The Central Desert Early Prehistory Project: preliminary results from a trans-peninsular survey

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Abstract

This paper presents a summary of findings from the first season of the Central Desert Early Prehistory Project (CDEPP), which ran from June through August 2009. The CDEPP study area is located within the central desert of Baja California and consists of a ca. 85-km trans-peninsular baseline, or mega-transect, stretching from Punta Blanco on the Pacific coast to Punta Calamajué on the Gulf of California. Fieldwork included pedestrian survey of 21 transects positioned along the baseline and test excavation of a single archaeological site, site LP-01, located within the Jaraguay volcanic field.

Introduction

Archaeological investigations focused on the discovery of the early prehistoric record of the Baja California peninsula may reveal important implications regarding the timing and nature of the peopling of the New World, due in large part to the position of the landform. Assuming the Pacific corridor was likely an initial migration entryway into the New World (Gruhn 1994; Mandryk et al. 2001), the isolated peninsula may have served as a natural cul-de-sac for select populations traveling south along the Pacific coast. Within the peninsula itself, the central desert is a promising region for studying the implications for these initial late Pleistocene (LP) and later early Holocene (EH) peoples (Figure 1). The environmental context in which these early populations lived included multiple ecosystems bounded within a narrow landscape, possibly resulting in unique human adaptive strategies not seen in other areas of the far west region (Ritter 1979; Willis and Des Lauriers 2011).

Recent archaeological excavations conducted at the Abrigo Paredón site at Laguna Seca Chapala (Bryan and Gruhn 2002, 2005; Davis 2003) and at two sites located on Isla Cedros (PAIC 44 and PAIC 46; Des Lauriers 2006) lend support for evidence of human occupation in the central desert region during the LP-EH transition. Numerous chronometric assays from these sites range from ca. 10,700 to 8,000 radiocarbon years B.P. (Bryan and Gruhn 2002, 2005; Des Lauriers 2006).

In acknowledging the importance of these early sites to our understanding of early human adaptation in the central desert region, results of the CDEPP 2009 season presented here are appropriate for establishing and further clarifying LP-EH culture history and the human-environmental record across the peninsula.

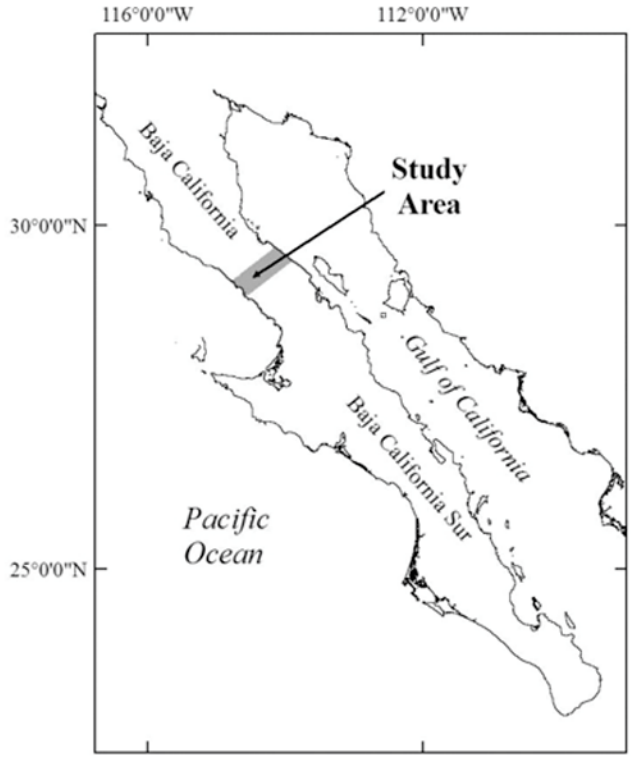

Figure 1: Map of the CDEPP study area.

Overview of the CDEPP field investigations for the 2009 season

The 2009 CDEPP archaeological field investigations consisted of (1) pedestrian survey of a multiple 5-10-km-long transects positioned along a single ca. 85-km trans-peninsular baseline, (2) limited excavation of one previously observed site (LP-01) located along an unnamed pluvial lake within the Jaraguay volcanic field, (3) systematic collection and sampling of select ecofacts (e.g. land snails, marine shell, faunal bone) and sediment for paleoenvironmental reconstruction across the central desert, (4) systematic collection of those datable materials directly associated with cultural material, (5) completion of a detailed analysis for all artifacts recovered from the survey and limited excavation, and (6) distinguishing the coastal origin of culturally transported marine shell.

CDEPP transect survey methodology and results

Survey transects were positioned along the ca. 85-km trans-peninsular baseline beginning at ca. 3.5 km north of Punta Blanco (E 721692.37 / N 3224386.44) on the Pacific coast and terminating at Punta Calamajué on the Gulf of California (E 774791.52 / N 3288002.52) (see Figure 2). Generally speaking, and due to a small field crew (n = 2), field investigations west of the Sierra de Colombia are focused on the pluvial lake system, mesa complexes, and Pacific coastline. Survey areas east of the Sierra de Colombia parallel the Arroyo Calamajué valley. In total, 21 of the possible 40 transects originally proposed for investigation by the author (Willis 2009) were systematically surveyed during the 2009 season. Given the immense size of the proposed survey area (i.e., 1,600 km^2, or 395,368 acres), a combination of stratified random and

Figure 2: Overview of the CDEPP 85-km baseline, or mega-transect, and all transects surveyed during the 2009 field season. (Green lines indicate transects surveyed; the blue line represents the baseline.)

biased samples were superimposed on the study area, largely based on a GIS predictive model built for the central desert by Jenevein et al. (2008) and Davis et al. (2009).

The GIS model predicts those productive patches assumed to have been optimal choices for early human populations. Patch productivity is based on multiple indicators, such as vegetation and animal biomass, proximity to water sources and fluvial drainages, slope and aspect. Initial patch designation is founded on modern soil types obtained from the Instituto Nacional de Estadística y Geografía (INEGI). Our stratified random sample uses the modern soil types as the sample strata. Three major soil types exist within the survey area, including solonchak, yermosol, and regosol (INEGI). A representative sample of sub-transects within each soil type was completed. Additional sub-transects were chosen through a biased sample, in which those areas located along the transect baseline that are observed to include high-probability landforms (e.g., water sources, older alluvial terraces, rock shelters) were chosen in the field by the author.

Approximate lengths of each soil type along the proposed transect baseline include solonchak, 2 km; yermosol, 43 km; and regosol, 32. Based on a random stratified 25% sample, the target sample of transects within each soil type results in solonchak with two transects, yermosol with 15 transects and regosol with four transects (Figure 3). In all, the 21 transects undertaken along the baseline resulted in a total of ca. 150 km of pedestrian survey.

Figure 3: Location of archaeological sites and transects in relation to soil types season. (Green lines indicate transects surveyed; the blue line represents the baseline.)

Justification of site recordation

Identifying and characterizing the early prehistory of human presence in the central desert region is the major goal for these investigations. Hence, work at all potentially early archaeological sites encountered during the survey included recordation and analysis. Discovery of sites suggested to date to the later prehistoric and contact periods did occur. As originally proposed to INAH (see Willis 2009), and due to an extensive survey area, non-early-period archaeological sites were limited to a brief description and mapping of their locations with GPS (NAD 1927).

Preliminary results of the CDEPP transect surveys

Forty-nine archaeological sites were observed along the 21 transect surveys. Many of these (n = 22) include artifacts affiliated with later periods of prehistory and where not collected, mapped, or analyzed. Yet over half of the archaeological sites and isolates included some characteristic(s) likely representative of LP or EH occupation (e.g., stemmed, foliate or leaf-shaped, and fluted finished bifaces; centripetal or discoidal cores; Levalloisian-like macroblade and flake; limace or slug; unidirectional core-tool with prepared platform, also termed scraper planes). These sites and isolates were mapped and datums established, recorded on official INAH

documentation, and their artifacts analyzed (n = 27).

A distinct pattern of early site distribution include multiple occupations concentrated in proximity to the four pluvial lakes investigated: Laguna La Guija, Laguna Seca Chapala, the Western Playa, and an unnamed playa along the Arroyo Jaraguay. During the LP-EH periods, these freshwater lakes were undoubtedly important locations for human occupation in the central desert. This lacustrine system offered early foragers a perennial water source for a secure drinking supply, edible aquatic resources, and a habitat attractive to ungulate, small mammal, and avian species.

An additional area of early site concentration observed during the 2009 CDEPP includes the vicinity of Punta Blanco on the Pacific coast. All sites recorded can be considered as palimpsests situated on deflated surfaces. While little stratified sedimentary and cultural deposition was observed in this coastal zone, all the Pacific coast sites included high concentrations of clam and mussel shell in association with lithic artifacts and undoubtedly represent deflated midden features. The Punta Blanco area includes an additional physiographic characteristic of note: numerous sites are associated with a lake playa adjacent to the active beach. This may represent an important and distinct lacustrine-marine ecosystem interface.

One of the more interesting findings of the 2009 CDEPP was the near absence of archaeological sites within the Arroyo Calamajué corridor. A single site was recorded for this portion of the study area. At present, the reason for the lack of prehistoric occupation within the Arroyo Calamajué corridor is unknown, but potential reasons may include extensive disturbance by geomorphic processes from the lateral movement of the Arroyo Calamajué channel, lack of perennial water supplies, lack of wildlife due to poor water supply, and/or poor-quality tool stone sources. It may be the case that prehistoric populations used other arroyo corridors located to the north and south of Arroyo Calamajué to reach the Gulf of California. Future fieldwork in the summer of 2010 will seek to clarify this matter.

Description of recovered artifacts

For the sake of brevity, the collected lithic assemblage from the central desert region is divided into a basic categorization: debitage (flakes and macroblades), cores, bifaces, unifaces (formal modified flakes and macroblades), gravers or burins, non-formal modified flakes and macroblades, and, cobble tools. All lithic analyses used here are based on macroscopic observations of 10x magnification or less. A forthcoming final report will be submitted to INAH in 2011 and will include a full description of artifacts, their significance to early central desert foragers, and a replicable and useful typology.

Lithic tools recovered from the CDEPP 2009 transect survey include debitage (n = 242); cores (n = 62), including multidirectional, unidirectional, and Levalloisian-like discoidal forms; early-stage bifaces (n = 6); finished or hafted bifaces (n = 15), including foliate or leaf-shaped and basally thinned lanceolate forms; unifaces (n = 5); a graver; a modified flake; and pebble/cobble tools (n = 17) (Figure 4).

The 2009 CDEPP transect survey data are an initial step in providing new perspectives on technological organization, economic orientation, and regional mobility patterns practiced by early foragers of the central desert. These results suggest that early central desert foragers employed a generalized technological organization produced mainly from locally available raw materials and applicable to a wide range of aquatic and terrestrial environmental contexts. Early central desert occupants applied a variety of well-developed formal and informal core technologies to a lithic toolkit well suited for the production of large early-stage bifaces; finished leaf-shaped and basally

Figure 4: Various artifacts from the 2009 CDEPP field investigations: (a) uniface, catalog no. 217, site T-20-02; (b) asymmetrical leaf-shaped biface, catalog no. 188, site T-9-01; (c) discoid core, catalog no. 8, site LP-01; (d) cobble tool, catalog no. 230, site T-20-01; (e) atlatl weight, catalog no. 53, site LP-01; (f) unidirectional core, catalog no. 242, site T-1-02. (All scales are 2 cm.)

thinned lanceolate bifaces, formal and non-formal modified flakes and macroblades, including one with a graver-like tip; and bi-marginal and uni-marginal cobble tools.

Given these initial CDEPP data and the LP-EH paleoenvironmental context of the central desert, it is hypothesized that LP-EH foragers likely employed some form of highly mobile seasonal or transhumant (i.e., logistical) land use system patterned within two marine coasts connected by an extensive pluvial lake system and mountain environment. Yet continued field research is needed to support this claim.

Archaeological Testing of Site LP-01

Setting

Site LP-01 includes a rich surficial assemblage of lithic artifacts and intact artifact-bearing sediments. The site is located on the southeast-facing slope of a small knoll and is adjacent to an ancient shoreline of an unnamed pluvial lake (29˚16'07.61" N / 114˚35'58.9" W). A surficial artifact deposit in the form of lithic and shell material extends from the upper slope of the knoll downward to the level desert floor. The site is bounded to the south by an ephemeral arroyo drainage and to the north and west by a steep basin range.

On-site vegetation is consistent with the Vizcaino subdivision of the Sonoran Desert biome (Turner 1994), largely comprised of creosote bush (*Larrea tridentata*), cholla (*Opuntia prolifera*), and blue agave (*Agave cerulata*). Cirio (*Fouquieria columnaris*), fishhook barrel cactus (*Ferocactus wislizenii*) and cardón (*Pachycereus pringlei*) are present, but in lower frequencies. Soils include those of the yermosol series. Exposed bedrock of angular basalt and metavolcanic boulders is observable on top of and along the upper slopes of the knoll. The bedrock towards the middle and lower portion of the slope is overlain by a thin colluvial facies of loamy sand.

Methodology

A datum was established mid-slope of the southwestern flank of the basalt knoll. Extensive mapping and collecting of the surficial archaeological component followed datum establishment, including the production of a contour map of the site. Limited subsurface sampling of site LP-01 included the excavation of two 1-x-2-m^2 test units, TU-1 and TU-2. Test units were placed in proximity to high surficial concentrations of artifacts. TU-1 and TU-2 were excavated in arbitrary 5-cm levels below ground surface with shovel, trowel and dustpan. All excavated material was dry-screened through a 1/8-in. mesh, and all lithic and shell artifacts were collected (Figure 5).

Surface deposits

The surficial deposit at LP-01 includes numerous leaf-shaped or foliate finished bifaces. The majority of these bifaces are striking in their continuity: they have a crescent-like form. The majority of the finished bifaces are made on flakes or macroblades. In some cases, the flake blanks appear to have been side-struck. It should be noted that these crescent, or pseudo-crescent, biface forms were only recovered at one other location in the study area: Laguna La Guija, the next playa to the east-northeast.

Multiple core forms are present at site LP-01, suggesting this location was used extensively to manufacture tools (considering the number of bifaces present) and to reduce cores. Portion of the debitage and core populations reveal a Levalloisian-like reduction system. Levalloisian-like evidence includes "A", "B", and "C" blades, "Levallois" flakes, and discoidal cores (see Figure 4c). This method of systematic core reduction is noted for other LP-EH sites along the North American Pacific coast as well as the Great Basin (Muto 1976).

One of the most interesting finds at site LP-01 is a pecked and battered (i.e., shaped) ground stone specimen interpreted here as an atlatl weight (see Figure 4e). The presence of the atlatl weight at site LP-01 is significant, considering its association with leaf-shaped bifaces, as well as atlatl weights' generally rare occurrence in the archaeological record.

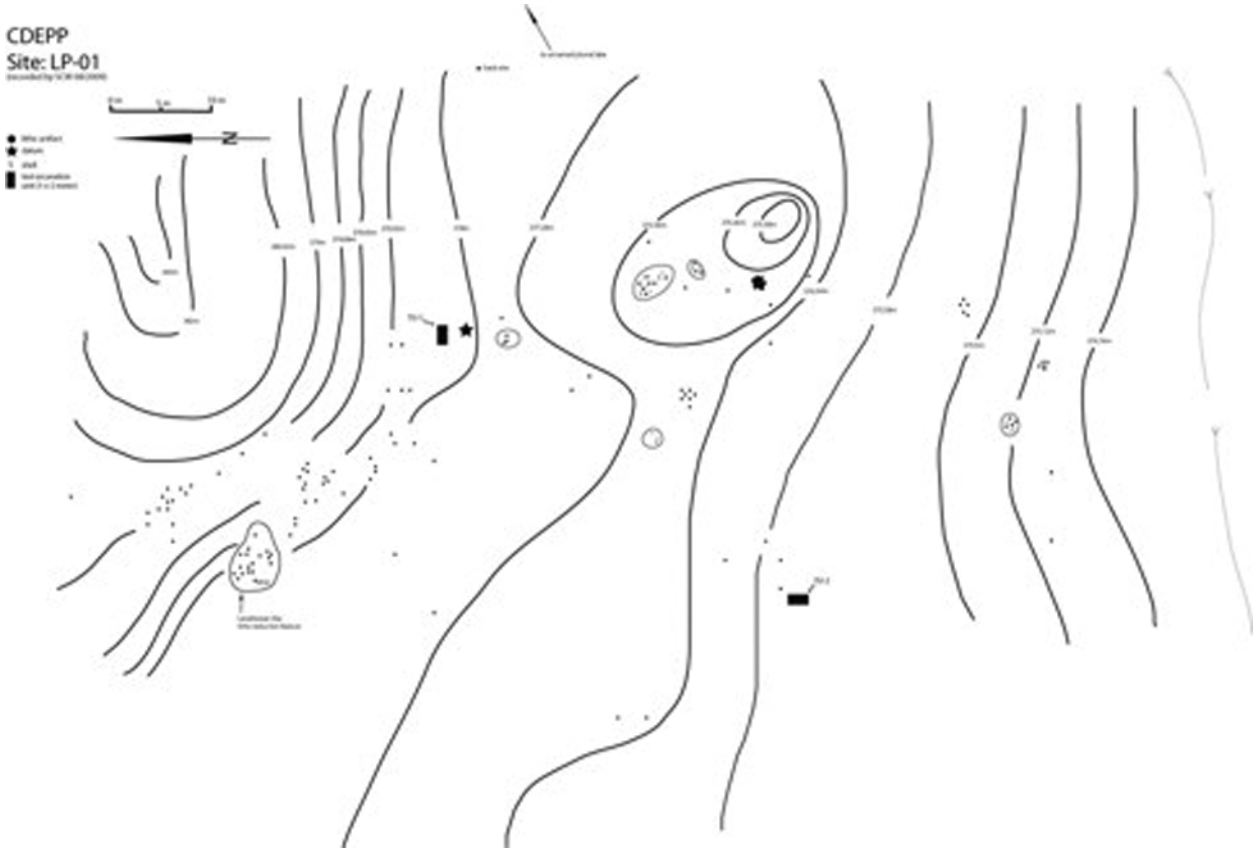

Figure 5: Site map of CDEPP site LP-01.

Test Unit 1

TU-1 excavation was limited to three levels, or a total of 15 cm. The reason for termination at this depth was the low frequency of intact cultural material within the upper colluvial deposit (n = 6) and subsequent contact with an underlying lacustrine facies. Together, these factors suggest that the area was inundated under a significant level of lake water during at least the EH period and was not available for occupation until at least the last recession of the pluvial lake strands (Davis 2003). The compact clay facies observed at 8 cm includes massive fine sediments (i.e., mud and silt) and is suggestive of a low-energy lacustrine environment at an appreciable distance from the shoreline (Table 1). The dearth of intact artifacts in the upper colluvial facies further suggests a lack of intact cultural deposits in this area of the site.

Test Unit 2

TU-2 is located west-southwest of TU-1 on the level base of the basalt knoll and closer to the ephemeral drainage. Withstanding the uppermost medium to coarse sand colluvial facies, the underlying sediment is characterized by a single massive loamy-sand facies overlying angular basalt bedrock (see Table 1). Pedoturbation in the form of numerous medium-to-large root casts and rodent burrows and are present throughout the depth of TU-2. Intact cultural material is present throughout the massive sediment. Yet the rather equal frequency and position of artifacts through depth in TU-2 is suggestive that movement of artifacts likely occurred through time (Figure 6;

Table 1. Summary of lithostratigraphic unit descriptions for site LP-01.

LU	Facies	Description
IV	Sd	Brown (10YR 5/3) loamy sand, dry, ≤ 5% sub-angular granules and pebbles, poorly sorted, massive, soft, very friable, non-plastic, non-sticky, many fine to coarse roots, non-effervescent, abrupt wavy boundary.
III	Lsd	Yellowish brown (10YR 5/4) loamy sand, dry, ≤ 1% sub-angular granules and pebbles, moderately sorted, moderate to weak sub-angular to blocky structure, soft, very friable, non-plastic, non-sticky, many fine to coarse roots, non-effervescent, clear wavy boundary.
II	C	Dark yellowish brown (10YR 4/4) clay, dry, well sorted, sub-angular blocky, hard, non-friable, sticky, plastic, few fine to medium roots, non-effervescent, unknown boundary.
I	R	Lithic pavement (i.e., bedrock), dry, ≥ 95% very poorly sorted sub-angular to angular granules, pebbles, cobbles, and boulders, unknown boundary.

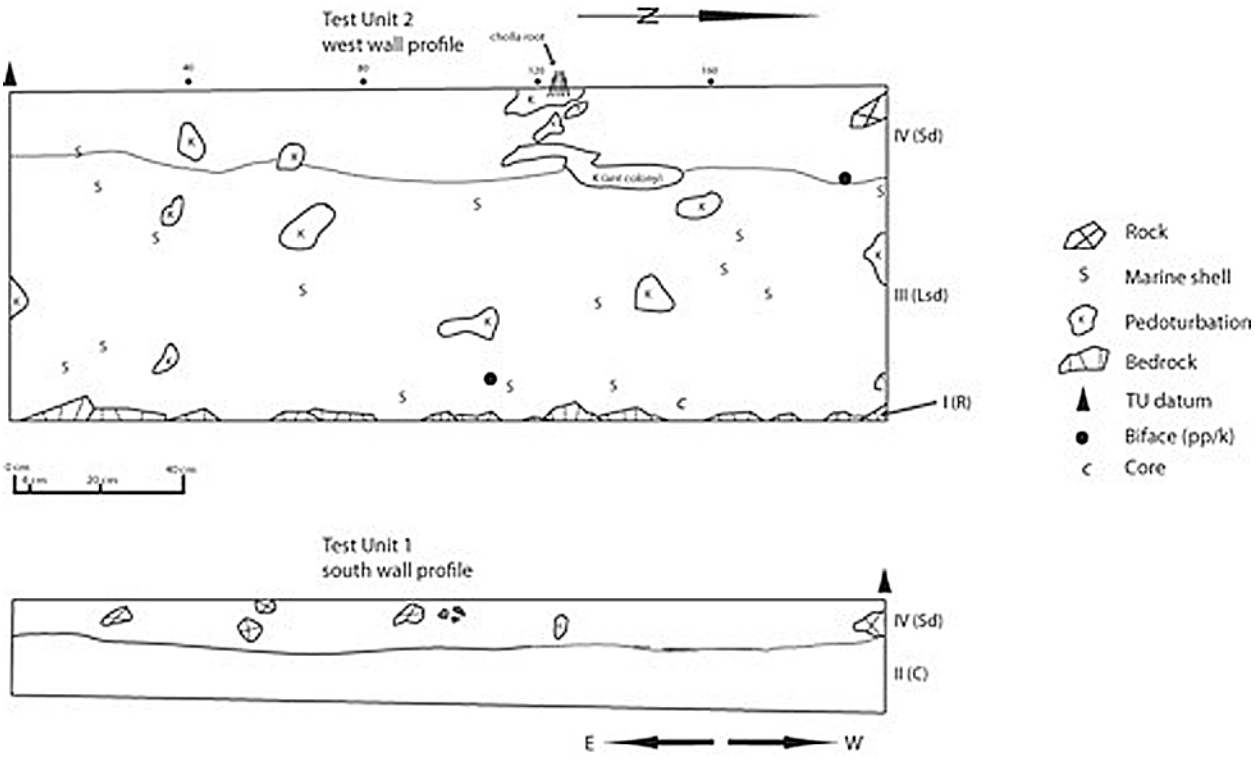

Figure 6: Profile of lithofacies of select walls for TU-1 and TU-2 at site LP-01.

Table 2), and is attributed to either symmetrical postdepositional local mixing of a single occupation or multiple occupations *sensu* Brantingham et al. (2007). Due to the recovery of corner-notched and leaf-shaped finished bifaces, it is here suggested that the latter (i.e., symmetrical local postdepositional mixing of multiple occupations) is the case. However, caution is suggested for this interpretation, based on the limited excavations performed at site LP-01.

While the finished bifaces recovered in TU-2 are likely temporally diagnostic, two species of shell (*Tivela stultorum* and *Septifer bifurcata*) were consistently recovered in association with the finished bifaces. Postdepositional mixing of artifacts aside, the future age assessment for the shells associated with the differing hafted biface forms may assist in understanding the nature of occupation(s) for the surficial artifact deposit at site LP-01.

Table 2: Summary of artifact and shell frequencies through depth for TU-2.

	Level																
Artifacts	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**Total**
Foliate pp/k	1	--	--	--	1	1	--	--	--	--	--	1	--	1	--	--	5
Corner-notched pp/k	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1
Unidentified pp/k	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1
Stage III biface	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Modified flake	1	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	2
Debitage	53	59	21	29	40	36	36	32	29	32	38	36	40	26	38	26	571
Core	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1
Tivela stultorum	49	37	17	19	19	17	5	4	12	5	24	17	11	10	12	--	258
Septifer bifurcatus	24	21	21	26	24	20	12	4	12	11	--	6	9	8	4	--	202
Total	128	117	59	76	84	74	53	40	53	48	62	60	60	46	55	26	1,041

Site LP-01 is significant due to (1) its position near an ancient lakeshore; (2) the presence of multiple leaf-shaped finished bifaces, many of which include crescent-like shapes; and (3) multiple examples of Levalloisian-like core and debitage technology. Indeed, this site may represent an EH occupation. Yet while numerous leaf-shaped finished bifaces are present on the site's surface, a single late-period triangular finished biface was observed in proximity to TU-2, as well as below the ground surface. Both late-period bifaces are consistent in style with that described for the Guerrero Negro series (Ritter and Burcell 1998). This is suggestive of multiple occupations of the site through time.

The amount and timing of these occupations await further clarification through chronometric analysis, though, at this preliminary time, it appears that the majority of site LP-01 may be attributed to an earlier occupation of people who made use of leaf-shaped bifaces and a Levalloisian-like core reduction strategy. Subsequently, groups using the Guerrero Negro style bifaces reoccupied the site at some point during the late prehistoric period.

Conclusion

In summary, the 2009 CDEPP field investigations resulted in the identification of 49 previously unrecorded archaeological sites and isolates. Twenty-one transects were pedestrian surveyed for a total of ca. 150 km. Transect surveys resulted in the mapping and collecting of 341 lithic artifacts, many of which may date to the late Pleistocene or early Holocene time periods. Limited subsurface investigations were conducted at site LP-01, adjacent to an unnamed pluvial lake within the Jaraguay Volcanic Field. Surface mapping of artifacts and test excavation units at site LP-01 resulted in the recovery of 730 lithic artifacts (in addition to shell). Test Unit 2 resulted in the in situ recovery of multiple diagnostic hafted bifaces, associated with Pacific coast marine shell, and may allow for a stratified chronological record of the site and the surrounding pluvial basin.

It is hoped that future survey and excavation within select portions of the CDEPP study

area in the 2010 season and the analysis of the Brigham Arnold central desert artifact assemblage will add to the data presented here, eventually leading to meaningful inferences regarding past human and environmental variation across the central desert landscape through time.

Acknowledgments

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