A 2,000 Year Old Milling Tool Kit from CA-SDI-10148, San Diego, California

Carolyn E. Kyle

Abstract

This study provides the results of an archaeological monitoring and subsequent data recovery program for a portion of prehistoric site CA-SDI-10148 as part of the East Mission Gorge Pump Station and Force Main project. The initial phase of this study included monitoring of excavation for the pump station and two ponds located west of the pump station. Monitoring identified six fire hearths, a stone bowl, numerous manos, and five complete metates. Upon completion of the monitoring program, the site determination of significance for that portion of CA-SDI-10148 on City of San Diego property was changed by the City of San Diego from not significant/not important to significant/important under City of San Diego and CEQA guidelines. A data recovery program was designed to mitigate additional subsurface impacts to the site using a City approved research design and excavation of up to a 15 percent sample (hand and mechanical excavation). Results of this program identified a sparse subsurface deposit in the southern and eastern portions of the study area and an intact living floor in the northeast portion of the study area. Two radiocarbon dates were obtained from soil samples obtained below hearth features located within the living floor of 1590±80 years B.P. and 2250±80 years B.P. An analysis of the primarily quartzite debitage and flaked lithic tools recovered from the living floor feature was completed by Lithic Analysts. This study identified the majority of the artifacts as tools and debitage resulting from manufacture and use of groundstone resharpening tools. Completion of the data recovery program identified a preceramic site, used circa 800 to 2250 years ago, where activities focused on grinding and processing of food materials. The results of this study are unique in that a milling station processing camp has been fully documented to include the range and type of groundstone resharpening tools of a rarely documented time period.

Introduction

Gallegos & Associates completed a multi-phased archaeological monitoring and data recovery program for a portion of prehistoric site CA-SDI-10148 as part of the East Mission Gorge Pump Station and Force Main project for the City of San Diego Clean Water Program. Phase I of the two phased program provided monitoring of excavation for the Pump Station and two holding ponds west of the Pump Station. Phase II included the data recovery program for portions of site CA-SDI-10148. This study was conducted in accordance with the *California Environmental Quality Act* (CEQA) and City of San Diego Guidelines.

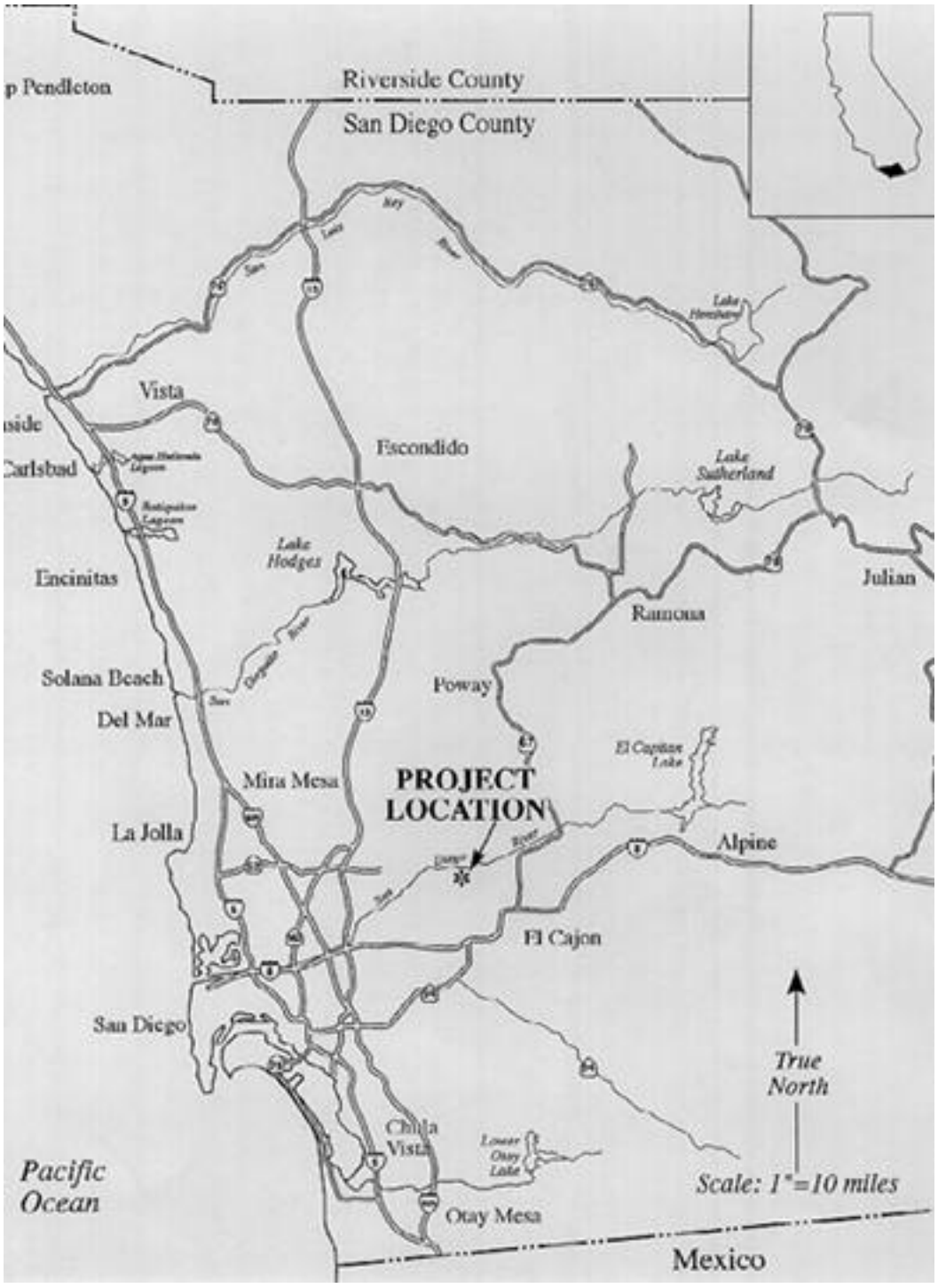

Fig. 1. Map showing regional location of project.

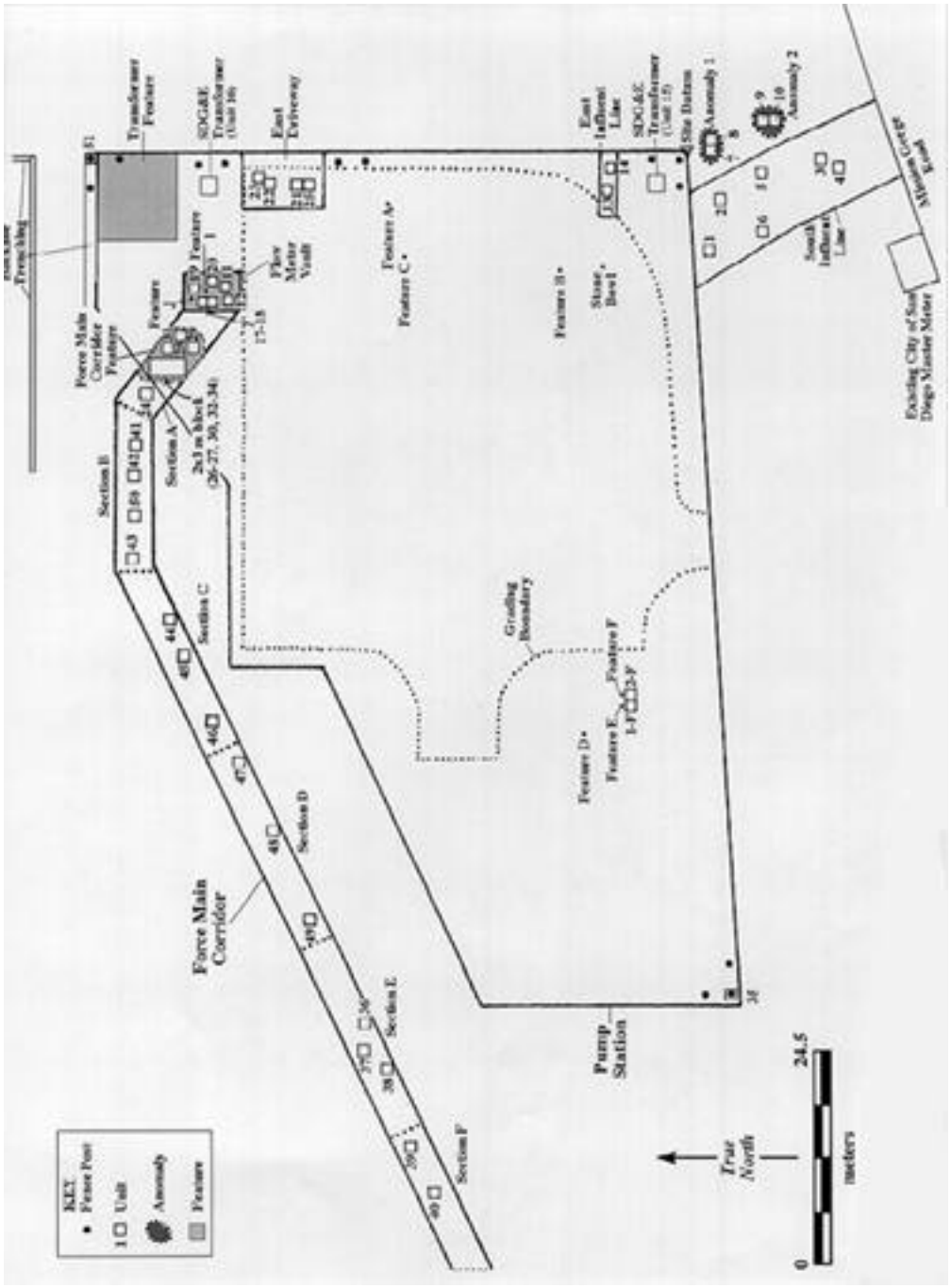

Fig. 2. East Mission Gorge pump station and force main within prehistoric site CA-SDI-10148.

The study area is located on City of San Diego property, adjacent to the western boundary of the City of Santee (Fig. 1). This area is shown on the *La Mesa* 7.5 (Photorevised 1975) USGS topographic map in an unsectioned portion of the El Cajon Rancho. The study area is bound on the south by East Mission Gorge Road, on the north by the San Diego River, on the east by the City of Santee (undeveloped land), and on the west by undeveloped land. The current topography is level, receding slightly toward the San Diego River.

The study area lies within the San Diego River floodplain and soil within this area is river alluvial deposits (Pryde 1976). Vegetation currently includes introduced grasses on the flat areas and riparian habitat along the river channel (Munz 1974). The riparian habitat has been reduced by modern development and channeling of the river. The portion of site CA-SDI-10148 that is located within the study area has not been plowed for agriculture, however, the portion of the site located east of the City of Santee boundary appears to have been plowed in the past. Aerial photographs from ca 1928 show what appears to be terracing on this portion of the site (Tax Factor, Inc. 1929).

Site Background

Site CA-SDI-10148 is near the Mission San Diego de Alcala, the oldest historical settlement in Southern California. The mission was initially established on Presidio Hill and relocated at the current location in 1774. The Mission Dam and Flume System were built nearby in the early 1800s. Site CA-SDI-10148 is one of a number of occupation/specialized use areas associated with the large village settlement SDM-W-200, recorded circa 1920 by Malcolm Rogers. This large village, located northwest of CA-SDI-10148, may have been the ethnographically recorded village of El Corral (Trafzer and Carrico 1992). El Corral and its outlying camps and activity areas were located along a major Native American trail that extended from the coast, through present day Mission Valley, past the Mission San Diego de Alcala, roughly following present day Mission Gorge Road to El Corral.

East from the village of El Corral, at the approximate location of Lakeside, the trail turned northeast through Ramona (the village of *Pamo/Canapui*), Ballena (village of *Epegam)*, Santa Ysabel (village of *Elcuanam*), and across the mountains to Agua Caliente (village of *Jocopin*) in the desert. An eagle rookery and a pictograph site were reported to be located in the vicinity of CA-SDI-10148, as well as, a sun solstice observatory that were located on Cowles Mountain, prior to destruction in 1982 (personal communication Fern Southcott 1993). These three types of sites had great significance to the religious practices of Kumeyaay Native Americans.

During the Spanish and Mexican Periods, present day Santee was known as Rancho de San Luis, and the surrounding area including Padre Dam was known as Valle de San Luis (Engelhardt 1920, Southcott, personal communication 1993). Almost 500 Native Americans from this area were baptized during a three month period, preceding the November 4, 1775 destruction of Mission San Diego. Most of these baptisms took place at a village located northeast of the mission in the Valle de San Luis (Killea 1978). This village is probably El Corral. One of the Native Americans baptized during this time period was Chief Cuanil (or Luis) of the Rancheria de la Santa Cruz in the Valle de San Luis. Chief Cuanil was one of the leaders of the attack against the mission in 1775.

Early researchers believed that the project area fell within the territory of the Yuman-speaking Ipai (Northern Diegueño) (Kroeber 1925; Heizer and Whipple 1971; Heizer 1978). More recent research, based on archaeological, ethnographic, ethnohistoric, and historic records, suggests that the San Diego River Valley was the boundary between the Northern Diegueño (Ipai) and the Southern Diegueño/Kumeyaay (Tipai) territories (Hedges 1975).

Phase I Monitoring Program

Previous testing had determined that the site was not eligible for the National Register or important under CEQA, however, the City of San Diego required monitoring during excavation for construction and Gallegos & Associates completed this work. Prior to construction excavation, pumps were placed around the perimeter of the building area to lower the level of groundwater. During drilling for pump placement, a large sandstone bowl containing burned bone, was recovered (Fig. 2). The bone was identified by Rose Tyson, San Diego Museum of Man, as not human and several fragments were submitted to Beta Analytic for radiocarbon analysis. Beta Analytic forwarded the bone fragments to a laboratory in Zurich, Switzerland for accelerated processing which produced a date of 805±50 years B.P. The bowl is very rounded with the rim, apparently deliberately broken prior to recovery, around the entire bowl. The inner bowl surface is highly polished and the exterior of the bowl is smooth and rounded by shaping. The symmetry and size of the bowl identify it as an unusual artifact for San Diego County.

Change in Site Status

During the monitoring program a large number of manos, complete metates, and intact fire hearths were identified. Radiocarbon dates were obtained from soil samples from three hearth features (1130±80 B.P. 1270±80 B.P., and 1760±90 B.P.). Based on the identification of intact features and radiocarbon dates, as well as, the recovery of a large number of artifacts during the monitoring program, the City of San Diego Planning Department changed the designation of CA-SDI-10148 from not eligible to the National Register to significant/important under City of San Diego and CEQA Guidelines. The change in site status to significant/important initiated several procedures. To protect the portion of CA-SDI-10148 adjacent to direct impact, the site surface was covered with up to one meter of fill soil. Site areas disturbed by construction included the South Influent Line, East Influent Line, two San Diego Gas & Electric pads, a portion of the East Driveway, the Flow Meter vault, the portion of the Force Main corridor within the Pump station area, two fence post locations, and the northeast corner of the study area.

Phase II Data Recovery Program

The Data Recovery program included the use of Ground Penetrating Radar and excavation of up to a 15 percent sample of each area to be impacted using hand excavated units and mechanical backhoe trenching. Given access limitations and time constraints, Ground Penetrating Radar was used only for the southeast portion of the study area. Anomalies identified were marked with spray paint, stakes, and flagging. Two of the six anomalies were investigated using 1x2 m units. The results of this investigation were inconclusive, with large quantities of pea gravel mixed with decaying plant roots in the 40 to 60 cm level and a sparse

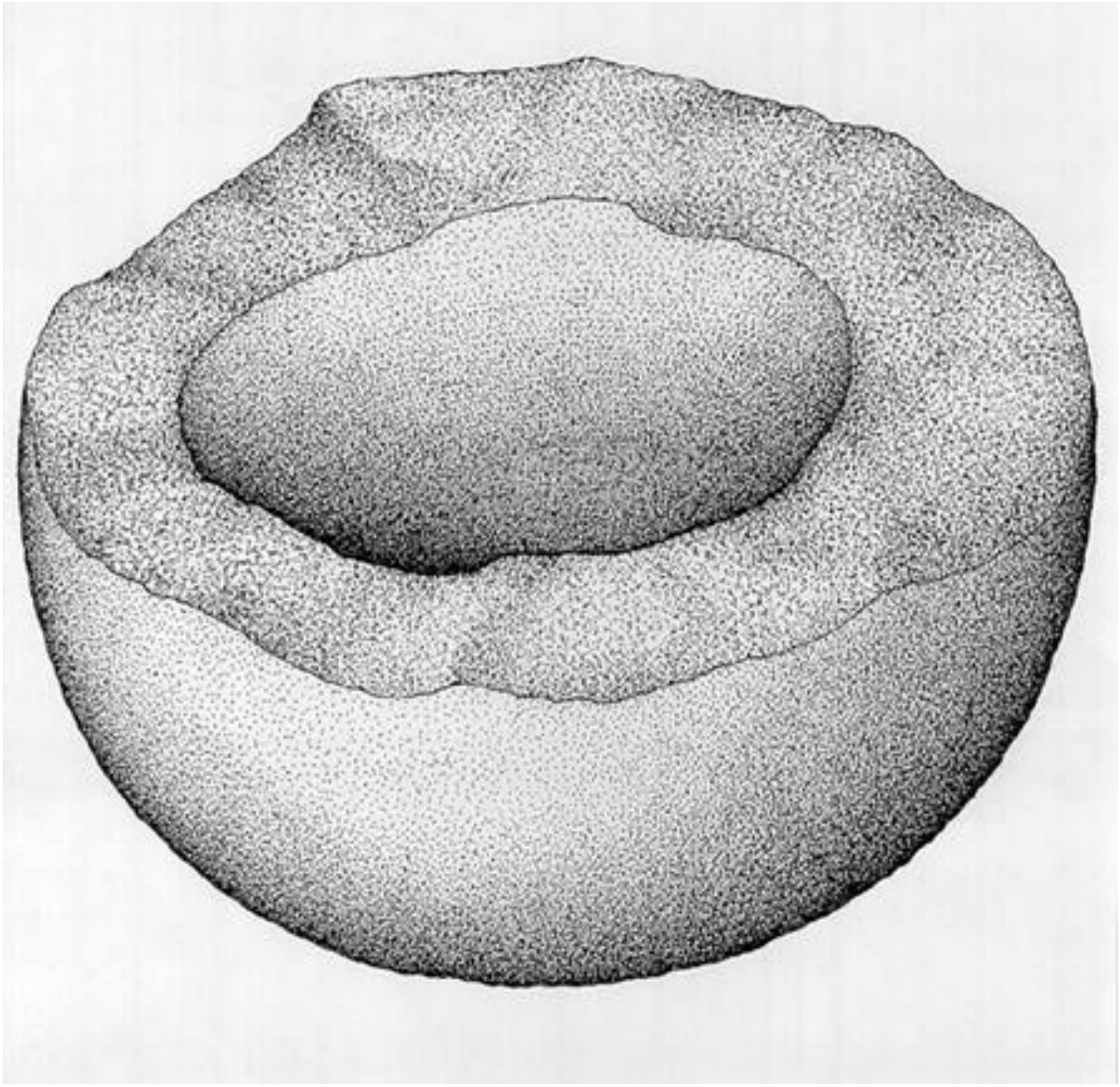

Fig. 3. Stone bowl from CA-SDI-10148-53 (approximately 7.75 inches across).

lithic scatter and a mano scattered across the 60 to 70 cm level. The second anomaly produced few artifacts and historic debris to 40 cm with no features.

Feature Excavation

Hand excavated units identified a feature in the northeastern portion of the study area. Upon completion of unit excavation a backhoe was used to carefully remove soil and expose the living floor. A 100 percent exposure and recovery of the living floor in each of these areas was completed, exposing approximately 300 sq. m. Radiocarbon dates were obtained from charcoal samples recovered below two hearths located within the living floor producing dates of 1590 and 2250 years B.P. One obsidian sample recovered from the feature was submitted for analysis and was identified as Obsidian Butte material with a 6.8 micron rim measurement. One pottery fragment was recovered from the site surface during an earlier testing program, however, no pottery was recovered during this study.

The southern portion of the living floor was disturbed/destroyed by the original excavation for the pump station. The feature extends north, outside the project area toward the San Diego River. This area, between the northern boundary of the study area and the river, had been slated for use as a biological mitigation area for the East Mission Gorge project. In order to determine the extent of the feature, two backhoe trenches were excavated perpendicular to each other. The trenches were excavated to subsurface sterile clay levels. Near the river the trench was shallow and sterile of cultural material. The trench stepped down gradually until it reached its deepest level, approximately 13 m south of the beginning point. The deepest area, over 5 m deep and 4 m long north/south, was filled with small river gravel, thereby identifying an old river channel. The trench then gradually stepped up from this old river channel to approximately 1 m from the present surface where the living floor feature was identified. The feature extended from this point, three meters south to the intersection with Trench B. Excavation of the two trenches identified the living floor feature approximately 28 m east/west by 16 m north/south (448 sq. m) outside the northeast corner of the study area.

Groundstone Analysis

Groundstone tools, defined for this study as artifacts shaped through use in tasks that include the use of stone against stone, include manos, metates, mano/pestles, and bowl/mortars. Artifact attributes used for this analysis include size, shape, condition (i.e., whole or fragmented), number of ground surfaces, presence/absence of battering, pecking, and fire alternation (fire-affected), and for metates depth of grinding surface. Measurements for whole groundstone tools are summarized on Table 1.

Two hundred and eighteen manos were recovered during this study. Of these, 64 are complete and 154 are fragments. One hundred and twenty-two manos, primarily fragments, are fire-affected, representing 56 percent of the collection. Two complete manos and 24 mano fragments complete enough for identification show unifacial use (17.51%), 108 show bifacial use (78.83%), 3 are trifacial (2.28%), and 2 are non-diagnostic (1.46%) (Table 2).

Table 1. Groundstone Tool Measurements*

	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
Manos				
Mean	117	95.8	60.1	971.5
Standard Deviation	20.52	16.3	13.7	445.6
Maximum	159.4	125.5	97.6	251.5
Minimum	56.1	51.6	25.3	63.2
Count	64	64	64	64
Metates				
Mean	503.9	334.5	119.2	31676.4
Standard Deviation	58.0	72.1	32	12317.28
Maximum	77.6	424.2	154.9	42638.4
Minimum	407.7	36.9	75.6	16329.6
Count	6	6	6	6
Manos/Pestles				
Mean	118.9	96.2	82.1	1404.5
Standard Deviation	40	10.2	13.7	668
Maximum	147.1	103.4	91.8	2876.8
Minimum	90.6	89	72.4	932.1
Count	2	2	2	2

*Complete Artifacts Only

Forty-nine of the bifacial manos are shaped. The majority of complete manos show battering on ends and/or sides. One hundred and eighteen of the manos are pecked on sides and/or faces. Four of the manos have asphaltum covering the majority of the mano, and one has asphaltum on the sides but not on the faces, indicating reuse of the tool after the use with asphaltum.

Table 2. Mano Shape

Outline Shape/Cross-section	Unifacial Cobble	Bifacial Cobble	Trifacial Cobble	Bifacial Shape	Trifacial Shape	Nondiag-nostic	Total	Percent
Irregular/irregul	1	2	0	0	0	0	3	2.16
Irregular/oval	0	3	0	0	0	0	3	2.16
Irregular/round-s	0	1	0	0	0	0	1	0.72
Oval/oval	0	17	0	8	1	0	26	18.71
Oval/rectangular	0	1	0	10	0	0	11	7.19
Oval/triangle	0	1	0	0	0	0	1	0.72
Oval/round	0	1	0	0	0	0	1	0.72
Oval/irregular	0	3	1	0	0	0	4	2.88
Rectangular/recta	0	0	0	3	0	0	3	2.16
Round/irregular	1	0	0	0	0	0	1	0.72
Round/oval	0	8	0	4	0	0	12	8.63
Round/round	0	0	0	1	0	0	1	0.72
Round/rectangular	0	0	0	4	0	0	4	2.88
Fragments	10	21	0	17	0	20	68	48.92
Total	12	58	1	47	1	20	139	100.00
Percent	8.63	41.73	0.72	33.81	0.72	14.39	100.00	

Six whole and 27 metate fragments were recovered during this study. All of the complete metates are unifacially ground. Two are small, shallow-basin slab metates and the remaining four are large, deep-basin block metates. An additional groundstone item recovered is the bowl described above.

The predominate lithic material for manos is granitic (97.69%), (n=135) with two of the manos manufactured from sandstone (Table 3). All but two of the metates are manufactured from granitic material. The two additional metates are sandstone. Additional sandstone artifacts recovered include the bowl and four amorphous sandstone melts recovered from the living floor feature. Based on their rounded shape, these artifacts are believed to be the remains of sandstone manos.

Lithic Analysis

The lithic collection recovered from the living floor consisted of large rough quartzite flaked artifacts, metavolcanic hammerstones, and large chunky quartzite debitage. Many of the tools appeared to be minimally worked or used. All of the tools (81) and debitage (446) recovered from the living floor were submitted to Flenniken et al. (1993) of Lithic Analysts for analysis. The living floor feature was located on sterile subsurface clay and capped by sediments deposited by flooding of the San Diego River. This type of a capped living floor is

rare in San Diego County, and the opportunity to analyze lithic tools and debitage from an intact, single component feature represented a unique opportunity. Lithic Analyst analysis included experimental simulations and ethnographic research.

This analysis determined that 519 of the 527 artifacts were associated with production, use, and rejuvenation of battered tools that were, in turn, used to sharpen or resharpen surfaces of manos and metates. The remaining eight artifacts, of fine grained materials, include one small core and seven flakes, and probably represent core reduction technology or trajectory. These artifacts were not considered in the analysis due to the small number and minor representation in the sample.

Three basic categories of identifying battered tools were used during this study: 1) Production Stage - those exhibiting characteristics indicative of manufacture but without evidence of subsequent use; 2) Rejuvenation Stage - rejuvenated/resharpened tools; and 3) Use Stage - artifacts exhibiting battered edges.

The majority of battered tools were identified as Use Stage with extensive edge damage on much of the surface topography and frequently with sharp edges. The study identified 56 complete and one incomplete Use Stage tools.

Rejuvenated or Resharpened Stage Tools generally do not have margin damage attributable to use, although a small remnant of battered edge damage is present on at least one area. This sequence is supported by the presence of negative flake scars produced during rejuvenation/resharpening. This analysis identified one incomplete and 17 complete tools with evidence of rejuvenation.

Experimental tool replication was completed by Lithic Analysts using rounded quartzite cobbles obtained from Snake River gravels in southeastern Washington. The experiments demonstrate that the use-life stage classification of debitage are not mutually exclusive to the stages for which they are named. Overlapping of classifications is characteristic of many technologies, but is exaggerated in expedient technologies where reduction is situational rather than regimented. The functional requirements of the tool are related to sharpness of the edge and size and durability of the stone rather than any particular shape of flake scar pattern.

Ethnographic Research

Ethnographic research from the American Southwest documented that ground stone tools, mainly manos and metates, were manufactured, sharpened, and resharpened with battered tools identical to those recovered from CA-SDI-10148. Zuni and Hopi informants told researchers that metates were maintained by degrees of coarseness: rough, medium, and fine and that this coarseness was controlled by pounding the surface of the metate and mano with a hammerstone. Metate resharpening was usually conducted every five days during times of hard use.

Summary

The data recovery program completed at CA-SDI-10148 identified a large living floor that dated between 1590 and 2250 years B.P. with the upper site strata dating circa 800 years B.P. Lithic analysis indicates that the living floor was a specialized activity site where food processing was the primary activity and that the upper or later site occupation was also focused on processing food resources. In addition to milling plant seeds, maintenance of the

milling tools (i.e., manos and metates) through the use of local quartzite, cobble based tools with a sharp edge was necessary. Recovery of obsidian from Obsidian Butte, chert, and serpentine indicates that trade and/or travel occurred both north along the coast and east to the desert. Site CA-SDI-10148 is probably associated with the large village complex located just west of the project site and adjacent to a major Native American trade route.

Acknowledgements

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