic pipes appear in the archaeological record in southern California at about 1,000 BP (e.g., Hudson 1969; Ross 1969:58) and may have been introduced from the Southwest (see Bonner 1985:178). The typical form in the San Luis Rey (Luiseño) area is the straight pipe (Sparkman 1908:210; Rogers 1936:21, 50, Plate 7a; True 1966:239; Bean and Shipek 1978:553), with the bow pipe form typically associated with Yuman groups (e.g., Spier 1923; True 1966:239-240; Underwood 2004; but see Schaefer 1995a:IX-46). However, bow style pipes are not that uncommon in the San Luis Rey area (e.g., McCown 1955:17, Plate 25; True et al. 1974:65; True et al. 1991:24, Figure 38a, b), significantly weakening this possible association.

As noted by True (1966:239-240), the origin of ceramic pipes among the Luiseño is uncertain, and it is unclear whether ceramic pipes were used during the San Luis Rey I phase (see True et al. 1974:97). Stone pipes first appeared in southern California by about 3,500 BP (see Bonner 1985:174) and are present in small numbers in San Luis Rey I (e.g., True 1966:148).

Nearly all the obsidian used by Encinitas Tradition groups and peoples of the Angeles I and II phases of the Del Rey Tradition in the Los Angeles Basin originated from geologic sources to the north, primarily the Coso Volcanic Field (Sutton 2010a:18). Sometime about 1,500 BP, the trade of Coso obsidian decreased dramatically in the southern San Joaquin Valley (Sutton and DesLauriers 2002), the Mojave Desert (Sutton 1996:240; Sutton et al. 2007:244), and along the Santa Barbara Coast (e.g., Ericson and Meighan 1984:149). After that time, people in southern California adjusted to this problem by using glass from the Obsidian Butte source located in Imperial County (Koerper et al. 2002:69; also see Koerper et al. 1986). In San Diego County, Obsidian Butte glass seems to appear more frequently in the interior than along the coast (Hughes and True 1985:333; Laylander and Christenson 1988).

Several other traits are conspicuous by their absence, including pottery and (apparently) ceramic figurines (True 1957:295; Ross 1969:59; but see Waugh 1986:Table 6.11). It also seems likely that San Luis Rey I people did not produce rock art (True 1954:69), although some undated petroglyphs are known in the area.

San Luis Rey I Mortuary Customs

The mortuary customs of San Luis Rey I are poorly understood. Cremation is widely considered to be a

trait typically associated with Takic groups in southern California (e.g., King and Blackburn 1978:535), and it has been suggested (King 1990:199; also see Gamble and Russell 2002:123) that cremation appeared in southern California about 3,500 BP, related to the arrival of Takic groups. However, it appears that cremation probably did not appear in the Los Angeles Basin until about 2,600 BP, and even then, inhumation remained the primary mortuary treatment through contact times (see Sutton 2010a:18).

Archaeologically, there is little evidence of mortuary practices during San Luis Rey I, and it has been generally assumed that cremation was employed. On the other hand, Allen (1994:156, 159) argued that the practice of exclusive cremation appears to have been "a Yuman trait that was adopted by certain Shoshonean groups" late in time. Sutton (2009:59) made a similar argument, suggesting that the groups that would become speakers of the Cupan languages were biological Yumans who had retained the trait of cremation.

For Orange County, Hudson (1969:17) concluded that while cremations were present at a few sites, "the majority of [sites]…have provided a consistent pattern of flexed burials and no cremations," further noting that cremations constituted "only four percent of the total number of graves." Cremations from Orange County, he believed, were in stone vessels, a trait ostensibly linking them to the San Luis Rey II phase (e.g., Meighan 1954; True et al. 1991). Hudson (1969:21-22) reported that cremations were present inland but were rare on the coast and speculated that the practices of inhumation and cremation "were contemporaneous among Shoshonean [Takic] inhabitants of Orange County," citing "a flexed burial complex in the coastal and prairie provinces, and a cremation complex in the intermediate mountain and foothill province" (Hudson 1969:22). He further speculated that cremation had diffused from the south (Hudson 1969:22). Citing Harrington (1955:27), Hudson (1969:57) also suggested that the ethnographic method of preparing a body for cremation (wrapping it in a flexed position) evolved from the former practice of burying a body in a flexed position.

In sum, it is suggested that during early San Luis Rey I, primary inhumation remained important, a holdover from Encinitas practices, with primary pit cremation becoming more popular through time. By the end of San Luis Rey I, primary pit cremation seems to have become the principal mortuary custom. This hypothesis awaits testing.

San Luis Rey I Settlement Systems

Little information regarding San Luis Rey settlement patterns existed when the complex was first proposed (Meighan 1954), but this has since improved. True and Waugh (1981:102) observed that San Luis Rey I sites tended to be located along "presently viable water supplies" and thought that sites along creeks were generalized camps contemporaneously occupied, each by a single lineage (True and Waugh 1981:109). Based on data from the Palomar Mountain area, True and Waugh (1982) later proposed that during the early part of San Luis Rey I, settlement "was diffuse, scattered in nature, and characterized by considerable movement" that developed into a series of seasonal settlements along major tributaries, with the eventual establishment of territories defined by the watersheds of those individual tributaries (True and Waugh 1982:35).

True and Waugh (1982:36) suggested that a shift to larger and more sedentary settlements, typically located where streams emerged from canyons, took place either in late San Luis Rey I or early San Luis Rey II and that a formalized winter-summer seasonal round became established at that same time. This model predicted the presence of a relatively large number of small sites dispersed across the landscape during early San Luis Rey I and a smaller number of larger sites

located at the mouths of major tributaries in the latter part of San Luis Rey I.

In the inland valleys to the north of the Palomar Mountain area, there appears to have been a major settlement shift during San Luis Rey I (ca. 800 BP), with sporadic use changing to intensive use (Wilke 1971:161). Jefferson (1971:167, 1974:6-7) suggested that this shift could have been due to an attempt to maintain "population/resource equilibrium" in the face of some variable, either a deteriorating environment resulting in resource shortages or population pressure from new groups moving into the area from the coast and/or from the Lake Cahuilla area.

Along the coast of northern San Diego County (e.g., the Camp Pendleton area), there appears to have been a major change in settlement at about 1,000 BP, with an increase in the occupation of the major drainages (e.g., Foster 1999:77). Most Late Holocene sites in this area appear to date after 1,300 BP (Byrd and Reddy 2002:47, 52) and can be divided into two basic site types: (1) shell scatters with associated artifacts and other faunal remains situated on small drainages; and (2) limited activity sites located on coastal terraces away from water and containing shell but little else. Byrd and Reddy (2002:53) reported that after about 800 BP, site density increased, major residential sites were located closer to each other, and the number and diversity of specialized sites increased. This suggested to Byrd and Reddy (2002:53) that people became more sedentary, that group territories became smaller, and that exploitation of littoral resources increased. Aside from the littoral resources, this pattern seems similar to that reported by True and Waugh (1982) for San Luis Rey II.

Along the Santa Margarita River to the south, York (2006) reported a Late Archaic occupation (La Jolla III, see Sutton and Gardner [2010]) with a settlement pattern of stable residential sites with temporary camps at resource procurement localities (York 2006:49-50), perhaps akin to a collector-like system (*sensu* Binford 1980). However, at the beginning of San Luis Rey I, the settlement system of the Late Archaic appears to have changed, with substantially increased mobility and the absence of stable residential localities (York 2006:50), more similar to a forager system (e.g., Rosenthal et al. 2001:194). This shift has been linked to changing environmental conditions (Rosenthal et al. 2001; Byrd and Reddy 2002; York 2006; Byrd and Raab 2007) and an expansion of resource exploitation, particularly of upland habitats.

San Luis Rey I Subsistence Practices

Based on the information gathered from survey and excavation projects in the 1940s and 1950s, San Luis Rey subsistence practices were thought to have focused on small game hunting and the gathering of seeds and nuts, especially acorns (Meighan 1954). True and Waugh (1982:35) suggested that early San Luis Rey I would have had a generalized subsistence pattern coupled with a mobile settlement pattern, but they also suggest that the latter part of San Luis Rey I would have developed a more formalized "winter to summer camp seasonal round" (True and Waugh 1982:36), associated with a more sedentary settlement pattern (see above).

It is possible that lagomorph hunting played an important role in San Luis Rey subsistence, perhaps linked to the appearance of Cottonwood points. Cottontail rabbits (cf. *Sylvilagus audubonii*) were generally hunted by individuals using bows and arrows, throwing sticks, nets, snares, and fire (e.g., Gifford 1931; Bean 1972:59; Luomala 1978), being much more difficult to capture by communal drives than the black-tailed jackrabbit (*Lepus californicus*). The absence of both lagomorphs and Cottonwood points from the southern Channel Islands may support this suggestion. It is also possible that the bow and arrow increased the efficiency of hunting other animals as well, such as deer (*Odocoileus hemionus*).

The role of acorns (*Quercus* sp.) is unclear, although True (1993:9) suggested that the relatively fewer mortars in San Luis Rey I components (with more in San Luis Rey II components) implied a lesser use of acorns during San Luis Rey I. Inland valley San Luis Rey I sites have contained evidence of the use of acorns, juniper (*Juniperus* sp.), holly-leaf cherry (*Prunus ilicifolia*), and lagomorphs (Wilke 1971:158-159).

Along the northern San Diego County coast, there appears to have been a major change in subsistence by about 1,000 BP (Foster 1999:77-78; Wake 1999:60; Rosenthal et al. 2001). Economies that had previously focused on marine resources appear to have shifted to a terrestrial focus after about 1,000 BP (Rosenthal et al. 2001:179), although marine resources continued to be used and bean clams (*Donax gouldii*) appear to have greatly increased in importance. Interestingly, the use of *Donax* along the Pacific Coast appears to be primarily restricted to later times in the San Luis Rey River area (Laylander and Saunders 1993:314). Other major changes include a decrease in fish species diversity, a major decrease in waterfowl, and an increase in terrestrial mammal utilization (Wake 1999:59). The reasons for these shifts are unclear but may involve some sort of environmental change.

San Luis Rey I: A Discussion

The San Luis Rey I phase spanned southern coastal Orange County, northern San Diego County, and far western Riverside County (see Figure 4a). The beginning of San Luis Rey I is herein placed at about 1,250 BP in the northwestern portion of its range, generally based on the first appearance of Cottonwood points in southern Orange County (e.g., Koerper et al. 1996:269). It seems that San Luis Rey I assemblages appear progressively later as one moves south and east, beginning between perhaps 1,000 and 800 BP in northern San Diego County and northern interior southern California.

It is suggested here that San Luis Rey I resulted from the movement of some Angeles IV (see Sutton 2010a) traits south. These traits would have included the bow and arrow tipped with Cottonwood points and the diffusion of a proto-Cupan language into existing Yuman populations (discussed in greater detail below). It seems possible that the movement of bow and arrow technology may have been the impetus for the language diffusion, perhaps even associated with some sort of warfare (e.g. Sutton 1986).

Climate change may also have been an important impetus for the initial development of the San Luis Rey pattern. Beginning about 1,200 years ago, a major period of warming and drought occurred, called the Medieval Climatic Anomaly (MCA) (Lamb 1965; Stine 1994; Jones et al. 1999; Gardner 2007). The MCA affected much of western North America, including southern California (e.g., Koerper et al. 2002:79), causing populations to adjust to shifting environmental conditions. The timing and intensity of the climatic changes during the MCA varied regionally, and while the warmest phases appear to have taken place during the mid-twelfth century (Anderson and Smith 1991:40; Graumlich 1993:253), extended droughts attributable to the MCA occurred at various times between 1,200 and 650 BP, interspersed with brief periods of climatic amelioration (Graumlich 1993:254; also see Gardner 2007:19-20). The specific impacts of the MCA remain unclear, although there are striking regional correlations between drought and changes in subsistence, population demographics, exchange systems, and health (Raab and Larson 1997; Jones et al. 1999; Gardner 2007; also see Kennett and Kennett 2000:391-392). Perhaps the appearance of the San Luis Rey pattern represents an episode of abrupt change within a pattern of "punctuated equilibrium" (e.g., Raab and Larson 1997).

Boxt et al. (1999) suggested that there may have been increased rainfall in southern California after about 800 BP, perhaps resulting in a variety of changes in

plant and animal communities. It is possible that such changes could have resulted in making interior regions more "attractive" to human populations such that they would have moved inland from the coast. This obviously remains an important research topic.

Little is actually known of San Luis Rey I settlement and subsistence. It seems possible that San Luis Rey I groups along the coast were organized differently from those inland since sites nearer the coast generally contain fewer artifacts overall, particularly milling tools and projectile points (see Rosenthal et al. 2001: Tables 8 and 10). In addition, coastal sites have fewer remains of terrestrial animals and more of shellfish (Rosenthal et al. 2001:Table 9) than sites in the interior. It is not clear whether this difference reflects two different groups of San Luis Rey people (e.g., coastal and inland) or simply the seasonal variation of a single mobile group (e.g., living on the coast for part of the year and living in the interior the other part).

The San Luis Rey Pattern, Phase II

A number of changes in the archaeological record mark the beginning of San Luis Rey II (see Tables 1 and 2), including differences in material culture, mortuary customs, settlement and subsistence systems, and the appearance of rock art (True et al. 1991:9-11; also see True 1954). In addition, San Luis Rey II sites (or components) have "markedly conspicuous" middens (True and Waugh 1981:102) and are generally larger than San Luis Rey I sites/components (True and Waugh 1981:87).

San Luis Rey II Material Culture

While much of the material culture present in the San Luis Rey I phase continued into San Luis Rey II (Meighan 1954:Table 2; also see Table 2), there were several important changes. Most notable was the appearance of Tizon Brown pottery and small quantities of Lower Colorado Buff Ware (LCB) pottery, the latter of which was clearly imported from the east. Deep concave base Cottonwood points (e.g., Waugh 1988:112), small numbers of steatite shaft straighteners (e.g., Meighan 1954:Table 2; True 1966:240-241), and Euroamerican materials (e.g., glass beads and metal knives) also appeared during San Luis Rey II. Other characteristics of San Luis Rey II sites/components include an increase in bedrock milling features with mortars, metates, and slicks and the appearance of cupule boulders and rock rings (True et al. 1991:8-11, 42-44; True 1993:9, Table 3; also see True et al. 1974:97-102).

Perhaps the most conspicuous trait of San Luis Rey II was the appearance of pottery vessels (Meighan 1954; True 1957; True et al. 1991:24, 46). Most of this pottery is brownware, originally called Palomar Brown (Meighan 1959:36-38). While Palomar Brown was classified by some as a type within Tizon Brown Ware (Euler 1959; May 1978; also see Colton 1958; Dobyns and Euler 1958), all brownwares in the southern California region are now generally combined into Tizon Brown (e.g., Lyneis 1988; Griset 1990), Southern California Brown (Van Camp 1979; Griset 1996), or California Desert Intermediate Ware (Griset 2010). In this article, the general term Tizon Brown will be used for San Luis Rey II brown pottery.

Tizon Brown was made by the paddle-and-anvil technique using residual clays that contain considerable iron (turning the paste brown when fired), mica, quartz, and feldspar. Vessel forms included plates and round-bottomed jars and bowls. After European contact, handles, flat bottoms, and thicker walled vessels were added (Griset 1990). Griset (1996:271, 274) observed that the frequency of pottery declined moving from south to north and that LCB pottery appeared later than Tizon Brown west of Lake Cahuilla.

The origin of Tizon Brown pottery in southern California is unclear (Griset 1996:272). Rogers (1936:21) believed that pottery technology diffused into the

Luiseño area from the south late in time and noted that pottery was not present at northern Luiseño sites. Rogers (1936:21) further reported that Luiseño pottery was undecorated and that the Luiseño made "very few [ceramic] pipes." Wallace (1955a:226) suggested that the diffusion of pottery technology north was hampered by the presence and utility of steatite vessels in southern California. More recently, Griset (2008:99) observed that in southern California, a "true pottery tradition extends back only until about A.D. 600" and that there was no reason to believe that the tradition was local. This suggests that the idea for pottery was imported, probably from the south, but that Tizon Brown was produced locally.

The basic projectile point type (Cottonwood Triangular) remained the same between San Luis Rey I and II. However, the points were "smaller and lighter" in San Luis Rey II (True et al. 1974:100, Table 6). It is possible that deep indented base Cottonwood points first appeared during San Luis Rey II, as Waugh (1988:112) proposed that they dated later than the other triangular forms (also see Lanning 1963:276). Desert Side-notched forms are generally rare.

It is possible that ceramic figurines first appeared in the San Luis Rey II phase (see True 1957:295), although Waugh (1986:Table 6.11) thought they were already present in San Luis Rey I. Straight ceramic pipes, possibly present in San Luis Rey I, are definitely present in San Luis Rey II, and stone pipes are also present in small numbers (e.g., True 1966:148). Interestingly, bow type pipes were found at the Temeku site (McCown 1955:17, Plate 25). Portable mortars are rare (True et al. 1991:23), but it is possible that hopper mortars were introduced at this time (True et al. 1974:102). It is also possible that mano morphology changed from "flat-surfaced" to "rectangular-shaped" (Waugh 1986:Table 6.11). Shell beads became more common. Obsidian is generally rare (True et al. 1991:51) and was obtained from the Obsidian Butte source (Hughes and True 1985:Table 2, 333).

San Luis Rey II Mortuary Customs

Primary cremation in pits appears to have become the principal mortuary practice by the end of San Luis Rey I and through San Luis Rey II, generally matching that of the ethnographic Luiseño who cremated their dead in shallow, oval depressions, shorter than the length of the body (Davis 1920:101, 1921). After the body was burned, the remains were placed in a pit, and all evidence of the cremation was obliterated so that it would not be visible on the surface. True (1966:218) reported that the locations of cremations were not marked and that no formal cemeteries existed in the Luiseño area.

San Luis Rey II Settlement Systems

Based on data from the Palomar Mountain area, True and Waugh (1981:113, 1982:36; also see True et al. 1991:47; True 1993:16) suggested that by the beginning of San Luis Rey II, the system of dispersed settlements of San Luis Rey I had developed into a bipolar system of larger and more sedentary winter and summer villages near permanent water. In this latter system, lowland winter villages would be located near the river valley while upland summer villages would be located high on the mountain.

During the latter part of San Luis Rey II, the "one village per drainage" pattern shifted to a more complex, consolidated village pattern. This shift was probably stimulated by contact with Euroamerican missionaries and settlers and by factors such as drought (Rowntree 1985) and resource competition. The role of smaller, subsidiary sites in this system is unclear (True et al. 1991:47). Some level of rock art appears to be associated with each major settlement (True 1954:68). Along the lower reaches of the San Luis Rey River, True (1993:17) reported that permanent villages were located near springs. Nearby, Wallace (1960) discovered several sites with San Luis Rey II components with associated San Luis Rey style rock art (Wallace 1960:285, 287).

As in the interior, the coastal San Luis Rey II settlement system appears to have changed from the "forager-like" pattern of San Luis Rey I to a more sedentary system (e.g., collector-like) with large, permanent villages (York 2006:51). Byrd and Reddy (1999:34, 49) reported that the number of specialized smaller sites increased after about 500 BP and argued that this trend reflected increasing intensification.

This late San Luis Rey II village-based settlement pattern is similar to that of ethnohistorically documented Luiseño settlements. Oxendine (1983:56-57, 159-160) reported a Luiseño settlement pattern that consisted of permanent villages with sedentary populations, located in a valley near water and in an ecotone, with smaller temporary camps used for special purposes. She suggested that the bipolar settlement pattern proposed by True et al. (1974) was restricted to those areas with marked changes in elevation (Oxendine 1983:33). Eventually, Luiseño populations shifted to missions (Oxendine 1983:99).

San Luis Rey II Subsistence Practices

True et al. (1991:47) tentatively suggested that the upland element of the bipolar San Luis Rey II settlement system (see above) had a subsistence focus on acorns, while the lowland system included a greater variety of resources, including acorns. This idea was supported by an increase in the percentage of mortars in San Luis Rey II bedrock milling features (True 1993:9). It is also possible that the adoption of pottery enabled a new cooking method to "detoxify" acorns (see Mack 2003:31), as the Luiseño cooked leached acorn meal in pottery vessels (Sparkman 1908:194). This is all suggestive of decreasing mobility and increasing resource intensification (e.g., Horne 2001c:2), although Hale (2006) argued that acorn intensification did not occur until late in northern San Diego County.

Other San Luis Rey II subsistence data include an increase in the exploitation of large animals (True et al. 1991:48), the incorporation of nonnative plants and animals, and a decrease in the use of coastal resources. Nevertheless, there is some evidence of the use of marine resources (shellfish) throughout the San Luis Rey Pattern (True et al. 1991:47-48), with variations in the species and quantity of shell by site. Along the coast, there was a "continuing trend toward the use of large mammals" (York 2006:53).

Rock Art in San Luis Rey II

The San Luis Rey rock art style of pictographs (Hedges 2002; also see Steward 1929; True 1954; Hedges 1973a; Heizer and Clewlow 1973) seems to be a San Luis Rey II manifestation. The San Luis Rey style consists of design elements that include zigzags, chevrons, straight lines, diamond chains, and handprints, predominately in red (True 1954:Figure 29; Freers 1998; Hedges 2002:27). The style was originally defined as being of "Luiseño" origin (Hedges 1970) and is associated with the "ethnographic territories of the Luiseño, Cahuilla, and Cupeño cultures with a few extensions south into Kumeyaay territory" (Hedges 2002:27-28; also see Minor 1973:30-32; Smith and Freers 1994; Freers 1998:58). San Luis Rey style pictographs are generally very well preserved, suggesting that the art is relatively recent, perhaps after 700 BP (Steward 1929:233; True 1954:69; Heizer and Clewlow 1973:40). San Luis Rey style art has been found at many San Luis Rey II sites and has also been identified at Tahquitz Canyon (CA-RIV-45) (Bean et al. 1995:XIX-16; also see Wilke et al. 1975).

Much of the rock art of this area has been associated with initiation ceremonies of girls, and sometimes boys (Minor 1973:30-32). There is evidence to suggest, however, that at least some of the art could be related to the appearance of the *Chingichngish* religion among the Luiseño within the last several hundred years (Hedges 1973a:9; Minor 1973:32-33). Sand paintings may also be associated with initiation rites and the *Chingichngish* religion (Bean and Shipek 1978:556; Cohen 1987).

A second rock art style, called Rancho Bernardo, is also known in the same general area (see Hedges 1973a, 1979, 2002:28-30). The Rancho Bernardo style consists of red pictographs and "maze-like" petroglyphs. The geographic distribution of the Rancho Bernardo style overlaps with that of the San Luis Rey style (Hedges 2002:30, Figure 1), but when the two are present at the same site, the San Luis Rey elements are superimposed on the Rancho Bernardo elements (see Hedges 2002:30), suggesting that the Rancho Bernardo style is older (also see McCarthy 1995:XIX-16, 17). The function of Rancho Bernardo art is unclear.

One possibility is that the Rancho Bernardo style is a general trait of the San Luis Rey Pattern, being present in both San Luis Rey I and II. Then, very late in time and in conjunction with beliefs associated with the *Chingichngish* religion, the San Luis Rey style was introduced, and its elements superimposed on some of the Rancho Bernardo panels. Assuming that the *Chingichngish* religion was introduced from the Gabrielino to the Luiseño (Koerper and Fouste 1977), it would have had to "go through" the Juaneño first. However, Hedges (2002:Figure 1) reported very little San Luis Rey style rock art in Juaneño territory. Perhaps the San Luis Rey style of rock art developed very late in time, after the *Chingichngish* religion had begun to spread. Clearly, this issue remains unresolved.

San Luis Rey II: A Discussion

As noted by True et al. (1974:102), San Luis Rey II is more than just San Luis Rey I with the addition of pottery. There were a number of important changes in settlement patterns, subsistence practices, mortuary customs, rock art (and perhaps religion), and technology. It seems that as acorns became the focus of the economy, settlements were consolidated, and group (e.g., lineage) territories emerged. Pottery appears to have diffused into the area from the south, a technology that may have influenced the economic system and mortuary customs. It appears that the changes in the archaeological record that denote San Luis Rey II began about 500 BP.

Of some interest is the Little Ice Age (LIA), a global event that took place between about 600 and 130 BP (e.g., Graumlich 1993; Wright et al. 1993; Gardner 2007; West et al. 2007). For southern California, Koerper et al. (1985) suggested that rainfall increased and that the event was not detrimental to hunter-gatherers in the region. Thus, the impact of the LIA on San Luis Rey II peoples, if any, is unknown.

Interpretations of rock art (e.g., Hedges 1973a:9; Minor 1973:32-33) suggest that San Luis Rey II may have seen the appearance of the *Chingichngish* religion, as reported ethnographically among the Luiseño (Sparkman 1908:218-219; Bean and Shipek 1978:556) and Gabrielino (Bean and Smith 1978:548; McCawley 1996:143-148; Jurmain and McCawley 2009:14-16). It is not clear whether the *Chingichngish* religion was purely an aboriginal development or was related to the arrival of Spanish and Christian influences (see Kroeber 1923:138; Bean and Vane 1978:669; McCawley 1996:143-148). It is possible that the *Chingichngish* religion was a "crisis" religion developed in response to Euroamerican pressures, particularly disease (Bean and Vane 1978:669; Raab 2009:210-211).

It has long been the premise that San Luis Rey II people were the direct ancestors of the Luiseño culture. Many of the traits are the same, and a number of ethnographically known Luiseño villages contain San Luis Rey II components. This is a compelling argument, and following the direct historical approach (e.g., Lyman and O'Brien 2001), this premise is supported herein. Archaeologically, this pattern of very late, even ethnohistoric, San Luis Rey II components in ethnographic Luiseño territory can be seen at sites such as CA-SDI-5589 (Fulmer 1985) on the San Luis Rey River, Christensen Webb (RIV-332) (Kowta et al. 1965), Temeku (McCown 1955), Walker Ranch (CA-RIV-333) (Freeman and Van Horn 1990; also see

Smith and Freers 1994:6, 8, 14), RIV-4045 (Hampson 1992), CA-ORA-855 (Koerper et al. 1988b; Koerper and Mason 2000), and a number of sites in the Palomar Mountain area (Meighan 1954; True et al. 1974, 1991). It also seems likely that the Cupeño are cultural descendants of San Luis Rey.

The San Luis Rey Pattern: A Discussion

The San Luis Rey Pattern is interpreted as resulting from the adoption of "Californian" traits (see Table 2) by existing Encinitas groups. These traits included bow and arrow technology, greater numbers of shell beads, shaft straighteners, and Takic languages, later to be augmented by Tizon Brown pottery and cremation. In addition, progressive changes in subsistence and settlement systems occurred, a new religion (*Chingichngish*) may have been adopted, and Euroamerican technology was incorporated. It is argued that San Luis Rey Pattern people were biological Yumans who adopted Cupan languages, specifically Luiseño and Cupeño (discussed in greater detail below). Thus, the San Luis Rey Pattern could be viewed as the intersection of Californian material culture, Cupan languages, and Yuman traits and biology.

The impetus for the adoption of a new cultural tradition by existing groups is not at all clear. At least two possibilities present themselves, new technology and environmental change, perhaps acting in tandem. Considering technology first, the entry of the bow and arrow into the region should have had a significant impact on a number of cultural systems, including subsistence and settlement. It seems possible that some level of increased interpersonal violence had accompanied the bow and arrow, but direct evidence is lacking. If new languages diffused into the region at about the same time, it seems possible that a small number of people carrying a new set of technologies could have had a significant impact on existing groups, particularly those thought to be as conservative as Encinitas Tradition groups (e.g., Sutton and Gardner 2010).

Second, it is possible that environmental change prompted the movement of traits from the coast inland and from the south to the north. For example, biotic change associated with the MCA could have resulted in the replacement of Encinitas economies by more specialized ones that emphasized acorns. This could have also impacted milling technologies and settlement patterns. Additional environmental permutation, such as the LIA, could have further resulted in various adaptive changes. Lastly, the arrival of Euroamericans would have dramatically altered the cultural environment, requiring drastic adaptations.

Archaeological Expectations of the San Luis Rey Pattern

If the general model of prehistory presented above is accurate, a number of correlates should be expected in the archaeological record. First, where San Luis Rey Pattern material assemblage is present, it should have replaced that of the Encinitas Tradition, essentially the La Jolla Pattern along the coast and the Greven Knoll Pattern inland (see Sutton and Gardner 2010). Second, this assemblage replacement should have begun first in southern Orange County, moved south into northern San Diego County, then inland into the Palomar Mountain area, and finally north into the inland valleys. Third, the Encinitas settlement system of small and scattered camps should have been replaced by a system of large and permanent villages, although this might not have happened quickly. Thus, the earliest appearance of large and permanent villages should contain a San Luis Rey material assemblage.

Fourth, it possible that the spread of bow and arrow technology, specifically with Cottonwood points, influenced subsistence practices (e.g., hunting), and if so, it would be reflected in the archaeological faunal record. In addition, bow and arrow technology may have resulted in an increase in interpersonal violence; if so, that should be reflected in the skeletal record (a data set compromised by the practice of cremation).

Fifth, pottery technology should have diffused into the San Luis Rey area from the south after about 600 BP (in San Luis Rey II) but should not be present in southern Orange County. The practice of cremation, if from the south, should follow a similar trajectory.

Finally, and in addition to the archaeological expectations noted above, if the general linguistic model of Cupan languages diffusing into populations of Yuman biology is correct, a number of other traits should be evident. These additional expectations are discussed below.

The Peninsular Pattern of the Palomar Tradition

As Palomar traits first diffused eastward from the California coast, they were adopted by Encinitas Tradition groups who then transformed into San Luis Rey Pattern groups. The filling of Lake Cahuilla ca. 1,070 BP created a new and highly productive ecosystem that attracted people from a number of areas. It is suggested herein that some San Luis Rey I people (of Yuman biology) in the inland valley split away and migrated east to the northern Peninsular Ranges and the northern Coachella Valley to exploit Lake Cahuilla and, in so doing, became Peninsular I. Arriving Peninsular I groups would have encountered existing Late Prehistoric Yuman (Patayan I) groups in the northwestern Colorado Desert and either absorbed or replaced them. The Peninsular Pattern then developed through the Peninsular I, II, and III phases, the latter representing the ethnographic Cahuilla (see Tables 1 and 3).

The Late Prehistoric archaeological record is poorly known in the northern Peninsular Ranges, being better documented in the northern Coachella Valley. Unfortunately, this necessitates a greater focus on the latter region, which may lead to the erroneous impression that the Peninsular Pattern is limited to the northern Coachella Valley. The prehistory of the southern Peninsular Ranges and of Lake Cahuilla south of the northern Coachella Valley appears to have followed a separate trajectory (e.g., Schafer 1994) and is well beyond the scope of this study.

While some of the traits of the Peninsular Pattern are similar to those of San Luis Rey, there are important differences. Both Cottonwood points and Desert Side-notched points are common in the Peninsular Pattern. Pottery is also present, initially consisting of LCB types with Tizon Brown apparently arriving later (contrary to the pattern seen to the west [Griset 1996:271]). Bedrock milling technology appeared but was not as important as in San Luis Rey. Shell beads, ceramic pipes (including both tubular and bow types), ceramic figurines, and shaft straighteners all appeared. Glass from the Obsidian Butte source became significant, although Coso Volcanic Field obsidian remained important. Some glass from other sources was also used. Cremation, an existing Patayan (Yuman) trait, was retained. The dark, "conspicuous" middens characteristic of the Late Period appeared. It is further proposed herein that the Cahuilla language split from Cupan at the beginning of Peninsular I and is one of the traits that moved eastward with the Peninsular Pattern (discussed in greater detail below).

Peninsular Pattern rock art was generally different and less abundant than in San Luis Rey, although there appears to have been some overlap in styles. Unlike San Luis Rey, rock art was not associated with every Peninsular village. This general change in rock art styles suggests that the *Chingichngish* religion was not adopted by Peninsular groups (it was not reported for the Cahuilla [Bean 1978]).

To track the expansion of the Peninsular Pattern, it is important to understand the prehistory of the northwestern Colorado Desert, particularly the northern Coachella Valley (a different prehistory is projected for the southern Salton Trough). Schaefer (1994) defined Paleoindian, Archaic, and Late Prehistoric periods for the region, and the Late Archaic was discussed by Love and Dahdul (2002) and by Schaefer and

Table 3. General Archaeological Traits of the Peninsular Pattern of the Palomar Tradition.

Trait	Peninsular I	Peninsular II	Peninsular III
portable metates	–	yes	yes
bedrock metates (slicks)	yes	yes	yes
manos	yes	yes	yes
portable mortars	yes	yes	yes (wooden)
bedrock mortars	yes, but rare	yes	yes
pestles	yes, but uncommon	yes	yes
large bifaces	yes	yes	unknown
projectile points	Cottonwood with some Desert Side-notched	Cottonwood with a few Desert Side-notched	Cottonwood with a few Desert Side-notched
hammerstones	yes	yes	yes
shaft straighteners	yes, but rare	yes, but rare	yes, but rare
modified bone	yes	yes	yes
pottery vessels	Tumco Buff and Salton Buff	Tumco Buff, Salton Buff, and Tizon Brown	Colorado Buff and Tizon Brown
stone beads	yes	yes	yes
shell beads	yes	yes	yes
glass beads	–	–	yes
crystals	unknown	yes	unknown
stone pipes	yes, but rare	yes, but rare	yes, but rare
ceramic pipes	–	yes (straight and bow types)	yes (straight and bow types)
ceramic figurines	–	yes	yes
Conspicuous Middens	yes	yes	yes
Rock Art	petroglyphs (uncommon) and Rancho Bernardo pictographs	San Luis Rey pictographs	Cahuilla style pictographs
Obsidian Sources	primarily Coso Volcanic Field and Obsidian Butte, as well as some Mojave Desert sources	primarily Coso Volcanic Field and Obsidian Butte	primarily Obsidian Butte
Mortuary Customs	primary pit cremation	Peninsular Funerary Complex, secondary cremations in “containers” with mourning ceremonies	primary pit cremation with mourning ceremonies
Settlement Systems	long-term lakeshore settlements with outlying special use sites	short-term lakeshore settlements with outlying special use sites	permanent villages at springs and wells with outlying special use sites
Subsistence Practices	lacustrine-based system with some use of terrestrial resources	lacustrine-based system with increasing use of terrestrial resources	terrestrial hunting and gathering

Laylander (2007). The Late Archaic (ca. 3,000 to 1,300 BP) record appears meager and is known only from a handful of sites, some of which appear to be associated with a stand (or stands) of Lake Cahuilla (Love and Dahdul 2002:77). Primary pit cremations are known during this time, and the use of obsidian from the Coso Volcanic Field has been documented (Love and Dahdul 2002:75, 78, 80). In general, occupation during the Late Archaic appears to have been sparse, preceramic, and perhaps associated with stands of Lake Cahuilla.

Lake Cahuilla (also known as Lake LeConte or Blake Sea, see Figure 1) played a major role in the prehistory of the Colorado Desert (e.g., Rogers 1945; Weide 1976; Wilke 1978; Waters 1983; Sutton 1993, 1998; Laylander 1997, 2006a; Schaefer and Laylander 2007). This lake formed periodically when the Colorado River broke its channel and flowed into the Salton Basin (Coachella and Imperial valleys), forming a body of water that extended some 184 km long, 54 km wide, and 96 m deep (Schaefer 1994:67). Once full, Lake Cahuilla overflowed into the Gulf of California along the Hardy River. When the Colorado River regained its original course, the lake evaporated and disappeared. Schaefer and Laylander (2007:250) estimated that it would take about 20 years for the lake to fill and about 60 years for it to evaporate (also see Wilke 1978:109).

At least six major lake cycles (some with several stands?) are known within the last 2,500 years (e.g., Wilke 1978:58; Waters 1983; Laylander 1997; Schaefer and Laylander 2007:250): one in the Late Archaic sometime between about 2,500 and 2,000 BP, a second between about 1,300 and 1,100 BP, a third between about 1,070 and 850 BP, a fourth between about 750 and 640 BP, a fifth between about 550 and 480 BP, and a sixth in historic times, between about 400 and 300 BP (Laylander 1997:68).

The apparent absence of any major occupation around Lake Cahuilla during either the ca. 2,500 to 2,000 BP cycle or the ca. 1,300 to 1,100 BP cycle seems puzzling. Perhaps fishing technology of sufficient scope or effectiveness had not yet been adopted. Such technology was presumably obtained from River Yumans (see White and Roth 2009), but Patayan influence was not very important in the northern Coachella Valley before about 1,000 BP. Perhaps the cultural system employed by Late Archaic groups in the northern Coachella Valley was not flexible enough to adapt to the change. Whatever the case, the topic is worth exploring in future research.

More germane here are the apparent fluctuations of the lake between about 750 and 480 BP, during the two postulated lake cycles of ca. 750 to 640 BP and 550 to 480 BP (see Laylander 1997:64). If the lake experienced significant recessions during those times, the resulting rapid variations in the availability of lacustrine resources could have led to a "flexible and dynamic" adaptive system. This idea is discussed further below.

The Late Prehistoric Period in the Colorado Desert (after about 1,200 BP) has generally been represented by the Patayan sequence (Waters 1982a; Schaefer 1994:65; Schaefer and Laylander 2007), primarily identified by pottery, although a "preceramic" phase was also identified (Rogers 1945:170). Patayan (also known as Yuman [Rogers 1945] or Hakataya [Schroeder 1957, 1979; also see Warren 1984]) commonly refers to the prehistoric agricultural groups living along the lower Colorado and middle to lower Gila Rivers. Three Patayan phases (I, II, and III) have been defined for that region (e.g., Waters 1982a; also see Rogers 1945). Patayan I (ca. 1,300 to 1,000 BP) is marked by the introduction of both pottery and agriculture, but hunting and gathering remained important. In Patayan II (ca. 1,000 to 500 BP), farming had become central, although hunting, gathering, and fishing remained important. Patayan III (ca. 500 to 100 BP) is generally the time after contact. The prevailing conventional thinking is that during the cycle/stand of Lake Cahuilla that began about 1,070 BP, groups of early Patayan II people (the Salton Branch, see

Schroeder [1979:Figure 1]) may have moved west from the Colorado River to occupy the area (Schaefer and Laylander 2007:252).

The Patayan sequence has been recognized in the northern Coachella Valley, and Patayan influence can be seen across much of the northern Colorado Desert and eastern Mojave Desert. Both Schroeder (1979:Figure 1) and Warren (1984:Figure 8.26) indicated that the northern Coachella Valley was within the Patayan (Hakataya) area during the Late Prehistoric, based on the "consistent occurrence of Buff and Brown wares and Cottonwood Triangular and Desert Side-notched points" (Warren 1984:427; also see Schaefer 1994:65-66). This general "Yuman" pattern is perhaps also manifested as the "Desert Mohave" (Kroeber 1959:294; Lerch 1985).

A few sites with Patayan I LCB pottery, likely trade pieces (see Waters 1982a:294), are known in the northern Coachella Valley (Schaefer and Laylander 2007:252), attesting to some Patayan influence prior to Patayan II times. The presence of Patayan II and III, reflected in LCB pottery types, is reasonably well documented in the northern Coachella Valley (Waters 1982a:Figure 7.5; Schaefer and Laylander 2007:252), although the specific identity of these "Patayan" people is unclear. The most common hypothesis is that they were River Yumans who had moved west when Lake Cahuilla filled (Schaefer and Laylander 2007:252), displacing or absorbing the existing Archaic populations. When the lake desiccated, these River Yumans would have moved back home (Rogers 1945:192-193). However, the absence of any direct evidence of precontact agriculture in the northern Coachella Valley (Hicks 1963:286; Wilke and Lawton 1975; Wilke and Sutton 1988:162; Laylander 1995; Schaefer and Laylander 2007:253-254) suggests that people from the Colorado River were not present. On the other hand, agricultural techniques used in the Colorado River floodplain were likely not suitable in the northern Coachella Valley, and thus, their absence may not be surprising.

A second possibility is that the ancestors of the "Patayan" people came from an area west of the Colorado Desert and moved east into the northern Coachella Valley when Lake Cahuilla filled. They would have displaced or absorbed the Archaic populations and adopted "Patayan" traits (e.g., Wilke 1974b, 1978; Waters 1982a:295). When Lake Cahuilla finally disappeared, some of the people would have moved back into the northern Peninsular Ranges (Jefferson 1971:167, 1974:6-7; O'Connell 1971:180; O'Connell et al. 1974; Wilke 1978:113, 118) with others remaining in the Coachella Valley, all to become the ethnographic Cahuilla (Wilke and Lawton 1975).

A third possibility is that the "Patayan" people of the northern Coachella Valley may have been the local Late Archaic groups (e.g., preceramic Yumans [Rogers 1945]) who adopted some Patayan traits (pottery), adapted to the filling of Lake Cahuilla, and after the lake desiccated, stayed where they were to become the ethnographic Cahuilla. This obviously remains an important research question.

The Patayan temporal classification is dropped here in favor of the Peninsular cultural pattern, one linked westward to California. The Patayan pottery classification (Waters 1982a, 1982b) is retained, but it should be recognized that some Patayan pottery types may occur across Peninsular phases.

As noted above, much of the discussion of the Peninsular Pattern in this study is focused on the northern Coachella Valley. This is partly due to a paucity of data for the northern Peninsular Ranges themselves and partly due to the presence of Lake Cahuilla in the northern Coachella Valley. The lake was also present well to the south of the northern Coachella Valley, but the archaeological evidence suggests that it was less intensely occupied along its southern reaches. Several possibilities might account for this disparity of use, including a poorly understood archaeological record, prehistoric cultural differences, or perhaps

environmental differences. It may be that the northern Coachella Valley contained a greater diversity and expanse of ecozones and associated ecotones, such as the Whitewater River, more extensive shallow wetlands due to the grade of the area, and directly adjacent mountains with pinyon and oak.

The Peninsular Pattern, Phase I

When Lake Cahuilla began to fill after about 1,070 BP, it seems likely that some influences from the Colorado River area soon moved west into the northern Coachella Valley, such as Patayan II pottery and perhaps even Desert Side-notched points. These traits would have been adopted by the existing Late Archaic groups. Other traits, such as Cottonwood points, would have moved into the area from interior southern California to the west. These Palomar traits would have blended with Patayan II traits to form the Peninsular I cultural assemblage in those areas, and it is this mix of Palomar and Patayan traits that makes Peninsular I unique.

Peninsular I Material Culture

Perhaps the primary material marker for Peninsular I is the presence of Cottonwood projectile points. Cottonwood points first appeared along the western side of the northern Peninsular Ranges about 900 BP (see Wilke 1974b:22; Robinson 1998:36), likely as a result of a continuation of their diffusion east from the coast (see above). Given the paucity of earlier (e.g., Rose Spring) point types in that area, Cottonwood points are seen as representing the introduction of bow and arrow technology into the northern Peninsular Ranges, although it is possible (Wilke 1974b:22) that hardwood tips were used on arrows prior to the arrival of Cottonwood points.

A bit later in time, Cottonwood points appear to have diffused still further east into the northern Coachella Valley where bow and arrow technology (e.g., Desert Side-notched points) seems to have already been present (Schaefer 1995b:III-4). Thus, Peninsular I groups would have utilized both Cottonwood and Desert Side-notched points, perhaps with the latter being generally limited to the northern Coachella Valley/San Gorgonio Pass region (e.g., Wilke 1978:56). Cottonwood Triangular and Desert Side-notched points also co-occur at Tahquitz Canyon (Binning and Schaefer 1995), Snow Creek Rockshelter (CA-RIV-210) (Michels 1964), and Yucaipa (SBR-1000) (Grenda 1998).

In the Mojave Desert/Great Basin, Desert Side-notched points have been seen as "Numic" markers (see Sutton 1987:52-57; Delacorte 2008), suggesting some linkage between the Mojave Desert and the northern Coachella Valley. However, the Numic Chemehuevi were not in the eastern Mojave Desert before about 400 BP when they displaced the Yuman "Desert Mohave" in that region (Lerch 1985; also Kelly 1934:556; Rogers 1936:38; Kroeber 1959:262; Stewart 1968:13; Van Valkenburgh 1976:228). This late date weakens the possible association of Desert Side-notched points and the Numic in this area. To the south, Desert Side-notched points have been considered to be "Yuman" markers (True 1966:280), indicating the possibility that southern Yuman groups were present in the northern Coachella Valley prior to the arrival of Peninsular I groups.

A second major technological marker of Peninsular I is pottery. Small quantities of Patayan I LCB pottery were present in the northern Coachella Valley perhaps as early as 1,300 BP but were probably not manufactured there (Waters 1982a:Figure 7.4, 287) and were rarely used (Schaefer and Laylander 2007:252). By about 1,000 BP, Patayan II LCB pottery, primarily Tumco Buff and Salton Buff, was present in greater quantities (Waters 1982a:Figure 7.5). Tumco Buff was apparently manufactured along the lower Colorado River and traded into the Coachella Valley (Waters 1982a:289), while Salton Buff was probably made locally in the valley bottom from sedimentary clays that were low in iron (the role of iron and firing atmosphere in pottery color is an unresolved issue) and transported to nonvalley sites.

The apparent absence of Tizon Brown pottery in Peninsular I components is of interest. If Tizon Brown is simply a "mountain" ware within the Patayan Ceramic Tradition (e.g., Hildebrand et al. 2002), then why was it not present when the other ware, LCB, was present? One possibility is that Peninsular I groups were "oriented" toward basketry and so did not readily adopt pottery. Once they entered the northern Coachella Valley, they could have adopted the existing LCB (Patayan II) pottery but did not manufacture pottery in upland settings where residual clays could have been used. In this scenario, the production of pottery in upland settings, what would be Tizon Brown, would not have occurred until Peninsular II.

Interestingly, very few stone beads or ornaments, such as pendants of steatite and slate, are known in Peninsular I contexts. Stone pipes are present in very small numbers throughout the Peninsular sequence (e.g., Sutton 1988:60-61; Schaefer 1995a). Two steatite shaft straighteners were found at Tahquitz Canyon (Schaefer 1995c), but these artifacts also appear to be uncommon.

While small numbers of *Olivella biplicata* and *O. dama* beads are known from Archaic contexts (e.g., King 1995; Love and Dahdul 2002:78, 80), the number and types of shell ornaments increased in Peninsular I. Beads of *O. biplicata* (from the Pacific Coast) are the most common (e.g., King 1988; Dahdul 2002), although *O. dama* beads from the Gulf of California are also present (e.g., Wilke 1978:56; King 1988; Dahdul 2002:62). In addition, ornaments of *Argopecten* and *Haliotis* shell (Dahdul 2002) appeared. In some cases, shell beads and ornaments have been found with cremations (Wilke 1988:8). Schaefer and Laylander (2007:255) argued that the types and sources of shell ornaments were "Californian" in character and did not match the pattern seen in the Imperial Valley to the south.

Unlike the San Luis Rey Pattern, the use of obsidian sources in the Peninsular Pattern was variable. During Peninsular I, glass was commonly obtained from the Coso Volcanic Field to the north and Obsidian Butte to the south, although glass from the Bagdad source to the northeast and some unknown sources was also used (Sutton and Wilke 1988; Binning and Schaefer 1995:Table X-5). The unknown glass may have originated from the eastern Mojave Desert as "Apache tears" (lapilli) or possibly from the San Felipe source in northern Baja California (e.g., McFarland 2000:54; Schaefer and Laylander 2007:255).

The food procurement technologies of Peninsular I differed by environmental zone. The general and long-standing set of technologies for the hunting and gathering of terrestrial resources was utilized in both the northern Peninsular Ranges and in the Coachella Valley and continued throughout the Peninsular Pattern. However, bedrock mortars appear to be uncommon (e.g., very few at Snow Creek Rockshelter [Michaels 1964] or Tahquitz Canyon [Schneider and McDonald 1995]), suggesting the possibility that acorns were less important to Peninsular groups than they were to San Luis Rey groups.

The lacustrine resources found in and around Lake Cahuilla, including marsh plants, fish, and waterfowl, would have necessitated the use of different technology during the times when the lake was present. For marsh plants, material culture should have included cutting tools, containers (pottery and/or basketry) for transport and storage, processing tools (likely generalized manos and metates), and possibly specialized cooking facilities (likely similar in character to those used for terrestrial plants). Waterfowl procurement tools should have included decoys, traps and/or nets, and perhaps distinctive arrow point types.

The technology to obtain the several species of large fish present in Lake Cahuilla (see below) included specialized facilities such as stone fish traps (Treganza 1945; Wilke and Lawton 1975; Wilke 1980; Schaefer and Laylander 2007; White and Roth 2009) and

(probably) wooden weirs. In addition, specialized netting, basketry, hooks and lines, and bow and arrows would also have been used (see discussion in White and Roth [2009:186-187]). For the prehistoric northern Coachella Valley, these methods are poorly known but were perhaps similar to those used by the ethnographic Mohave on the Colorado River (e.g., Wallace 1955b). The types of tools used to process fish are unknown.

Peninsular I Mortuary Customs

What little is known of Peninsular I mortuary customs suggests that cremation was the primary method used (e.g., Schaefer 1995b:III-4), although few specific data on the practice from Peninsular I components exist. The antiquity of cremation in the region is unclear, but it appears to date from at least the Late Archaic (e.g., Love and Dahdul 2002:75, 80). In the northern Coachella Valley, primary pit cremation appears to have been the preferred method during both the Late Archaic (Love and Dahdul 2002) and Peninsular I (e.g., Bean et al. 1995:XXI-5). After cremation, the remains were covered up and left in place. There is currently no evidence that mourning ceremonies were associated with either Late Archaic or Peninsular I cremations.

Peninsular I Settlement Systems

Geographically, Peninsular I occupied the northern Peninsular Ranges and the northern Coachella Valley (see Figure 4). As so little is known of the archaeology of the northern Peninsular Ranges, it is difficult to develop any coherent settlement model for that region. The Yucaipa site (SBR-1000) (Grenda 1998) in the far northern reaches of the Peninsular Ranges apparently contains a Peninsular I component, but the placement of that component into a regional settlement pattern has not been determined. At a minimum, the northern Peninsular Ranges probably contain special use sites, such as hunting camps and bedrock mortar localities, associated with more permanent settlement in the northern Coachella Valley. The possible presence of permanent habitation in the mountains should not yet be discounted, however.

In the northern Coachella Valley, it is proposed (following Wilke [1978]) that the Peninsular I settlement system consisted of generally permanent lakeshore villages to exploit lacustrine resources coupled with a series of special use sites in various ecozones to exploit terrestrial resources (Figure 5). This generally sedentary collector-like system would have replaced the mobile forager-like system of the Late Archaic. Presumably, the presence of the lake would have provided a large and stable economic base (the lacustrine resources) capable of supporting a substantial population living in permanent lakeshore villages. Thus, while the carrying capacity of the region has never been modeled (e.g., Baumhoff 1981), it is generally assumed to have been higher while the lake was present than when it was not (O'Connell 1971:180; Jefferson 1974:7).

Wilke (1978) based this model on his excavations at several sites along the northern shoreline of Lake Cahuilla, including Myoma Dunes (CA-RIV-1766). This site contained both Desert Side-notched and Cottonwood Triangular points, LCB pottery, shell beads from both the Pacific and Gulf of California coasts, some evidence of the use of desert resources, and considerable evidence of the use of lacustrine resources (Wilke 1978:55-57). The site was seen as a permanent village (Wilke 1978), although Sutton (1998) thought the coprolite data indicated only a seasonal occupation. Due to the apparent absence of Tizon Brown pottery, Myoma Dunes is viewed herein as a Peninsular I principal settlement.

Peninsular I special use sites had a variety of functions, including resource procurement, trade, ritual, and social activities. Such sites could be expected in three general areas—the uplands of the northern

Peninsular Ranges, the desert floor of the northern Coachella Valley, and the shoreline of Lake Cahuilla (see Figure 5). Upland special use sites would have focused on the collection and processing of resources such as acorns, pinyon, deer, and mountain sheep. It is hypothesized that such upland sites would have been located at some distance from the principal settlements and thus would have been occupied by relatively large task groups staying for perhaps several months. It is further hypothesized that Peninsular I upland sites would contain evidence of habitation, a diversity of activities, pottery, milling facilities, and occasional cremations.

One such Peninsular I upland special use camp might be located at Tahquitz Canyon (Bean et al. 1995). A small component (classified as Patayan II) was identified that contained Cottonwood Triangular and Desert Side-notched points (Binning and Schaefer 1995), beads of *Mytilus*, *Olivella biplicata*, and *O. dama* (King 1995), some pottery (mostly Tumco Buff and Tizon Brown [Schaefer 1995a]), and obsidian from Obsidian Butte as well as some from the Coso Volcanic Field and unknown sources (Binning and Schaefer 1995:Table X-5). Subsistence remains from Tahquitz Canyon have indicated the primary use of terrestrial resources with some lacustrine resources also being present (Christenson 1995). With the exception of the Tizon Brown pottery (which may be associated with a later Peninsular II component), this suggests a Peninsular I assemblage.

Desert special use sites would have focused on the collection and processing of resources on the valley floor, such as mesquite, dicoria, and lagomorphs. Some sites could have been located at a considerable distance from the principal settlements, while others could have been nearby. Those at a distance may have been positioned near accessible water, such as springs, and occupied by relatively small, highly mobile task

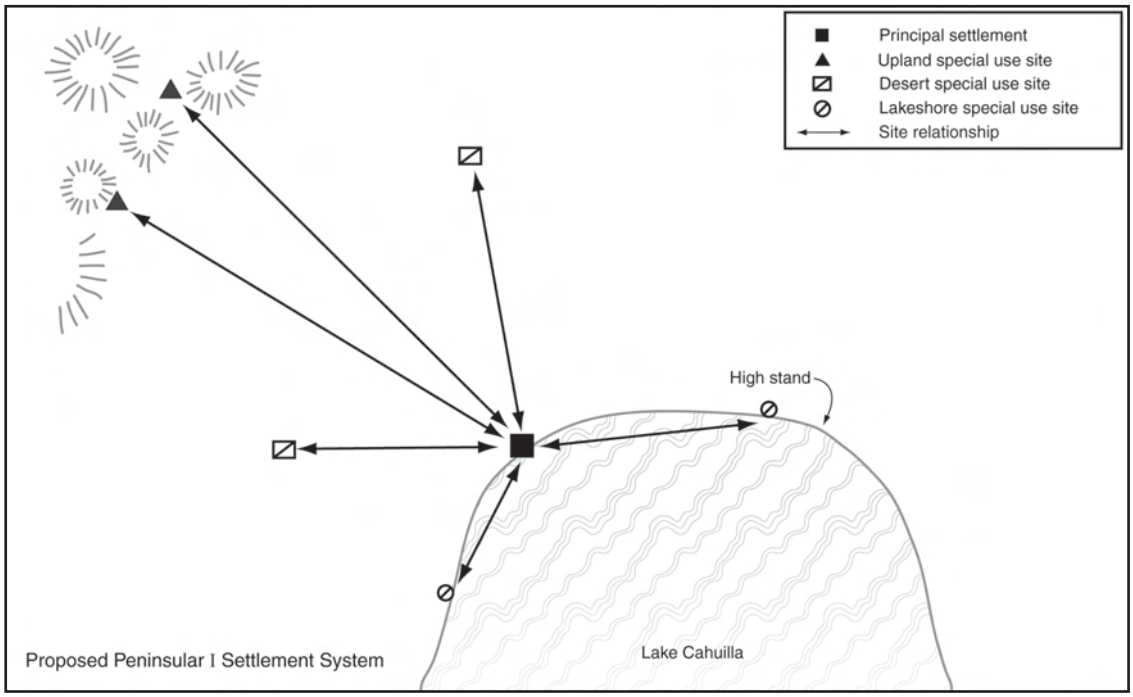

Figure 5. Model of Peninsular I settlement system around Lake Cahuilla in the northern Coachella Valley, with principal settlements on the Lake Cahuilla high stand shoreline and special use sites in upland, desert, and lakeshore settings.

groups for brief periods of time. Desert special use sites located near the principal settlements would have been used by small task groups for short periods. Such sites would contain little evidence of habitation, a low diversity of activities, little pottery, and cremations only rarely.

White (1980:185-186) hypothesized that certain species in the vicinity of the lake would have been exploited by different sized task groups, with bonytail, jackrabbits, and coots being taken by small groups and mullet, cottontails, and canvasback ducks (cf. *Aythya valisineria*) being taken by individuals. If this is correct, special use sites associated with the exploitation of these species would have different archaeological signatures, and this would apply for both desert and lakeshore contexts.

Lakeshore special use sites were located along the high stand (ca. 12 m amsl) of Lake Cahuilla. While it is possible, if not likely, that the procurement and processing of lacustrine resources (e.g., fish) would have been conducted at principal settlements along the lakeshore, additional procurement and processing activities would have been conducted at special use sites located in other favorable places, such as shallows, fish spawning areas, and birding locales (e.g., Wilke 1978:102-103; Beezley 1995). Such sites would contain little evidence of occupation, little pottery, and no cremations, but would contain specialized lacustrine procurement and processing facilities and tools. If a lakeshore special use site was located at some distance from its principal settlement, fish may have been processed on-site for transport back to the principal settlement. If so, the faunal remains would show evidence of "schlepping" (e.g., Daly 1969:149), such as a preponderance of fish head and tail elements at procurement sites and an absence of such elements at habitation sites.

The model of Peninsular I settlement offered above, with the idea that upland camps would be occupied by relatively large task groups over relatively long periods during the year, might appear to be more closely aligned with a forager system than a collector system. It is important to remember, however, that the forager/collector model proposed by Binford (1980) was a continuum and not a dichotomy. Thus, the presence of permanent lakeshore settlements and temporary upland sites makes the system more collector-like than forager-like.

Peninsular I Subsistence Practices

Subsistence systems in Peninsular I involved a diverse tactical inventory that included the exploitation of lacustrine, upland, and desert resources, including pinyon, deer, bighorn sheep, mesquite, dicoria, and lagomorphs. Apparently new to the subsistence inventory were acorns, as suggested by the appearance of bedrock mortars at upland sites. Many of the practices surrounding the procurement of terrestrial resources are well known (see Bean 1972, 1978) and are not elaborated herein.

In the northern Coachella Valley, the filling of Lake Cahuilla and the establishment of lacustrine ecozones resulted in the availability and subsequent exploitation of a variety of new resources, including marsh plants, shellfish, waterfowl, and fish. Marsh plants included bulrushes (*Scirpus* sp.) and cattails (*Typha* sp.), and mussels (*Anodonta dejecta*) were abundant in shallow water. Waterfowl inhabited the lake as part of the Pacific flyway, and many species of ducks, geese, and shorebirds were used, especially the American coot (*Fulica americana*).

Perhaps the major new resource associated with Lake Cahuilla was fish. Four major species were taken from the lake, including striped mullet (*Mugil cephalus*), Colorado pike minnow (*Ptychocheilus lucius*), razorback (humpback) sucker (*Xyrauchen texanus*); and Colorado River bonytail (*Gila elegans*). Of these species, the latter two appear to have been the most commonly utilized (e.g., Gobalet and Wake 2000). The technology related to the exploitation of these

lacustrine resources and the influences on settlement patterns were discussed above.

Peninsular I Rock Art

Some rock art, primarily petroglyphs, is known from the Archaic in the Colorado Desert, generally subsumed under a "Western Archaic Tradition" that lasted until relatively recent times (Hedges 2002:34). Schaefer and Laylander (2007:249) thought that this rock art had "Archaic Period roots…with a continuous progression toward distinctive Patayan symbolic systems." However, no specific rock art or rock art style has been identified for Patayan II, although it seems that at least some of the petroglyphs date after the final high stand of the lake (Wilke and Wilke 1978).

Two sites with substantial rock art are known from the northwestern Coachella Valley, Tahquitz Canyon (McCarthy 1995:XIX-16, 17) and Andres Canyon (CA-RIV-68) (Hedges 1989). Both contain petroglyphs (Western Archaic?) and pictographs of the San Luis Rey and Rancho Bernardo styles (also found at San Luis Rey sites). At Andres Canyon, Hedges (1989) identified two additional styles, a "Cahuilla Style A" and a possibly later "Cahuilla Style B," the latter of which contained historic designs (e.g., people on horseback). This could indicate some sort of "continuity" from Western Archaic petroglyphs, to Rancho Bernardo pictographs, to San Luis Rey pictographs, to Cahuilla Style A pictographs, and finally to Cahuilla Style B pictographs. As such, it may be that the Rancho Bernardo style art is a trait for Peninsular I. Little else is known about rock art in the region.

Peninsular I: A Discussion

The archaeological entity identified as Peninsular I is proposed to have initially developed along the eastern edges of the interior valleys west of the northern Peninsular Ranges sometime about 900 BP, marked by the appearance of Cottonwood points. It seems that Cottonwood points could represent the adoption of bow and arrow technology, as small "arrow" points are notably lacking in immediately preceding Greven Knoll III components (Sutton and Gardner 2010; also see Wilke 1974b:22; Robinson 1998). Another Peninsular I marker trait, Tumco Buff LCB pottery, is also generally lacking in the interior valleys, making the identification of Peninsular I components more difficult. Thus, the geographic "border" between the San Luis Rey and Peninsular patterns is quite unclear. Prior to Peninsular I, groups in the interior valleys west of the northern Peninsular Ranges would have been Greven Knoll III (see Sutton and Gardner 2010).

It seems possible that the Peninsular I assemblage first appeared in the Moreno Valley/Yucaipa/San Gorgonio Pass area. The SBR-1000 site in Yucaipa contains a Greven Knoll III component (Hicks 1958; Martz 1977; Grenda 1998; Sutton and Gardner 2010). Materials recovered from "Late Prehistoric" deposits included Cottonwood Triangular and Desert Side-notched points, Patayan II and III and Tizon Brown pottery (Montgomery 1998), shell beads, glass beads, an undated cremation, and obsidian, mostly from the Coso Volcanic Field, but also some from Obsidian Butte, Bagdad, and several Nevada sources (Hughes 1998). A series of six radiocarbon dates ranged between 1000 ± 150 and <150 RCYBP (Martz 1977:35). Although precise stratigraphic provenience of most recovered materials from the SBR-1000 site is generally lacking, it is suggested here that Peninsular I, II, and III components are present, probably reflecting seasonal occupation (Grenda 1998:110). Interestingly, the site was thought to be the ethnohistoric Serrano village of *Yukaipa't* (Grenda and Lerch 1998:1).

Sometime after about 900 BP, Peninsular I traits were carried east into the northern Coachella Valley and "merged" with existing Patayan II traits, "fleshing out" the Peninsular cultural assemblage. It is hypothesized that proto-Cahuilla split from proto-Cupan at this time and was carried east by Peninsular I groups.

The eventual development of the dialectical divisions of Cahuilla (Mountain, Pass, and Desert) is seen as reflecting the progressive movement of the proto-language east after about 900 BP (see below).

The impetus for the movement of Peninsular traits to the east is of obvious interest. While the diffusion of Cottonwood Triangular points eastward may be a factor, the apparent presence of bow and arrow technology (Desert Side-notched points) in the northern Coachella Valley prior to ca. 1,000 BP should have lessened any urgency of obtaining Cottonwood Triangular points in that area. Another factor may be a possible environmental degradation due to the MCA (see above), although any impacts from that episode remain undemonstrated.

The presence of Lake Cahuilla was almost certainly a major attraction. A major cycle/stand of the lake began after about 1,070 BP (Laylander 1997:68; Schaefer and Laylander 2007:250), at which time the lake would have filled, with lacustrine ecozones becoming established within a few decades. The response adopted by the existing Late Archaic populations is unclear, as few Late Archaic sites are known to be associated with that lakestand, and there is little evidence of a lacustrine-based adaptation during earlier lake cycles.

At this same time to the west, Greven Knoll III (Encinitas) groups occupied the interior valley areas (Sutton and Gardner 2010). The Encinitas Tradition has been viewed as reflecting a well-developed collecting economy with a relatively minor emphasis on hunting (Warren 1968:6) and a heavy reliance on plant resources. Thus, it seems unlikely that Encinitas groups would have moved to Lake Cahuilla as specialized fishers.

With the arrival of the San Luis Rey pattern in the interior valleys after about 900 BP, however, the situation changed. It is proposed that some San Luis Ray groups split off and migrated to the northern Coachella Valley to exploit the lake and its associated resources. As noted earlier, there is little to suggest that River Yuman people moved west in any real numbers, and it seems much more likely that any population influx would have originated from the west. The population of the existing Late Archaic groups was probably small and could have easily been overwhelmed and absorbed by incoming Peninsular groups moving in from the west. This general model was proposed some time ago (e.g., Wilke 1974b:27, 1978; Waters 1983; Sutton 1993, 1998) and is further supported here. It also seems possible that the Desert Cahuilla "originated" as a result of such a population movement, as first suggested by Cochran (1965:87; also see Laylander 2007), with the Desert Cahuilla dialect splitting from proto-Cahuilla at that time (see below). By about 900 BP, various influences, such as Patayan pottery, Desert Side-notched points, Cottonwood points, shell beads, and multiple obsidian sources, coalesced to form the Peninsular Pattern.

The impact of the MCA on Peninsular I groups is unknown but may have been relatively minor (e.g., O'Connell 1971:180). As noted above, the MCA was a period of warming and drought between about 1,200 and 650 BP that affected much of western North America, including southern California. While the range and productivity of a number of important species could have been impacted, Lake Cahuilla was not very dependent on local climate and so would not have been affected to any substantial degree.

The Peninsular Pattern, Phase II

While the advent of Peninsular I appears to be related to the appearance of Lake Cahuilla and Peninsular III to the desiccation of Lake Cahuilla (see below), the changes that define Peninsular II occurred during the lake cycle dated between ca. 750 and 480 BP. Tizon Brown pottery appeared, a new funerary complex emerged, stone fish traps were built as lake levels fluctuated and began to decline, and a new settlement

system was adopted. This new and perhaps more flexible settlement system appears to be related to the apparent slow (decades long) fluctuations of lake levels, during which the availability of lacustrine resources may have rapidly changed.

Many of these traits can be seen at the CA-RIV-1179 site (Sutton and Wilke 1988) along the Lake Cahuilla high stand shoreline near La Quinta, and it is proposed herein as the type site for Peninsular II. The RIV-1179 site contained stone and ceramic straight pipes, no ceramic figurines, a roughly even mixture of Tizon Brown and Salton Buff (Patayan II) pottery, cremations in "containers" with evidence of a directly associated mourning ceremony, very little obsidian (largely from unidentified sources), some *O. dama* beads, and both lacustrine and terrestrial fauna. The RIV-1179 site was dated between about 600 and 400 BP and was thought to be a temporary residence rather than a permanent settlement (Sutton and Wilke 1988).

Peninsular II Material Culture

Perhaps the primary Peninsular II material trait is the appearance of Tizon Brown pottery. On the western side of the northern Peninsular Ranges, pottery technology represented by Tizon Brown is thought to have diffused from the south (e.g., Laylander 1985:37), entering northern San Diego County perhaps as late as 500 BP. In the northern Coachella Valley, a number of sites known to have been occupied when Lake Cahuilla was full—that is between about 800 and 500 BP—have contained both LCB and Tizon Brown (or perhaps Salton Brown, see May [1978; Hildebrand et al. 2002:122]) pottery, including Wadi Beadmaker and Bat Cave Buttes (Wilke 1978, 1988:6) and RIV-1179 (Sutton 1988:63).

Away from Lake Cahuilla, Tizon Brown pottery has been found with Patayan II LCB pottery at a number of sites. These include Tahquitz Canyon (Schaefer 1995a), SBR-1000 in Yucaipa (Montgomery 1998), and Snow Creek Rockshelter in the San Gorgonio Pass (Michels 1964:96), all reinforcing the co-occurrence of these wares.

The Patayan Ceramic Tradition is currently thought to contain two major wares; Lower Colorado Buff and Tizon Brown (e.g., Hildebrand et al. 2002:121). Both wares were constructed with the paddle-and-anvil technique and are generally undecorated. Buff pottery types were made from alluvial clays with low iron content that fired to a light color, obtained either from the Colorado River or from lake deposits. It seems likely that buff pottery was manufactured in the Salton Trough and transported to the west (Hildebrand et al. 2002:122).

Tizon Brown was made of residual clays with high iron content probably originating from the Peninsular Ranges and fired to a brown color (Hildebrand et al. 2002:130; also see Lyneis 1988). In addition to Tizon Brown made in the mountains, Hildebrand et al. (2002:139) proposed a second brownware, Salton Brown, made from sedimentary (valley) clays obtained from the western Salton Trough that also contained a relatively high iron content (and so it also fired brown). Sand temper was used in Salton Brown. Thus, brownware pottery is more common along the northwestern shoreline where it is adjacent to the mountains and where residual clays can be obtained and made into pottery. Consequently, the pottery typology appears to reflect the general manufacturing location of the vessels, rather than any major cultural differences or boundaries. The role of temper, vessel forms, and decoration remains to be determined.

Nevertheless, it appears that brownware pottery was absent in the northern Coachella Valley until sometime about 800 BP, generally at the beginning of Peninsular II, and began to be manufactured later than Patayan II pottery. This may simply be due to a Peninsular I emphasis toward basketry and perhaps a desire to avoid carrying heavy items around in the uplands. Tizon Brown tends to co-occur with Salton Buff, a Patayan

II type that is also present (without Tizon Brown) in Peninsular I. Salton Buff is known at a number of sites along the Lake Cahuilla shoreline and was probably manufactured locally (Waters 1982b:565).

Additional Peninsular II traits include the addition of ceramic pipes and figurines, heretofore considered part of the Patayan material culture (Schaefer 1994:65). The majority of ceramic pipes known from the northern Coachella Valley were made from brownware and have been found at Tahquitz Canyon (Schaefer 1995a: IX-45-IX-52, Table IX.14), Snow Creek Rockshelter (Michels 1964:97) and RIV-1179 (Sutton 1988:61).

Both bow and tubular type pipes found at Tahquitz Canyon (Schaefer 1995a:IX-46) were made primarily of brownware and Colorado Buff (the latter being a Patayan III pottery type and a Peninsular III trait). It is possible that at least some of the brownware examples could date earlier than the examples made from Colorado Buff. Thus, it is possible that if the bow type proves to be a Yuman form, it could have diffused north with brownware and was then produced locally (e.g., Schaefer 1995a:IX-49).

A fourth Peninsular II ceramic trait is the apparent introduction of ceramic figurines, also generally considered part of the Patayan material culture (Schaefer 1994:65). Peninsular II figurines are rare, small, rather nondescript (or poorly described), and quite different from the "Patayan" types identified by Hedges (1973b; also see Koerper and Hedges 1996). Such artifacts have been reported from Peninsular II components at Wadi Beadmaker and Bat Cave Buttes (see Wilke 1988:6), but none were found at RIV-1179 (Sutton and Wilke 1988). More elaborate figurines are known from Peninsular III contexts (see below).

Peninsular II groups continued to use obsidian obtained from a variety of sources, including the Coso Volcanic Field, Obsidian Butte, and some unknown sources. Other traded materials came from the Pacific Coast and Gulf of California, and some pottery (e.g., Tumco Buff) came from the Colorado River area (Waters 1982a:289), although it appears that Salton Buff was made locally rather than obtained in trade (Waters 1982b:565).

Peninsular II Mortuary Customs

Relatively little information exists as to the mortuary customs of Peninsular II groups in general, with data on the northern Peninsular Ranges being particularly meager, and it is generally assumed that cremation continued as the primary method. The record is better known in the northern Coachella Valley, where cremations are known from a number of sites.

A new form of mortuary treatment distinguishes Peninsular II in the northern Coachella Valley. This new mortuary practice is perhaps better characterized as a funerary complex and is herein named the Peninsular Funerary Complex (PFC). The PFC consists of at least six parts that should be readily detectable in the archaeological record but likely includes other characteristics, such as singing ceremonies, that would be more difficult to detect. First, bodies were cremated, likely as pit cremations, in some currently unknown location. Second, instead of the remains then being covered in place (primary pit cremations), they were collected into some sort of container for transport to another (perhaps very close) location. Third, the remains were moved to their burial place, a process that likely involved some sort of "funeral procession." Fourth, a pit was dug, pottery sherds placed at the bottom of the pit, and the remains (consisting of charcoal, ash, and burned bone) put in the pit on top of the pottery. It is hypothesized that the pottery and pit formed a conceptual "container" (e.g., urn), the pottery being the base and the pit the sides. Fifth, a "hearth feature" would have been constructed directly on top of the pit in which material goods, such as basketry and awls, would have been burned, likely as part of a mourning ceremony. The time that elapsed between the deposition of the remains

and the construction of the mourning feature would probably have been fairly short in order to minimize the risk of being unable to relocate the remains. Sixth, the pit and mourning feature would have been "sealed" with a smashed pot, with the broken pottery perhaps forming the top of the cremation "container."

The first major characteristic of the PFC, the initial cremation, was probably a trait retained from Peninsular I, and it is certainly possible that primary pit cremation without secondary burial continued to be practiced in some cases. The second major characteristic of the PFC, secondary cremations buried in "containers," was a new trait. The placement of secondary cremations in pottery vessels (urns) is a trait generally associated with the Yumans to the south (True 1966:245-246, Map 15; Bean et al. 1995:XXI-5; also see Laylander 2010:209-210). In the PFC, however, the final burial containers were more conceptual than real. It seems possible that the Yuman concept of cremations in containers diffused into the northern Coachella Valley (from the south or west?) and was adopted by Peninsular II people, who then modified the concept. The third major characteristic of the PFC, the mourning ceremony, was apparently also new to the northern Coachella Valley during Peninsular II (there being no evidence of any earlier manifestation in this region).

The PFC is defined based on the remains discovered at RIV-1179 (Sutton and Wilke 1988). The sample is thus very small, so the definition of the PFC should be considered very tentative. Nevertheless, the funerary remains found at RIV-1179 are clearly different and encompass all but the first two characteristics of the PFC. Cremation Locus 6 at RIV-1179 had no surface indications and contained the secondary cremation of an adult, probably male (the presence of a few elements belonging to a subadult were considered incidental, and may have been accidentally transported to the pit from the primary cremation location). The feature consisted of a single pit, with a large brownware sherd at the bottom, over which the cremated remains had been placed (Sutton and Yohe 1988:85-88, 93, Figures 27 and 28). On top of the cremation was a burned area containing calcined bone awls and possible textiles, burned fish bone, small unmodified stones (mostly unburned), and a smashed unburned brownware olla on top (Sutton and Yohe 1988:94-97). No beads were recovered from the feature. Radiocarbon assessment placed the age of the feature at about 560 cal BP (Sutton and Yohe 1988:98).

An analogous cremation feature was discovered at CA-RIV-7398 (Mirro and McDougall 2010:36, 40-41) several miles to the south of RIV-1179. The feature (No. 111) consisted of an adult male interred in a pit with brownware pottery sherds on its bottom and sides. A shaft straightener, Desert Side-notched point, and some modified bone were found in association, and a brownware olla had been smashed on top of the pit. Radiocarbon placed the age of the feature at about 540 cal BP. The general structure and content of the RIV-7398 feature is similar to the one found at RIV-1179. One major difference is that the artifacts that would presumably have been associated with a mourning feature (e.g., the worked bone) were found in the cremation matrix, suggesting that a mourning ceremony had taken place prior to interment, with all the materials collected and placed in the pit.

Given the paucity of well-described and well-dated cremations in the northern Coachella Valley and northern Peninsular Ranges, it is quite possible that the characteristics described above for the PFC constitute only a part of the total funerary complex. Perhaps both primary and secondary cremations were the norm, with certain people afforded special treatment such as was seen at RIV-1179 and RIV-7398. Further refinement of the PFC must await additional data.

The origins of the major traits of the PFC are unclear, but at least some of them are known elsewhere in space and time. A secondary cremation associated with an apparent mourning feature was discovered at SBR-6580

(the Siphon site) in the Summit Valley of the western San Bernardino Mountains (Sutton et al. 1993). The body had been burned in an unknown location, and the remains were buried in a pit on top of four metates that had been placed at the bottom of the pit, possibly to "contain" the remains. A "hearth" was located directly on top of the cremation and was interpreted as an associated mourning feature, although no artifacts were found in it. A radiocarbon date of ca. 3500 cal BP was obtained on human bone (Sutton et al. 1993:22), and the "hearth" was dated to ca. 3490 cal BP (Sutton et al. 1993:12), virtually identical to that of the cremation.

Secondary cremations and associated mourning features have also been documented in the Los Angeles Basin, as part of the Angeles Funerary Complex (AFC) dated between about 2,600 and 1,600 BP (Sutton 2010a:16). The AFC is associated with early proto-Gabrielino (Takic) groups, and it is possible that it is linked with other Takic groups to the east. Secondary placement of cremations in vessels and mourning ceremonies are also known among the Yumans to the south (e.g., Schaefer 2000), although it is unclear how old such practices are in that region.

Given the antiquity of these practices in California to the west, it seems possible that secondary cremations and associated mourning ceremonies originated in that area. Both traits may be part of an undefined funerary complex associated with the Greven Knoll II phase of the Encinitas Tradition (Sutton and Gardner 2010:30), and both appear to be part of the AFC associated with the Del Rey Tradition (Sutton 2010a). Perhaps the traits diffused into the northern Coachella Valley from the west.

Peninsular II Settlement Systems

As with Peninsular I, little is currently known about the archaeology of the northern Peninsular Ranges, and no overall model of Peninsular II settlement for that region is proposed. Certainly, special use sites related to the occupation of the northern Coachella Valley, including resource procurement, trade, ritual, and social activity, would have been present, and the possibility of more permanent settlements should not be discounted.

It was proposed above that the Peninsular I settlement pattern in the northern Coachella Valley involved the presence of permanent villages along the shore of a relatively stable Lake Cahuilla, with special use sites located in upland, desert, and lakeshore ecozones (Figure 5). During Peninsular II, however, Lake Cahuilla apparently fluctuated in elevation (see Laylander 1997:64), and at least one of these recessions was substantial. The lacustrine ecozones and associated resources would have fluctuated along with the lake level (if the changes were slow enough), so they could have continued to be available, even if their geographic locations shifted.

Following this, Weide (1976:91) proposed a flexible settlement and subsistence model (herein referred to as Model A) "similar to [that] of Great Basin people to the north who exploited similarly fluctuating resource bases" (Figure 6; Table 4). In this model the lake was only part of the system (the "limnobad" model; Bettinger 1993:45-47) with small, mobile populations without permanent settlements moving to the lake to use the lacustrine resources as part of their overall seasonal round. When the lake desiccated, people would have simply readjusted their system back to terrestrial resources. Due to the frequent fluctuation of the lake, populations would not have significantly increased, so no explanation of where large populations would have gone when Lake Cahuilla desiccated would be required (Weide 1976:91). A similar system was proposed by Sutton (1993, 1998) as a "transitional" system from prehistoric "lake" to historic (ethnographic) "desert" conditions.

Model A would have two archaeological expressions, one when the lake was full (high stand) and one with the lake in recession (see Figure 6, Table 4). Each expression would reflect a seasonal round practiced by

a residential group of both sexes and all ages. The "high stand" expression would consist of upland, desert, and lakeshore sites linked to each other in some fashion. The "recessional" expression would include the same site types, but the lakeshore and some desert sites would be located below the high stand. During time when the lake effectively disappeared, lakeshore sites would be absent. In this model, no "permanent" settlements would be present, although it is possible that some small special purpose sites used by specialized task groups could have been used, such as small rockshelters near the lakeshore (Pallette and Schaefer 1995).

Schaefer (1994:70) argued that the presence of Tizon Brown pottery in lakeshore sites was "suggestive of a seasonal round from base camps in transitional areas, where Tizon Brown Ware was made, to temporary camps in the vicinity of Lake Cahuilla, where the pottery was transported, used, and eventually discarded," an argument that appears to support Model A.

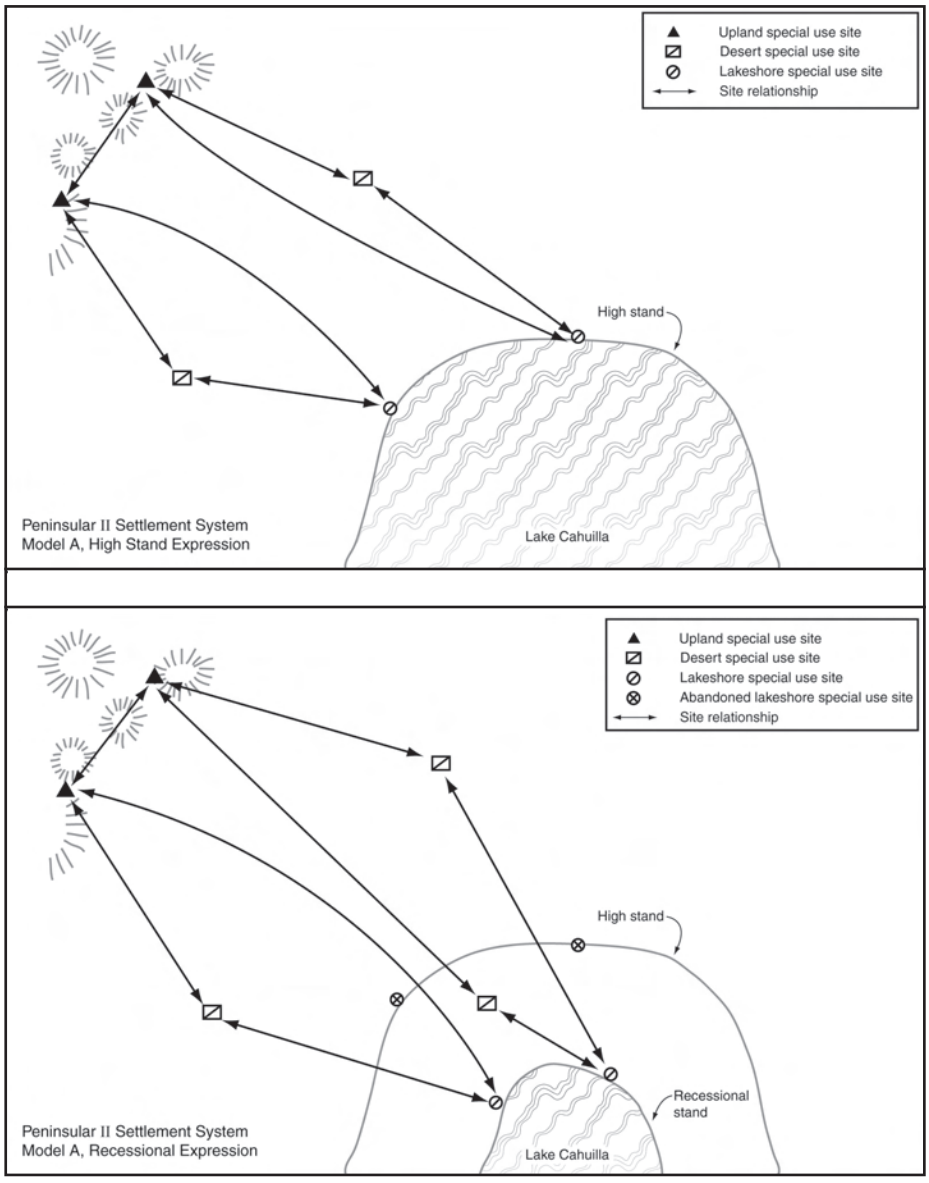

Figure 6. The "limnobad" model (Model A) of Peninsular II settlement systems (high stand and recessional) around Lake Cahuilla in the northern Coachella Valley (adapted from Weide 1976:91).

Table 4. The "Limnobad" Peninsular II Settlement Model A Associated with Lake Cahuilla in the Northern Coachella Valley (adapted from Weide 1976:91).

Site Characteristics	Archaeological Expectations
Model A, High Stand Expression	
Upland Sites	
sites in upland ecozones to exploit resources, such as acorns, pinyon, deer, and sheep (generally the same as in Peninsular I) used by relatively large residential groups some ceremonial activity seasonal occupation possible presence of very small special use sites used by specialized task groups	medium and possibly deep middens evidence of only seasonal habitation ecofacts of upland resources evidence of procurement, processing, and storage of upland resources, including facilities such as bedrock mortars and granaries some brown and buff pottery, cremations, ritual artifacts
Desert Sites	
sites in desert ecozones above the high stand to exploit resources such as mesquite, dicoria, and lagomorphs (generally the same as in Peninsular I) used by relatively large residential groups some ceremonial activity seasonal occupation possible presence of very small special use sites used by specialized task groups	small and shallow middens with evidence of habitation evidence of only seasonal habitation ecofacts of desert resources evidence of procurement, processing, and storage of desert resources some brown and buff pottery, cremations, ritual artifacts
Lakeshore Sites	
sites along shorelines to exploit lacustrine resources used by relatively large residential groups some ceremonial activity seasonal occupation possible presence of very small special use sites used by specialized task groups	small and shallow middens with evidence of seasonal habitation only evidence of procurement, processing, and storage of lacustrine resources, including facilities such as fish traps presence of (as yet unidentified) specialized toolkits for lacustrine resources some brown and buff pottery, cremations, ritual artifacts difficult to locate in lake sediments
Model A, Recessional Expression	
Upland Sites	
the same as in high stand expression	the same as in high stand expression
Desert Sites	
the same as in high stand expression	generally the same as in high stand expression located above and below high stand
Lakeshore Sites	
the same as in high stand expression	located on shorelines below high stand could be absent if lake disappeared entirely

A second possibility is that Peninsular II groups retained a focus on lacustrine resources even during fluctuations in lake levels and maintained a focus on the lake (a "limnogood" model; Bettinger 1993:45-17). Here, the permanent settlements of Peninsular I would have been retained, but a more flexible system would have been adopted that could have included changes in settlement location and/or special use sites to adapt to the changing geographic location of the lacustrine ecozones. In such a system, the lakeshore would be expected to be permanently occupied with some combination of principal habitation and special use sites utilized with varying duration and intensity. As a result, dependence on specific resources would fluctuate, with lacustrine resources remaining generally dominant but with terrestrial resources varying in importance (see below). This fluctuating resource dependency could be seen as variations in diet breadth and/or in the employment of various tactics within the overall strategic inventory (Sutton 2000).

Such a Peninsular II settlement system could have taken one of at least two different forms (Table 5). The first possibility, presented here as Model B (Figure 7 top, Table 5), is that the preexisting (Peninsular I) principal settlements located along the high stand of the lake would have been moved to progressively lower elevations to remain close to the receding shoreline and lake resources (e.g., fish and marsh plants). Wilke (1988:9) suggested that lake levels did not decline to the point that the increasing salinity became toxic until the "final" recession, that is, during Peninsular III (e.g., the current Salton Sea continues to support plants and fish). As the lake levels again rose, the principal settlements would have been relocated to progressively higher elevations, perhaps even to their old locations. The archaeological signature would be a series of relatively short-lived principal settlements spread from the high stand down to the (as yet undetermined) low stand elevation. In essence, then, the association between settlements and the lakeshore would have remained basically the same during high and low lake levels in that principal settlements would have been located on the shoreline.

Archaeologically, Model B principal settlements might look like relatively large temporary camps. Even if these sites were occupied for only short periods when the water was rising, they should still contain the full range of behaviors associated with high stand principal settlements, specifically evidence of "permanent" habitation, ceremonial cycles, and cremations. Special use sites in upland, desert, and lakeshore ecozones would have continued to be used as they had in Peninsular I (see above), although the distance to many such sites from the principal lakeshore settlements would have increased as the lake retreated. However, as the lake retreated, areas formerly underwater would have become "desert," and desert special use sites would have been established in areas below the high stand shoreline. In addition, a series of lakeshore special use sites would have been established to follow the retreating lake.

A second possibility, Model C (Figure 7 bottom, Table 5), is that the principal settlements on the high stand shoreline would not have been moved as lake levels fluctuated. As the water receded, the ecozone around the principal settlements would have become "desert" rather than lacustrine, and local resource procurement would then be focused on the exploitation of desert resources. As before, upland, desert, and lakeshore special use sites would have continued to be used, with desert and lakeshore special use sites being established below the high stand. This cycle could have repeated itself several times. The availability of fresh water at the principal settlements may have been an issue.

Desert and lakeshore special use sites would have been located at variable distances from principal settlements, depending on the lake level at the time. They would have been occupied by relatively small task groups for comparatively brief periods of time, and the resources obtained would heve been processed

before being taken back to the principal settlements. Lakeshore special use sites would contain considerable evidence of fish/marsh plant procurement and processing but little evidence of habitation.

As a result, the Model C principal settlements would contain "less" evidence of lacustrine resource procurement and processing and perhaps "more" evidence of terrestrial resource procurement and processing. In addition, one would expect changes in toolkits, processing facilities, and ecofactual remains at all the lake basin sites. Perhaps the stone fish traps known in some portions of the northern Coachella Valley and elsewhere in the Salton Basin (Treganza 1945; Wilke and Lawton 1975; Wilke 1980; Schaefer and Laylander 2007; White and Roth 2009) are examples of such lakeshore special use sites. Special use sites located below the high stand would have been inundated as the lake rose again, were probably covered with sediments, and many now are very difficult to locate.

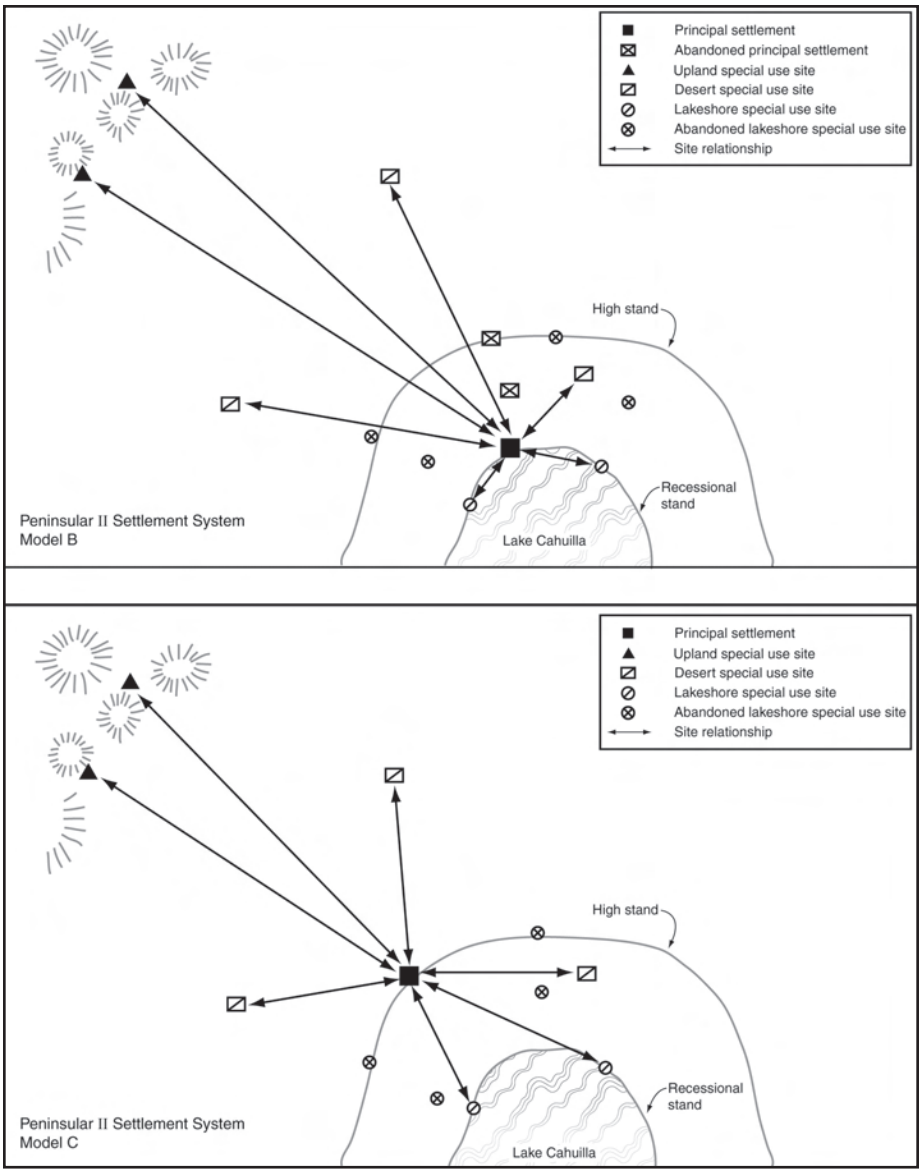

Figure 7. Two possible "limnogood" models (B and C) of Peninsular II settlement systems around Lake Cahuilla in the northern Coachella Valley. In Model B, the principal settlements along the Lake Cahuilla high stand shoreline would be moved to follow the receding Lake Cahuilla shoreline with special use sites being located in upland, desert, and lakeshore settings. In Model C, the principal settlements would remain in place with special use sites being located in upland, desert, and lakeshore settings.

Table 5. Two Possible "Limnogood" Peninsular II Settlement Models B and C Associated with Lake Cahuilla in the Northern Coachella Valley.

Principal Settlements		Special Use Sites (SUS)	
Characteristics	**Archaeological Expectations**	**Characteristics**	**Archaeological Expectations**
Model B			
a series of short-lived occupation sites at different elevations along the receding shoreline full range of habitation and ceremonial activities exploitation of upland, desert, and lacustrine resources	located on the high stand and at recessional stands of Lake Cahuilla relatively small and shallow middens possible evidence of abandonment and later reoccupation large-scale facilities, such as cooking features ecofacts of upland (e.g., pinyon), desert (e.g., lagomorphs), and lacustrine (e.g., fish and Typha) resources tools for the procurement, processing, and storage of upland, desert, and lacustrine resources considerable pottery many cremations	**Upland SUS** sites in upland ecozones to exploit resources, such as acorns, pinyon, deer, and sheep (generally the same as in Peninsular I) used by relatively large specialized task groups for extended periods	**Upland SUS** medium and possibly deep middens, evidence of seasonal habitation evidence of procurement, processing, and storage of upland resources, including bedrock mortars and granaries possible presence of lacustrine resources, such as fish some pottery, cremations
		Desert SUS sites in desert ecozones to exploit resources such as mesquite, dicoria, and lagomorphs (generally the same as in Peninsular I) used by small, mobile task groups for brief periods	**Desert SUS** small and shallow middens with little evidence of habitation located in a variety of settings above and below the high stand evidence of procurement and processing of desert resources, possible presence of lacustrine resources, such as fish little pottery, rare cremations
		Lakeshore SUS sites along shorelines to exploit lacustrine resources used by small, mobile task groups for brief periods	**Lakeshore SUS** small and shallow middens with little evidence of habitation extensive remains of lacustrine resources, with "schlepping" evident from processing on site specialized procurement (e.g., fish traps) and processing areas presence of as yet unidentified specialized toolkits for lacustrine resources little pottery, no cremations difficult to locate in lake sediments
Model C			
relatively few large settlements along the high shoreline of the lake relatively permanent occupation shift from local exploitation of lacustrine resources to desert resources, continued use of upland resources full range of habitation and ceremonial activities	relatively large and deep midden deposits not located below high stand ecofacts of upland resources, increase in ecofacts from desert resources decrease in ecofacts of lacustrine resources (e.g., fish bone), with "schlepping" evident from processing elsewhere absence of as yet unidentified specialized toolkits for lacustrine resources considerable pottery, many cremations	**Upland SUS** the same as in Model B	**Upland SUS** the same as in Model B
		Desert SUS the same as in Model B	**Desert SUS** generally the same as in Model B but with increased intensity
		Lakeshore SUS the same as in Model B	**Lakeshore SUS** the same as in Model B

A brief discussion of the ecofactual remains from RIV-1179, located along the high stand near La Quinta, is relevant to the models outlined above. That site (see Sutton and Wilke 1988) was interpreted as a base camp containing a substantial midden, a variety of material culture (e.g., milling tools, points, and pottery), coprolites, cremations, and abundant fish bone, all indicative of an occupation during a high stand of Lake Cahuilla. It appears that fish were brought whole to the site and processed there, with tails being removed and discarded into the midden (see Wilke and Sutton 1988:160). Interestingly, the pottery vessel forms found at RIV-1179 were more suggestive of serving than storage (Wilke and Sutton 1988:158), suggesting that fish were not stored in pottery vessels. The upper portion of the RIV-1179 deposit contained fewer fish and larger quantities of terrestrial animals from both upland and desert ecozones (see Sutton and Yohe 1988:Table 19). Interestingly, though, the ecofacts from the coprolites all contained lacustrine resources, primarily fish (see Farrell 1988:Table 23).

This pattern could be interpreted as supporting settlement Model C, with the site being on the shoreline at one point in time with the heavy use of lacustrine resources. Later in time (as the lake receded?), fish bone decreased, terrestrial macrofaunal remains increased, but fish remained present in coprolites, suggesting that the site continued to be occupied during a lake recession and that fish continued to be consumed, perhaps obtained from lakeshore special use sites. On the other hand, it is possible that the RIV-1179 site was a spring/summer seasonal camp, not "permanent" (Sutton 1993:11), and so would not support Model C.

Peninsular II Subsistence Systems

As in Peninsular I, the subsistence systems of Peninsular II involved a very diverse tactical inventory that included the use of upland, desert, and lacustrine resources. In the northern Peninsular Ranges subsistence data are few, and no model of a subsistence system is yet possible. In the northern Coachella Valley, Peninsular II subsistence would have varied depending on the level of Lake Cahuilla. People living along the lake would have focused on lacustrine resources (refer to the earlier outlining of resources), probably augmented with resources obtained from upland and desert ecozones. Depending on what settlement system was employed (see above), the specific mix of terrestrial and lacustrine resources used at any one time and place would have varied. An increase in the use of terrestrial resources during fluctuations of lake levels could have been a response to decreasing availability of lacustrine resources.

Although stone fish traps could have been used at any time when Lake Cahuilla was full, large complexes of traps were clearly used as lake levels declined (Treganza 1945; Wilke and Lawton 1975; Wilke 1980; Schaefer and Laylander 2007; White and Roth 2009). These facilities could have been used when the lake levels temporarily declined (lakeshore special use sites) and almost until the lake finally desiccated completely. Some of the stone fish traps were probably among the final efforts at harvesting fish from the lake by Peninsular II groups.

Peninsular II Rock Art

An understanding of rock art in Peninsular II remains elusive. Rock art is not associated with every Peninsular II habitation site even though suitable rock was present at some locations such as RIV-1179 (Sutton and Wilke 1988).

Nevertheless, it is suggested herein that the San Luis Rey rock art style of pictographs (Hedges 2002; also see Steward 1929; True 1954; Hedges 1973a; Heizer and Clewlow 1973) is a Peninsular II manifestation. The San Luis Rey style was originally defined as "Luiseño" in character (Hedges 1970) but is also known from other places, including the northern Peninsular Ranges and northern Coachella Valley (Hedges 2002:

Figure 1, 27-28; also see Minor 1973:30-32; Smith and Freers 1994; Freers 1998:58). The good preservation of San Luis Rey style pictographs suggests that the art is relatively recent, perhaps after 700 BP (Steward 1929:233; True 1954:69; Heizer and Clewlow 1973:40). In the northern Coachella Valley, however, there is little to indicate that San Luis Rey style art is associated with the adoption of the *Chingichngish* religion (as discussed above).

Peninsular II: A Discussion

Peninsular II is proposed to reflect the changes in settlement and subsistence that were instituted to adapt to the fluctuations in the level of Lake Cahuilla, prior to its "final" desiccation. Some important new material traits appeared, including brownware pottery, ceramic pipes, and figurines. In addition, a new funerary complex seems to have emerged. All in all, it was a dynamic time, with influences from the south, north, and west. The Peninsular II phase ended when Lake Cahuilla desiccated about 300 years ago, and new traits were adopted.

The impetus behind the adoption of brownware pottery, presumably from the south, is of interest. With Patayan pottery already being present, there should not have been any urgency to adopt brownware as if it were a new and innovative technology. Perhaps it was a trait that accompanied the adoption of a new funerary complex from the south.

The impact of the LIA (see above) on Peninsular II groups after about 600 BP is unclear. In the northern Peninsular Ranges, the lowered temperature could have affected resource productivity (perhaps an increase), caused changes in people's seasonal schedules, or impacted their mobility. Increased precipitation could have resulted in the expansion of juniper zones in the mountains and foothills. In the northern Coachella Valley where the lake was not climate-dependent, little direct impact would be expected.

The Peninsular Pattern, Phase III

The disappearance of Lake Cahuilla at about 300 BP had a significant impact on people in the northern Coachella Valley and surrounding regions. The loss of lacustrine resources resulted in major changes in settlement and subsistence systems, along with changes in material culture, mortuary practices, and rock art. This "new" cultural assemblage is herein classified as Peninsular III. It is also hypothesized that at least some people moved back into the northern Peninsular Ranges and interior valleys, occupying areas formerly considered to be San Luis Rey II territory. In addition, obsidian use patterns changed, with the suddenly available glass from Obsidian Butte being used over other sources. It is also possible that the loss of obsidian from sources in the Mojave Desert reflects waning Yuman influences in that region as the Yuman Desert Mohave were replaced by the Numic Chemehuevi late in time (e.g., Lerch 1985).

Peninsular III Material Culture

Perhaps the most immediate change in material culture marking Peninsular III in the northern Coachella Valley was the discontinued use of lacustrine subsistence technology, such as fishing tools, fish traps, marsh plant processing tools, and the like. Existing tactics and technologies to procure and process terrestrial resources would have become more important and probably more common. Elsewhere in Peninsular III contexts, such as at upland special use sites, material culture probably did not change much. In both regions, Cottonwood Triangular and Desert Side-notched points continued to be used.

Pottery remained important, and brownware pottery continued to be used. Specific local varieties of brownware have been identified, such as Salton Brown (Hildebrand et al. 2002:122) and Tahquitz Brown (Schaefer 1995a; Schaefer and Laylander 2007), but the times of their introductions are unclear.

Patayan pottery types changed, primarily to Colorado Buff, a Patayan III type thought to have been made locally (Waters 1982b:569-570).

Straight and bow ceramic pipes continued to be used, made from both brownware and Colorado Buff. Both stone and ceramic pipes are known to have been used by the Cahuilla (Rogers 1936:50, Plate 7a; Bean and Saubel 1972:91), although Drucker (1937:25) reported that only a stone pipe was used by the Mountain Cahuilla. The Cahuilla used two basic types of pipes, a straight tubular type (Rogers 1936:50, Plate 7c) and a smaller, handled bow type (Bean and Saubel 1972:91; Rogers 1936:50, Plate 7a). The bow type is generally considered to be Yuman, while the straight type is typically associated with "Shoshonean" groups (e.g., True 1966:239-240; Underwood 2004; but see Schaefer 1995a:IX-46).

Ceramic figurines seem to have been present in Peninsular II contexts (see above), but they are poorly described and defined. Several new figurine types appeared in Peninsular III, including both the paddle-shaped type and the flat coffee-bean eye type (at Tahquitz Canyon, see Schaefer [1995d:VII-15]; also see True [1966:154-155, 238]). The paddle-shaped type is specific to the Luiseño and Cahuilla (and possibly other Takic groups) and could be related to the "Northern Tradition" of ceramic figurines (Schaefer 1995d:VII-15). "Northern" figurines were also recovered from CA-RIV-102 (Langenwalter 1980), a San Luis Rey II site.

Flat coffee-bean eye figurines were also new, described as Patayan figurines associated with the "Southern Tradition" of figurines (Hedges 1973b:6). Hedges (1973b:6) defined three types of Patayan figurines from southern California, each with a generally flat body having no arms or legs, coffee-bean eyes, a prominent nose, and punctate mouth (Hedges 1973b:9). The Type III figurine defined by (Hedges 1973a:Figure 4) is limited to the northern Coachella Valley (Hedges 1973a:32, Figure 1).

The coffee-bean eye type was adopted by the Cahuilla and has been discovered in Peninsular III contexts (Schaefer 1995d:VII-15; also see Koerper and Hedges 1996). Hedges (1973b:34) suggested that the type was perhaps associated with "death and mourning practices," but only one, from a cremation in the Joshua Tree area of the Mojave Desert (Campbell 1932:111), has been found in a mortuary context, and it seems more likely that they were associated with fertility or curing rituals (Schaefer 1995d:VII-16).

The use of obsidian sources changed in Peninsular III. Glass from sources to the north in the Mojave Desert, such as the Coso Volcanic Field and Bagdad, dropped out of the archaeological record, and glass from the Obsidian Butte source to the south became dominant. It is possible that the late arrival of the Numic Chemehuevi into the eastern Mojave Desert disrupted the trade of obsidian south into the Colorado Desert. Lastly, as Euroamerican materials such as glass beads and metal tools became available, they were adopted. A good example of the incorporation of such materials into a Peninsular III component can be seen at Tahquitz Canyon (Schaefer 1995e).

Peninsular III Mortuary Customs

The secondary cremations of the PFC practiced in Peninsular II appear to have been abandoned, with primary pit cremations alone being readopted. It should be noted, however, that this change in mortuary practices is only generally surmised from the existing archaeological literature of post-300 BP cremations (e.g., Hogan 2005) as detailed descriptions of cremation features of any kind are generally lacking. The protohistoric (e.g., Peninsular III) pit cremations found at Tahquitz Canyon were primary and were "identical to the Luiseño method and stands in contrast to the Kumeyaay (Diegueño) method of secondary pot urn cremation" (Bean et al. 1995:XXI-5). Thus, this cremation method was considered as an "ethnic marker separating Shoshonean [Takic] from Yuman groups in southern California"

(Bean et al. 1995:XXI-5; also see True 1966, 1970). Caution is advised, though, in the use of ethnographic parallels in funerary studies (Ucko 1969).

Secondary cremations may have been dropped in Peninsular III, although secondary (urn) burials of cremated remains were reported for the ethnographic Desert Cahuilla (Drucker 1937:36). However, the mourning ceremony of the PFC was retained and undoubtedly evolved into the funerary customs of the ethnographic Cahuilla (see Davis 1920; Curtis 1926; Strong 1929; Fairchild 1933; Drucker 1937; Wilke and Lawton 1975; Lando and Modesto 1977; Bean 1978). The shell beads seen in many cremations were generally replaced by glass beads.

It was hypothesized above that the PFC of Peninsular II had diffused into the area, possibly from the south or the west. True (1966:246), in describing a cremation cemetery in the Tipai area to the south, reported the presence of "miniature arrowshaft straighteners, and miniature [pottery] vessels" (also see DuBois 1905:626) within the cemetery, suggesting the possibility that these artifacts are part of an undefined archaeological funerary complex. Similar artifacts were recovered from cremation contexts at Tahquitz Canyon (Schaefer 1995d:VII-13; 1995c:XII-8), thus suggesting a link.

Peninsular III Settlement Systems

The northern Peninsular Ranges remain an archaeological enigma, and little can be said about any settlement patterns in that region. Interestingly, neither Strong (1929:Map 2, Map 4, Map 5), Lando and Modesto (1977:Figure 2), nor Bean (1978:Figure 1) showed Cahuilla village locations within the San Jacinto or Santa Rosa mountains (although some are close).

However, it is clear that major settlement changes occurred in the northern Coachella Valley after the desiccation of Lake Cahuilla (Wilke 1978). Once the lake had disappeared, principal settlements were apparently relocated away from the former lakeshore to near springs along the fringes of the northern Peninsular Ranges or springs or wells on the desert floor, as well as on the former lakebed (see Figure 8). These new principal settlements were permanent, and special use sites (such as locations for resource procurement, trade, ritual, and social activities) were located in both upland and desert ecozones. As Lake Cahuilla was no longer present, no lakeshore special use sites were used. This is the same basic system as was reported for the ethnographic Cahuilla (Bean 1972:68-82, 1978:575).

The loss of Lake Cahuilla and its associated lacustrine ecozones would almost certainly have resulted in a decrease in carrying capacity for the northern Coachella Valley (O'Connell 1971:180; Jefferson 1974:7). Assuming that the population around the lake was reasonably high at that time, it seems likely that it would have been necessary for at least some people to move out of the northern Coachella Valley as it underwent desertification. Assuming such a population movement did occur, there is currently no clear evidence to indicate where the people might have gone.

While it is possible that some people moved east to the Colorado River, most archaeologists have suggested a population movement into the northern Peninsular Ranges to the west (e.g., Wilke 1978:113, 118). In this scenario, it would seem that people in a Peninsular II village, being forced to relocate, would move to a place they already knew and controlled, such as suitable upland or desert special use sites.

One such "upland" (although it is not very high) locality is Tahquitz Canyon in the northeastern foothills of the San Jacinto Mountains. This site contains a comparatively small Patayan II (Peninsular II) component, but after about 400 BP, there was a "considerable population influx," an "intensified use of some resources," and a larger occupation (Schaefer 1994:72; also see Bean et al. 1995). It is hypothesized here that

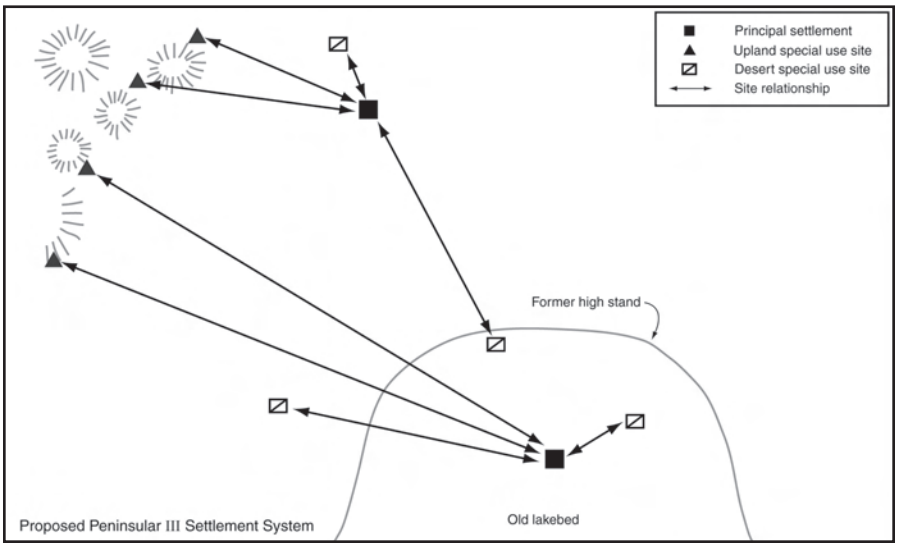

Figure 8. Model of Peninsular III settlement system in the northern Coachella Valley showing principal settlements located at various locations, such as springs and wells, where water could be obtained. Special use sites were located in upland and desert settings.

Tahquitz Canyon was a relatively small Peninsular II upland special purpose site. Once Lake Cahuilla finally disappeared, the population of its principal settlement on or near the lake would have moved to this site, establishing a Peninsular III settlement that evolved into an ethnohistoric Cahuilla village. Another such possible locality is *Yamisevul* (CA-RIV-269) near Desert Hot Springs (Altschul and Shelley 1987).

At least a few other special purpose sites in both upland and desert ecozones would have followed similar trajectories to become villages, while others would have retained their special use functions. It seems likely that additional special purpose sites would have been established in Peninsular III to accommodate an increased need for both upland and desert resources.

A "desert" locality that may also fit this description is located at a spring on the valley floor; the site complex at Two Bunch Palms near Desert Hot Springs. Here, a fairly substantial Late Archaic occupation appears to have been followed by smaller Late Prehistoric (Peninsular I and II) occupations (Dahdul et al. 2008). A major ethnohistoric Cahuilla village (Peninsular III?) is known at this general locality (Wilke and Lawton 1975:30, Figure 6).

In addition, it is possible that some people moved even further west into the interior valley west of the northern Peninsular Ranges (see Jefferson 1971:167, 1974:6-7; O'Connell 1971:180; O'Connell et al. 1974; Wilke 1978:113, 118). In this scenario, Peninsular III groups from the lake would have established settlements in the interior valley, an area that had witnessed only minimal occupation until very late in time (Wilke 1978:118).

Lake Cahuilla is mentioned in Cahuilla oral tradition a number of times. For example, Blake (1856:98) recorded that people living in the mountains came to the lake to fish and eventually moved their villages there when the lake disappeared. Other stories related the arrival and retreat of the water three times (Patencio 1943:84), the movement of people to avoid the water (Strong 1929:87), the establishment of small fishing camps (Strong 1929:87), and the use of stone fish traps (Strong 1929:87). Laylander (2006b:170) suggested that these stories "lay close to the borderland between factual history and myth" but did not discount the narratives.

In addition, some of the ethnographic Desert Cahuilla on the floor of Coachella Valley claimed their origins

in the Santa Rosa Mountains to the west (e.g., Strong 1929:37). This suggests that when Lake Cahuilla desiccated, they moved up to the mountains and returned to the valley floor once the desert plant communities, such as mesquite, had been reestablished on the valley floor.

Peninsular III Subsistence Practices

In general, subsistence practices during Peninsular III were the same as those reported for the ethnographic Cahuilla (e.g., Barrows 1900; Bean 1972, 1978), and the reader is referred to those sources for details. It is possible that the historic stand of Lake Cahuilla entailed the use of some lacustrine resources, but this is uncertain. Aboriginal cultigens were introduced from the Colorado River area at some point in time (e.g., Wilke and Lawton 1975), and these crops, and perhaps some European ones as well, began to be grown in the northern Coachella Valley.

Peninsular III Rock Art

It seems that even less is known about rock art in Peninsular III than in earlier Peninsular phases. Both Tahquitz Canyon (McCarthy 1995:XIX-16, 17) and Andres Canyon (Hedges 1989) contain San Luis Rey and Rancho Bernardo style pictographs, but their dating is unclear. The Cahuilla Style B" art identified at Andres Canyon (Hedges 1989:95) contained historic designs (e.g., people on horseback) and so can be firmly placed to historic times. It is suggested herein that Cahuilla Style B art is associated with Peninsular III.

Interestingly, motifs that resemble San Luis Rey style rock art elements have been found painted on Patayan III pottery vessels at Tahquitz Canyon (Schaefer 1995a:IX-45). This suggests either that San Luis Rey style rock art was made during Peninsular III or that old rock art designs were used on later pottery.

Peninsular III: A Discussion

The Peninsular III phase reflects the archaeological signature of the ethnographic Cahuilla that had become established in Peninsular I and II. During this time, some settlements were moved closer to ranches, and some Euroamerican material culture and subsistence resources were adopted.

The Peninsular Pattern: A Discussion

It is suggested here that the Peninsular Pattern represents a migration of proto-Cahuilla people into the northern Peninsular Ranges and northern Coachella Valley. Beginning about 900 BP, Peninsular I groups migrated into the region to exploit the Lake Cahuilla resource base, displacing or absorbing the existing Patayan II peoples in those areas. Peninsular people remained in the area, adjusting to both a period of lake fluctuation (Peninsular II) and to the final desiccation of the lake (Peninsular III). The prehistory of the areas around the southern two-thirds of Lake Cahuilla followed a different trajectory and is beyond the scope of this article.

The prehistory of the northern Peninsular Ranges, although poorly known, was likely tied to that of Lake Cahuilla. When the lake was present, it seems probable that occupation of the uplands would have been seasonal, focused on the exploitation of resources that were then transported back to principal settlements in the northern Coachella Valley. When the lake was absent, populations may have been larger in the mountains, and perhaps they were associated with principal settlements in the desert to the east and the inland valley to the west.

Archaeological Expectations of the Peninsular Pattern

If the general model of prehistory presented above is accurate, a number of correlates should be expected in

the archaeological record. First, while Lake Cahuilla may have been present by about 1,000 BP, the lakeshore would have been occupied to a major degree only after the arrival of Peninsular I groups after about 900 BP. The arrival of Peninsular I groups would be marked by a shift in settlement pattern from a "forager" to a "collector" system and by the appearance of Cottonwood points, although Desert Side-notched points may have already been present.

On the premise that Peninsular components represent a new and different cultural tradition than Late Archaic components, a cultural discontinuity should be evident in sites with both components. This may be difficult to distinguish due to bioturbation and a general similarity in ecological adaptations (e.g., Schafer 1995b:III-4). A comparison of single-component sites from each entity may be beneficial in clarifying this issue.

The first "major" occupation of the northern Peninsular Ranges would have occurred during Peninsular I as the settlement pattern expanded to include upland resources as a major aspect of the subsistence systems for the first time. Occupation of the uplands would have continued unbroken through Peninsular III, albeit with changes in intensity of use.

A number of ideas regarding Peninsular II settlement and subsistence systems were outlined above and remain to be tested. The same is true for the proposed PFC, whose testing will require more detailed data than are currently available.

The Palomar Tradition: A Brief Summary

The Palomar Tradition is proposed to represent the movement of Californian traits and Takic languages from coastal southern California east into interior southern California generally north of San Diego County. Two patterns are proposed, San Luis Rey and Peninsular, each representing a divergent track from a common origin. In the case of the San Luis Rey Pattern, it is proposed that a suite of traits, including proto-Cupan (Takic) languages, first diffused south then east and northeast and was adopted by existing Encinitas Tradition groups of Yuman biology. It is also proposed that the Peninsular Pattern represents a migration of people that had separated from San Luis Rey and moved east to occupy the northern Lake Cahuilla region. Peninsular people, also of Yuman biology, spoke proto-Cahuilla, a language that had split from proto-Cupan when they migrated eastward. Thus, it is argued that all Palomar groups spoke Takic languages but were of Yuman biology. As such, Palomar people can trace their biological ancestry well back into prehistory, likely at least to the inception of the Encinitas Tradition.

The Palomar Tradition was apparently not adopted south of northern San Diego County. A different Encinitas entity, Pauma, seems to have occupied that area (Greven Knoll was to the north, Sutton and Gardner [2010]), and it is possible that for whatever reason, Pauma groups declined to adopt Palomar traits. To speculate, perhaps there was a cultural boundary of sorts separating the "northern" Encinitas Greven Knoll groups more closely associated with the Mojave Desert from the "southern" Encinitas Pauma groups associated with far southern Alta California and northern Baja California.

It is suggested that the San Luis Rey Pattern evolved into the ethnographic Luiseño and Cupeño and that the Peninsular Pattern represents the ethnographic Cahuilla. However, there is not a neat correlation between the archaeological assemblages and the ethnographic boundaries in the interior valleys west of the Peninsular Ranges, with both the Luiseño and Cahuilla claiming that area. This may be due to some sort of "rebound" effect as Peninsular III groups (presumably the ethnographic Cahuilla) moved from the northern Coachella Valley west into the mountains and interior valleys. They would have displaced the San Luis Rey II groups (presumably the ethnographic Luiseño) in the interior valleys (see Figure 4), generally the

model initially proposed in 1971 (Jefferson 1971:167, 1974:6-7; O'Connell 1971:180; O'Connell et al. 1974; Wilke 1978:113, 118).

It is important to note that the Palomar Tradition model described here was constructed on the basis of archaeological data, and while there are linguistic and cultural implications that follow from the model, the archaeological data remain independent. Thus, if at some future time it is learned, for example, that the Cahuilla are not of Yuman biology, the archaeological aspects of the Palomar Tradition would still have merit.

A Note on the Spread of Bow and Arrow Technology

Cottonwood Triangular projectile points are a primary material marker for the Palomar Tradition. Earlier arrow points (Rose Spring or Marymount) are known in the Los Angeles Basin (Sutton 2010a:17) but are rare in other areas of southern California. Desert Side-notched points tend to be considered "Yuman" markers in southern California (e.g., True 1966:280), although they have been found in small numbers across southern California, being more numerous in the northern Coachella Valley. The paucity of Rose Spring (or equivalent) points in southern California contexts suggests the possibility that bow and arrow technology did not spread into interior southern California until after Cottonwood points had been introduced, keeping in mind that it is possible that hardwood tips were used on arrows prior to the arrival of Cottonwood points (Wilke 1974b:22).

If the appearance of Cottonwood (or Desert Side-notched) points reflects the arrival of bow and arrow technology to interior southern California, then it is possible to propose a model of the spread of that technology across much of southern California (Figure 9). In this model, bow and arrow technology (Rose Spring/Marymount points) entered the Los Angeles Basin sometime about 1,600 BP but was not adopted outside that area. At that time, the Los Angeles Basin was occupied by the proto-Gab/Cupan (Sutton 2010a), while the surrounding regions were occupied by Encinitas groups (see Sutton and Gardner 2010). Sometime about 1,250 BP, Cottonwood points diffused into the Los Angeles Basin and a bit later (ca. 1,200 BP) spread to the south along with other "Californian" traits, into the areas that would become San Luis Rey. As San Luis Rey expanded to the east and north, Cottonwood points reached the interior valley by about 900 BP (e.g., Wilke 1974b:22; Robinson 1998:36).

Further south, bow and arrow technology marked by Desert Side-notched points diffused into the San Diego County region from the east, arriving by about 1,000 BP. At about the same time, the bow and arrow with Desert Side-notched points diffused north into "Yuman" populations then occupying the northern Coachella Valley.

Sometime about 900 BP, Peninsular I groups, armed with Cottonwood points, moved east into the northern Coachella Valley, encountering people (although probably not for long) who already had Desert Side-notched points. Both point types were then retained by subsequent Peninsular groups. In the Mojave Desert to the north, Serran languages, and presumably Cottonwood points, seem to have only moved east after about 1,000 BP (Sutton 2009).

Linguistic Correlates of the Palomar Tradition

Adjunct to the material archaeology of the proposed Palomar Tradition is that it reflects the movement of Takic languages eastward from the coast after about 1,250 BP. It seems reasonably clear that an actual migration of "Takic" people entered the Los Angeles Basin about 3,500 BP, replacing the existing Encinitas groups in that area (Sutton 2009) and initiating the Del Rey Tradition (Sutton 2010a).

Takic is not a language but rather branch of Northern Uto-Aztecan (NUA), a subfamily of the Uto-

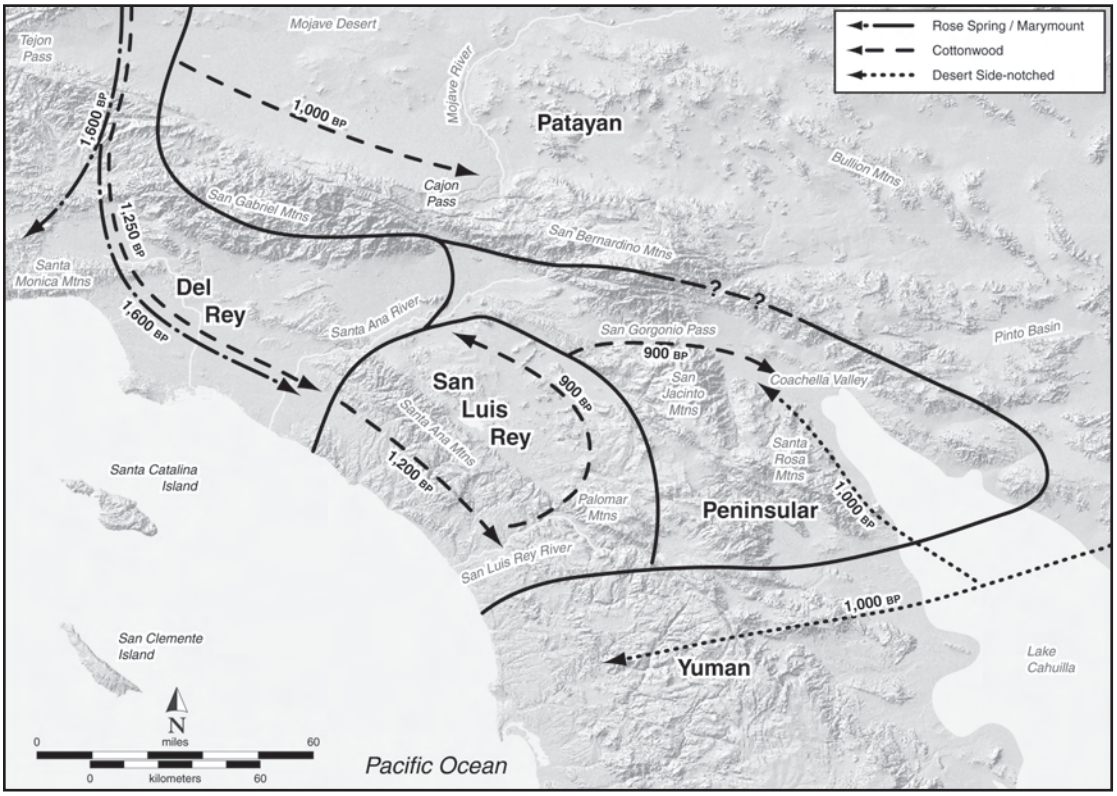

Figure 9. Proposed routes and timing of the spread of bow and arrow technology across southern California.

Aztecan linguistic family that extends from southern Mexico across much of western North America. Traditionally, NUA has been divided into four branches; Hopic, Tubatulabalic, Takic, and Numic (e.g., Hinton 1991; Goddard 1996). This division has been revised, however, in that the Takic branch has been redefined to include the Tubatulabal language (Manaster Ramer 1992; Hill 2007; also see Sutton 2010b), with the result that Takic is now comprised of two major sub-branches, Serran and Tubatulabal/Gab/Cupan (see Table 6). The Serran sub-branch is generally located in the northern portion of Takic territory (e.g., the Mojave Desert), while the Tubatulabal/Gab/Cupan sub-branch is located in the southern portion of Takic territory (e.g., southern California), although the Tubatulabal language is found in the southern Sierra Nevada to the north (see Figure 10).

The Tubatulabal/Gab/Cupan sub-branch of Takic consists of two further subdivisions, Tubatulabal and Gab/Cupan. Tubatulabal is geographically isolated in the southern Sierra Nevada, while Gab/Cupan is located in southern California. Gab/Cupan is again divided into sub-subbranches, Gabrielino and Cupan (see Table 6), with Gabrielino located in the Los Angeles Basin and Cupan distributed to the south and east across southern California. Gabrielino has one language, Gabrielino, while Cupan consists of three languages; Luiseño, Cupeño, and Cahuilla (Table 6).

Sutton (2009; also see Sutton 2010b) argued that the initial Takic entry into the Los Angeles Basin some 3,500 years ago was carried out by people speaking proto-Gab/Cupan, defined archaeologically by the Del Rey Tradition (Sutton 2010a). The Del Rey Tradition was confined to the Los Angeles Basin and southern

Table 6. Classification of the Takic Branch within Northern Uto-Aztecan (following Hill 2007).

I. TAKIC (two sub-branches)
- A. SERRAN
  - 1. Kitanemuk
  - 2. Serrano (and Vanyume?)
  - 3. Tataviam (tentative)
- B. TUBATULABAL/GAB/CUPAN
  - 1. Tubatulabal
  - 2. GAB/CUPAN
    - a. Gabrielino (four dialects; two mainland and two island)
    - b. CUPAN
      - 1. Luiseño (two dialects)
      - 2. Cupeño
      - 3. Cahuilla (three dialects)

Note: Linguistic divisions are all upper case while languages are upper and lower case. Tubatulabal is a subbranch and a language. Gabrielino is a sub-subbranch and a language.

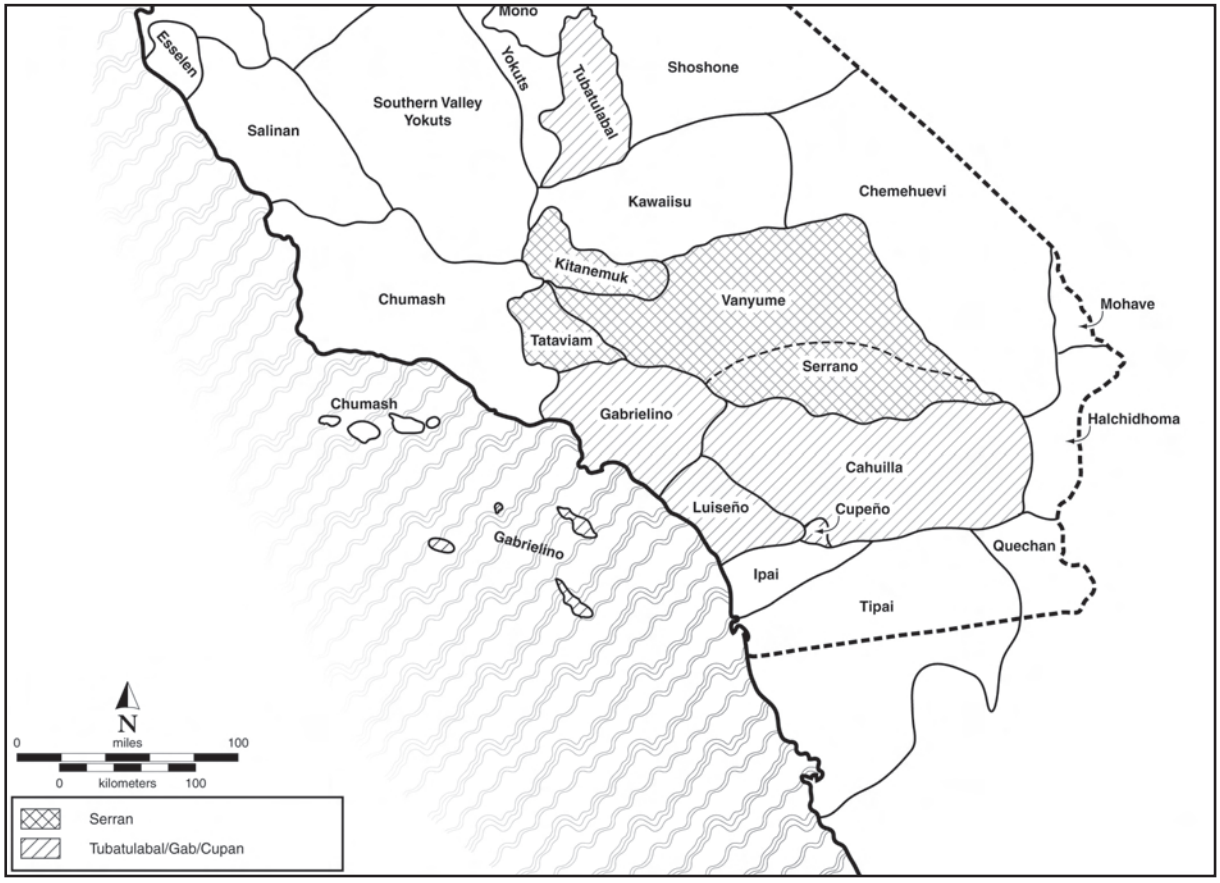

Figure 10. The geographic distribution of the two branches of Takic in California.

Channel Islands and eventually gave rise to the Gabrielino people and language. The Del Rey Tradition did not involve groups that would later speak Cupan languages.

Based on linguistic data, Golla (2007:75) maintained that ethnographic Cupan (Luiseño, Cupeño, and Cahuilla) territory "reflects a fairly recent Uto-Aztecan intrusion, probably within the last millennium." Golla (2007:75) further thought that Cupan "showed closer affinities with Gabrielino than with Serrano" and that Cupan "probably originated on the southern and eastern borders of Gabrielino territory and expanded southward along the coast and eastward through San Gorgonio Pass." In addition, Bright and Bright (1969; also see Hinton 1991) thought it possible that Yuman had previously occupied the region. This linguistic model is generally concordant with the archaeological data, although the archaeology suggests that it happened somewhat earlier than 1,000 BP.

Thus, the following model of linguistic divergence and movement of Cupan is proposed based on the linguistic, biological, and archaeological data. San Luis Rey I appears to be the earliest phase in southern Orange County and would have been bordered on the north by Angeles III groups speaking proto-Gabrielino (e.g., Sutton 2010a). Sometime about 1,250 BP, proto-Cupan split from proto-Gab, diffused south into southern Orange County, and was adopted by an unknown Yuman group (possibly La Jolla III or Topanga III) in that area, perhaps accompanied by the southward diffusion of the bow and arrow tipped with Cottonwood points. This movement south represents the beginning of the San Luis Rey pattern, at which time Yuman people adopted the newly arrived Takic language (proto-Cupan).

Proto-Cupan would then have split, with the first and northernmost proto-Cupan dialect becoming Juaneño and the second dialect becoming Luiseño. In this scenario, the Juaneño would be the descendants of the earliest San Luis Rey I groups. This idea is consistent with the classification of Takic (see Table 6) and finds some archaeological support in a general lack of pottery (a San Luis Rey I trait) in Juaneño ethnographic territory (e.g., Kroeber 1925) and the presence of pottery (a San Luis Rey II trait) in late Luiseño sites, a difference that might form a "boundary" between the two groups (Cameron 1989:245, Figure 120, 1999:117). Proto-Cupan would then have diffused east, manifested as the expansion of San Luis Rey I into the inland areas where it was adopted by Greven Knoll III Encinitas groups, marking the end of the Encinitas Tradition in those areas.

Sometime about 900 BP, proto-Cupan would have split into Luiseño and proto-Cahuilla-Cupeño, the latter moving further east to occupy the environs around northern Lake Cahuilla, manifested as Peninsular I. Perhaps a little later, proto-Cahuilla-Cupeño split, with Cupeño being adopted by a small group southeast of the Luiseño. Cahuilla began to diffuse to the east and was adopted by existing Yuman (Patayan II) groups that occupied the northern Peninsular Ranges and northern Coachella Valley north of San Diego County. Laylander (2007:14) also thought that the Cupan homeland was to the west of the Colorado Desert and (2007:14-15) that the initial Cupan groups moving into the desert already spoke Cahuilla rather than proto-Cupan. It is argued here that proto-Cahuilla-Cupeño was carried east by a migration of people that had separated from their Yuman ancestors (San Luis Rey I groups).

Cahuilla would have spread a considerable distance to the east, perhaps attracted by the appearance of Lake Cahuilla. The differentiation of the Pass, Mountain, and Desert Cahuilla territories and dialects could reflect the expansion of the Cahuilla eastward as they occupied different ecozones (e.g., Kroeber 1925:694; also see Seiler 1977:6-7; Laylander 1985, 2007:13).

At least some ethnographic data generally support this model (although an exhaustive examination is

well beyond the scope of this paper). The Takic groups suggested herein to have originally been Yuman appear to have shared an internal pattern of culture. Strong (1927:21, 33-37, 56, 1929:337-339) noted that the Luiseño, Cupeño, and Cahuilla (and Serrano) all shared a common cultural pattern, including parts of their social organization, creation stories, many ceremonies, mourning rites, and eagle killings. Interestingly, the Takic themselves recognized western (Gabrielino?) and eastern (Cupan?) divisions (DuBois 1908:148-150).

This same basic pattern was recognized by Klimek (1935), who studied cultural traits and groupings of tribes across California. He noted (1935:34) that the group representing the southern California province "includes Diegueño, three Cahuilla tribes, Cupeño, Luiseño, Serrano, and Gabrielino. The center of this group, consisting of very high coefficients, contains only Cahuilla, Cupeño, Luiseño, and Serrano. On one wing of the center we find Diegueño, on the other Gabrielino." No data for the other Takic groups were provided in that study. It was clear to Klimek (1935) that Gabrielino was separate, although it was related to the Cupan groups who were linked to the Yuman Diegueño. This is exactly the pattern of relationship to be expected if Cupan had diffused into Yuman groups.

Oral tradition also holds some clues to the linguistic and archaeological data. A direct reference to the migration of the Juaneño (Luiseño) appeared in Boscana (1978:83, 85), who noted that the founders of *Putuidem* (ORA-855) had come from the north, spoke a language close to Gabrielino (although not too close [Kroeber 1909:249]), and changed their language. Following this line of thought, Koerper et al. (2002:68) suggested that "some Gabrielino peoples migrated from places somewhere between southern Los Angeles County and the Santa Ana River to the San Juan Capistrano Valley area."

Some evidence of a late movement of people south was obtained from excavations at ORA-855 (Koerper et al. 1988b; Koerper and Mason 2000). Recovered from this site were many Cottonwood points, steatite shaft straighteners, ceramic pipes, and Tizon Brown pottery, as well as seven burials and five cremations. Cranial index data for two of the burials resulted in a score of 75 for Burial 1 (Koerper et al. 1988b:258) and 77 for Burial 6 (calculated from Koerper and Mason 2000:7-6), both of which are within the range of the Western Mono physical type (see Gifford 1926a:224, 1926b) characteristic of the Gabrielino but not the Luiseño, supporting the idea of an actual migration and not just language diffusion. It may be that Angeles VI groups (see Sutton 2010a) were pressing south and moved as far as Aliso Creek (the southern ethnographic boundary of the Gabrielino), after which a pioneering Angeles VI group continued a bit further south to the San Juan Capistrano Valley area. This could be the group "from the north" identified by Boscana (1978) that founded *Putuidem*, who may have then changed their language to become Juaneño. However, ORA-855 is dated only as early as about 600 BP, too late to reflect an initial "Cupan" movement as suggested in this paper.

For the Cahuilla, Bean et al. (1995:V-137) recorded a story of the Cahuilla coming from the Mojave Desert region and moving to their present location over time. Another Cahuilla story suggests that they had accompanied the Gabrielino into southern California and then moved east, first into interior valleys and then further east, presumably into the Coachella Valley (see Bean et al. 1995:V-138-139), although this suggests an unlikely cultural memory of some 3,500 years (see Laylander 2006b). Finally, a Cupeño origin story talks about a group of Cahuilla that moved south, intermarried with the Luiseño, and became the Cupeño (Gifford 1918:199-201; Strong 1929:270-273).

Expectations of the Linguistic Model

It has been argued that the Cupan languages diffused into preexisting Yuman groups in interior southern California. If this is correct, a number of expectations

should derive from this scenario. First and foremost, the DNA of the Cupan groups should be closer to Yuman (e.g., Ipai) than Takic (e.g., Gabrielino), allowing for some crossover due to intermarriage. To date, DNA studies have not supported this model (e.g., Potter 2004; Johnson and Lorenz 2006; Potter and White 2009; but see Eshleman and Smith 2007:292). Sutton (2009:49) suggested, however, that the basic assumptions regarding the ethnicity of the baseline data are skewed and should be reconsidered.

Second, other biological markers, such as cephalic/cranial indices (CI), should also reflect Yuman biology. Gifford (1926a:224, 1926b) identified three basic physical "types" of California Indian peoples; Yuki, Californian, and Western Mono. The Yuki type is uncommon and confined to northwestern California. The Californian type has a CI generally greater than 81 (mesocephalic to brachycephalic), while the Western Mono type has an average CI of 76 (dolichocephalic) and is quite rare in California.

Gifford (1926a:Map 2, Table 7) mapped the distribution of head shape indices in southern California and noted that the Californian type is represented by the Takic Cahuilla, Serrano, Luiseño, and Cupeño; by the Yuman Diegueño, Mohave, Cocopa, and Yuma; and where data are available, by the Chumash. The distribution of the Western Mono type in southern California is limited to the Takic Gabrielino. The only other recorded living Western Mono type groups are the Monache (Western Mono) and Tubatulabal (both NUA groups) in the Sierra Nevada to the north.

The ethnographic Cupan groups all conform to the Californian type while the Gabrielino are the Western Mono type. Relatively few archaeological data are available, but the post-3,500 BP materials in the Los Angeles Basin are Western Mono, supporting the presence of that physical type after that time (see Sutton 2009:40-46). To date, there are few archaeological CI data from Cupan regions. However, it appears that at least some "La Jollan" people from the San Diego region also fall in the Western Mono "range" (Rogers 1963). This issue remains to be tested.

Third, if the Luiseño, Cupeño, and Cahuilla have a "Yuman" cultural ancestry, there should be evidence of the retention of at least some "old" Yuman cultural traits, such as oral tradition (e.g., Laylander 2001), a few old words, and some social structure. A brief discussion of Cupan social structure was presented above. More work is required on this topic.

Conclusions

The prehistory of southern California was very complex, and broad generic periods of time are insufficient to address anthropological questions about that past. In the pages above, a new cultural tradition referred to as Palomar, having several patterns and phases, has been proposed to replace the "Late Prehistoric Period" in interior southern California. Palomar groups would have replaced Encinitas groups as "Californian" traits, including new technologies, settlement and subsistence systems, mortuary patterns, and language moved east after about 1,250 BP. It is hoped that the application of the Palomar Tradition to archaeological problems and issues will increase our understanding of southern California prehistory.

As an adjunct to this discussion, the number and general geographic extent of Palomar groups may have been influenced by the political/geographic situation during late Greven Knoll III or Patayan II. For example, under the model presented here, a given Greven Knoll group would have "converted" to a Palomar group, retaining its sociopolitical identity and territory. If so, the geographic extent of ethnographic Cupan groups could serve as a model to explore some of the late Greven Knoll III and Patayan II polities.

On one final thought, it seems that the initial migration of the Takic into coastal southern California was

related to population pressures from the north (Sutton 2009, 2010b). However, the diffusion of Takic languages south and east to Yuman groups was likely due to some other factor or combination of factors. The movement of bow and arrow technology into the Luiseño area at apparently the same time as the language diffusion and the subsequent movement of bow and arrow technology into much of interior southern California at the same time as the language movement into that area is unlikely to have been coincidental. Perhaps the new technology, or access to it, was employed as a tool to gain control of the societies, with the consequent adoption of a new language. Similar phenomena occurred on the Plains with the adoptions of guns and horses.

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References Cited

Allen, Kathleen C.
1994 *The Spatial and Temporal Distribution of Prehistoric Burial Practices in the "Shoshonean Wedge" Area of Coastal Southern California*. Master's thesis, Department of Anthropology, California State University, Fullerton.

Altschul, Jeffrey H., and Steven D. Shelley
1987 *Yamisevul: An Archaeological Treatment Plan and Testing Report from CA-RIV-269, Riverside County, California*. Technical Series No. 9, Statistical Research, Inc., Tucson.

Altschul, Jeffrey H., Teresa L. Gregory, and Christopher J. Doolittle
1998 Cultural Setting and Previous Research. In *House Pits and Middens: A Methodological Study of Site Structure and Formation Processes at CA-ORA-116, Newport Bay, Orange County, California*, edited by Donn R. Grenda, Christopher J. Doolittle, and Jeffrey H. Altschul, pp. 13-27. Technical Series No. 69, Statistical Research, Inc., Tucson.

Anderson, R. Scott, and Susan J. Smith
1991 Climatic Extremes of the Last 4,000 Years as Reflected in the Pollen Records from the Southern Sierra Nevada, California. In *Proceedings of the Southern California Climate Symposium, 25 October 1991, Trends and Extremes of the Past 2000 Years*, edited by M. R. Rose and P. E. Wigand, pp. 27-43. Natural History Museum of Los Angeles County, Technical Report No. 11.

Barrows, David P.
1900 *The Ethno-Botany of the Coahuilla Indians of Southern California*. University of Chicago Press, Chicago.

Baumhoff, Martin A.
1981 The Carrying Capacity of Hunter-Gatherers. In *Affluent Foragers: Pacific Coasts East and West*, edited by Shuzo Koyama and David Hurst Thomas, pp. 77-87. Senri Ethnological Studies No. 9. Osaka, Japan.

Bean, Lowell J.
1972 *Mukat's People: The Cahuilla Indians of Southern California*. University of California Press, Berkeley.
1978 Cahuilla. In *California*, edited by Robert F. Heizer, pp. 573-587. Handbook of North American Indians, Vol. 8, W. C. Sturtevant,

general editor, Smithsonian Institution, Washington, D.C.

Bean, Lowell J., and Florence C. Shipek
1978 Luiseño. In *California*, edited by Robert F. Heizer, pp. 550-563. Handbook of North American Indians, Vol. 8, W. C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Bean, Lowell J., and Charles R. Smith
1978 Gabrielino. In *California*, edited by Robert F. Heizer, pp. 538-549. Handbook of North American Indians, Vol. 8, W. C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Bean, Lowell J., and Sylvia Brakke Vane
1978 Cults and Their Transformations. In *California*, edited by Robert F. Heizer, pp. 662-672. Handbook of North American Indians, Vol. 8, W. C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Bean, Lowell J., Jerry Schaefer, and Sylvia Brakke Vane (editors)
1995 *Archaeological, Ethnographic, and Ethnohistoric Investigations at Tahquitz Canyon, Palm Springs, California*. Report on file at the San Bernardino County Archaeological Information Center, Redlands.

Beezley, John H.
1995 A Coot Kill Site at Lake Cahuilla. *Proceedings of the Society for California Archaeology* 8:79-86. San Diego.

Bettinger, Robert L.
1974 The Dead Dog Site (4-Riv-202). In *Perris Reservoir Archeology: Late Prehistoric Demographic Change in Southeastern California*, edited by James F. O'Connell, Philip J. Wilke, Thomas F. King, and Carol L. Mix, pp. 79-93. California Department of Parks and Recreation Archeological Reports No. 14. Sacramento.
1993 Doing Great Basin Archaeology Recently: Coping with Variability. *Journal of Archaeological Research* 1(1):43–66.

Binford, Lewis R.
1980 Willow Smoke and Dog's Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45(1):4-20.

Blake, W. P.
1856 Geological Report. In *Reports of Explorations in California for Railroad Routes to Connect with Routes Near the 35th and 32nd Parallels of North Latitude, by Lt. R. S. Williamson, Corps of Topographical Engineers. Reports of Explorations and Surveys to Ascertain the Most Practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean, Made Under the Direction of the Secretary of War in 1853-1854*, Vol. 5. Beverly Tucker, Printer. Washington D.C.

Bonner, Wayne H.
1985 *Smoking Pipes and Sucking Tubes of Prehistoric California: A Distributional and Typological Study*. Master's thesis, Department of Anthropology, California State University, Long Beach.

Boxt, Matthew A., L. Mark Raab, Owen K. Davis, and Kevin O. Pope
1999 Extreme Late Holocene Climate Change in Coastal Southern California. *Pacific Coast Archaeological Society Quarterly* 35(2&3):25-37.

Byrd, Brian
1998 *Testing and Evaluation of 14 Archaeological Sites in India LFMA on Camp Pendleton, San Diego County, California*. Report on file with the U.S. Department of the Navy, NAVFAC Southwest, San Diego, California.

Byrd, Brian F., and L. Mark Raab
2007 Prehistory of the Southern Bight: Models for a New Millennium. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 215-227. AltaMira Press, Lanham, Maryland.

Byrd, Brian F., and Seetha N. Reddy
1999 Collecting and Residing Near the Shore: The Role of Small and Large Sites in Settlement Reconstruction. *Pacific Coast Archaeological Society Quarterly* 35(1):33-56.
2002 Late Holocene Adaptations Along the Northern San Diego Coast. In *Catalysts to Complexity: Late Holocene Societies of the California Coast*, edited by Jon M. Erlandson and Terry L. Jones, pp. 41-62. University of California Los Angeles, Institute of Archaeology, Perspectives in California Archaeology, Vol. 6. Los Angeles.

Cameron, Constance
1989 Archaeological Investigations on the Rancho San Clemente, Orange County, California. *Coyote Press Archives of California Prehistory* No. 27. Salinas.
1999 Determining Tribal Boundaries Through Potsherds: An Archaeological Perspective. *Pacific Coast Archaeological Society Quarterly* 35(2&3):98-126.

Campbell, Elizabeth W. Crozer
1932 Cremation in the Desert. *The Masterkey* 6(4):105-112.

Chace, Paul G.
1964 An Ethnographic Approach to the Archaeology of the Luiseno Indians. *San Bernardino County Museum Association Quarterly* 12(2).

Christenson, Lynne E.
1995 Faunal Remains. In *Archaeological, Ethnographic, and Ethnohistoric Investigations at Tahquitz Canyon, Palm Springs, California* by Lowell J. Bean, Jerry Schaefer, and Sylvia Brakke Vane, pp. XVI-1-XVI-30. Report on file at the San Bernardino County Archaeological Information Center, Redlands.

Ciolek-Torrello, Richard, Donn R. Grenda, Angela Keller, and Anne Q. Stoll
2006 *A Passage in Time: The Archaeology and History of the Santa Susana Pass State Historic Park, California*. Technical Series No. 87. Statistical Research, Inc., Tucson.

Cleland, James H., Andrew L. York, and Lorraine M. Willey
2007 *Piecing Together the Prehistory of Landing Hill: A Place Remembered*. EDAW Cultural Publications, No. 3. San Diego.

Cohen, Bill
1987 Indian Sandpaintings of Southern California. *Journal of California and Great Basin Anthropology* 9(1):4-34.

Colton, Harold S.
1958 Pottery Types of the Southwest. *Museum of Northern Arizona, Ceramic Series* No. 3D. Flagstaff.

Curtis, Edward S.
1926 *The North American Indian, Being a Series of Volumes Picturing and Describing the Indians of the United States,* Vol. XV. The University Press, Cambridge, Massachusetts.

Curtis, Freddie
1959 *Arroyo Sequit: Archaeological Investigations of a Late Coastal Site in Los Angeles County, California*. Archaeological Survey Association of Southern California Paper No. 4. Los Angeles.

Dahdul, Mariam
2002 Beads and Pendants from the Coachella Valley, Southern California. *Pacific Coast Archaeological Society Quarterly* 38(2&3):47-64.

Dahdul, Mariam, Harry M. Quinn, and Zachary X. Hruby
2008 *Final Report, Archaeological Testing and Evaluation Program at Sites CA-RIV-2642, -2643, and a Portion of -2646, Near the City of Desert Hot Springs, Riverside County, California.* Report on file at the Eastern Information Center, University of California, Riverside.

Daly, Patricia
1969 Approaches to Faunal Analysis in Archaeology. *American Antiquity* 34(2):146-153.

Davis, Edward H.
1920 Cremation Ceremony. In *Edward H. Davis and the Indians of the Southwest United States and Northwest Mexico*, edited by Charles R. Quinn and Elena Quinn, pp. 96-113. Elena Quinn, Downey, California.
1921 Early Cremation Ceremonies of the Luiseño and Diegueño Indians of Southern California. *Indian Notes and Monographs of the Museum of the American Indian Heye Foundation* 7(3):91-110. New York.

Delacorte, Michael G.
2008 Desert Side-Notched Points as a Numic Population Marker in the Great Basin. In *Avocados to Millingstones: Papers in Honor of D. L. True*, edited by Georgie Waugh and Mark E. Basgall, pp. 111-136. Monographs in California and Great Basin Anthropology No. 5. Sacramento.

Demcak, Carol R., Kimberley L. Holanda, Carleton S. Jones, Lynne E. Christenson, Stephen R. Van Wormer, Kathleen C. Allen, Linda Scott Cummings, Mari A. Pritchard-Parker, Melissa R. Julien, and Susan M. Conrad
1992 *Final Report of Test, Salvage, and Monitoring Phases at CA-RIV-102, Tract 24714, City of Hemet, Riverside County, California.* 3 vols. Report on file at the Eastern Information Center, University of California, Riverside.

Dobyns, Henry F., and Robert C. Euler
1958 Tizon Brown Ware. In *Pottery Types of the Southwest*, edited by Harold S. Colton, pp. 66-81. Museum of Northern Arizona, Ceramic Series 3D. Flagstaff.

Drucker, Phillip
1937 *Culture Element Distributions: V, Southern California*. University of California Anthropological Records 1(1). Berkeley.

DuBois, Constance G.
1905 Religious Ceremonies and Myths of the Mission Indians. *American Anthropologist* 7(4):620-629.
1908 *The Religion of the Luiseño Indians of Southern California*. University of California Publications in American Ethnology and Archaeology 8(3). Berkeley.

Ericson, Jonathon E., and Clement W. Meighan
1984 Boundaries, Alliances and Exchange in California. In *Exploring the Limits: Frontiers and Boundaries in Prehistory*, edited by Suzanne P. De Atley and Frank J. Findlow, pp. 143-152. British Archaeological Reports, International Series 223. Oxford.

Euler, Robert C.
1959 Comparative Comments on California Pottery, Appendix A. In Archaeological Resources of Borrego State Park by C. W. Meighan. *University of California Archaeological Survey Annual Report* 1958-1959:41-44. Los Angeles.

Farrell, Nancy
1988 Analysis of Human Coprolites from CA-RIV-1179 and CA-RIV-2827. In *Archaeological Investigations at CA-RIV-1179, CA-RIV-2823, and CA-RIV-2827, La Quinta, Riverside County, California*, edited by Mark Q. Sutton and Philip J. Wilke, pp. 129-142. Coyote Press Archives of California Prehistory No. 20. Salinas.

Foster, Karen Rasmussen
1999 The Red Beach Site and 3,000 Years of Coastal Settlement Change. *Pacific Coast Archaeological Society Quarterly* 35(1):57-81.

Freers, Steven M.
1998 Lending a "Hand" to the San Luis Rey Style. In *American Indian Rock Art,* Vol. 22, edited by Steven M. Freers, pp. 57-78. American Rock Art Research Association, Tucson.

Fritz, Ken, Lavinia Knight, and Jane Gothold
1977 The Williams Ranch Sites, San Diego County, California. *Pacific Coast Archaeological Society Quarterly* 13(4):1-52.

Fulmer, Scott
1985 Summary of the SDCAS Investigations at CA-SDI-5589, Bonsall, California. *San Diego State University Cultural Resource Management Center Casual Papers* 2(1):59-76.

Gamble, Lynn H., and Glenn S. Russell
2002 A View from the Mainland: Late Holocene Cultural Developments Among the Ventureño Chumash and the Tongva. In *Catalysts to Complexity: Late Holocene Societies of the California Coast*, edited by Jon M. Erlandson and Terry L. Jones, pp. 101-126. University of California Los Angeles, Institute of Archaeology, Perspectives in California Archaeology, Vol. 6. Los Angeles.

Gardner, Jill K.
2007 The Potential Impact of the Medieval Climatic Anomaly on Human Populations in the Western Mojave Desert. *Coyote Press Archives of Great Basin Prehistory* No. 7. Salinas.

Gifford, E. W.
1918 *Clans and Moieties in Southern California*. University of California Publications in American Ethnology and Archaeology 14(2). Berkeley.
1926a *Californian Anthropometry*. University of California Publications in American Ethnology and Archaeology 22(2). Berkeley.
1926b Californian Indian Physical Types. *Natural History* 26:50-60.
1931 The Kamia of Imperial Valley. *Bureau of American Ethnology Bulletin* 97. Washington, D.C.

Gobalet, Kenneth W., and Thomas A. Wake
2000 Archaeological and Paleontological Fish Remains from the Salton Basin, Southern California. *The Southwestern Naturalist* 45(4):514-520.

Goddard, Ives
1996 Introduction. In *Languages*, edited by Ives Goddard, pp. 1-16. Handbook of North American Indians, Vol. 17, W. C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Golla, Victor
2007 Linguistic Prehistory. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 71-82. AltaMira Press, Lanham, Maryland.

Goodman, Ruth, and Richard Raskoff
1964 The Bernasconi Site in Southern California. *The Masterkey* 38(1):17-25.

Graumlich, Lisa J.
1993 A 1000-Year Record of Temperature and Precipitation in the Sierra Nevada. *Quaternary Research* 39(2):249-255.

Grenda, Donn R.
1997 *Continuity & Change: 8,500 Years of Lacustrine Adaptation on the Shores of Lake Elsinore*. Statistical Research, Inc., Technical Series No. 59. Tucson.
1998 *Between the Coast & the Desert: Archaeological Data Recovery at the Yukaipa't Site, CA-SBR-1000, Yucaipa, California*. Statistical Research, Inc., Technical Series No. 70. Tucson.

Grenda, Donn R., and Michael K. Lerch
1998 Introduction. In *Between the Coast & the Desert: Archaeological Data Recovery at the Yukaipa't Site, CA-SBR-1000, Yucaipa, California*, by Donn R. Grenda, pp. 1-5. Statistical Research, Inc., Technical Series No. 70. Tucson.

Griset, Suzanne
1990 Historic Transformation of Tizon Brown Ware in Southern California. In *Hunter-Gatherer Pottery from the Far West*, edited by Joanne M. Mack, pp. 180-200. Nevada State Museum Anthropological Papers No. 23. Carson City.
1996 *Southern California Brown Ware*. Ph.D. dissertation, Department of Anthropology, University of California, Davis.
2008 When is a Pot, Not? In *Avocados to Millingstones: Papers in Honor of D. L. True*, edited by Georgie Waugh and Mark E. Basgall, pp. 91-107. Monographs in California and Great Basin Anthropology No. 5. Sacramento.
2010 Ceramic Studies. In *Emergency Data Recovery Investigations at CA-RIV-7398 for the Dike 4 Groundwater Recharge Facilities Project in the Coachella Valley, California* by Vanessa A. Mirro and Dennis P. McDougall, pp. 53-70. Draft report on file with Applied Earthworks, Hemet.

Hale, Micah J.
2006 Processing Economies, Coastal Settlement, and Intensification in Northern San Diego County. *Proceedings of the Society for California Archaeology* 19:205-210. Chico.

Hampson, R. Paul
1992 *Evaluation of CA-RIV-4043H, CA-RIV-4044/H, and CA-RIV-4045, Lake Elsinore, California*. Report on file at the Eastern Information Center, University of California, Riverside.

Harrison, William M.
1964 *Prehistory of the Santa Barbara Coast, California*. Ph.D. dissertation, Department of Anthropology, University of Arizona.

Hedges, Ken
1970 *An Analysis of Diegueño Pictographs.* Master's thesis, Department of Anthropology, San Diego State University.
1973a Rock Art in Southern California. *Pacific Coast Archaeological Society Quarterly* 9(4):1-28.

1973b Hakataya Figurines from Southern California. *Pacific Coast Archaeological Society Quarterly* 9(3):1-40.

1979 The Rancho Bernardo Style in Southern California. In *American Indian Rock Art*, Vol. 5, edited by Frank Bock, Ken Hedges, Georgia Lee, and H. Michaelis, pp. 51-58. American Rock Art Research Association, El Toro, California.

1989 Sketches and Scratches. In *Rock Art Papers*, Vol. 6, edited by Ken Hedges, pp. 91-99. San Diego Museum Papers No. 24.

2002 Rock Art Styles in Southern California. In *American Indian Rock Art,* Vol. 28, edited by Alanah Woody, pp. 25-40. American Rock Art Research Association, Tucson.

Heizer, Robert F., and C. William Clewlow

1968 Projectile Points from Site NV-Ch-15, Churchill County, Nevada. *University of California Archaeological Survey Reports* No. 71:59-88. Los Angeles.

1973 *Prehistoric Rock Art of California.* 2 vols. Ballena Press, Ramona, California.

Heizer, Robert F., and Thomas R. Hester

1978 *Great Basin Projectile Points: Forms and Chronology*. Ballena Press Publications in Archaeology, Ethnology and History No. 10. Socorro, New Mexico.

Hicks, Frederic

1958 Archaeological Investigations in the Yucaipa Valley. *San Bernardino County Museum Association Quarterly* 6(1).

1963 *Ecological Aspects of Aboriginal Culture in the Western Yuman Area*. Ph.D. dissertation, Department of Anthropology, University of California, Los Angeles.

Hildebrand, John A., G. Timothy Gross, Jerry Schaefer, and Hector Neff

2002 Patayan Ceramic Variability: Using Trace Elements and Petrographic Analysis to Study Brown and Buff Wares in Southern California. In *Ceramic Production and Circulation in the Greater Southwest: Source Determination by INAA and Complementary Mineralogical Investigations*, edited by Donna M. Glowacki and Hector Neff, pp. 121-139. University of California, Los Angeles, Cotsen Institute of Archaeology Monograph 44. Los Angeles.

Hill, Jane H.

2007 "External Evidence" in Historical Linguistic Argumentation: Subgrouping in Uto-Aztecan. Paper presented at the Alternative Approaches to Language Classification, Stanford, California.

Hinton, Leanne

1991 Takic and Yuman: A Study in Phonological Convergence. *International Journal of American Linguistics* 57(2):133-157.

Hogan, Michael, Bai "Tom" Tang, Harry M. Quinn, and Mariam Dahdul

2005 *Archaeological Monitoring Report, Tentative Tract No. 28964, Talante Property, City of La Quinta, Riverside County, California*. Report on file at the Eastern Information Center, University of California, Riverside.

Horne, Melinda C.

2001a CA-RIV-4628/H. In *Eastside Reservoir Project: Final Report of Archaeological Investigations, Volume II: Archaic and Late Prehistoric Occupation Sites*, edited by Melinda C. Horne and Susan E. Rapp, pp. 325-440. Report on file at the Eastern Information Center, University of California, Riverside.

2001b CA-RIV-4930: The Maze Creek Site. In *Eastside Reservoir Project: Final Report of Archaeological Investigations, Volume II: Archaic and Late Prehistoric Occupation Sites*, edited by Melinda C. Horne and Susan E. Rapp, pp. 573-738. Report on file at the Eastern Information Center, University of California, Riverside.

2001c Introduction. In *Eastside Reservoir Project: Final Report of Archaeological Investigations, Volume II: Archaic and Late Prehistoric Occupation Sites*, edited by Melinda C. Horne and Susan E. Rapp, pp. 1-6. Report on file at the Eastern Information Center, University of California, Riverside.

Hudson, Dee T.

1969 The Archaeological Investigations During 1935 and 1937 at ORA-237, ORA-238, and ORA-239, Santiago Canyon, Orange County, California. *Pacific Coast Archaeological Society Quarterly* 5(1):1-68.

Hughes, Richard E.

1998 Origin of Obsidian Artifacts, Appendix B. In *Between the Coast & the Desert: Archaeological Data Recovery at the Yukaipa't Site, CA-SBR-1000, Yucaipa, California*, by Donn R. Grenda, pp. 203-211. Statistical Research, Inc., Technical Series No. 70. Tucson.

Hughes, Richard E., and D. L. True

1985 Perspectives on the Distribution of Obsidians in San Diego County, California. *North American Archaeologist* 6(4):325-339.

Jefferson, George T.

1971 A Model of Adaptive Change in Late Prehistoric Southeastern California. *University of California Archaeological Survey Annual Report* 13:167-172. Los Angeles.

1974 A Research Strategy for Interior Southern California Archaeology. In *Perris Reservoir Archeology: Late Prehistoric Demographic Change in Southeastern California*, edited by James F. O'Connell, Philip J. Wilke, Thomas F. King, and Carol L. Mix, pp. 5-9. California Department of Parks and Recreation Archeological Reports No. 14. Sacramento.

Johnson, John R., and Joseph G. Lorenz

2006 Genetics, Linguistics, and Prehistoric Migrations: An Analysis of California Indian Mitochondrial DNA Lineages. *Journal of California and Great Basin Anthropology* 26(1):33-64.

Jones, Terry L., Gary M. Brown, L. Mark Raab, Janet L. McVickar, W. Geoffrey Spaulding, Douglas J. Kennett, Andrew L. York, and Phillip L. Walker

1999 Environmental Imperatives Reconsidered: Demographic Crises in Western North America During the Medieval Climatic Anomaly. *Current Anthropology* 40(2):137-170.

Jurmain, Claudia, and William McCawley

2009 *O, My Ancestor: Recognition and Renewal for the Gabrielino-Tongva People of the Los Angeles Area*. Heyday Books, Berkeley.

Karst, Smiley

1974 Artifacts from SDi-593, Palomar Mountain State Park, California, Appendix B. In *Archaeological Investigations at Molpa, San Diego County, California* by D. L. True, Clement W. Meighan, and Harvey Crew, pp. 146-163. University of California Press Publications in Anthropology Vol. 11. Berkeley.

Keller, Jean S., and Daniel F. McCarthy
1989 Data Recovery at the Cole Canyon Site (CA-RIV-1139), Riverside County, California. *Pacific Coast Archaeological Society Quarterly* 25(1).

Kelly, Isabel T.
1934 Southern Paiute Bands. *American Anthropologist* 36(4):548-560.

Kennett, Douglas J., and James P. Kennett
2000 Competitive and Cooperative Responses to Climatic Instability in Coastal Southern California. *American Antiquity* 65(2):379-395.

King, Chester D.
1988 Shell Beads from RIV-1179. In *Archaeological Investigations at CA-RIV-1179, CA-RIV-2823, and CA-RIV-2827, La Quinta, Riverside County, California*, edited by Mark Q. Sutton and Philip J. Wilke, pp. 71-76. Coyote Press Archives of California Prehistory No. 20. Salinas.
1990 *Evolution of Chumash Society: A Comparative Study of Artifacts Used for Social System Maintenance in the Santa Barbara Channel Region Before A.D. 1804*. Garland Publishing, New York.
1995 Beads and Ornaments from Excavations at Tahquitiz Canyon (CA-RIV-45). In *Archaeological, Ethnographic, and Ethnohistoric Investigations at Tahquitz Canyon, Palm Springs, California*, by Lowell J. Bean, Jerry Schaefer, and Sylvia Brakke Vane, pp. XIII-1-XIII-77. Report on file at the San Bernardino County Archaeological Information Center, Redlands.

King, Chester D., and Thomas C. Blackburn
1978 Tataviam. In *California*, edited by Robert F. Heizer, pp. 535-537. Handbook of North American Indians, Vol. 8, W. C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Klimek, Stanislaw
1935 *Culture Element Distributions: I: The Structure of California Indian Culture*. University of California Publications in American Ethnology and Archaeology 37(1). Berkeley.

Koerper, Henry C., and Christopher E. Drover
1983 Chronology Building for Coastal Orange County: The Case from CA-Ora-119-A. *Pacific Coast Archaeological Society Quarterly* 19(2):1-34.

Koerper, Henry C., and E. Bonita Fouste
1977 An Interesting Late Prehistoric Burial from CA-ORA-119-A. *Pacific Coast Archaeological Society Quarterly* 13(2):39-61.

Koerper, Henry C., and Ken Hedges
1996 Patayan Anthropomorphic Figurines from an Orange County Site. *Journal of California and Great Basin Anthropology* 18(2):204-220.

Koerper, Henry C., and Roger D. Mason
2000 *Results of Data Recovery at CA-ORA-855, San Juan Capistrano, Orange County, California*. Report on file at the South Central Coastal Information Center, California State University, Fullerton.

Koerper, Henry C., John S. Killingley, and R. E. Taylor
1985 The Little Ice Age and Coastal Southern California Human Economy. *Journal of California and Great Basin Anthropology* 7(1):99-103.

Koerper, Henry C., Paul E. Langenwalter II, and Adella B. Schroth
1988 *The Putuidem Project: Archaeological Investigations at CA-ORA-855*. Report on file at the South Central Coastal Information Center, California State University, Fullerton.

Koerper, Henry C., Roger D. Mason, and Mark L. Peterson
2002 Complexity, Demography, and Change in Late Holocene Orange County. In *Catalysts to Complexity: Late Holocene Societies of the California Coast*, edited by Jon M. Erlandson and Terry L. Jones, pp. 63-81. University of California, Los Angeles, Institute of Archaeology, Perspectives in California Archaeology, Vol. 6. Los Angeles.

Koerper, Henry C., Adella B. Schroth, and Paul E. Langenwalter
1992 A Late Prehistoric Site (CA-SDI-5353) at Agua Hedionda Lagoon, Northern San Diego County. *Pacific Coast Archeological Society Quarterly* 28(1):1-42.

Koerper, Henry C., Christopher E. Drover, Jonathan E. Erickson, and Paul E. Lagenwalter II
1986 Obsidian Exchange in Prehistoric Orange County. *Pacific Coast Archaeological Society Quarterly* 22(1):33-69.

Koerper, Henry C., Adella B. Schroth, Roger D. Mason, and Mark L. Peterson
1996 Arrow Projectile Point Types as Temporal Types: Evidence from Orange County, California. *Journal of California and Great Basin Anthropology* 18(2):258-283.

Kowta, Makoto, R. A. Appleton, Jr., D. J. Harris, D. A. M. Lane, and C. A. Singer
1965 Excavations at the Christensen Webb Site, Menifee Valley, 1963-64. *San Bernardino County Museum Association Quarterly* 13(2).

Kroeber, Alfred L.
1909 *Notes on Shoshonean Dialects of Southern California*. University of California Publications in American Archaeology and Ethnology 8(5). Berkeley.
1923 *The History of Native Culture in California*. University of California Publications in American Ethnology and Archaeology 20(8). Berkeley.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. Washington, D.C.
1959 *Ethnographic Interpretations 7-11*. University of California Publications in American Archaeology and Ethnology 47(3). Berkeley.

Kyle, Carolyn E.
1988 An Overview of Four Late Prehistoric Sites Located in the Westwood Valley, Rancho Bernardo, California. In *Proceedings of the Society for California Archaeology* 2:97-116. Society for California Archaeology, San Diego.

Lamb, Hubert H.
1965 The Early Medieval Warm Epoch and its Sequel. *Palaeogeography, Palaeoclimatology, Palaeoecology* 1:13-37.

Lando, Richard, and Ruby E. Modesto
1977 Temal Wakhish: A Desert Cahuilla Village. *The Journal of California Anthropology* 4(1):95-112.

Langenwalter, Rebecca E.
1980 A Possible Shaman's Cache from CA-Riv-102, Hemet, California. *Journal of California and Great Basin Anthropology* 2(2):233-244.

Lanning, Edward P.
1963 *Archaeology of the Rose Spring Site, INY-372*. University of California Publications in American Archaeology and Ethnology 49(3). Berkeley.

Laylander, Don
1985 Some Linguistic Approaches to Southern California's Prehistory. *San Diego State University Cultural Resource Management Center Casual Papers* 2(1):14-58.
1992 The Development of Baja California Prehistoric Archaeology. In *Essays on the Prehistory of Maritime California*, edited by Terry L. Jones, pp. 231-250. Center for Archaeological Research at Davis, Publication No. 10. Davis, California.
1995 The Question of Prehistoric Agriculture Among the Western Yumans. *Estudios Fronterizos* 35-36:187-203.
1997 The Last Days of Lake Cahuilla: The Elmore Site. *Pacific Coast Archeological Society Quarterly* 33(1&2).
2001 The Creation and Flute Lure Myths: Regional Patterns in Southern California Traditions. *Journal of California and Great Basin Anthropology* 23(2):155-178.
2006a The Regional Consequences of Lake Cahuilla. *San Diego State University Occasional Papers* 1:59-77. San Diego.
2006b California's Prehistory as a Remembered Past. *Journal of California and Great Basin Anthropology* 26(2):153-177.
2007 Linguistic Prehistory and the Archaic-Late Transition in the Colorado Desert. Paper presented at the Conference on the Archaic-Late Transition in the Colorado Desert, Borrego Springs, California.
2010 Diversity in Prehistoric Burials and Cemeteries in the Western Yuman Region. *California Archaeology* 2(2):203-222.

Laylander, Don, and Lynne E. Christenson
1988 Corral Canyon and Late Prehistoric Exchange in Inland San Diego County, California. *Proceedings of the Society for California Archaeology* 1:135-157. San Diego.

Laylander, Don, and Dan Saunders
1993 Donax Exploitation on the Pacific Coast: Spatial and Temporal Limits. In *Proceedings of the Society for California Archaeology* 6:313-325. San Diego.

Lerch, Michael K.
1985 The Desert Mojave: A Review of Ethnohistoric Data and Archaeological Implications. Manuscript on file at the Department of Anthropology, University of California, Riverside.

Love, Bruce, and Mariam Dahdul
2002 Desert Chronologies and the Archaic Period in the Coachella Valley. *Pacific Coast Archaeological Society Quarterly* 38(2&3):65-86.

Luomala, Katherine
1978 Tipai and Ipai. In *California*, edited by Robert F. Heizer, pp. 592-609. Handbook of North American Indians, Vol. 8, W. C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Lyman, R. Lee, and Michael J. O'Brien
2001 The Direct Historical Approach, Analogical Reasoning, and Theory in Americanist Archaeology. *Journal of Archaeological Method and Theory* 8(4):303-342.

Lyneis, Margaret M.
1988 Tizon Brown Ware and the Problems Raised by Paddle-and-Anvil Pottery in the Mojave Desert. *Journal of California and Great Basin Anthropology* 10(2):146-155.

Mack, Joanne
2003 California Ceramic Traditions: The Obscurity and the Assumptions 2002. *Society for California Archaeology Newsletter* 37(1):30-33.

Marshall, Ralph P.
1979 Harper Site (ORA-302): Second Season. *Pacific Coast Archaeological Society Quarterly* 15(3):21-44.

Martz, Patricia
1977 *Archaeological Investigations at CA-SBR-1000, Yucaipa, California*. Report on file at the San Bernardino County Archaeological Information Center, Redlands.

Mason, Roger D., and Mark L. Peterson
1994 *Newport Coast Settlement Systems: Analysis and Discussion, Vol. 1*. Report on file at the South Central Coastal Information Center, California State University, Fullerton.

Mason, Roger D., Henry C. Koerper, and Paul E. Langenwalter II
1997 Middle Holocene Adaptations on the Newport Coast of Orange County. In *Archaeology of the California Coast During the Middle Holocene*, edited by Jon M. Erlandson and Michael A. Glassow, pp. 35-60. University of California Los Angeles, Institute of Archaeology, Perspectives in California Archaeology, Vol. 4. Los Angeles.

May, Ronald V.
1978 A Southern California Indigenous Ceramic Typology: A Contribution to Malcolm J. Rogers Research. *Archaeological Survey Association of Southern California Journal* 2(2).

McCarthy, Daniel F.
1987 Archaeological Studies at Wildomar, CA-RIV-2769, Riverside County, California. *Pacific Coast Archaeological Society Quarterly* 23(1):1-46.
1995 The Rock Art of Tahquitz Canyon. In *Archaeological, Ethnographic, and Ethnohistoric Investigations at Tahquitz Canyon, Palm Springs, California* by Lowell J. Bean, Jerry Schaefer, and Sylvia Brakke Vane, pp. XIX-1-XIX-24. Report on file at the San Bernardino County Archaeological Information Center, Redlands.

McCawley, William
1996 *The First Angelinos: The Gabrielino Indians of Los Angeles*. Malki Museum/Ballena Press Cooperative Publication. Banning, California.

McCown, Benjamin. E.
1955 *Temeku: A Page from the History of the Luiseño Indians*. Archaeological Survey Association of Southern California Paper No. 3. Los Angeles.
1964 Excavation of Fallbrook Site 7. In *Collected Papers of Ernest Benjamin McCown,* edited by Roberta Greenwood, pp. 61-84. Archaeological Survey Association of Southern California Paper No. 6. Los Angeles..

McDonald, Meg, and James D. Eighmey
2008 Late Period Prehistory in San Diego. In *Prehistoric and Historic Archaeology of Metropolitan San Diego: An Historic Properties Background Study*, prepared by ASM Affiliates, Inc., Carlsbad, California, pp. 109-169. Report on file at the South Coastal Information Center, San Diego State University. San Diego.

Meighan, Clement W.
1954 A Late Complex in Southern California Prehistory. *Southwestern Journal of Anthropology* 10(2):215-227.
1959 Archaeological Resources of Borrego State Park. *University of California Archaeological Survey Annual Report* 1958-1959:27-46. Los Angeles.

Michels, Joseph W.
1964 The Snow Creek Rockshelter Site (RIV-210). *University of California Archaeological Survey Annual Report* 1963-1964:85-128. Los Angeles.

Minor, Rick
1973 Known Origins of Rock Paintings of Southwestern California. *Pacific Coast Archaeological Society Quarterly* 9(4):29-36.

Mirro, Vanessa A., and Dennis P. McDougall
2010 Emergency Data Recovery Investigations at CA-RIV-7398 for the Dike 4 Groundwater Recharge Facilities Project in the Coachella Valley, California. Manuscript on file at Applied Earthworks, Hemet, California.

Montgomery, Barbara K.
1998 Ceramic Analysis. In *Between the Coast & the Desert: Archaeological Data Recovery at the Yukaipa't Site, CA-SBR-1000, Yucaipa, California*, by Donn R. Grenda, pp. 113-119. Statistical Research, Inc., Technical Series No. 70. Tucson.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, Orlando.

Moratto, Michael J., Adella Schroth, John M. Foster, Dennis Gallegos, Roberta S. Greenwood, Gwendolyn R. Romani, Melinda C. Romano, Laurence H. Shoup, Mark T. Swanson, and Eric C. Gibson
1994 *Archaeological Investigations at Five Sites on the Lower San Luis Rey River, San Diego County, California: Final Report*. Report on file at the South Coastal Information Center, San Diego State University.

O'Brien, Thomas P.
1974 The Oleander Tank Site (4-Riv-331). In *Perris Reservoir Archeology: Late Prehistoric Demographic Change in Southeastern California*, edited by James F. O'Connell, Philip J. Wilke, Thomas F. King, and Carol L. Mix, pp. 65-71. California Department of Parks and Recreation Archeological Reports No. 14. Sacramento.

O'Connell, James F.
1971 Recent Prehistoric Environments in Interior Southern California. *University of California Archaeological Survey Annual Report* 13:173-184. Los Angeles.

O'Connell, James F., Philip J. Wilke, Thomas F. King, and Carol L. Mix (editors)
1974 Perris Reservoir Archeology: Late Prehistoric Demographic Change in Southeastern California. *California Department of Parks and Recreation Archeological Reports* No. 14. Sacramento.

Olsen, Ronald L.
1930 *Chumash Prehistory*. University of California Publications in American Archaeology and Ethnology 28(1). Berkeley.

O'Neil, Stephen, and Nancy Evans
1980 Notes on Historical Juaneño Villages and Geographic Features. *Journal of California and Great Basin Anthropology* 2(2):226-232.

Oxendine, Joan
1983 *The Luiseño Village During the Late Prehistoric Era*. Ph.D. dissertation, Department of Anthropology, University of California, Riverside.

Pallette, Drew, and Jerry Schaefer
1995 Archaeological Investigations of Two Lake Cahuilla Associated Rockshelters in the Toro Canyon Area, Riverside County, California. *Proceedings of the Society for California Archaeology* 8:105-122. San Diego.

Patencio, Francisco
1943 *Stories and Legends of the Palm Springs Indians*. Times-Mirror, Los Angeles.

Pigniolo, Andrew
2004 Points, Patterns, and People: Distribution of the Desert Side-Notched Point in San Diego County. *Proceedings of the Society for California Archaeology* 14:27-39.

Potter, Amiee B.
2004 *The Genetic Affinities of the Prehistoric People of San Clemente Island, California: An Analysis of Ancient DNA*. Ph.D. dissertation, Department of Anthropology, University of Oregon.

Potter, Amiee B., and P. Scott White
2009 The Mitochondrial DNA Affinities of the Prehistoric People of San Clemente Island: An Analysis of Ancient DNA. *Journal of California and Great Basin Anthropology* 29(2):163-181.

Raab, L. Mark
2009 Vectors of Death and Native Messiahs. In *California Maritime Archaeology: A San Clemente Island Perspective*, edited by L. Mark Raab, Jim Cassidy, Andrew Yatsko, and William J. Howard, pp. 197-211. AltaMira Press, Lanham, Maryland.

Raab, L. Mark, and Daniel O. Larson
1997 Medieval Climatic Anomaly and Punctuated Cultural Evolution in Coastal Southern California. *American Antiquity* 62(2):319-336.

Reddy, Seetha N.
1997 *Camping and Milling in the Highlands: Archaeological Investigation of Case Spring and Firebreak Sites on Camp Pendleton, San Diego County, California.* Report on file at the South Central Costal Archaeological Information Center, California State University, Fullerton.
2000 *Settling the Highlands: Late Holocene Highland Adaptations on Camp Pendleton, San Diego County, Southern California.* Report on file at the South Central Costal Archaeological Information Center, California State University, Fullerton.

Robarchek, Clayton A.
1974 The Charles Mott Site (4-Riv-464). In *Perris Reservoir Archeology: Late Prehistoric Demographic Change in Southeastern California*, edited by James F. O'Connell, Philip J. Wilke, Thomas F. King, and Carol L. Mix, pp. 94-110. California Department of Parks and Recreation Archeological Reports No. 14. Sacramento.

Robinson, Mark C.
1998 *Arrow Points from the Eastside Reservoir Project: Typology and Chronology in the Late Prehistory of Riverside County, California*. Master's thesis, Department of Anthropology, University of Oregon.
2001 CA-RIV-4627/H. In *Eastside Reservoir Project: Final Report of Archaeological Investigations, Volume II: Archaic and Late Prehistoric Occupation Sites*, edited by Melinda C. Horne and Susan E. Rapp, pp. 165-323. Report on file at the Eastern Information Center, University of California, Riverside.

Rogers, David B.
1929 *Prehistoric Man of the Santa Barbara Coast*. Santa Barbara Museum of Natural History, Santa Barbara.

Rogers, Malcolm J.
1936 *Yuman Pottery Making*. San Diego Museum of Man Papers No. 2. San Diego.
1945 An Outline of Yuman Prehistory. *Southwestern Journal of Anthropology* 1(2):167-198.

Rogers, Spencer L.
1963 *The Physical Characteristics of the Aboriginal La Jollan Population of Southern California.* San Diego Musuem of Man Papers No. 4. San Diego.

Rosenthal, Jeffrey S., William R. Hildebrandt, and Jerome King
2001 *Donax* Don't Tell: Reassessing Late Holocene Land Use in Northern San Diego County. *Journal of California and Great Basin Anthropology* 23(2):179-214.

Ross, Lester A.
1969 *The Irvine Complex: A Late Prehistoric Horizon Archaeological Complex for the Newport Bay Area, California*. Master's thesis, Department of Anthropology, Washington State University.
1970 4-ORA-190: A Descriptive Site Report of a Late Prehistoric Horizon Site in Orange County, California. *Pacific Coast Archaeological Society Quarterly* 6(2&3):1-135.

Rowntree, Lester B.
1985 Drought During California's Mission Period, 1769-1834. *Journal of California and Great Basin Anthropology* 7(1):7-20.

Schaefer, Jerry
1992 Ceramic Vessels, Figurines, Pipes, and Disks from Tahquitz Canyon. Paper presented at the Annual Meeting of the Society for California Archaeology, Pasadena.
1994 The Challenge of Archaeological Research in the Colorado Desert: Recent Approaches and Discoveries. *Journal of California and Great Basin Anthropology* 16(1):60-80.
1995a Ceramics. In *Archaeological, Ethnographic, and Ethnohistoric Investigations at Tahquitz Canyon, Palm Springs, California*, by Lowell J. Bean, Jerry Schaefer, and Sylvia Brakke Vane, pp. IX-1-IX-73. Report on file at the San Bernardino County Archaeological Information Center, Redlands.
1995b Prehistoric Cultural Setting. In *Archaeological, Ethnographic, and Ethnohistoric Investigations at Tahquitz Canyon, Palm Springs, California* by Lowell J. Bean, Jerry Schaefer, and Sylvia Brakke Vane, pp. III-1-III-5. Report on file at the San Bernardino County Archaeological Information Center, Redlands.
1995c Stone Implements. In *Archaeological, Ethnographic, and Ethnohistoric Investigations at Tahquitz Canyon, Palm Springs, California* by Lowell J. Bean, Jerry Schaefer, and Sylvia Brakke Vane, pp. XII-1-XII-8. Report on file at the San Bernardino County Archaeological Information Center, Redlands.
1995d The Face of the Nakatum: A Burnt Shaman's House and Cache. In *Archaeological, Ethnographic, and Ethnohistoric Investigations at Tahquitz Canyon, Palm Springs, California* by Lowell J. Bean, Jerry Schaefer, and Sylvia Brakke Vane, pp. VII-1-VII-16. Report on file at the San Bernardino County Archaeological Information Center, Redlands.
1995e Historic Artifacts. In *Archaeological, Ethnographic, and Ethnohistoric Investigations at Tahquitz Canyon, Palm Springs, California*, by Lowell J. Bean, Jerry Schaefer, and Sylvia Brakke Vane, pp. XIV-1-XIV-13. Report on file at the San Bernardino County Archaeological Information Center, Redlands.
2000 "Now Dead I Sing": A Protohistoric Clothes-Burning Ceremonial Feature in the Colorado Desert. *Journal of California and Great Basin Anthropology* 22(2):186-211.

Schaefer, Jerry, and Don Laylander
2007 The Colorado Desert: Ancient Adaptations to Wetlands and Wastelands. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 247-257. AltaMira Press, Lanham, Maryland.

Schneider, Joan S., and Meg McDonald
1995 Milling Implements from Tahquitz Canyon. In *Archaeological, Ethnographic, and Ethnohistoric Investigations at Tahquitz Canyon, Palm Springs, California*, by Lowell J. Bean, Jerry Schaefer, and Sylvia Brakke Vane, pp. XI-1-X-44. Report on file at the San Bernardino County Archaeological Information Center, Redlands.

Schroth, Adella, and L. R. V. Joesink-Mandeville
1987 Bifaces from the Soda Springs Rockshelter (CA-SBr-363B). *Pacific Coast Archaeological Society Quarterly* 23(3):35-57.

Seiler, Hansjakob
1977 *Cahuilla Grammar*. Malki Museum Press, Banning, California.

Smith, Gerald A., and Steven M. Freers
1994 *Fading Images: Indian Pictographs of Western Riverside County*. Riverside Museum Press, Riverside.

Sparkman, Philip S.
1908 *The Culture of the Luiseño Indians*. University of California Publications in American Ethnology and Archaeology 8(4). Berkeley.

Spier, Leslie
1923 *Southern Diegueño Customs*. University of California Publications in American Archaeology and Ethnology 20(16). Berkeley.

Steward, Julian H.
1929 *Petroglyphs of California and Adjoining States*. University of California Publications in American Archaeology and Ethnology 24(2). Berkeley.

Stine, Scott
1994 Extreme and Persistent Drought in California and Patagonia During Mediaeval Time. *Nature* 369:546-549.

Stoll, Anne Q., John G. Douglass, and Benjamin R. Vargas
2003 Cultural Setting. In *At the Base of the Bluff: Archaeological Inventory and Evaluation along Lower Centinela Creek, Marina Del Rey, California*, edited by Jeffrey H. Altschul, Anne Q. Stoll, Donn R. Grenda, and Richard Ciolek-Torrello, pp. 7-55. Statistical Research, Inc., Playa Vista Monograph Series Test Excavation Report 4. Tucson.

Strong, William D.
1927 An Analysis of Sotuhwestern Society. *American Anthropologist* 29(1):1-61.
1929 *Aboriginal Society in Southern California*. University of California Publications in American Ethnology and Archaeology 26. Berkeley.

Stewart, Kenneth M.
1968 A Brief History of the Chemehuevi Indians. *The Kiva* 34(1):9-27.

Sutton, Mark Q.
1986 Warfare and Expansion: An Ethnohistoric Perspective on the Numic Spread. *Journal of California and Great Basin Anthropology* 8(1):65-82.
1987 *A Consideration of the Numic Spread*. Ph.D. dissertation, Department of Anthropology, University of California, Riverside.

1988 Material Culture from CA-RIV-1179. In *Archaeological Investigations at CA-RIV-1179, CA-RIV-2823, and CA-RIV-2827, La Quinta, Riverside County, California*, edited by Mark Q. Sutton and Philip J. Wilke, pp. 53-69. Coyote Press Archives of California Prehistory No. 20. Salinas.

1989 Late Prehistoric Interaction Spheres in the Mojave Desert, California. *North American Archaeologist* 10(2):95-121.

1993 Midden and Coprolite Derived Subsistence Evidence: An Analysis of Data from the La Quinta Site, Salton Basin, California. *Journal of Ethnobiology* 13(1):1-15.

1996 The Current Status of the Archaeology of the Mojave Desert. *Journal of California and Great Basin Anthropology* 18(2):221-257.

1998 Cluster Analysis of Paleofecal Data Sets: A Test of Late Prehistoric Settlement and Subsistence Patterns in the Northern Coachella Valley, California. *American Antiquity* 63(1):86-107.

2000 Strategy and Tactic in the Analysis of Archaeological Hunter-Gatherer Systems. *North American Archaeologist* 21(3):217-231.

2009 People and Language: Defining the Takic Expansion into Southern California. *Pacific Coast Archaeological Society Quarterly* 41(2&3):31-93.

2010a The Del Rey Tradition and its Place in the Prehistory of Southern California. *Pacific Coast Archaeological Society Quarterly* 44(2):1-54.

2010b A Reevaluation of Early Northern Uto-Aztecan Prehistory in Alta California. *California Archaeology* 2(1):3-30.

Sutton, Mark Q., and Matthew R. Des Lauriers

2002 Emerging Patterns in Obsidian Usage in the Southern San Joaquin Valley, California. *Pacific Coast Archaeological Society Quarterly* 38(2&3):1-18.

Sutton, Mark Q., and Jill K. Gardner

2010 Reconceptualizing the Encinitas Tradition of Southern California. *Pacific Coast Archaeological Society Quarterly* 42(4):1-64.

Sutton, Mark Q., and Philip J. Wilke (editors)

1988 *Archaeological Investigations at CA-RIV-1179, CA-RIV-2823, and CA-RIV-2827, La Quinta, Riverside County, California*. Coyote Press Archives of California Prehistory No. 20. Salinas.

Sutton, Mark Q., and Robert M. Yohe II

1988 The Human Remains from CA-RIV-1179. In *Archaeological Investigations at CA-RIV-1179, CA-RIV-2823, and CA-RIV-2827, La Quinta, Riverside County, California*, edited by Mark Q. Sutton and Philip J. Wilke, pp. 77-102. Coyote Press Archives of California Prehistory No. 20. Salinas.

Sutton, Mark Q., Joan S. Schneider, and Robert M. Yohe II

1993 The Siphon Site (CA-SBR-6580): A Millingstone Horizon Site in Summit Valley, California. *San Bernardino County Museum Association Quarterly* 40(3).

Sutton, Mark Q., Mark E. Basgall, Jill K. Gardner, and Mark W. Allen

2007 Advances in Understanding Mojave Desert Prehistory. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 229-245. AltaMira Press, Lanham, Maryland.

Thomas, David H.

1981 How to Classify the Projectile Points from Monitor Valley, Nevada. *Journal of California and Great Basin Anthropology* 3(1):7-43.

Treganza, Adán E.
1945 The "Ancient Stone Fish Traps" of the Coachella Valley, Southern California. *American Antiquity* 10(3):285-294.

True, D. L.
1954 Pictographs of the San Luis Rey Basin, California. *American Antiquity* 20(1):68-72.
1957 Fired Clay Figurines from San Diego County, California. *American Antiquity* 22(3):291-296.
1966 *Archaeological Differentiation of Shoshonean and Yuman Speaking Groups in Southern California*. Ph.D. dissertation, Department of Anthropology, University of California, Los Angeles.
1970 *Investigations of a Late Prehistoric Complex in Cuyamaca Rancho State Park, San Diego County, California*. University of California, Los Angeles, Archaeological Survey Monograph. Los Angeles.
1993 Bedrock Milling Elements as Indicators of Subsistence and Settlement Patterns in Northern San Diego County, California. *Pacific Coast Archaeological Society Quarterly* 29(2):1-26.

True, D. L., and Georgie Waugh
1981 Archaeological Investigations in Northern San Diego County, California: Frey Creek. *Journal of California and Great Basin Anthropology* 3(1):84-115.
1982 Proposed Settlement Shifts During San Luis Rey Times: Northern San Diego County, California. *Journal of California and Great Basin Anthropology* 4(2):34-54.
1983 Radiocarbon Determinations from the Frey Creek Drainage in Northern San Diego County. *Journal of California and Great Basin Anthropology* 5(1 and 2):253-255.

True, D. L., Clement W. Meighan, and Harvey Crew
1974 *Archaeological Investigations at Molpa, San Diego County, California*. University of California Press Publications in Anthropology Vol. 11. Berkeley.

True, D. L., Rosemary Pankey, and Claude N. Warren
1991 Tom-Kav: A Late Village Site in Northern San Diego County, California, and Its Place in the San Luis Rey Complex. *University of California Anthropological Records* 30. Berkeley.

Ucko, Perer J.
1969 Ethnography and Archaeological Interpretation of Funerary Remains. *World Archaeology* 1(2):262-280.

Underwood, Jackson
2004 Pipes and Tobacco Use Among Southern California Yuman Speaker. *Journal of California and Great Basin Anthropology* 24(1):1-12.

Van Camp, Gena R.
1979 *Kumeyaay Pottery: Paddle-and-Anvil Techniques of Southern California*. Ballena Press Anthropological Papers No. 15. Socorro, New Mexico.

Van Horn, David M.
1990 Marymount Points: A Tanged Arrowhead Series in Coastal Southern California. *Journal of New World Archaeology* 7(4):29-36.

Van Valkenburgh, Richard F.
1976 Chemehuevi Notes. In *Paiute Indians II*, edited by David A. G. Horr, pp. 225-253. Garland Publishing Company, New York.

Wake, Thomas A.
1999 Temporal Variation in Vertebrate Archaeofaunas from Camp Pendleton Marine Corps Base, San Diego County, California. *Pacific Coast Archaeological Society Quarterly* 35(4):45-64.

Walker, Edwin F.
1951 *Five Prehistoric Archeological Sites in Los Angeles County, California*. Publications of the Frederick Webb Hodge Anniversary Publication Fund Vol. 6. Southwest Museum, Los Angeles.

Wallace, William J.
1955a A Suggested Chronology for Southern California Coastal Archaeology. *Southwestern Journal of Anthropology* 11(3):214-230.
1955b Mohave Fishing Equipment and Methods. *Anthropological Quarterly* 28(2):87-94.
1960 Archaeological Resources of the Buena Vista Watershed, San Diego County, California. *University of California Archaeological Survey Annual Report* 1959-1960:277-301. Los Angeles.
1962 Prehistoric Cultural Developments in the Southern California Deserts. *American Antiquity* 28(2):172-180.
1986 Archaeological Research at Malaga Cove. In *A New Look at Some Old Sites*, edited by Francis A. Riddell, pp. 21-27. Coyote Press Archives of California Prehistory No. 6. Salinas.

Warren, Claude N.
1968 Cultural Tradition and Ecological Adaptation on the Southern California Coast. In *Archaic Prehistory in the Western United States*, edited by C. Irwin-Williams, pp. 1-14. Eastern New Mexico University Contributions in Anthropology 1(3). Portalas, New Mexico.
1984 The Desert Region. In *California Archaeology*, by Michael J. Moratto, pp. 339-430. Academic Press, Orlando.

Waters, Michael R.
1982a The Lowland Patayan Ceramic Tradition. In *Hohokam and Patayan: Prehistory of Southwestern Arizona*, edited by R. H. McGuire and M. B. Schiffer, pp. 275-297. Academic Press, New York.
1982b The Lowland Patayan Ceramic Typology. In *Hohokam and Patayan: Prehistory of Southwestern Arizona*, edited by R. H. McGuire and M. B. Schiffer, pp. 537-570. Academic Press, New York.
1982c Ceramic Data on Lowland Patayan Sites. In *Hohokam and Patayan: Prehistory of Southwestern Arizona*, edited by R. H. McGuire and M. B. Schiffer, pp. 571-580. Academic Press, New York.
1983 Late Holocene Lacustrine Chronology and Archaeology of Ancient Lake Cahuilla, California. *Quaternary Research* 19:373-387.

Waugh, Georgie
1986 *Intensification and Land-use: Archaeological Indication of Transition and Transformation in a Late Prehistoric Complex in Southern California*. Ph.D. dissertation, Department of Anthropology, University of California, Davis.
1988 Cottonwood Triangular Points from Northern San Diego County, California. *Journal of California and Great Basin Anthropology* 10(1):104-113.

Weide, Margaret L.
1976 A Cultural Sequence for the Yuha Desert. In *Background to Prehistory of the Yuha Desert Region*, edited by Philip J. Wilke, pp. 81-94. Ballena Press Anthropological Papers No. 5. Ramona, California.

West, G. James, Wallace Woolfenden, James A. Wanket, and R. Scott Anderson
2007 Late Pleistocene and Holocene Environments. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 11-34. AltaMira Press, Lanham, Maryland.

White, Chris
1980 Regional Research Design. In *Class II Cultural Resource Inventory, East Mesa and West Mesa Regions, Imperial Valley, California*, Vol. 1, edited by Dennis Gallegos, pp. 183-187. Report on file with the Bureau of Land Management, Riverside.

White, Eric S., and Barbara J. Roth
2009 Fish Traps on Ancient Shores: Exploring the Function of Lake Cahuilla Fish Traps. *Journal of California and Great Basin Anthropology* 29(2):183-193.

Wilke, L. A., and Philip J. Wilke
1978 A New Site with Tufa-Covered Petroglyphs near Travertine Point, Imperial County, California. *Journal of New World Archaeology* 2(4):9-14.

Wilke, Phillip J.
1971 Late Prehistoric Change in Land-Use Patterns at Perris Reservoir. *University of California Archaeological Survey Annual Report* 13:155-164. Los Angeles.
1974a The Peppertree Site (4-Riv-463). In *Perris Reservoir Archeology: Late Prehistoric Demographic Change in Southeastern California*, edited by James F. O'Connell, Philip J. Wilke, Thomas F. King, and Carol L. Mix, pp. 48-64. California Department of Parks and Recreation Archeological Reports No. 14. Sacramento.
1974b Settlement and Subsistence at Perris Reservoir: A Summary of Archaeological Investigations. In *Perris Reservoir Archeology: Late Prehistoric Demographic Change in Southeastern California*, edited by James F. O'Connell, Philip J. Wilke, Thomas F. King, and Carol L. Mix, pp. 20-29. California Department of Parks and Recreation Archeological Reports No. 14. Sacramento.
1978 *Late Prehistoric Human Ecology at Lake Cahuilla, Coachella Valley, California*. University of California Archaeological Research Facility Contributions No. 38. Berkeley.
1980 Prehistoric Weir Fishing on Recessional Shorelines of Lake Cahuilla, Salton Basin, Southeastern California [Abstract]. *Desert Fishes Council Proceedings* 11:101-103.

Wilke, Philip J., and Harry W. Lawton
1975 Early Observations on the Cultural Geography of Coachella Valley. *Ballena Press Anthropological Papers* No. 3, edited by J. Lowell Bean, pp 9-43. Ramona, California.

Wilke, Philip J., and Mark Q. Sutton
1988 Summary and Inferences. In *Archaeological Investigations at CA-RIV-1179, CA-RIV-2823, and CA-RIV-2827, La Quinta, Riverside County, California*, edited by Mark Q. Sutton and Philip J. Wilke, pp. 157-164. Coyote Press Archives of California Prehistory No. 20. Salinas.

Wilke, Philip J., Thomas F. King, and Stephen Hammond
1975 Aboriginal Occupation at Tahquitz Canyon: Ethnohistory and Archaeology. In *The Cahuilla Indians of the Colorado Desert: Ethnohistory and Prehistory, Part 2*. Ballena Press Anthropological Papers No. 3. Socorro, New Mexico.

Willey, Gordon R., and Philip Phillips
1958 *Method and Theory in American Archaeology*. University of Chicago Press, Chicago.

Williams, Scott A.
2001 CA-RIV-1162/H. In *Eastside Reservoir Project: Final Report of Archaeological Investigations, Volume II: Archaic and Late Prehistoric Occupation Sites*, edited by Melinda C. Horne and Susan E. Rapp, pp. 7-57. Report on file at the Eastern Information Center, University of California, Riverside.

Wright, H. E., Jr., J. E. Kutzbach, T. Webb III, W. F. Ruddiman, F. A. Street-Perrott, and P. J. Bartlein (editors)
1993 *Global Climates Since the Last Glacial Maximum*. University of Minnesota Press, Minneapolis.

York, Andrew L.
2006 *An Archaeological Research Context for the Lower Santa Margarita River*. EDAW Cultural Publications No. 1. San Diego.