CULTURAL RESOURCES DATA RECOVERY PROGRAM FOR THE 230kV TRANSMISSION LINE RIGHTS-OF-WAY FROM SAN ONOFRE NUCLEAR GENERATING STATION TO BLACK STAR CANYON AND SANTIAGO SUBSTATION AND TO ENCINA AND MISSION VALLEY SUBSTATIONS

VOLUME I

CULTURAL RESOURCE REPORT

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MANAGEMENT SUMMARY

The Data Recovery Program has resulted in the collection of all surface cultural material susceptible to potential adverse impact at the following sites: SDi-6130, 6138, 6140, 6149, and Ora-438, 447, 495, 496, 498, 499, 725, 824, 825, 830, and 831. In addition, subsurface excavation was accomplished at Ora-438, resulting in a 0.25 percent sample of the area of potential adverse impact. Although this represents a very small sample, mitigation of adverse impacts has been effected through the strict utilization of a research design especially developed to maximize the research potential of the data gathered. Because of this, the recovered artifacts have not only been saved from impending adverse impact but will add significantly to our understanding of the pre-European history of San Diego and Orange counties.

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I. INTRODUCTION

A. Purpose of Study/Mandates

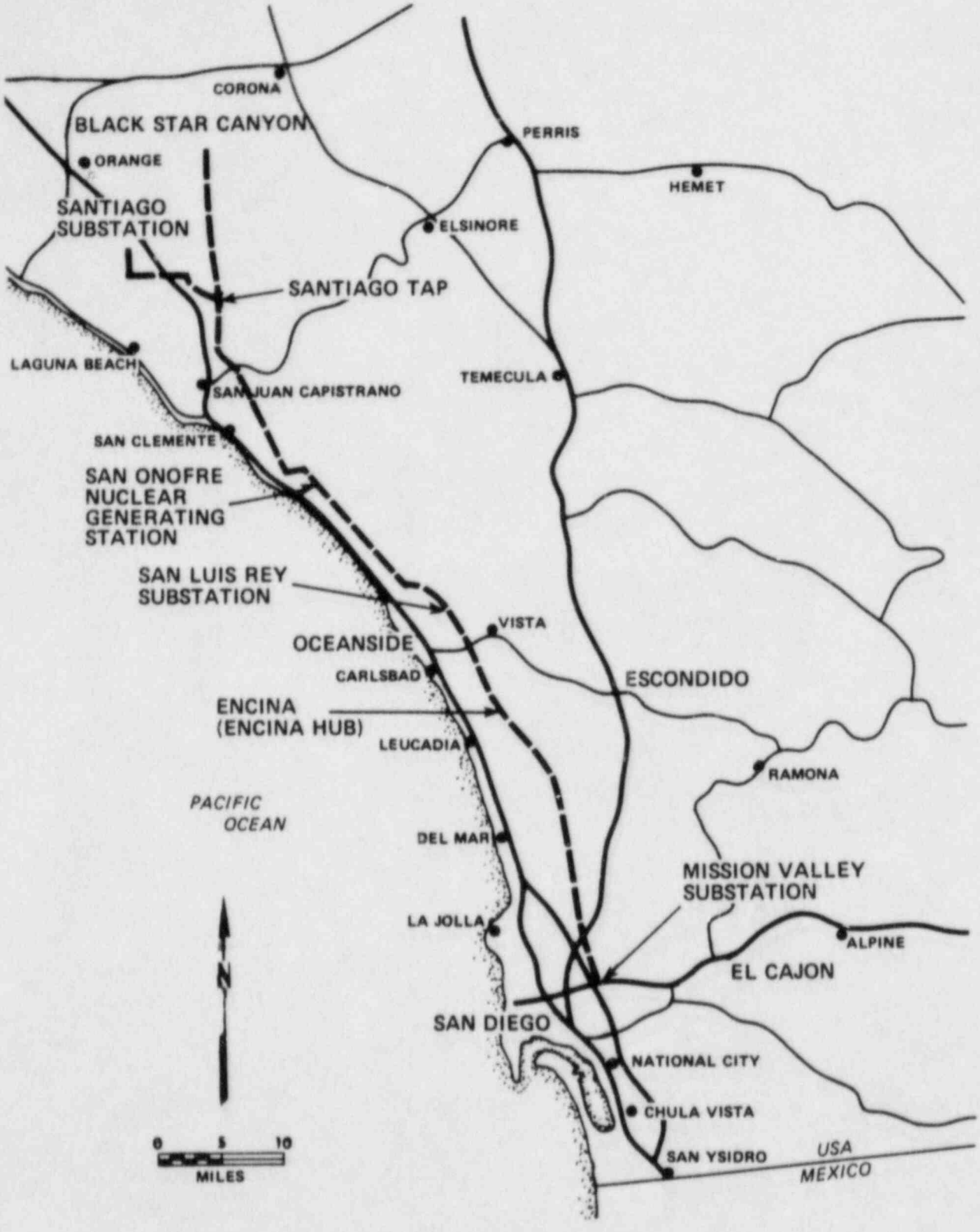
The following report and technical appendices detail and discuss the Data Recovery Program for certain archaeological sites located within the Southern California Edison (SCE) and San Diego Gas & Electric (SDG&E) 230 kV transmission line rights-of-way from San Onofre Nuclear Generating Station to Black Star Canyon and Santiago Substation and to Encina and Mission Valley Substation (Fig. 1). Archaeological sites that could receive potential adverse impacts (e.g., from vehicular traffic, etc.) and which have been determined eligible for inclusion on the National Register of Historic Places (McCoy and Phillips 1980) include 4(CA)-SDi-6130, 6138, 6140, 6149, and 4(CA)-Ora-438, 447, 495, 496, 498, 499, 725, 824, 825, 830, and 831.

Pursuant to Section 106 of the Historic Preservation Act and 36 CFR Part 800, and in accordance with the Advisory Council's Supplementary Guidelines for Treatment of Archaeological Properties, a Research Proposal was developed by Cultural Systems Research, Inc. (CSRI 1981) to fully utilize the research potential of the data gathered. In compliance with the Research Proposal, the Data Recovery Program entailed the collection of all surface cultural material on the access roads located on or adjacent to the above-mentioned sites, and, additionally, the collection of subsurface cultural material adjacent to the access road traversing archaeological site Ora-438.

B. Project Characteristics

Potential adverse effects (impacts) to cultural resources considered in this study primarily derive from the normal operation and maintenance of existing access roads and/or stub roads located within the transmission line rights-of-way. The effects of these activities, along with potential adverse impacts resulting from erosional processes accelerated by existing access/stub roads, are described separately for each site in Section VI.

A majority of the existing access roads found along the SCE and SDG&E rights-of-way corridors are privately owned or were previously constructed for an older existing right-of-way, and have been in use for many years. As a result, the artifacts first located on the access roads (McCoy and Phillips 1980) have most likely sustained cumulative impacts from the time of initial construction and use of the roads.



LOCATION OF PROJECT REGION

FIGURE 1

C. Project Setting

The Orange County archaeological sites included in this study are located in the foothills of the Peninsular Range just inland from San Juan Capistrano and El Toro. The terrain consists of fairly steep-sided canyons and narrow drainage valleys and ridges, with vegetative communities varying from Southern California Grassland through Coastal Sage Scrub to Riparian Woodland. The hills and valleys are crossed by numerous dirt roads deriving from farming/ranching activities and from transmission line access. Although some surface disturbance has occurred from use of these roads, by far the most pronounced alteration of the landscape has come from intense agricultural activities in the general area. Despite this, native flora and fauna are still well represented in numerous canyons and ravines.

The San Diego County sites dealt with in the current study are relatively close to the coast and occur in an area topographically characterized by headlands, lagoons, sloughs, and marine terraces. Much of the area has been extremely disturbed by highways and residential development and is lacking in native biota. Coastal Salt Marsh and Southern California Grassland communities are strictly limited to the canyons and lagoon areas.

D. Previous Program Studies

During the previous National Register assessment (McCoy and Phillips 1980), all surface artifacts on the access/stub roads were located, identified and micromapped (artifacts were not collected). Limited subsurface testing was conducted at all the sites investigated. With the exception of Ora-438, no indication of subsurface material was found in areas of potential adverse impact. In all cases, the major portions of the sites investigated were preserved *in situ* through avoidance by the project.

E. Current Program Objectives

The Data Recovery Program was designed as a multi-phased, multi-level investigation primarily focused on answering a series of research questions previously outlined in the Research Proposal (CSRI 1981). Phase I entailed a thorough review of pertinent literature which included previous fieldwork reports, published articles in professional journals, and unpublished research materials. These data were primarily sought to evaluate the research potential of the area and to generate research objectives directly related to the sites investigated. Phase II involved the actual field

investigation of the 15 sites and consisted of surface and subsurface collection of material susceptible to potential adverse impact. Data recovery field methods were designed to maximize the retrieval of useful information and directed at providing answers to the various research questions. Phase III was the last portion of the Data Recovery Program and comprised laboratory analysis, ancillary studies, data interpretation, compilation and manipulation, and report composition. The Research Design (Section V) dictated all analytic techniques and approaches to data analysis.

All data concerning actual archaeological site locations or information that would allow sites to be exposed to or to be possibly disturbed by the general public have been kept separate from this volume as Confidential Technical Appendices.

II. PREVIOUS RESEARCH

A. Introduction

Compilation of previous research data was accomplished by a careful and thorough review of site record forms, previous reports, professional journals, and assorted monographs. Analysis focused on 1) defining site function, 2) defining the chronology of each site identified within the overall area, and 3) providing baseline data for a tentative reconstruction of settlement-subsistence patterns for the area. It was felt that this type of review would enhance the data base for the present analysis by placing the currently investigated sites within a meaningful regional context.

B. Site Function

Sites recorded within and adjacent to the study area were categorized according to function using a taxonomic model developed by Binford and Binford (1966). Briefly stated, activities of prehistoric people are perceived as representing either maintenance tasks or extractive tasks. According to the Binfords, maintenance tasks are "activities related to the preparation and distribution of subsistence goods already on hand and to the processing of on-hand raw material in the production of a base camp whose archaeological assemblage reflects preparation and consumption of food as well as the manufacture of tools for use in other locations." In contrast, extractive tasks are "those that center around the direct procurement of subsistence items or raw materials to be used in the manufacturing of artifacts" (Binford and Binford 1966:238-295). Extractive tasks are definitive of work camps.

Review of pertinent literature coupled with site type criteria established for the current study indicates that of 61 archaeological sites sampled for Orange County, 47 (77 percent) appear to be solely extractive in nature, while 7 (11.5 percent) represent maintenance areas. Furthermore, at most sites more than one kind of extractive task appears to have been carried out. For example, evidence of lithic activity (tool maintenance, core reduction, etc.) and of milling (manos, pestles, metates) was recorded at 36 sites. These kinds of activity account for 67.9 percent of the total sample (Table 1). These percentages reflect the more inland orientation of sites assessed for the current study in Orange County. San Diego sample site type distribution is consistent with the relative proximity of sites to lagoon resources and the resulting extractive exploitation of these resource areas.

TABLE 1
ORANGE COUNTY SITE TYPES
WITHIN 1 MILE RADIUS OF ASSESSED AREAS

61 sites recorded, of which:	Number of Sites	Percentage of Sites
Extractive only	47	77.0
Maintenance only	7	11.5
Undetermined only	0	0
Multiple activity sites:		
Extractive/cairns	4	6.6
Extractive/quarry	2	3.3
Maintenance/cairns	1	1.6
	61	100.0
Extractive sites:		
Lithics	8	15.1
Milling	4	7.5
Shellfish	0	0
Lithics/milling	36	67.9
Lithics/shellfish	3	5.7
Lithics/milling/shellfish	2	3.8
	53	100.0

TABLE 2
SAN DIEGO COUNTY SITE TYPES
WITHIN 1 MILE RADIUS OF ASSESSED AREAS

57 sites recorded, of which:	Number of Sites	Percentage of Sites
Extractive only	30	52.6
Maintenance only	21	36.8
Undetermined only	5	8.8
Multiple activity sites:		
Extractive/cairns	0	0
Extractive/quarry	1	1.8
Maintenance/cairns	0	0
	57	100.0
Extractive sites:		
Lithics	9	29.0
Milling	1	3.2
Shellfish	7	22.6
Lithics/milling	4	12.9
Lithics/shellfish	3	9.7
Lithics/milling/shellfish	7	22.6
	31	100.0

Fifty-seven sites are included within the sample universe, of which 30 (53.5 percent) are extractive. Maintenance sites numbered 21, accounting for 37.5 percent of the total. Analysis of extractive site types for San Diego verifies the frequent occurrence of shellfish remains. Seven archaeological sites (22.6 percent) have been recorded as consisting only of shell. Furthermore, shellfish occur with lithics at three sites (9.7 percent), or with lithics and milling at another seven locales (22.6 percent). Interestingly enough, shellfish in association with only milling artifacts have not yet been reported. Overall extractive locales which contain shellfish debris account for 54.9 percent of the total San Diego sample (Table 2).

C. Cultural Affiliation

Specific cultural affinities (as recorded) have been assigned temporal divisions as developed by Warren (1968); for a detailed discussion, see Section III. Regional cultural sequences consistent with the Warren hypothesis include the San Dieguito, Encinitas, Campbell, and Shoshonean/Yuman periods. Attempts to use raw data to determine specific site cultural affinity with certainty have not been successful at the present level of investigation. A majority of archaeological sites (Table 3) have been assigned to the Encinitas and/or Campbell tradition (circa 7500 to 1000 years before present). The most reliable data on how people used artifacts have been extracted from ethnographic information pertaining to missionized Native American groups. While obviously relevant, these data are susceptible to interpretive error and may be limited in temporal application.

D. Settlement-Subsistence Patterns

A fundamental component of effective settlement analysis is the reliance upon the catchment area concept. Any archaeological camp or village has a catchment area around it encompassing all exploitable resources within a reasonable distance. As stated by Fagan, "the assumption is simple, the greater the distance of resources to a site, the less likelihood are such resources to be utilized" (1978:437). Studies by White (1963), Luomala (1963), Hudson (1971), and others contain statements regarding settlement distributions in relationship to various environmental assets. White (1963:116-117) noted that Luiseno rancherias included various types of terrain, so that people could travel on foot to the most important subsistence resources in approximately half a day. Thus foods were efficiently harvested,

TABLE 3

ORANGE COUNTY SITE CULTURAL AFFILIATION
(After Warren 1968)

Ora No.	SAN DIEGUITO	ENCINITAS	CAMPBELL	SHOSHONEAN/ YUMAN	UNKNOWN
438		x			
447		x	x		
495		x	x		
496		x	x		
498		x			
499		x	x		
725					x
824		x	x		
825					x
830			x	x	
831		x	x		

SAN DIEGO COUNTY SITE CULTURAL AFFILIATION
(After Warren 1968)

Ora No.	SAN DIEGUITO	ENCINITAS	CAMPBELL	SHOSHONEAN/ YUMAN	UNKNOWN
6130	x	x		x	
6138	x	x		x	
6140		x			
6149	x	x		x	

and village territory could be effectively defended.

Diegueno seasonal movements and settlement have been researched by Luomala, who states "Each group moved seasonally within a familiar and restricted habitat" (1963:246). Luomala describes the assembly of many kindred at a common campsite to exploit the seasonally available foods in a particular area. Thus, while they used a particular rancheria as a primary home base, multiple other residences (camps) were used during various seasons of the year.

Hudson's analysis of proto-Gabrielino territorial organization identified three distinct patterns of settlement for 1) sheltered coasts and adjacent inland prairies, 2) exposed coasts and adjacent inland prairies, and 3) interior mountains. Hudson speculated that within each area a social organization based on the clan or multiple clans inhabited primary subsistence villages or rancherias and formed smaller family units to exploit adjacent areas (1971:69). He concluded that a determining factor in primary subsistence village location, in contrast to gathering locales, rested upon the spacing of environmental (micro) niches. Where niches occurred in proximity, thus providing a wide range of exploitable resources throughout most seasons, semi-sedentary exploitation patterns resulted (1971:70).

Preliminary analysis (Section II) indicates that site distribution within the current study area is consistent with settlement hypotheses as developed by White (1963), Luomala (1963), Hudson, (1971), and others. Generally, the data gathered during the course of this study suggest a mobile populace, which maintained semi-permanent residences in regions offering a wide range of seasonally exploitable resources. Obviously, a complex set of variables which cannot be isolated at the present level of investigation affected settlement factors over a long period of time. There are numerous variables which can be isolated and elucidated upon by using data from a literature review (Section III).

In San Diego County, extractive sites (work camps) are usually near maintenance (base camp) locations, though ratios (as recorded) vary from area to area. For example, coastal/lagoon oriented areas have more base camps than extractive sites. In contrast, there are fewer base camps than extractive locales situated in Orange County, specifically in the Aliso Creek Historic District (Ora-438 and environs). Five base camps are recorded for this district, whereas 30 extractive locations have been reported.

Site clusters exhibit a random distribution, with no well defined patterning. The Batiquitos Lagoon district (SDi-6149) accounts for the highest percentage of recorded

archaeological sites within the San Diego segment. Twelve base camps have been reported in the area. In addition, 22 extractive sites are recorded in the vicinity. Batiquitos maintenance camps (as recorded) are extensive in area and suggest intensive occupation spanning several cultural phases. This pattern is also recorded for Agua Hedionda (SDi-6140) and the Buena Vista areas (SDi- 6138). An exception to this observation (for the San Diego study area) is SDi-6130 (San Dieguito region). Archaeological sites in the vicinity of this resource are consistent with site types recorded in the Orange County study area, thus reflecting inland oriented adaptive strategies. The presence of shellfish remains in inland locations suggests movement to and/or contact with coastal resource areas, although relative frequencies and distributions are quite limited. Continuing research into seasonal movement and exploitation patterns of southern California hunting/gathering societies should provide more conclusive evidence regarding this aspect of prehistoric social organization than is available for the current study.

III. RESEARCH DESIGN

The Data Recovery Program includes two sets of research objectives: one dealing with surface collection at SDi-6130, 6138, 6140, 6149, Ora-438, 447, 495, 496, 498, 499, 725, 824, 825, 830, and 831; and one concerned with subsurface excavation at Ora-438.

A. Surface Collection

Four research objectives were formulated to address the surface collection of the 15 sites listed above. These deal with site disturbance, chronology, site function, and sourcing of lithic material. Of the four, site disturbance has the greatest potential for yielding significant information for cultural resource management. The other research objectives may provide useful information pertaining to culture history and culture process.

1. Site Disturbance

a. Research Background

The destructive effects of vehicular traffic on archaeological material are well recognized by the archaeological community and substantially documented in literature pertaining to the subject (Wilshire and Nakata 1976; Iverson 1979; Iverson, Hinkley, Webb and Hallet 1981; and Sheridan 1978). Quantification of these destructive events has been attempted by some investigators (Lyneis, Weide, and von Till Warren 1980; Fuchs, Kaufman, and Ronen 1977), but further investigation and experimentation is clearly needed to provide for rational and effective management of cultural resources in the future. To meet this need, a research objective was formulated for the current project that deals on a broad level with the effects of vehicular impact on archaeological material.

Most of the access roads found along the SCE and SDG&E rights-of-way corridors are privately owned or were previously constructed for an older existing right-of-way, and have been in use for many years. As a result, the artifacts first located on the access roads (McCoy and Phillips 1980) represent material which may have sustained cumulative impacts from the time of initial construction of the roads. Major sources of impact have been from vehicle use and maintenance of the roads; however, erosion and other factors (e.g., pedestrian traffic) may have played a minor role in

affecting site integrity.

During the previous archaeological assessment (McCoy and Phillips 1980), all sites along the rights-of-way were relocated and micromapped according to surface artifacts (artifacts were not collected), natural landforms and manmade features. Subsequent to this, all sites were tested for subsurface content. With the exception of Ora-438, no indication of subsurface cultural material was found in the areas of potential adverse impact. In all cases, the major portions of the sites investigated were preserved in situ through avoidance by the project.

b. Research Questions

Because of this initial documentation and the other factors discussed above, an experiment on surface disturbance at these sites was relevant to the current Data Recovery Program. By resurveying and remapping artifactual material on and adjacent to the access roads, the degree of disturbance that had occurred within the past one and a half years could be ascertained. From the remapping and collection of artifactual material, the following questions were addressed:

1) How many of the same artifacts (those initially found on the access roads) are present in the impact areas?

2) How many of these artifacts display a different provenience from that originally recorded?

3) How many "new" artifacts (not originally found) are on the surface of the impact areas?

4) What is the distribution of the artifacts and how does it compare with the pattern seen from the original mapping?

5) Is there evidence of the type(s) of impact responsible for any observed disturbance of artifacts?

2. Chronology

a. Research Background

Warren (1968) has proposed four cultural traditions for the vicinity of the study area: San Dieguito (circa 8000 BC); Encinitas (circa 5500 BC); Campbell (circa 3000 BC); and Shoshone/Yuman (circa AD 700). The traditions are based

upon the occurrence of differing sets of cultural manifestations seen in archaeological assemblages through time as evidenced in Santa Barbara County. Although all four traditions are clearly seen in cultural materials in Santa Barbara, only three (San Dieguito, Encinitas and Shoshone/Yuman) have been definitely identified in the San Diego area. Warren feels that two factors prevented the Campbell tradition from developing in the San Diego area: 1) the intrusive hunting culture evident in the Santa Barbara-Ventura area during the Campbell period did not extend as far south as San Diego; and 2) the silting of lagoons and estuaries in the San Diego area during this time period discouraged a subsistence strategy based on a maritime economy (as seen in the Campbell tradition). Since Orange County is in a transitional zone between the Santa Barbara-Ventura and San Diego areas, it may have followed either the chronological sequence found in the San Diego area, or the sequence found further north.

It is obvious that using such a chronological scheme on surface assemblage is difficult to accomplish, especially in the absence of sensitive time markers such as projectile points, ceramics, or shell beads. Nevertheless, cultural complexes at surface sites seen within the project area can be tentatively identified by viewing the total surface assemblage in terms of relative time markers (such as mortars, obsidian tools, etc.). Impressions gained from such analysis, used in conjunction with comparative data derived from Warren's chronological outline for the area (Table 4) result in a justifiable chronological assignment for the surface sites under investigation. Table 4 also correlates Warren's terminology with terminology first presented by Wallace (1955), and with WESTEC terminology used by McCoy and Phillips (1980:23-24).

b. Research Questions

1) What and how many chronological components are present at each site?

2) Does the Campbell tradition occur at any of the sites investigated? The presence of the Campbell tradition at any one of the sites would carry various ecological implications (see above) for the general area, and would generate additional questions dealing with environmental changes and human response to them.

TABLE 4
CULTURAL AFFILIATION AND ASSOCIATED ARTIFACT CHARACTERISTICS

HORIZON Wallace 1955 (McCoy and Phillips 1980)	TRADITION Warren 1968	DATES	ARTIFACT CHARACTERISTICS
Late Horizon (Late Milling)	SHOSHONEAN/ YUMAN	700 AD to contact	1. Pottery 2. Small triangular points 3. Mortar and pestle as well as millingstones 4. Artifact assemblage similar to Encinitas tradition with the exception of the above 3 items
Intermediate Horizon (Early Milling)	CAMPBELL	3000 BC to 700 AD	1. Side-notched, stemmed, to lanceolate or leaf-shaped points 2. Larger knives and wide variety of flake scrapers 3. Drill-like implements 4. First appearance of basket-hoppers, mortars, stone bowls 5. New types of shell, bone, and stone ornaments 6. Few millingstones
Milling Stone (Early Milling)	ENCINITAS	5580 to 3000 BC	1. Crude flaked stone tools 2. Percussion flaked tools from macrocrystalline rock 3. Crude chopping and scraping tools, hammerstones 4. Projectile points rare, crudely made and large 5. Large numbers of manos and millingstones 6. Doughnut stones, cog stones and discs 7. Shell and bone artifacts are rare 8. Basketry inferred from tarring pebbles

TABLE 4 (continued)
CULTURAL AFFILIATION AND ASSOCIATED ARTIFACT CHARACTERISTICS

HORIZON	TRADITION	DATES	ARTIFACT CHARACTERISTICS
Early Man (Paleo-Indian)	SAN DIEGUITO	7080 to 5670 BC	1. Wide range of scraper types, percussion and side struck flakes 2. Leaf-shaped knives, large points of all varieties 3. Stone crescents 4. Hammerstones and crudely flaked tools, few in number 5. No manos or millingstones

3. Site Function

a. Research Background

A major portion of the sites dealt with in this study represent what has been referred to in the literature as limited activity sites (Dillehay 1973) or task specific sites (Gould 1980:195-199). Defined as a small surface assemblage which reflects short term use and limited activity, this particular site type includes kill and butchering locations, quarry/workshop locations, burial locations, short term hunting and gathering camps, fishing locations and pictograph locations. Dillehay (1973) and others (Talmadge and Chesler 1977; Gould 1980) have aptly demonstrated that investigating small archaeological sites such as these can significantly contribute to a variety of research interests, including those dealing with procurement activities, sociopolitical systems, trade, warfare, and population size.

Determination of site function, which is relatively easy to discern at limited activity sites, is basic, and perhaps mandatory to the elucidation of these particular research concerns. Due to the limited scope of the present investigation, a research design with regional implications is not cogent or practical. Nevertheless, it is within the scope of this study to determine the function of each of the sites investigated, thereby providing baseline data for the reconstruction of settlement-subsistence patterns and other pertinent research designs dealing with cultural dynamics on a regional basis.

b. Research Questions

1) How does the function of each site, as determined by the current investigation's analysis of the recovered material (e.g., lithic tool studies, ecofactual analysis, etc.), compare with results gained from previous studies?

2) Is the determined function of the site compatible with ambient environmental factors documented for the sites (e.g., are bedrock mortars present in an area with abundant oak trees)? If it is not

compatible, what could be offered to explain the apparent anomaly?

3) What is the predominant site type observed during the current investigation? How do these observations compare numerically with those seen during the WESTEC assessment (McCoy and Phillips 1980)?

4. Sourcing of Lithic Material

1. Research Background

Sourcing of the raw material used to manufacture lithic artifacts was an important aspect of the current investigation. It was felt that the identification of localized sources (i.e., quarries) could provide useful information dealing with the socioeconomics of lithic resource procurement and distribution. As shown by Fitting and Stone (1969) and Gould (1980:121-137), the identification of localized sources can be valuable when attempting to explain lithic material frequency and utilization modes at related archaeological sites. They aptly demonstrate that without adequate sourcing data, spurious interpretations of site function or chronology can occur.

b. Research Questions

1) What is the source of the lithic material at each of the sites investigated? If material is not locally represented (e.g., in nearby streambeds), are data available to determine a non-local source?

2) What is the predominant lithic material type? Can anomalies observed with material frequency and source (e.g., predominant material not locally available) be explained?

3) If exotic material types are found, can trade networks and interaction spheres be reconstructed?

4) Are obsidian artifacts present? If found, these can be sourced to provide information pertinent to question (3) and tentatively dated to enhance chronological assignment of the sites involved.

B. Subsurface Excavation

The excavation of Ora-438 entailed the testing of a multi-level research design encompassing a series of questions dealing with chronology, function and exchange systems. Each of these research domains is discussed below.

1. Chronology

a. Research Background

Ora-438 was originally identified as a single component site dating from the "Millingstone Horizon" (Crabtree et al. 1973). Although subsequent observations (McCoy and Phillips 1980) have substantiated further these initial findings, a recent review of site data has suggested that more than one component was present at the site. As with the previous investigation, an early component (Encinitas?) was readily identifiable and well represented in the site's large milling stone/scraper-plane/chopper assemblage. However, in contrast to previous interpretations, it appeared highly probable that the numerous chert artifacts and one obsidian projectile point reflected an additional and subsequent occupation of the site.

To evaluate this possibility, surface and subsurface excavation was directed at obtaining radiometric and obsidian hydration dates and recovering diagnostic artifactual material such as projectile points, mortars, pestles, and ceramics, all of which are considered to be the time markers tor post-Encinitas occupation.

b. Research Questions

1) Using the chronological indicators outlined by Warren (1968), does Ora-438 contain two or more distinct artifact assemblages? The presence of later period projectile points (e.g., Cottonwood series), mortars, pestles, and ceramics strongly suggests an additional and subsequent occupation of the site.

2) Does the site in any manner contain assemblages associated with the Campbell tradition (e.g., large side-notched projectile points?) How would this relate to the assumed ecological and cultural changes (Section IIIA) outlined for the northern counties (Ventura and Santa Barbara)?

2. Function

a. Research Background

Site Ora-438 was designated by Crabtree et al., Cooley and Fenenga (1973) and McCoy and Phillips (1980) as a possible village site. Given the quantity and range of artifacts present, the site may be a village with a series of specialized activity areas. If this is the case, site function and intrasite variability can be best understood by identifying, mapping and analyzing all activity areas (surface and subsurface recovery and analysis of any ecofactual material, i.e., pollen, seeds, and faunal material), conducting lithic analyses geared to discern function, and comprehensively reconstructing the paleoenvironment.

b. Research Questions

1) Is Ora-438 a series of limited activity areas devoted to a narrow range of resource procurement, or is it a full-fledged maintenance camp possessing a wide range of resource procurement and utilization artifacts?

2) Was the site occupied continuously throughout the year or was it seasonally utilized? If it is a seasonal site, during what part of the year was it occupied?

3) Did site function change through time? The presence of two or more chronological components strongly suggests diachronic functional change.

4) Does vertical or horizontal stratification occur at the site? What type of synchronic and diachronic interpretation can be formed from any observed stratification (e.g., horizontal stratification could indicate social ordering or class specialization areas)?

3. Exchange Systems

a. Research Background

The presence of obsidian, an exotic material type, suggests that trade in this area may have been occurring any time after 2000 BC (Singer and Ericson 1977:186). It is likely that trade networks were operative in California at least by that date, and probably were organized along lines of kinship and socioeconomic obligations (Davis 1974:4).

Sourcing and dating obsidian from Ora-438 will contribute to the better understanding of the mechanisms involved in exchange systems within southern California.

2. Research Questions

1) Is the obisidian source part of an interaction sphere previously documented by researchers working in the area? If not, does the material represent an idiosyncratic item not part of a viable prehistoric exchange system?

2) If recovered obsidian items are felt to have functioned within an exchange system, what indigenous resources were used as trade items?

3) What is the date(s) of the obsidian recovered from the site? Is the date(s) of the material consistent with the assumed age of the archaeological assemblage(s) present?

IV. METHODS

A. Introduction

All phases of the Data Recovery Program were completed by trained personnel and consultants under direct professional supervision. Fieldwork was accomplished during an eight hour workday beginning with daily personnel meetings held prior to implementation of fieldwork at each site location to explain investigative techniques and coordinate logistical matters.

Specific tasks performed for the Data Recovery Program were assigned to individual CSRI crew persons throughout the field investigation to ensure consistency and efficiency of data recovery.

B. Fieldwork Procedures

Surface Collection:

The surface collection of cultural material at the sites listed above was conducted in three phases: 1) resurvey and flagging of artifacts in areas subject to potential adverse impact; 2) micromapping of all flagged material; and 3) systematic surface collection of flagged artifacts. Resurvey was accomplished by walking parallel transects approximately two yards (two m) apart across areas of potential impact. Flakes, debitage, tools, and significant topographic features were flagged during the survey. Features of the existing environment were photographed and recorded during this phase (with particular emphasis on areas of disturbance). All flagged items were micromapped using a standard engineer's transit which was stationed at datums originally used during the McCoy and Phillips (1980) assessment. Each micromapped artifact was given a field number that was lettered on masking tape and attached to the item. The item was then collected and placed in an appropriately labeled bag.

Excavation of Ora-438:

Prior to the systematic excavation of Ora-438, the merits of both probabilistic and non-probabilistic (purposeful) sampling strategies were considered. Of the two, probabilistic sampling was thought to be less appropriate in terms of methodological and theoretical considerations. Statistically, the sample size, which was by necessity limited to ten

1.2 yard by 1.2 yard (1 m by 1 m) units, was felt to be much too small (only 0.25 percent of the total area investigated) for a probabilistic sampling design; sample size, although dependent on many variables, should be at least 5 percent of the sampling universe to be representative (Hester et al. 1975: 294). It was also thought that a probabilistic sample might jeopardize the objectives of the research design (Section III) by not providing adequate data to support some of its tenets. Basic to the intent of the research design was the need to concentrate excavation efforts in areas previously documented as containing activity loci and/or possessing high artifact density. As a probabilistic sample of only 0.25 percent would most assuredly miss these important areas, a purposeful sampling strategy appeared to be the most efficient means of obtaining all necessary data. As Read (1979:47) points out, "If models that relate archaeological data to the variables or concepts of interest are known...non-probabilistic or purposeful sampling may be the most efficient."

Using this approach, ten 1.2 yd. by 1.2 yd. (1 m by 1 m) excavation units were placed (Map D-5; Appendix D) within a 984 ft. by 39 ft. (300 m by 12 m) corridor, representing that area of the site susceptible to potential adverse impact from the proposed project. Selected units were manually excavated in arbitrary (non-stratified) 4 inch (10 cm) levels. Excavated soil was passed through one- eighth inch (.3 cm) mesh hardware cloth screening. Emphasis was placed on recovery of artifacts in situ and on the delineation of any subsurface cultural feature (e.g., artifact concentrations or rock clusters) as they appeared in the ground. It was necessary in one instance to enlarge a unit to expose the entire extent of a feature encountered within that unit. In situ artifact locations were triangulated and specifically identified on appropriate level forms. Other cultural debris not retrieved in situ but recovered in screening was bagged separately by level. Pick mattocks, axes, shovels, trowels, and whiskbrooms served as excavation tools. An excavation unit was deemed complete when dug to a depth where the soil appeared "sterile," i.e., where cultural material was absent. To negate the possibility of "capping" of cultural material from "sterile" overburden, a minimum of 12 inches (30 cm) of depth was excavated in all units. All positive units were required to have one "sterile" level before being considered complete.

Photographic documentation of each unit was conducted during all phases of the excavation. Photographs depicting each unit level, completed units and backfilled units were taken using 35 mm black and white film (125 ASA). Additional photographs wree taken using 35 mm black and white film (125 ASA). Additional photographs were taken when necessary to document any features, soil condition and other subsurface anomalies. Further test unit information was documented on

a series of record forms (Appendix A) giving information on a level by level basis.

C. Ancillary Studies

Two forms of dating were utilized to investigate chronological aspects of Ora-438: obsidian hydration and radiocarbon dating. The only obsidian specimen found at Ora-438 came from a surface context during a previous investigation of the site (Munoz 1977). Obtained from WESTEC, the specimen, a large leaf-shaped projectile point, was sent by CSRI to the Anthropology Department of the University of California at Davis for sourcing and dating. Carbon samples in the form of charcoal were obtained from Feature 1 at Ora-438 in Unit 6 at the 8 to 16 inch (20 to 40 cm) level. Charcoal was collected with a trowel rinsed in distilled water, wrapped in aluminum foil and placed in appropriately labeled level bags. Upon completion of the fieldwork, carbon samples totaling one gram in weight were sent to the Beta Analytic Lab, Coral Gables, Florida, for radiometric dating. Pollen samples were taken from each completed unit at 4 inch (10 cm) intervals corresponding to previously excavated unit levels. Prior to removal of these samples, the subject sidewall was scraped clean from the bottom of the unit upwards to reveal a non- contaminated soil face. Samples were then removed using a trowel rinsed in distilled water and placed in appropriately labeled pollen envelopes. Soil samples were taken from the two most productive units at Ora-438 (those units containing high amounts of cultural material). In Unit 6, all soil associated with Feature 1 was removed as one soil component, while in Unit 5 soil was removed in a 4 in. by 4 in. by 4 in. (10 cm by 10 cm by 10 cm) column from the north wall. All soil sample material was placed in appropriately labeled, reinforced level bags. All soil samples were then sent to a soil specialist for flotation of culturally related micro- materials (e.g., flakes, faunal remains, carbon, etc.).

D. Laboratory Procedures

All artifacts collected from the surface of the 15 sites and the subsurface materials from Ora-438 were washed, dried, and issued consecutive catalog numbers (either inked directly onto the item or on an attached label) at the CSRI laboratory. A complete description including material type, shape, artifact type (using the typology discussed in Section V), and any other distinguishing characteristics were entered on standardized catalog cards (Appendix B). Data from the catalog cards were also entered on master catalog sheets in sequential order and placed in binders for

safekeeping. Lithic analysis included edge angle measurements of all recognizable tools. Subsequent to this preliminary analysis, comparative studies of identifiable variables were conducted to determine whether or not significant relationships were present between such factors as material and artifact type, edge angle and artifact type, and inferred site function and artifact type. Line and bar graphs as well as cross tabulation assisted in this phase of the analysis.

All catalogued artifacts were placed in properly labeled boxes and stored at the CSRI laboratory in San Diego. This collection will remain at the CSRI facility until the ultimate disposition of the materials has been determined.

V. BACKGROUND DISCUSSION AND ANALYSIS OF ARTIFACT TYPES

The type concept, central to any artifact analysis, represents one of the most important analytic tools available to the archaeologist. For this reason, artifact taxonomy has received a great amount of attention from researchers in the last 50 years (see Deetz 1971). During this time, artifact type concepts have experienced a rapid evolution from simple descriptive schemes, as seen in the Classificatory-Descriptive period of American archaeology (Willey and Sabloff 1980:34-80) to effective theoretical schemes capable of answering questions of culture chronology, tool function and culture change and process.

A consequence of this theoretical evolution has been a proliferation of differing approaches which originates from varying methodological and theoretical biases. Generally, these approaches fall into four major categories: morphological, functional, temporal, and technological. Morphological typologies, the most basic form of classificatory scheme, focus on the explicit definition of morphological (i.e., formal) attributes. Although primarily descriptive in nature, this typology is often used in combination with other type constructs such as those having temporal or functional implications.

Functional type analysis is directed at discovering those attributes which are functionally related to the artifact's use and manufacture. During such an analysis, edge angles, weights, striations, flake scars and polish are analyzed in conjunction with data derived from ethnographic analogy and replicative experimentation to discover the aboriginal use of the tool.

Temporal classificatory schemes are used to establish a set of time markers or morphological types known to have a certain assigned temporal range. This approach was very popular during the first part of the century; however, due to the development of more accurate dating techniques, temporal typologies have decreased in use.

Technological analysis is directed toward the elucidation of the toolmaker's behavior by stressing the means of manufacture as evidenced on tools and debitage (Sheets 1975). Technological analysis is purported to limit presumptive constructs and provide insight to questions dealing with culture change and process.

For the present analysis, lithic artifacts will be typed using the typological system employed during the San Onofre National Register Assessment (McCoy and Phillips 1980). The

merits of using such a classificatory system for the current study are many. First, because of its previous use by several archaeologists working in the general area, its artifact types have been empirically tested and found to be categorically valid. Second, this typology is a combination of several different approaches, i.e., morphological, functional and temporal, and could be considered a multi-purpose classification, providing a basis for classifying a wide range of behavioral modes. Finally, the repeated use of this typology in previous reports makes inter-site comparisons more feasible.

Definitions on a type-by-type basis are provided in Appendix C to assist the reader in the assessment of each category. Included with these definitions are sections on possible errors in assignment to type category, hypothetical systemic function and the type's research value.

VI. DATA RECOVERY PROGRAM RESULTS

A. SDi-6130

1. Site Documentation

Previously recorded by: M. Rogers (1930).

Later recorded by: L. Eckhardt (1979a); McCoy and Phillips (1980).

Temporary/other site designations: "Stone Crusher Site," SDM-W-185.

2. Site Location

Situated on a small knoll within a lemon grove, adjacent to and north of the San Dieguito River.

3. Previous Fieldwork

Surface cultural material: Rogers noted felsite flakes (or tools) and mano fragments. The site was subsequently described as containing several unifacial manos, various Tizon Brown Ware sherds and shellfish remains. McCoy and Phillips recorded a total of 397 artifacts on the surface during their National Register Assessment Program. Over 84 percent of this observed assemblage was in the waste production (cores, flakes and debitage) category. The remaining artifacts comprised hammer-pounders, manos, sidescrapers, and other unifacial flaked tools. They also observed shellfish remains (Chione sp. and Pecten sp.) on the surface.

Most of the lithic material observed during the WESTEC assessment was felsite and basalt. Jasper, quartzite, chert, andesite, and rhyolite also occurred but in very small amounts (less than 2 percent). Almost all artifactual material exhibited some degree of patination, ranging from moderate to heavy.

Subsurface cultural material: Investigation by McCoy and Phillips (1980) entailed the excavation of one test unit (3.3 by 3.3 ft. [1 by 1 m]) placed on the top of the knoll within an area previously cleared for cultivation. The 23 artifacts recovered from the unit resembled those observed on the surface. The greater portion of these artifacts were found at the 4 to 8 inch (10 to 20 cm) level. No shell or ceramics were found in a sub-surface context.

Current Field Investigation

Primarily because of its location within a lemon grove, archaeological site SDi-6130 has been subjected to intense agricultural activities. Although a minor factor, the construction and maintenance of an existing dirt access road has further compromised site integrity. These disturbances, although profound in their consequences, have not totally destroyed the archaeological potential of the site. As exemplified by the research design utilized in the current study, disturbed sites can be a viable source of significant and useful data.

Investigation by McCoy and Phillips (1980) determined that while subsurface cultural materials occurred in portions of the site, no subsurface cultural deposition was present in the area of potential impact (i.e., the access road). As a result, it was recommended by the SHPO that only surface data recovery be conducted within the access road.

Surface cultural material: Only one surface artifact, a large andesitic flake, was located and collected during the current resurvey of the access road. This artifact, which was first located and identified during the National Register Assessment Program (McCoy and Phillips 1980) showed no marked displacement from its initially documented provenience (see Maps D-1 and E-1 in Appendices D and E). The predominance of flakes, cores, and debitage on the site as a whole suggest that tool manufacturing was a major, although not exclusive, activity at the site (see Table 5).

Laboratory Analysis

Macroscopic examination revealed that the described flake possesses a convex edge exhibiting an angle of 33 degrees. According to recent lithic tool studies (Tainter 1980; Wilmsen 1968), edge angles ranging from 26 to 35 degrees fall within an acute mode commonly associated with cutting implements.

Research Design Application

Little information can be obtained from the recovery and analysis of one artifact. At best, only highly speculative statements can be made concerning site function, chronology

TABLE 5
(from McCoy and Phillips 1980:313)

SDi-6130
SURFACE ARTIFACTS

	Fragments	Total	Percent
Manos			
Unifacial, unshaped	2	6	1.5
Unifacial, shaped		1	0.3
Bifacial, unshaped	2	3	0.8
Bifacial, shaped	1	2	0.5
Non-diagnostic	2	2	0.5
Cores		23	5.8
Flakes		210	52.9
Debitage		99	24.9
Sidescrapers		8	2.0
Non-diagnostic unifaces		2	0.5
Choppers		3	0.8
Inverse chopper		1	0.3
Hammer-pounders		20	5.0
Composite tool		1	0.3
Retouched flakes		9	2.3
Ceramics		7	1.8
TOTAL:		397	100.2

and disturbance. In fact, it would be valueless to consider site function and chronology, since these deal with a wide range of intra-site variables, and demand substantial sample size to allow for even suggestive analyses.

Questions dealing with site disturbance, however, can be considered at this site. Although the sample size is small, there is some significance to the fact that the one artifact located on the access road was not disturbed in the last one and one-half years (see Maps D-1 and E-1 in Appendices D and E). During this time, the forms of disturbance related activities occurring on the road probably ranged from light vehicular and pedestrian traffic to minimal amounts of erosion from water and wind. Other more profound forms of disturbance, such as grading, were not evident on the access road, or for that matter in the overall site area. This relatively slight disturbance, when considered in conjunction with on-site erosional factors, i.e., erosion which is minimal because of low slope gradient (less that five percent), explains why artifact movement has not taken place in the last several months.

B. SDi-6138

1. Site Documentation

Previously recorded by: M. Rogers (1930s).

Later recorded by: WESTEC Services, Inc. (1978);
McCoy and Phillips (1980).

Temporary/other site designations: SDM-W-1780.

2. Site Location

The site is located on a north-south trending ridge, northeast of Buena Vista Lagoon. Most of the site is on the easten side of El Camino Real; a small portion in the northwest section extends west of the highway.

3. Previous Fieldwork

Surface cultural material: The site was first described as having a shell midden with Donax sp., Chione sp., Pecten sp., and salt-water gastropods. Five hearths with fire-cracked rocks were observed, as were three to four choppers, two hammer-pounders and manos. Soil was described as greasy black midden. During the National Register Assessment of the site (McCoy and Phillips 1980), 101 artifacts were

observed on the surface. Fifty percent of these represented waste production and included four cores, 11 pieces of debitage and 36 flakes. Artifacts within this category were primarily made of basalt and felsite. Groundstone artifacts included 14 manos, seven metate fragments and two non-diagnostic items, and represented 22.8 percent of the total artifact inventory. Chopping-pounding tools comprise 20.8 percent of the artifact inventory and included two basalt chopping tools and 19 hammer-pounder type tools. Cutting/scraping tools represented only 5 percent of the surface assemblage; two types of sidescrapers, two bifaces, and one blade comprise this category. In addition eight unidentified bone fragments were observed on the surface.

Subsurface cultural material: McCoy and Phillips (1980) excavated two units (3.3 by 3.3 ft. [1 by 1 m]) to assess the site for potential eligibility for inclusion on the National Register. Unit 1 was placed just east of the access road and was found to contain cultural material in the first three levels (0 to 12 inches [0 to 30 cm]). Besides artifactual material, shellfish remains were recovered representing three genera; Donax sp., Aequipecten sp. and Chione sp. Unit 2 was placed adjacent to the SDG&E transmission line tower and produced negative results. Pollen samples taken during this investigation showed that climatic conditions were similar to present day regimes. Common species found in the pollen record were Asteraceae (sunflower), Poaceae (grass family), Chenopodiaceae (goosefoot weeds), and Pinaceae (pine family).

Current Field Investigation

At present, the site exists on the east side of El Camino Real within a narrow strip of open land bordered on the east by a deep unnamed canyon and to the west by an apartment house, parking lots and office buildings. Originally, this highly disturbed site may have been appreciably larger, possibly extending a great distance to the north and west of its present location. According to Harvey (1974:152), the locale contained a large Luiseno village site that continued to be occupied after the American conquest.

Thirty-three items were micromapped and collected from the proposed access road area within the site's boundaries. Flakes comprised 30.3 percent of the collection and represented the predominant artifact type (Table 6). Groundstone was second in frequency, accounting for 23.3 percent of the material collected. During the WESTEC assessment, similar percentages were observed, suggesting that the present inventory is representative of the total surface assemblage.

Laboratory Analysis

Edge angle measurements conducted on artifacts displaying use or retouch revealed a predominance of angles in the 45 to 90 degree range (Table 7). The data gathered by Tainter (1979:463-471) on lithic scatters in central New Mexico show that edge angles exceeding 46 degrees fall in a range functionally associated with tools commonly found at vegetal food gathering/processing camps (Tainter 1979:465).

Research Design Application

Site Activity/Function

The range of edge angle, taken with the high predominance of grinding artifacts, suggests that plant food gathering and processing was a major activity within this portion of the site. If this was the site of a large Luiseno village in the eighteenth and nineteenth centuries, the vestigial strip investigated here would constitute a specialized activity area primarily devoted to the processing of plant foods.

Chronology

In addition to the later component, documented to some extent by ethnohistorical accounts, an earlier occupation (suggested by the presence of numerous manos and metates) may have occurred; however, in the absence of chronometric dating and diagnostic artifacts, its presence must remain speculative.

Site Disturbance

Because of the elongated nature of the project area (Map E-2 in Appendix E) and the presence of a large parking lot in its middle portion, artifact micromapping was conducted separately within two distinct sections, designated A and B. The micromapping demonstrated an increase in the number of of artifacts from 8 to 23 in Section A, and a redistribution of artifacts in both sections in comparison with what had been mapped in the assessment phase (McCoy and Phillips 1980). See maps D-2 and E-2 in Appendices D and E.

TABLE 6

SDi-6138
SURFACE ARTIFACTS
(Adapted from McCoy and Phillips 1980:268)

ARTIFACT TYPE	NUMBER	PERCENT
MANOS		
Unifacial, unshaped	2	6.1
Bifacial, unshaped	5	15.2
CORES	2	6.1
FLAKES	10	30.3
DEBITAGE	5	15.1
HAMMER-POUNDERS	4	12.1
RETOUCHED FLAKES	3	9.1
COMPOSITE	1	3.0
UTILIZED FLAKES	1	3.0
TOTAL	33	100.0

TABLE 7

SDi-6138
TOOL EDGE ANGLE

ANGLE	Number	Percent
45°	1	11.1
55°	1	11.1
60°	1	11.1
75°	1	11.1
80°	1	11.1
90°	1	11.1
95°	2	22.2
100°	1	11.1
TOTAL	9	99.9

$\bar{X}$ = 77.2
SD = 19.9

Two types of disturbance have occurred on the access road and tower sites: 1) vehicular traffic and 2) road grading. Road grading has had the more severe impact on cultural material. During the current study, evidence of significant recent grading was observed on the access road (Photograph 1). The grading appears to have reached as deep as 10 inches (25 cm). This much earth moving has apparently brought the additional artifacts to the surface in Section A, and has redistributed artifacts in both sections. It is pertinent that when a test unit in this general site area was excavated, artifacts were recovered to a depth of 12 inches (30 cm) (WESTEC 1980). Thus the road grading that has occurred would not have exceeded the maximum depth of the cultural deposit, and could have exposed additional items.

It is worthy of note in this respect that a previously unrecorded isolated midden pocket (Photograph 2) within the northern segment of the access road was identified in the current study. It is possible that some of the "new" artifacts on the access road have originated from this deposit.

C. SDi-6140

1. Site Documentation

Previously recorded by: M. Rogers (1930a).

Later recorded by: L. Eckhardt (1979a, 1979b).

Temporary/other site designation: SDM-W-1782.

2. Site Location

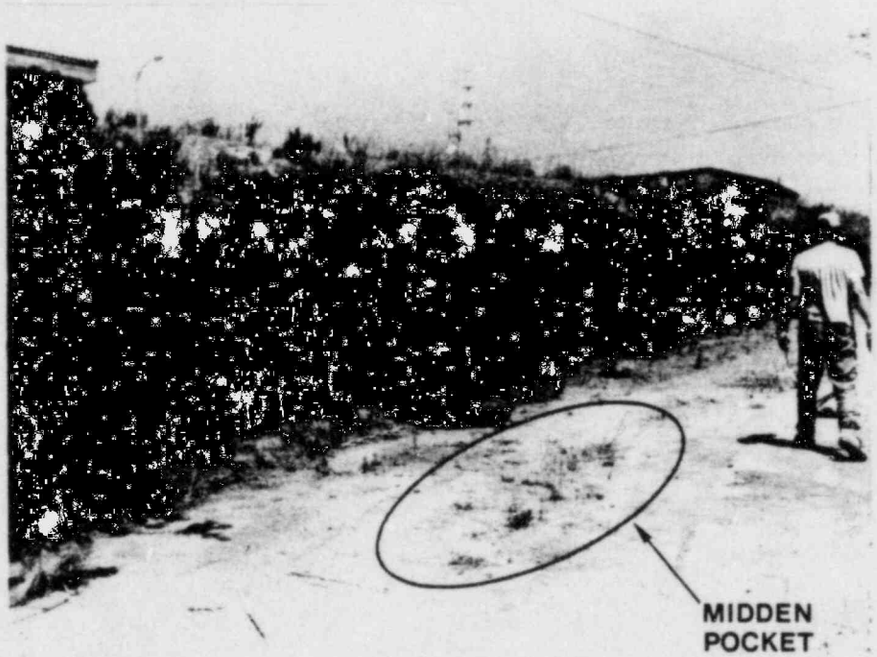
Site is situated on a small knoll, adjacent to and north of Agua Hedionda Lagoon.

3. Previous Fieldwork

Surface cultural material: The site was initially described as a shell midden with chopping and pounding tools, flakes and fire-cracked rock. The most prevalent tools observed

GRADING AT SDI-6138

PHOTO
1



PREVIOUSLY UNRECORDED ISOLATED MIDDEN POCKET AT SDI-6138

PHOTO 2

have been chopping tools, a bifacial mano, flakes, and a hammer-pounder; fire-cracked rock; shellfish remains (Chione sp. and Aequipecten sp.) were also noted (McCoy and Phillips 1980)

.

A total of 35 artifacts was micromapped on the surface of the site during the National Register Assessment. Cores, debitage and flakes accounted for 85.7 percent of the assemblage. Most of this material was manufactured from basalt (23 examples). The remaining portion of the assemblage comprised artifacts suggestive of hammer-pounding and grinding activities. Felsite and basalt were the common material types for these artifacts. A burnt bone was also observed on the surface.

Subsurface cultural material: To investigate the horizontal and vertical limits of the site and to provide baseline data for National Register Assessment, two units were excavated by McCoy and Phillips (1980). Unit 1 was placed 49 feet (15 m) east of the access road and 49 feet (15 m) west of an abandoned unimproved road. The unit, which was excavated to 28 inches (70 cm), yielded six artifacts. Most of these were found in the first three levels, accounting for five out of the six artifacts recovered. With the possible exception of bird bone found at the 31 to 35 inch (80 to 90 cm) level, no culturally related material was found after the 16 to 20 inch (40 to 50 cm) level. Unit 2, which was located in the access road, was excavated to 16 inches (40 cm). One flake, found in the 4 to 8 inch (10 to 20 cm) level, was the only artifact recovered in the unit. Throughout both units much shell, mostly Donax sp. and Chione sp., was encountered, suggesting that shellfish gathering was a major activity at the site. A radiocarbon date of 5815±110 BP (McCoy and Phillips 1980:281) places the site within the Milling Stone Horizon (Wallace 1955) and the Encinitas tradition (Warren 1968).

Current Field Investigation

Site SDi-6140 is located on a small knoll adjacent to and north of Agua Hedionda Slough. The knoll currently supports a low density groundcover of grasses and sedges. Besides agricultural activities, grading and maintenance of existing roads and tower sites has led to appreciable surface disturbance within the immediate area.

Previous archaeological investigation (McCoy and Phillips 1980) determined that while subsurface cultural materials occurred in portions of the site, no subsurface cultural deposits were present in the area of potential impact (i.e.,

the access road). As a result of these findings, it was recommended by the California State Historic Preservation Office that only surface data recovery be conducted within the access road.

Surface cultural material: 29 artifacts were micromapped and recovered from the surface of the site. Preliminary examination of the material revealed that the predominant artifact types were in the flake and debitage categories (Table 8). These frequencies are similar to those first observed during the assessment phase (Table 9).Comparable overall frequencies suggest that the recovered material is a representative sample of the total site.

Laboratory Analysis

Edge angle analysis of utilized and retouched flakes (Table 10) revealed a relatively high frequency of acute angles (less than 45 degrees). Angles of less than 45 degrees often relate to cutting activities, especially when seen in utilized, unretouched flakes (Tainter 1980:465; Wilmsen 1968:156). Angles greater than 45 degrees are usually associated with scraping activities and are well represented in the remaining tool assemblage for this site.

Research Design Application

Site Activity/Function

Grinding, pounding and cutting activities are well represented in the overall tool inventory. Of these activities, pounding (represented by hammerstones) and cutting (reflected by flake tools) predominate. As noted by McCoy and Phillips (1980:281), shellfish collecting and processing may have been a major activity at the site and may be represented archaeologically by the associated hammer-pounders. As observed by an early ethnographer (McGee 1898:195), the Seri smashed shellfish with hammerstones to extract the raw meat.

The consumption of small mammals and birds, usually abundant in estuary type environments such as that adjacent to the site, possibly supplemented a shellfish diet. The cutting implements found, as well as the recovery of bird bone in Unit 1, may reflect these supplemental but important subsistence activities.

The rather limited range of tool types at the site suggests a specialized activity area primarily concerned with processing of shellfish and birds. Landberg (1965:82), in

TABLE 8
SDi-6140
SURFACE ARTIFACTS

	This study:		McCoy and Phillips (1980):	
Artifact Type	Number	Percent	Number	Percent
METATE			1	2.9
CORE	1	3.4	1	2.9
FLAKES	16	55.2	23	65.7
DEBITAGE	7	24.1	6	17.1
HAMMER-POUNDER	4	13.8	3	8.5
CHOPPER	1	3.4	1	2.9
TOTALS	29	99.9	35	100.0

TABLE 9
SDi-6140
TOOL EDGE ANGLE

Angle	Number	Percent
35°	2	28.5
45°	1	14.3
55°	1	14.3
60°	1	14.3
75°	1	14.3
85°	1	14.3
TOTAL	7	100.0

$\bar{X}$ = 59.2
SD = 18.6

reconstructing the settlement-subsistence pattern of the Chumash, feels shellfish gathering and hunting of birds may have been important during the winter when other food was scarce.

Chronology

Radiocarbon dating of shellfish found at the site places it within the Encinitas tradition (McCoy and Phillips 1980). The fact that the artifact assemblage consists primarily of large scraper planes manufactured from macrocrystalline rock partially supports this chronological assessment. The weakly developed milling component at SDi-6140 is not compatible with other Milling Stone Horizon assemblages (Wallace 1955); however, its absence may be explained by the specialized nature of the site.

Site Disturbance

The remapping of the site in the areas of potential adverse impact showed a significant change in the distribution of artifactual material. Due to the nature of the initial assessment which utilized only in-field observations of artifactual material, it cannot be ascertained whether the same artifacts occur in these areas as previously described (1980); it can be stated that in the last one and a half years artifact movement has occurred with an increase in the number of artifacts in the access road from 17 to 28. The increase is greatest in the lower part of the site, especially in an area where a stub road has increased in area.

Three forms of disturbance were observed upon close examination of the road surface: 1) vehicle and heavy equipment use; 2) possible pothunting; and 3) water erosion. The surface of the road exhibited compaction, ruts and occasional potholes. Data on the effects of vehicles on soils similar to those encountered at SDi-6140 suggest that vehicles compact soils, leading to reduced rates of infiltration (Iverson et al. 1981:915). Vehicles also tend to have a channelizing effect (Iverson 1980:38) on sloping terrains which ultimately leads to increased runoff. The erosional patterns on the access road (Photograph 3) at SDi-6140 suggest that vehicle traffic caused increased erosion from compaction and channelization; sporadic digging on the road may have further increased these.

With increased erosion, previously located artifacts may have been transported to new locations and/or buried by alluvium. The same process may have also exposed new items, thus accounting for the increase in artifacts on the road.

EROSION AT SDI-6140

PHOTO
3

Downslope movement of cultural material may thus have come about subsequent to disturbance related activities.

Rick (1976) has demonstrated a positive correlation between lithic artifact weight/density and slope angle. As shown by his research at a rockshelter site in Peru, "Lighter objects will come to rest on steeper slopes while heavier objects will continue toward gentler slopes" (1976:143). Although there may be numerous unknown variables at work, the generalization that heavier lithic artifacts such as cores will travel farther than lighter items (e.g., small projectile points) may be applicable. At SDi-6140, a comparative analysis of lithic artifacts recovered during the current study conformed generally with Rick's thesis. When weight distribution in two areas of the site (i.e., sloping area of access road and terrace below it) was compared, there were more artifacts heavier than 20 grams on the lower portion of the site.

D. SDi-6149

1. Site Documentation

Previously recorded by: M. Rogers (1930s).

Later recorded by: J. Thesken and R. Franklin (1978); R. Franklin (1980).

Temporary/other site designations: SDi-4358, SDM-W-954, SDM-W-108, SDM-W-1880, SDi-8195.

2. Site Location

Site is adjacent to an SDG&E steel lattice tower on a ridge one-half mile (800 m) north of Batiquitos Lagoon.

3. Previous Fieldwork

Surface cultural material: Site was originally described as having numerous flakes, sherds, bone, manos, metate fragments, scrapers, choppers, and blades. Two areas of rock concentrations, possibly hearths, and several species of shell were observed on the surface.

WESTEC (McCoy and Phillips 1980) observed 202 lithic and ceramic artifacts. The upper portion of the site, because of its high artifact concentration, was randomly sampled.

From this sampling procedure artifacts reflecting grinding, cutting and scraping, chopping and pounding, flaking and cooking or storing were noted. Also observed was a highly disturbed feature possibly representing one of two rock concentrations previously recorded during the first investigation. The pottery located was of a local variety of Tizon Brown Ware, most likely fragments of utilitarian ollas.

Subsurface cultural material: Rogers (1930) found a burial at the site after "pot hunters" plowed the area for relics. While excavating the burial, Rogers discovered various lithic tools of which one, a chert biface, is significant because of its similarity in material and artifact type to some found in the Santa Barbara area.

McCoy and Phillips (1980) excavated a single unit to 20 inches (50 cm) recovering flakes, debitage, ceramics, and shellfish remains in the first three levels. The predominant shellfish genera found were Chione sp. and Pecten sp. The ceramic fragments from the unit (12) probably came from a single pot.

Current Field Investigation

SDi-6149 is a very extensive site encompassing approximately 477,300 square feet (44,340 m²). Equally impressive is the site's vertical extent, exceeding 39 inches (100 cm) in some portions. Within the major portion of the site, artifact yield ranges from moderate to high with the most dense area containing 15 items of cultural material per square meter.

Disturbance to the site has been moderate in some areas and extreme in others. The worst form of disturbance is a tract home development to the south which has completely destroyed approximately one quarter of the site. The remaining site area is generally intact and continues to represent a significant scientific resource.

Previous archaeological investigation (McCoy and Phillips 1980) determined that while subsurface cultural materials occurred in portions of the site, no subsurface cultural deposits were present in the area of potential impact (i.e., the access road). As a result of these findings, it was recommended by the SHPO (1979) that only surface data recovery be conducted within the access road.

Surface cultural material: Only 15 artifacts were recovered from the area of potential impact, i.e., the access road and tower site (see map D-4, Appendix D). Low artifact density in this particular area is understandable since it represents the southern periphery of the site. The 15

artifacts consisted of 10 flakes, 4 items of debitage, and 1 chopper. This proportion of flakes/debitage (93.3%) is comparable to the WESTEC (McCoy and Phillips 1980) inventory in which flakes and debitage were also predominant categories.

Although not collected, shellfish and faunal remains were also identified and inventoried within the impact area. As with the initial assessment, Chione sp. and Pecten sp. were the predominant shell types.

Laboratory Analysis

A wide range of edge angle was identified with the five recovered flake tools. The five tools had seven edges whose angles were measured. Single edges with angles of 44°, 57°, 59°, 75°, and 83° respectively were recorded; two edge angles measuring 35° were recorded. Even with such a small sample as this, it is not surprising that both cutting and scraping activities were indicated. The site does represent a maintenance area where a wide range of human activity might be expected.

Research Design Application

Site Activity/Function

As previously mentioned, SDi-6149 is a maintenance site where a wide range of human activity occurred. Cooking, storing, cutting, scraping, and grinding activities are all substantially documented throughout the site. It can also be assumed that both hunting and gathering were practiced from this extensive base camp. Due to its proximity to the lagoon, fishing may have been a major activity, but direct evidence (e.g., fish-hooks) is lacking.

Chronology

As previously documented (Rogers 1930; McCoy and Phillips 1980), the site probably contains two or more components. Ceramics definitely relate to a Yuman (Late Horizon) occupation while a heavily patinated scraper-plane reflects an older, possibly San Dieguito (Early Man Horizon), component. Clearly, additional investigation would be required to delineate diachronic parameters represented at this significant village site.

Exchange Systems

An item previously recovered by Rogers (1930s) at this site can be classified as an exotic (i.e., trade) item. It is a large projectile point (Photograph 4), made from a chert commonly found in the Santa Barbara area.

Partial documentation of a trade relation between the Luiseno and the northern tribes is found in Kroeber (1970: 630). Davis also alludes to some type of regular contact with northern areas (1974; Map 2), but fails to provide any specifics.

Site Disturbance

Little surface disturbance has occurred in the potential adverse impact area dealt with in this study (see maps C-4 and D-4 in Appendices C and x D). Surface disturbance has come about only on the access road leading to the steel-lattice tower site, and on the tower site. Artifacts in the access road decreased from 7 to 5, and those in the tower area increased from 6 to 10. Three are in locations where artifacts were mapped before. Since erosional patterns are not dramatically expressed on the road surface, vehicle and/or pedestrian traffic may be solely responsible for the redistribution noted. In the latter case, the proximity of a large housing tract makes it likely that residents walk through the site, possibly collecting and/or moving artifacts.

E. Ora-438

1. Site Documentation

Previously recorded by: R. H. Crabtree, T. G. Cooley, C. Fenenga (1973).

Later recorded by: Munoz (1977); J. Howard (1977); WESTEC (1980).

Temporary/other site designations: CSRI-343.

Site Locations

Situated on a low ridge adjacent to Serrano Creek, within the boundaries of the upper Aliso Creek Historic District.

SDI-6149: PROJECTILE POINT

PHOTO
4

3. Previous Fieldwork

Surface and subsurface cultural material: As documented in Section II of this report, Ora-438 was previously subjected to numerous surveys and other investigations (Munoz 1977; Howard 1977). The most intense and comprehensive of these were conducted by WESTEC (1980; McCoy and Phillips 1980). Both studies were done to assess the nature and significance of the resource, for the expressed purpose of evaluating potential adverse impact from forthcoming projects. The first study, conducted by Schilz, entailed both identification and assessment of all surface artifacts and subsurface testing of the cultural deposits (seven 1.2 yard by 1.2 yard [1 by 1 m] test units were excavated). Part of the investigation included the surface recovery of artifacts found within a gridded area in the southern portion of the site. From this work, 251 artifacts were recovered, most of which are unmodified flakes. Tools found included an obsidian projectile point (originally collected by Munoz 1977), four scrapers and six modified flakes. Unit 6, located on the eastern periphery of the site, yielded the greatest number of artifacts (30 items) and represented the maximum depth of the deposit (24 in. [60 cm]). All other units showed positive results of varying degrees, demonstrating that the site had extensive cultural deposits.

The subsequent investigation of the site (McCoy and Phillips 1980) was focused along the dirt access road used by SCE. From an intense surface survey of this area, 210 artifacts were identified. As with most of the sites in the area, flakes and debitage dominated the inventory, accounting for more than 80 percent of the total assemblage. Identified tools reflected grinding, cutting, and scraping activities. Comparable artifact type frequencies were found from the surface inventory and collection conducted during the current investigation (Tables 14 and 15); however, the total amount was lower than that found by Schilz. Recent grading accounted for this discrepancy. The remaining number of artifacts originally located were found in the backfill on either side of the access road.

Current Investigation

Surface cultural material: Ora-438 is situated on a gently sloping ridge which is bordered on either side by intermittent drainages. The streams form a confluence in the southern portion of the site, draining ultimately into Serrano Creek, approximately one mile (1.6 km) south of the site. Vegetation, although abundant through the site area, is especially thick along the streams. Oak trees predominate within these riparian strips, with sycamore and willow being almost as frequent. Vegetation in the remaining

portions of the site consists of prickly pear, coastal sagebrush, black mustard, and brome grass. Ground cover, especially in the northern section of the site, militates against intense surface survey of the site. Only in the southern portion, where pasture exists, is ground visibility conducive to intensive survey. Probably for this reason, this area was focused upon by Schilz (WESTEC 1980) during surface and subsurface sampling of the site. As shown by random transects conducted by the present investigation, the site extends much farther north than originally delineated by Schilz.

Disturbance at the site primarily derives from three sources: road grading, livestock grazing and water erosion. Of these, road grading has had the greatest adverse effect on site integrity. In some portions of the site the road has been cut down more than 78 inches (200 cm). Constant maintenance of the road has had cumulative adverse effect on the impacted portions of the site. Nevertheless, at least 85% of the total surface area of the site is intact. This fact, plus other factors to be discussed below, makes the site a significant and valuable resource.

A total of 395 artifacts was recovered from ten 1.2 by 1.2 yard (1 by 1 m) units placed judgmentally on and adjacent to the dirt access road. Most of the same artifact types found on the surface were found, although artifact type frequencies differed significantly between surface and subsurface. In both surface and subsurface collections, flakes and debitage were the most common categories of artifacts (Table 16). The most notable of the artifacts found was a triangular, quartzite, concave-base projectile point recovered in Unit 8 at the 8 to 12 inch (20 cm to 30 cm) level.

Unit 6 was the most productive unit, yielding a total of 176 items which represented nearly half the total number recovered from a subsurface context. Unit 6 also contained the only feature found during the excavation (see Map D-5, Appendix D, and Figure 2). The feature occurred between 8 to 16 inches (20 to 40 cm) and occupied the southern half of the unit. Besides containing a mano, flakes and thermal fractured rock, it yielded approximately three grams of datable charcoal. From subsequent flotation of associated soil, pulverized rodent bone and carbonized seeds were recovered. Seeds were tentatively identified by a botanist (Appendix F-4) to consist of Lotus, Stephanomeria, Chenopodium, Salvia sp., Amaranthus sp., and Stipa sp. Of these, Chenopodium, Salvia sp. and Amaranthus sp. are documented to have been exploited by Native Americans in southern California (Bean and Saubel 19/2:37; Balls 1962).

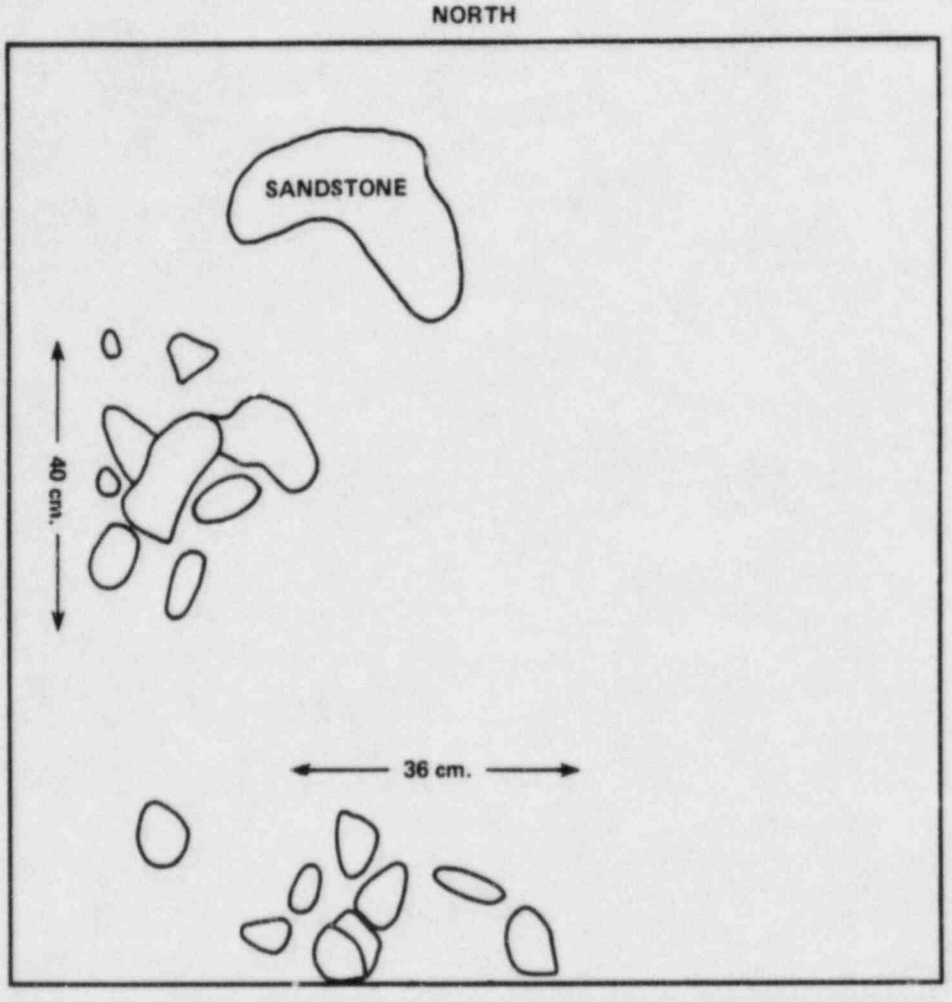
Chert and chalcedony were by far the most abundant artifact material types (greater than 70 percent) at the site.

TABLE 10
Ora-438 SURFACE ARTIFACTS

ARTIFACT TYPE	Present study		McCoy and Phillips 1980	
	NUMBER	PERCENT	NUMBER	PERCENT
MANOS				
Unifacial,unshaped	1	0.5	6	2.9
Unifacial, shaped			1	0.5
Bifacial, unshaped	8	4.0		
Bifacial, shaped	1	0.5	2	1.0
Non-diagnostic			2	1.0
METATES	2	1.0	3	1.4
FLAKES	65	32.5	82	39.0
DEBITAGE	94	47.0	88	42.0
CORES	11	5.5	5	2.4
PROJECTILE POINTS	1	0.5	1	0.5
CHOPPERS	5	2.5	1	0.5
HAMMER-POUNDER	3	1.5	3	1.4
UTILIZED FLAKES	4	2.0		
RETOUCHED FLAKES			5	2.4
SIDESCRAPER	2	1.0	7	3.0
ENDSCRAPER	2	1.0		
DOMED SCRAPER	1	0.5		
PUSHPLANE			1	0.5
NON-DIAGNOSTIC UNIFACE			1	0.5
NON-DIAGNOSTIC BIFACES			2	1.0
TOTAL	200	100.0	210	100.0

TABLE 11
DISTRIBUTION OF SURFACE AND SUBSURFACE ARTIFACTS FROM Ora-438
(From Schilz 1980)

Test Unit	Level	Cores	Hammer-stones	Chopping Tools	Scrapers	Modified Flakes	Unmodified Flakes	Manos	Metates	Fire-cracked Rock
1	0-10						0			
	10-20						1			
	20-30						4			
	30-40						1			
2	0-10						2			
	10-20						0			
	20-30						1			
	30-40						0			
3	0-10						3			
	10-20						6			
	20-30						0			
4	0-10						6			
	10-20						16			
	20-30						0			
5	0-10						0			
	10-20						4			
	20-30						2			
	30-40						0			
	40-50						4			
6	0-10						4			
	10-20						3			
	20-30						6			
	30-40					1	3	1		2
	40-50						8			
	50-60		1				6			
	60-70						0			
7	0-10						1			
	10-20						1			
	20-30						1			
	30-40						3			
Surface		6	11	8	4	1		10	5	22



ORA - 438: FEATURE

FIGURE 2

Generally, the chert and chalcedony materials were similiar in texture and color, suggesting a single source. From review of site record forms and reports dealing with the area, and informal reconnaissance of adjacent sites, it was found that a nearby site, Ora-507, contained raw chert and chalcedonic material much like the material found at Ora-438. Ora-507 is within a mile (1.6 km) of Ora-438 and probably functioned for a long period of time as a quarry for aboriginal people living at the site as well as in the general region.

Quartzite and metavolcanic material also occur and are primarily evident in the lower portions of the site (Table 17). Generally speaking, quartzite tools are larger than chert/chalcedony artifacts and more reflective of heavy duty scraping activity.

Laboratory Analysis

Laboratory analysis of material recovered from Ora-438 was two-phased: one entailed a macro-analytic examination of artifactual material only; and the other consisted of special analyses conducted by various consultants, primarily done on the micr-analytical level.

Macro-Analysis: Sixty-four items recovered from Ora-438 fell into either a utilized or retouched flake category. Edge angle measurement on these artifacts revealed a strong emphasis within the 40 to 70 degree range (Fig. 3). Tainter suggests that this range is indicative of skinning, hide scraping, sinew and plant fiber shredding, heavy cutting of wood and bone or horn (1980:465). Less frequently encountered edge angles were in the 25 to 30 degree range. Edge angles within this range are felt to reflect cutting implements, especially when the utilized edge is straight to convex (as is the case with artifacts recovered from Ora-438). Edge angles ranging from 75 to 85 degrees were also observed and these probably indicate heavy duty scraping and shredding activities (Tainter 1979:465).

In terms of material preference at the site, most of the flake tools were made from quartzite (greater than 70 percent). Quartzite is harder and more durable than chert or chalcedony and may have been a material type compatible with the subsistence focus at the site.

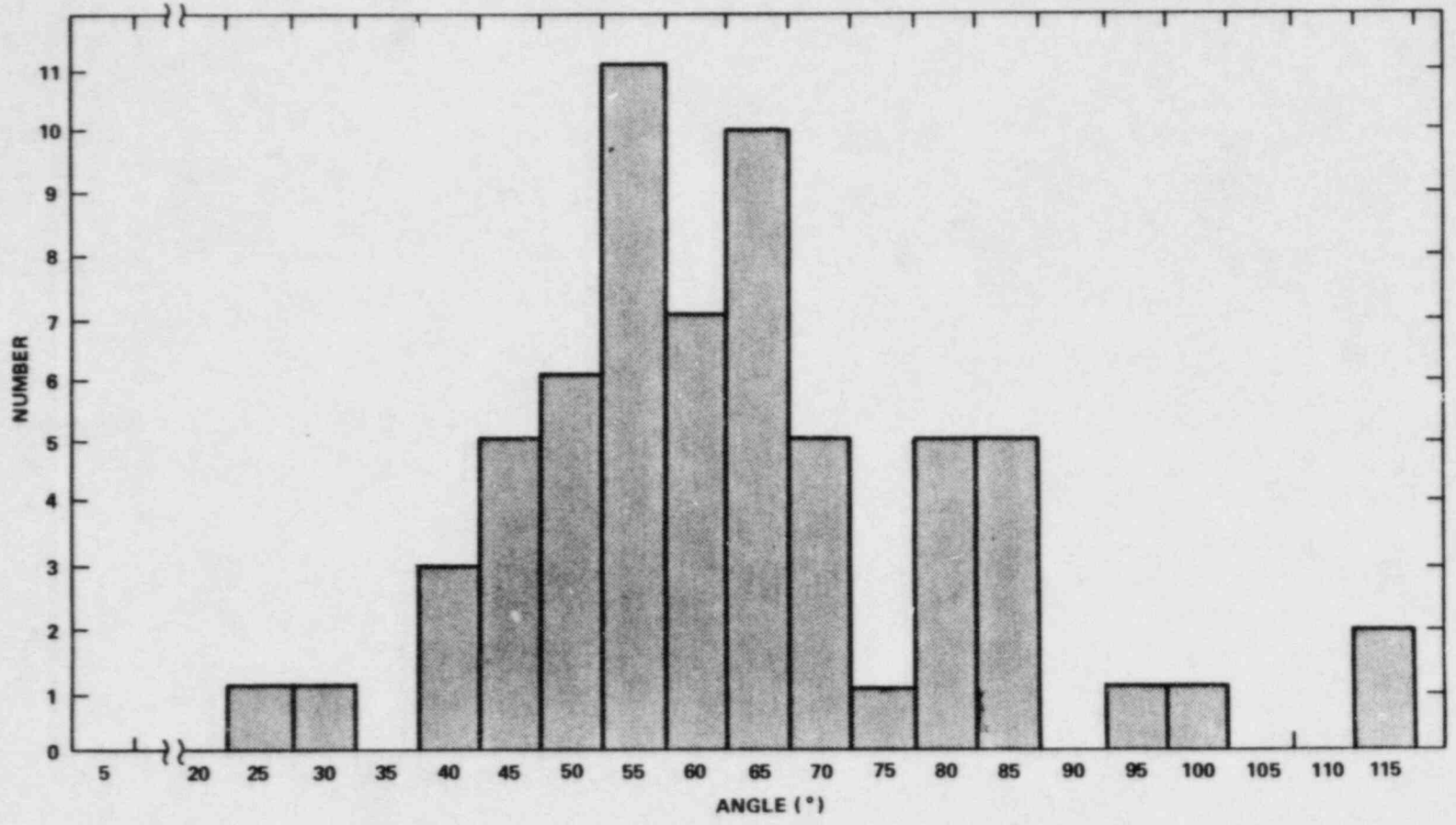
Mean weight for artifacts within the flake, core and flake-based tool categories was 10.7 grams. Lowest mean weights were found in the upper portions of the site (especially Units 5 and 6; Table 26) where a great deal of chert and chalcedonic microflakes were recovered. Highest mean weights were encountered in the lower section of the site

TABLE 12
Ora-438, ARTIFACT TYPES AND MATERIAL FOUND, BY UNIT

Material: / UNIT:	1	2	3	4	5	6	7	8	10	n	%
Felsite	1	1	1	0	1	1	4	2	0	11	2.6
Basalt	0	0	2	1	0	0	0	0	0	3	0.7
Quartzite	8	1	26	3	6	20	3	29	3	99	23.4
Granite	1	0	3	1	0	0	0	1	0	6	1.4
Rhyolite	2	0	0	0	0	0	0	0	0	2	0.5
Andesite	1	0	3	0	0	0	0	0	0	4	0.9
Chert	1	1	7	0	1	53	11	20	0	94	22.2
Chalcedony	8	1	25	4	5	95	19	40	0	197	46.6
Quartz	0	1	1	0	1	3	0	0	0	6	1.4
Other	0	0	0	0	0	0	1	0	0	1	0.2
TOTAL	22	5	68	9	14	172	38	92	3	423	99.9

TABLE 13
CA-Ora-438, ARTIFACT TYPES AND MATERIAL, ALL UNITS

MATERIAL	FLAKES		DEBITAGE		CORE		CHOPPER		CHOPPING TOOL		COMPOSITE TOOL		MANO		HAMMER-POUNDER		PROJECTILE POINT		METATE		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
FELSITE	6	2.8	5	3.0	-		-		-		-		-		-		-		-		11	2.6
BASALT	2	0.9	1	0.6	-		-		-		-		-		-		-		-		3	0.7
QUARTZITE	43	20.4	48	28.7	6	60	1	50	1	100	-		-		-		1	100	-		100	23.4
GRANITE	1	0.5	4	2.4	-		-		-		-		3	100	-		-		1	100	9	2.1
RHYOLITE	-		2	1.2	-		-		-		-		-		-		-		-		2	0.5
ANDESITE	1	0.5	-		1	10	1	50	-		1	100	-		-		-		-		4	0.9
CHERT	45	21.3	46	27.5	3	30.0	-		-		-		-		-		-		-		94	22.0
CHALCEDONY	111	52.6	87	52.1	-		-		-		-		-		-		-		-		198	46.3
QUARTZ	2	0.9	4	2.4	-		-		-		-		-		-		-		-		6	1.4
OTHER	-		-		-		-		-		-		-		1	100	-		-		1	0.2
TOTAL	211	49.3	197	46.0	10	2.3	2	0.5	1	0.2	1	0.2	3	0.7	1	0.2	1	0.2	1	0.2	428	100.1



ORA – 438: EDGE ANGLE MEASUREMENTS

FIGURE 3

TABLE 14
Ora-438, ARTIFACT MEAN WEIGHT, UNITS 1 THROUGH 8

Unit Number	N	$\bar{X}$	SD
1	22	2.8	1.9
2	5	1.9	1.0
3	60	5.8	18.2
4	6	1.7	1.3
5	13	0.4	0.3
6	176	0.5	0.2
7	31	0.8	0.4
8	73	0.9	0.5

and reflect the predominance of large metavolcanic tools and flakes in this particular area.

Micro-Analysis: Pollen analysis for Ora-438 is fully documented in Appendix F-1 and will be discussed only briefly here. With the exception of an unusually large accumulation of Opuntia sp. grains at the 4 to 8 inch (10 to 20 cm) level of Unit 3, analysis of palynoflora from all ten units was unremarkable. As stated by Vork, "Palynoflora...are indicative of generally subtropical climatic conditions. These conditions are probably very similar to the contemporary climate." In regards to the inordinate amount of Opuntia sp. grains in Unit 3, Vork feels that it does not reflect "natural" pollen accumulation. As such, this concentration may reflect Opuntia sp. processing or cooking within this particular area of the site.

Obsidian hydration and sourcing, conducted by Volcanic Trace (Appendix F-2) on a large leaf-shaped obisidian projectile point (Fig. 4C), revealed a Coso source and hydration layer from 4.94±0.2 to 8.64±0.2 microns. Microscopic analysis of the specimen indicated the presence of two distinct hydration band widths, one almost twice the other in thickness. As stated in the hydration report, the presence of multiple bands "...suggests a complex artifact history and may reflect the resharpening and/or reuse of a much older tool by later aboriginal craftsmen."

Radiocarbon dating was conducted on approximately three grams of charcoal recovered from Feature no. 1 (8 to 16 inch [20 to 40 cm] level) in Unit 6. Radiometric analysis revealed a date of 350±60 years BP. As documented in the report (Appendix F-3), dating of the charcoal proceeded normally.

Research Design Application

Chronology

As discussed previously in the research proposal (CSRI 1981) and in Section III of this document, Ora-438 was thought to contain two chronological components: one dating from a Milling Stone Horizon, and the other from a later period. From detailed analyses of recovered artifactual and ecofactual material, it was found that this initial interpretation was correct and that at least two components were present and horizontally stratified at the site. The early components appeared to be limited to the lower section. Within this area, many large artifacts indicative of early Milling Stone Horizon period sites (Wallace 1954) (Table 17)

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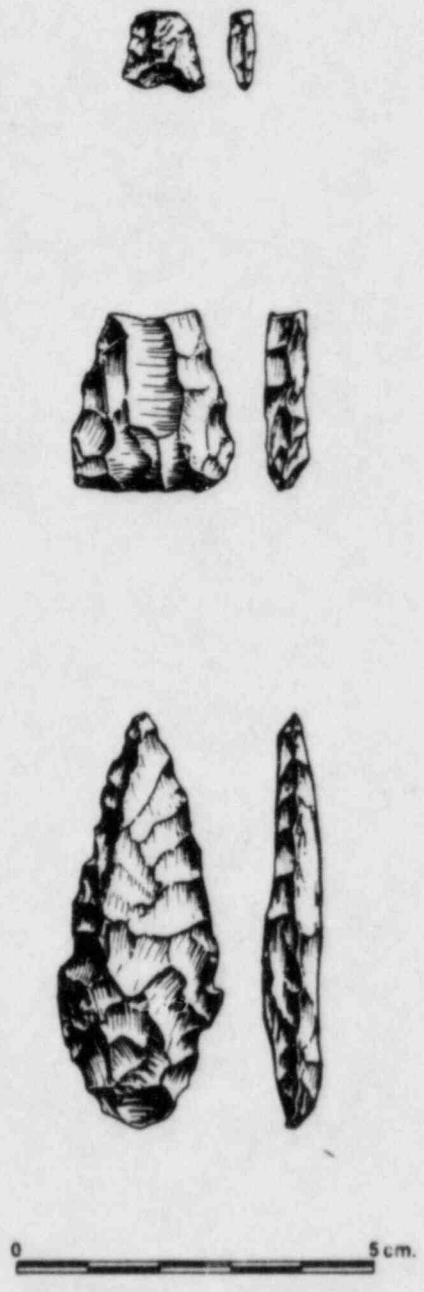


ORA - 438: PROJECTILE POINTS

FIGURE
4

indicative of Milling Stone Horizon sites (Table 17) were found as well as an obsidian projectile point (Fig. 4C) at approximately 2100 years B.P. (Singer 1982). The later component seemed to be most pronounced in the upper segment of the site. Here, smaller and more "refined" artifacts occurred almost exclusively, with an emphasis on flake and cutting tools. Two projectile points found in this area are of the Cottonwood series (Figs. 4A, 4B), a late period projectile point type (Koerper 1981). Further and final documentation for a Late Horizon occupation in this area is the radiocarbon date of 350±60 years BP from a charcoal sample recovered from the area.

Site Function

As in the previous assessment of the site (McCoy and Phillips 1980), results from the current examination revealed a wide range of activities reflecting a fully developed maintenance site: cutting and/or hunting activities are indicated by the projectile points and flake knives; cooking activities are indicated by the presence of thermal fractured rock; grinding by recovered manos, metates, and a mortar; tool maintenance and production by hammerstones and cores; and scraping by flakes and core-base scrapers.

The primary subsistence activity at the site, as reflected by artifact type and function, appears to have been gathering and processing of plant foods. Investigation of the current vegetation and analysis of ecofactual material found at the site suggests that seeds (e.g., Salvia sp. and Amaranthus sp.) and nuts, such as acorns, were gathered near or at the site. This activity was done on a seasonal basis, most likely during the spring, summer, and fall months (Balls 1962; Bean and Saubel 1972:37). Subsistence needs were further supplemented by hunting small to large-sized mammals, as indicated by pulverized rodent bone recovered from soil samples from Unit 6.

Sourcing of Lithic Material

With the exception of the one obsidian specimen, all artifact material types found at the site were of local origin. All metavolcanic materials are available in raw form within the eastern portion of Orange County and are often seen as cobbles in or near dry creek beds. The cryptocrystalline materials, on the other hand, are available from one very localized source, the quarry at Ora-507. The large amounts of this material at the site reflect the proximity of the quarry and explains why other material types available in the area were not as intensively exploited (Table 27). Gould (1980) and others have ethnographically documented

this pattern at habitation sites associated with quarries. There is a tendency in these cases for aboriginal people to carry raw material from the nearby quarry to their base camp for core preparation and production of stone tools (Gould 1980:132). (The low frequency of cores is not consistent with this thesis, and cannot be resolved at this time.) Tool production, as reflected by cores, flakes and debitage, was a major activity at the site and it can be assumed that tools made here were either traded or carried to other areas. Possibly, Ora-438 was a base camp associated with a series of small hunting and butchering camps located within a clearly defined catchment. Such a system has been previously described to have been operative in various parts of Orange County during the late period (Hudson 1969). As indicated by that study and from the results of the current investigation, such a settlement-subsistence model should be tested for its applicability to this particular region of Orange County.

Exchange Systems

As evidenced by the obsidian projectile point found at Ora-438, a trade system may have existed between the study area and the Coso region of central California. Such a system, which would have been operative after 2000 BC and prior to AD 500 (Singer and Ericson 1977:186), would have entailed the exchange of shell beads, baskets, bear skins, etc., for obsidian and other resources not commonly found in Orange County (Davis 1974:20-21). (See Maps D-5 and E-5 in Appendices D and E).

Site Disturbance

As briefly discussed in the introduction, site disturbance has been limited to those areas impacted by grading and road maintenance activities. Such activities have been destructive in their effect on surface as well as subsurface cultural material. The number of artifacts found on the access road has decreased by about 14%, and many of the artifacts appear to have been redistributed.

When graded, the artifacts on the surface of midden sites like SDi-6138 and Ora-438 may be buried and new artifacts from a subsurface context may be brought to the surface Thus there is a redistribution of artifacts (see Maps D-5 and E-5 in Appendices D and E). Also evident in some areas after such activities is midden-soil mixing. This occurrence was illustrated in Unit 1 at Ora-438 where the first 8 inches (20 cm) were later discovered to be transported midden. Not until the unit was entirely

excavated and a sidewall profile examined was this possibility suspected and verified.

F. Ora-447

Site Documentation

Previously recorded by: C. Fenenga, T. Cooley, and W. Butler (1973).

Later recorded by: Munoz (1977); Howard (1977); WESTEC (1980).

Temporary/other site designation: CSRI-352.

Site Location

Located along a narrow ridge overlooking Serrano Creek to the west (1973). Also described as being situated near the western boundary of the Glenn Ranch project area (1980). Site is within boundaries established for Upper Aliso Creek Historic District.

Previous Fieldwork

Surface cultural material: As perceived by Fenenga et al. (1973), this resource was described as "medium gray midden on ridge with artifact and detritus scatter beyond." Artifacts noted included scrapers, cores, hammerstones and manos. Cultural material was visible only in road cut and eroded areas. Surface artifact collection by WESTEC (McCoy and Phillips 1980) at this locale produced 89 items. Waste production accounted for 75.3 percent of the assemblage and included cores, flakes and debitage. Material composition was primarily chert, with quartzite and basalt occurring in lesser frequency. Grinding artifacts constituted 11.2 percent of the assemblage and included a variety of types, i.e., unifacial unshaped and shaped manos, bifacial unshaped and shaped manos, and a metate fragment. An equal number of artifacts represent cutting/scraping and pounding activities, with each category totaling 6.7 percent. Material types for these particular artifacts included quartzite, rhyolite, basalt, and chert.

Subsurface cultural material: Two "road cut" excavations were conducted along the access road by WESTEC (McCoy and Phillips 1980). Road Cut 1 was excavated to 55 centimeters. Two flakes, two pieces of debitage, and a chopping tool were

recovered. Road Cut 2 was excavated to 62 centimeters, although this test excavation was devoid of cultural material. Distinct soil types were observed at Ora-447 and included loam, loamy clay, sandy clay, clay, and sandstone.

Current Field Investigations

Ora-447 is located on a densely vegetated ridge running approximately north-south. Due primarily to thick ground cover, only the dirt roads running through the site offered optimum ground visibility for a surface inventory of the site's cultural material. Additional views of the surface were possible only when topography and vegetation allowed unimpeded access to areas adjacent to the dirt roads.

Disturbance at the site is limited to the dirt roads, which are periodically graded and renovated by the maintenance crews from SCE and the Glenn Ranch Company. Deep cuts from past grading testify to a long history of maintenance activities on these particular roads. Primarily due to a high rate of erosion, maintenance of the roads is a constant and ongoing process.

Previous archaeological investigation (McCoy and Phillips 1980) determined that while subsurface cultural materials might occur in other portions of the site, no subsurface cultural deposits were present in the area of potential impact (i.e., the access road). As a result of these findings, it was recommended by the SHPO that only surface data recovery be conducted within the access road.

Surface cultural material: A total of 42 artifacts were recovered on and adjacent to the access road. Flakes and debitage accounted for 35.7 percent of the recovered material and collectively represented the predominant artifact type. Next in frequency were manos, both bifacial and unifacial. Chopping tools were also a predominant artifact type and comprised 7.1 percent of the total inventory.

McCoy and Phillips (1980) also found that flakes and debitage were the dominant artifact types, accounting for 38.2 percent and 33.7 percent respectively of the total surface inventory. However, these figures, when combined, far exceed the percentages arrived at during the current study and suggest that the sampling universes were not comparable between the two studies.

Laboratory Analysis

Many of the recognizable flake tools recovered fr[illegible] site possessed edge angles of 50 to 55 degrees (Table 2[illegible] Primarily thought to be useful for the processing [illegible]es

TABLE 15

Ora-447 EDGE ANGLES

ANGLE	N	PERCENT
40°	1	4.5
45°	2	9.1
50°	1	4.5
55°	3	13.6
60°	1	4.5
65°	3	13.6
75°	1	4.5
80°	2	9.1
90°	3	13.6
95°	1	4.5
105°	1	4.5
110°	2	9.1
115°	1	4.5
TOTAL	22	99.6

$\bar{X}$ = 74.5

SD = 22.8

or soft wood, these angles reflect moderate scraping activities. From the vegetative context of the site, it would be reasonable to assume that scraping tools such as these were used to process the Opuntia species (Bean and Saubel 1972: 96-97) or some other fleshy plant present at the site. The remaining flake tools analyzed from the site exhibited edge angles greater than 50 degrees, suggesting that heavy duty scraping such as hard wood shredding (Van Horn 1980:136) was an important activity as well.

Research Design Application

Site Activity/Function

From the recovered artifacts two major activities (i.e., grinding and scraping) are readily apparent. However, as reflected by disparate findings with the previous and more extensive inventory, these activities do not necessarily represent the total range of site activity. The high frequency of grinding artifacts in the present study suggests one of two things: 1) the area where the milling artifacts were collected, mostly in the southern portion of the main access road, represents a specialized activity area devoted to the processing of plant food; or 2) the artifacts represent a particular form of natural artifact transport seen at sloping sites subjected to moderate to heavy fluvial erosional processes. Whatever the case, this portion of Ora-447 predominantly functioned as a plant processing area, probably during late spring and early summer when fruit from Opuntia species and seed from Salvia sp. were harvested (Bean and Saubel 1972:97, 136-138) and processed.

Site Chronology

In addition to the substantial milling component present at the site, the relatively high frequency of large scrapers suggests that this site belongs within the Encinitas tradition (Milling Stone Horizon). However, in the absence of absolute dating, this interpretation must remain conjectural.

Site Disturbance

There can be little doubt that grading of the dirt road has affected artifact provenience in the last one and one-half years . All areas of the access road showed changes in the artifact distribution from the initial inventory (see Maps D-6 and E-6 in Appendices D and E). The upper portion

of the main access road showed an increase in number of artifacts, for example, and the area just below it at the junction with the first branch access road, a decrease.

Downslope movement of artifacts is not suspected, since erosion is not a significant factor in this area of the ridge. It can be presumed that the heavy vegetation in the general area, as well as the topography of the ridge top, has minimized water erosion.

G. Ora-495

Site Documentation

Previously recorded by: P. Langenwalter (1974).

Also recorded by: W. Dodge (1978); Bean and Vane (1979).

Temporary/other site designations: Field No. 2 (1974); CSRI-321 (1979).

Site Location

Situated along a ridge crest on the north side of Laguna Canyon (Langenwalter 1974).

Previous Fieldwork

Surface cultural material: "Extensive scatter of artifacts which appear to be relatively uniform over the site area and broken only where access roads or tower pads have been placed" (Langenwalter 1974). Dodge (1978) reported a widely dispersed artifact scatter comprised mostly of bifacial manos, oval and oblong in shape. Hammerstones were present, but other chipped stone was rare.

In a later survey (Bean and Vane 1979) numerous artifacts were observed along the access road. The site was described as extensive. Artifacts included quartz, quartzite, chalcedony, and igneous flakes. In addition, a milling assemblage was documented that included manos and metates. Nine apparent rock cairns and an alignment of small boulders were also observed, and it was stated that the site might contain

burials. WESTEC's analysis of surface cultural material (McCoy and Phillips 1980:208) verified an extensive artifact scatter in addition to several types of features. Artifact distribution was variable over portions of the site. The northwestern portion of the site contrasted significantly in terms of artifact density with the outer site areas. A total of 144 artifacts were located during surface collection operations. Surface artifacts were found to be comprised primarily of groundstone and waste product materials. Groundstone objects (i.e., manos and metates) accounted for 26 percent of the assemblage. Manos were represented by a variety of lithic materials (quartzite, sandstone and igneous rocks), and a wide range of sizes and subtypes (unifacial, bifacial, shaped, and unshaped).

Waste production materials consisted of basalt, with chert, quartz, felsite, rhyolite, jasper, chalcedony, and petrified wood evident in minimal quantities. Flaked tools, also primarily of basalt, consisted of 11 retouched flakes and one domed scraper.

Feature types at this locale consisted of rock clusters or cairns and bedrock milling elements. Bedrock features were identified as consisting of a rub and two slicks. These milling features were observed on sandstone outcrops. Rock cairns seemed to correspond with those reported by Bean and Vane (1979). These clusters were documented by WESTEC field crew (McCoy and Phillips 1980) in an attempt to determine whether clusters were of a pre- or post-European origin. Pre-European origin would indicate possible burials. Post-European construction suggests that these cairns were a result of rock clearing activity associated with agricultural practices. Additional analysis of these features was recommended.

Subsurface cultural material: Langenwalter (1974) reported that there was no apparent development of midden. Bean and Vane (1979) suggested that artifacts exposed by grading of access roads indicated a subsurface deposit of cultural materials. WESTEC (McCoy and Phillips 1980:210) excavated two 1.2 by 1.2 yard (1 by 1 m) test units at this locale. Minimal amounts of cultural material were retrieved. Maximum depth of cultural material was 12 inches (30 cm) and consisted of flakes and debitage.

Current Field Investigations

The entire site occupies the spine of a north-south trending ridge. The ridge is topographically distinct from the surrounding area due to deep canyons bordering its eastern and western sides. The main access road for the tower sites on the ridge runs north-south, ultimately linking up with other

towers along this particular right-of-way. Disturbance has mainly come about from maintenance activities on and along the existing dirt road. Within the archaeological site area, disturbance from road grading has been minimal. Only superficial scraping and road clearing is evident along the entire length of road within this area. The low slope gradient has lessened erosional disturbance of the area and has assisted in preservation of the road surface as well as the archaeological site itself.

Surface cultural material: Previous archaeological investigation (McCoy and Phillips 1980) determined that while subsurface cultural materials occurred in portions of the site, no subsurface cultural deposits were present in the area of potential impact (i.e., the access road). As a result of these findings, it was recommended by the SHPO that only surface data recovery be conducted within the access road.

Of the 86 surface artifacts recovered from the site, nearly half were flakes and debitage (Table 29). Groundstone (manos and metates) artifacts were next in frequency, comprising over 20 percent of the inventory. The remaining artifact categories primarily included flaked stone tools such as scrapers, choppers and chopping tools. A previous inventory of the entire site revealed comparable artifact frequencies (McCoy and Phillips 1980), suggesting that data recovery of the access road produced a representative sample of the complete surface assemblage.

Laboratory Analysis

Edge angle measurements of all identifiable flake tools recovered from the site revealed a strong preference by aboriginal inhabitants for angles between 65 to 75 degrees (Table 30 and Fig. 4). Unifacial wear or retouch on these tools suggests that heavy duty scraping was a major activity at the site. Recent ethnographic studies conducted by Cantwell (1979:7) reveal that angles falling within this range reflect either hardwood scraping or hide scraping.

Research Design Application

Site Activity/Function

Because of the high frequency of milling implements and occurrence of milling features at the site (several were found during previous investigations), it is thought that the site functioned as an extractive camp devoted to procurement and processing of local plant resources. Edge

TABLE 16
Ora-495 SURFACE ARTIFACTS

ARTIFACT TYPE	NUMBER	PERCENT
MANOS		
Unifacial, unshaped	5	5.8
Bifacial, unshaped	7	8.1
Bifacial, shaped	1	1.2
METATES	5	5.8
CORES	9	10.5
FLAKES	22	25.6
DEBITAGE	18	20.9
HAMMER-POUNDER	4	4.7
RETOUCHED FLAKE	4	4.7
UTILIZED FLAKE	2	2.3
SIDESCRAPERS	3	3.5
ENDSCRAPER	1	1.2
CHOPPERS	2	2.3
CHOPPING TOOLS	2	2.3
COMPOSITE	1	1.2
TOTAL	86	100.1

TABLE 17
Ora-495 TOOL EDGE ANGLES

ANGLE	N	PERCENT
45°	2	6.9
50°	1	3.4
55°	1	3.4
60°	1	3.4
65°	6	20.7
70°	5	17.2
75°	4	13.8
80°	1	3.4
90°	2	6.9
95°	3	10.3
105°	1	3.4
110°	1	3.4
115°	1	3.4
TOTAL	29	99.6

$\bar{X}$ = 74.8
SD = 17.8

TABLE 18
Ora-495 ARTIFACT TYPE AND MATERIAL

MATERIAL														
FELSITE	-	-	1	-	-	-	-	-	-	-	-	-	-	1
BASALT	-	-	1	1	-	-	-	-	-	-	-	-	-	2
QUARTZITE	-	-	17	14	3	1	1	-	2	2	9	3	1	53
GRANITE	12	2	-	-	-	-	-	-	-	-	-	1	-	15
RHYOLITE	-	-	-	-	-	1	-	-	-	-	-	-	-	1
ANDESITE	-	-	-	-	-	-	1	-	-	-	-	-	-	1
BRECCIA	1	-	-	-	-	-	-	-	-	-	-	-	-	1
CHERT	-	-	2	1	-	-	1	1	-	-	-	-	-	5
CHALCEDONY	-	-	1	-	-	-	-	-	-	-	-	-	-	1
SANDSTONE	-	3	-	-	-	-	-	-	-	-	-	-	-	3
QUARTZ	-	-	-	2	1	-	-	-	-	-	-	-	-	3
TOTAL	13	5	22	18	4	2	3	1	2	2	9	4	1	86
PERCENT OF TOTAL	15.1%	5.8%	25.6%	20.9%	4.7%	2.3%	3.5%	1.2%	2.3%	2.3%	10.5%	4.7%	1.2%	

angle analysis, as discussed above, adds further support to this interpretation which is entirely consistent with previous assessments of the site (Dodge 1978, McCoy and Phillips 1980). As a previous investigation suggested (Dodge 1978), locating on this particular ridge would have placed aboriginal inhabitants conveniently close to a major confluence containing a variety of important plant resources.

Chronology

The strong focus on plant processing with an emphasis on the use of manos and metates is indicative that the site falls within the Encinitas tradition (Milling Stone Horizon). However, in the absence of diagnostic artifacts (e.g., cogstones) and absolute dating, this assignment must remain speculative.

Site Disturbance

There were more artifacts on the access road surface in the current survey than in 1980. Rains, or disturbance by cattle, may have brought them to the surface. See Maps D-7 and E-7, Appendices D and E.

H. Ora-496

Site Documentation

Previously recorded by: P. Langenwalter (1974).

Later recorded by: W. Dodge (1978); Bean and Vane (1979).

Temporary/other site designations: Field No. 3 (1974); CSRI-32 (1979).

Site Location

On a low hill adjacent to Laguna Canyon Road in Laguna Canyon.

Previous Fieldwork

Surface cultural material: Langenwalter (1974) cited manos, a chipped stone scraper, and chipped stone. Pecten sp. shell was also observed. Dodge (1978) described this site as containing metates, manos, hammer-pounders and chipped stone. No shell was reported at that time. Bean and Vane (1979) located five manos, two quartzite cores, and a metamorphic tool. WESTEC site assessment (McCoy and Phillips 1980) identified 26 artifacts, most of them situated on a south-facing slope of the knoll. In addition, 19 shell

fragments were noted. Milling tools were represented by two metates and eight manos. Tool production activity was suggested by the presence of cores, flakes and debitage. Core materials consisted of basalt, quartz, and an undetermined lithic type. Flakes noted were of the same material types with the addition of chert. With the exception of a possible pushplane manufactured from quartzite, flaked tools were made from basalt. Chert, quartz, quartzite, and metavolcanics were present in minimal amounts.

Subsurface cultural material: WESTEC's subsurface investigation (McCoy and Phillips 1980) consisted of excavation of two 1.2 by 1.2 yard (1 by 1 m) test units. One unit produced no cultural material. Testing of a second unit produced only shellfish remains, found at a maximum depth of 20 inches (50 cm). Species recovered included Aequipecten circularis, Balanus sp., and Mytilus sp. Seasonal exploitation (September to April) is indicated by the presence of California mussel, Mytilus californicus. Two of these species are associated with intertidal zones along the rocky shores --mussel (Mytilus californicus) and barnacle (Balanus sp.). The other, Aequipecten circularis, is more commonly associated with a bay/estuary environment.

Current Field Investigation

Ora-496 is located atop a small north-south trending ridge deriving from the Laguna Hills. Cultural material, though present on the ridge top, is mostly concentrated on the south-facing slope of the site. Slope wash may have been responsible for depositing artifacts on the slope, although other factors (e.g., cultural) also may have been operative during prehistory.

Vegetation at the site was dense and primarily composed of wild artichokes and introduced grasses. Poor ground visibility hampered mapping and collecting procedures. Nevertheless, by partially clearing areas of thick vegetation and by using specialized survey techniques (e.g., close interval transects) most of the cultural material within the impact zone was located and collected.

Site disturbance is light to moderate and has resulted from maintenance activities conducted on the access and stub roads. Due to high potential for water erosion, roads in the immediate area need to be refurbished on a regular basis. Regrading of damaged roads has entailed in certain areas the removal of 8 to 12 inches (20 to 30 cm) of topsoil. Close examination of backfill along either side of the access road suggests that the most recent grading was done within two or three months before this investigation.

Surface cultural material: Previous archaeological investigation (McCoy and Phillips 1980) determined that while subsurface cultural materials may occur in portions of the site, no subsurface cultural deposits were present in the area of potential impact (i.e., the access road). As a result of these findings, it was recommended by the SHPO that only surface data recovery be conducted within the access road.

Only four artifacts (two manos, one core and one piece of debitage) were located and collected from the impact zone of the site. Other artifacts were observed and recorded at the site but were not collected. The most notable of these was a mortar fragment, possibly of the globular type. Shell was also observed, including Chione sp. and Aequipecten sp., both of the bay/estuary environment, and Mytilus Californicus, a rocky coast shellfish.

Laboratory Analysis

Because of an extremely small sample size and because flake tools were not recovered, analysis of the four artifacts remained on the descriptive level.

Research Design Application

Chronology

Two components may be present at Ora-496. Manos, metates, and large scraper planes observed at the site may indicate the Milling Stone Horizon (Encinitas Tradition), while the presence of shellfish and a mortar fragment suggest the Late Horizon (Shoshonean Tradition). However, as with many of the sites dealt with in this study, the lack of absolute dates and diagnostic artifacts (e.g., projectile points) makes these chronological statements purely conjectural.

Site Activity/Function

From previous investigations (Langenwalter 1974, Dodge 1978, Bean and Vane 1979, McCoy and Phillips 1980) and observations made during the present study, the site appears to be a limited use area focused on the gathering and processing of seeds and nuts during certain times of the year. Seasonal use of the site can be partially determined by examining the natural history of a shellfish found at the site: the mussel. The California mussel (Mytilus

californicus) has the potential to accumulate a deadly toxin produced by dinoflagellates of the genera Gonyaulax. Commonly referred to as the red tide, these dinoflagellates are dangerously active in the summer months, making mussels poisonous to consume during the same months. Only during the months between September to April can these particular shellfish be eaten safely (Morris 1966). Therefore, it is quite plausible that the site was occupied during the spring and fall months when not only shellfish from the nearby coast, but also seeds and nuts would be available. The high frequency of milling artifacts (e.g., manos, metates and mortars) observed at the site substantiates this subsistence focus, as does the presence of abundant oaks and seed bearing plants in the immediate vicinity.

Site Disturbance

Ground disturbance has come solely about from grading and maintenance of the dirt access and stub road at the site. Recent grading, evident in most areas of the road, attained a maximum depth of 12 to 16 inches (30 to 40 cm). It was expected that excavation of this magnitude would have eliminated any artifacts on and adjacent to the road. It was found, however, that there were three artifacts on the access road, where there had been one before (see Maps D-8 and E-8 in Appendices D and E). It is possible that the artifacts were brought to the surface by the grading.

I. Ora-498

Site Documentation

Previously recorded by: P. Langenwalter (1974).

Later recorded by: W. Dodge (1978); Bean and Vane (1979).

Temporary/other site designations: CSRI-228.

Site Location

West-sloping knoll in Trabuco Arroyo (1974); located on the first terrace above Trabuco Canyon (1978).

Previous Fieldwork

Surface cultural material: Recorded by Langenwalter as an extensive surface scatter of artifacts on the knoll and its western slopes, consisting of manos, metate fragments, and hammerstones (1974). Several possible rock features were also observed. No chipped stone artifacts were noted at that time. In 1978 Dodge recorded the site as comprised of a widely dispersed surface scatter of artifacts, including groundstones and a few hammerstones. The artifacts were observed primarily to the west and southwest of a transmission tower. WESTEC's investigation (McCoy and Phillips 1980) documented 109 surface artifacts. Seventy-seven percent of the artifacts catalogued were representative of milling activities. Flaking, cutting/scraping, and chopping/pounding implements accounted for seven percent of the assemblage. Flake tools were composed primarily of basalt, with lesser quantities of felsite, quartzite and quartz occurring in a surface context. Nineteen objects exhibit medium to heavy patination. A single blade fragment composed of milky quartz was observed on the access road near the tower.

Groundstone artifacts included a number of subtypes. Of 29 manos catalogued, 15 were shaped (12 of these were bifacial). Seven of the unshaped manos were unifacial. Metates were a significant artifact type, not only in quantity but also in terms of a variety of subtypes. A total of 55 metates/metate fragments was observed on the surface. The largest quantity of metates was located near the top of a steep drainage in the southwestern portion of the site. In addition, three rock clusters were recorded as features due to their association with cultural materials (metates, manos, and tools). A discoidal was observed on the surface at Ora-498. This groundstone object exhibited pecking in the center of one side.

Subsurface cultural material: Two test units were excavated at Ora-498 by WESTEC field crews (McCoy and Phillips 1980). Only one unit produced cultural material (glass fragments which were dated circa 1880 and 1915). No pre-European materials were retrieved.

Current Field Investigation

Ora-498 is situated on the first terrace east of and adjacent to Trabuco Canyon. The terrace as well as the hills east of it have been subjected to intense agricultural activities and are currently planted in commercial grasses (alfalfa, barley, etc.). Disking and possibly plowing have had a marked adverse effect on surface integrity of the site, displacing and dispersing artifacts and features from

original provenience. Disturbance, however, has not totally destroyed the scientific value of the site. Its high artifact yield and strong milling component give the site a certain degree of uniqueness for the general area, especially in regards to information dealing with settlement-subsistence patterns. Data recovery at the site, while representing a small sample size, may provide good baseline data for future research in such matters.

Surface cultural material: As with the first complete inventory of the site (McCoy and Phillips 1980), groundstone artifacts were the most prevalent artifact type found during data recovery (Table 33). Nearly 50 percent of the artifacts recovered were grinding artifacts, most of which were manos. Other artifacts relating to plant processing were scrapers and heavy duty flake tools, most often seen ethnographically as vegetal processing implements. Cutting implements were weakly represented in the artifacts collected, with only one flake reflecting this type of use. Cutting, though probably a minor activity at the site, was substantiated during a previous investigation (a blade was found by McCoy and Phillips in 1980).

Laboratory Analysis

With the exception of the flakes discussed above, all flake tools examined exhibited edge angle greater than 45 degrees (Table 34), suggesting that scraping of vegetal material was a major activity. The very obtuse angles observed could have been used for hardwood shaping or scraping. Less obtuse angles on flakes found at the site 50 to 60 degrees) suggest that hide scraping may have been a minor, but important activity as well.

Research Design Application

Chronology

The site was interpreted by previous investigators (Langenwalter 1974, Dodge 1978) to be a millingstone complex. The current examination of the site led to a similar interpretation-- of a single component from the Milling Stone Horizon (Encinitas tradition) dating to between 7000 and 3000 BP. This assignment is based on three types of evidence: 1) the site has an extraordinary number of milling artifacts, which is a common occurrence only at single component Milling Stone sites (Greenwood 1969, Warren 1968:6); 2) the discovery of a discoidal artifact by McCoy and Phillips (1980) suggests an early occupation of the site; Van Horn (1980:89) and others (Farmer 1952, Warren

TABLE 19
Ora-498 SURFACE ARTIFACTS

ARTIFACT TYPE	NUMBER	PERCENT
MANOS		
Unifacial, unshaped	4	19.0
Bifacial, unshaped	5	23.8
METATE	1	4.8
FLAKE	5	23.8
DEBITAGE	2	9.5
SIDESCRAPER	1	4.8
HAMMER-POUNDER	1	4.8
UTILIZED FLAKE	2	9.5
TOTAL	21	100.0

TABLE 20
Ora-498 TOOL EDGE ANGLE

ANGLE	N	PERCENT
45°	2	6.9
50°	1	3.4
55°	1	3.4
60°	1	3.4
65°	6	20.7
70°	5	17.2
75°	4	13.8
80°	1	3.4
90°	2	6.9
95°	3	10.3
105°	1	3.4
110°	1	3.4
115°	1	3.4
TOTAL	29	99.6

$\bar{X}$ = 74.8
SD = 17.8

1967) feel that discoidal artifacts are diagnostic for the Milling Stone period and were possibly non-utilitarian objects (Farmer believes they were used as gaming pieces); 3) heavy patination, although a relative indicator of great age, was observed on numerous artifacts.

Site Activity/Function

As indicated by the predominance of milling and vegetal processing implements, the site appears to be a limited activity area focused on the exploitation of plant foods and materials. Current vegetation (Coastal Sage Scrub), although weakly represented in the general area, contains many species known to have been exploited by aboriginal people for seeds and fiber (Balls 1962). If the past vegetation pattern was similar and more extensive during prehistoric times, the assumed subsistence focus at the site is easily understood.

As discussed previously, a secondary subsistence activity at the site may have been related to cutting or butchering. Hunting, as suggested by a blade and a flake "knife" found at the site, may have occurred as a supplemental subsistence activity.

Site Disturbance

Although comparable artifact type frequencies and quantities were revealed from both inventories, a redistribution of artifacts has come about in the last one and one-half years (see Maps D-9 and E-9 in Appendices D and E). Grading, which was recently carried out on the access road, undoubtedly was responsible for moving artifacts from their original provenience. It is believed that the grading was done in an east to west direction, since more of the artifacts are now were located in the eastern segment of the road, whereas fewer are in the area immediately west of the tower.

J. Ora-499

Site Documentation

Previously recorded by: P. Langenwalter and J. Howard (1974).

Later recorded by: W. Dodge (1978); Bean and Vane (1979).

Temporary/other site designations: Field No.1 (1974); CSRI-323 (1979

Site Location

On west side of Laguna Canyon Road adjacent to and west of Poh Ranch.

Previous Fieldwork

Surface cultural material: Manos, a metate, a mano hammerstone, and a chopper were reported by Langenwalter in 1974 at this locale. In addition, two mano fragments were observed by Dodge (1978). Site re-evaluation (Bean and Vane 1979) indicated the presence of manos, a metate fragment, a quartzite core, ingeous tools, and chalcedony flakes. Artifact density was low and scattered in distribution. Forty-nine artifacts were cataloged by WESTEC (McCoy and Phillips 1980). A majority of artifact types were perceived as reflecting flaking and milling activities. Flaked lithics were primarily of basalt, with chalcedony, rhyolite and felsite materials comprising the remaining lithic types. Patination was absent, as were characteristics which could have served as an aid in reconstructing specific flaking/manufacturing techniques. A single shellfish fragment (Laevicardum substriatum, egg cockle) was identified at Ora-499. The species is common to sandy bottoms and sloping banks in bays or offshore.

Subsurfact cultural material: Excavation of two test units by WESTEC (McCoy and Phillips 1980) resulted in the recovery of a limited amount of cultural material. Only one unit produced cultural material. This included a wedge-shaped mano at a depth of 4 to 8 inches (10 to 20 cm). Fire-cracked rock was observed at this level. Unit excavation to a depth of 16 inches (40 cm) revealed no additional cultural material.

Current Field Investigation

Ora-499 is located on the east-facing slope of a gentle hill west of and adjacent to Poh Ranch. The site and its immediate environs appear to have been disked and subjected to moderate to heavy livestock grazing for the past few decades. Erosion is also evident in the form of gully and sheet washing over the entire extent of the site. Primarily due to these factors, surface distribution of artifactual material does not to any degree reflect original provenience.

Native vegatation within the vicinity of the site is strictly limited to minor creeks. Within these areas riparian species such as willow and other moisture loving species

abound. Prehistorically, species associated with Coastal Sage Scrub and Valley Grassland communities probably occurred over the general area but were reduced to relict communities from ambient grazing and agricultural activities.

Surface cultural material: Only 13 items were recovered from the impact zones of the site. As with most of the sites in the general area, milling implements are highest in frequency (Table 21). Flakes and debitage were second in frequency with hammer-pounders and utilized flakes the least prevalent. Previous inventory of the site (McCoy and Phillips 1980) revealed comparable frequencies in only the mano/metate and debitage categories. Disparate findings with the 1980 inventory, which included the entire site, suggest that the present sample is not representative of the site.

Unreported by the 1980 inventory is a historic trash pit (measuring 33 by 33 ft. [10 by 10 m]), located in the northeastern portion of the site outside the right-of-way. The pit contains discarded farming implements (e.g., old plows) and household trash. The material may have historic significance of its own.

Laboratory Analysis

Edge angle for all recovered flake tools exceeded 45 degrees (Table 22) suggesting moderate to heavy scraping activities for these implements. Scraping of vegetal material is plausible and consistent with the remaining tool assemblage, which is composed of milling artifacts and hammer-pounders. In the latter case the one recovered hammer-pounder exhibited a utilized edge suggestive of scraping and pounding, possibly on a hard wood surface.

Research Design Application

Chronology

Chronological assignment of the site is difficult to assess in the absence of diagnostic artifacts and because of the small sample size. Given the artifact types present, occupation of the site could have taken place any time during the last 7000 years. However, the lack of patinated artifacts and the presence of shaped manos (often thought to be a late characteristic) indicates the site may either be dated from the late Campbell or early Shoshonean period (Intermediate or Late Horizon).

Site Activity/Function

The statement that "...this locale probably was not used

TABLE 21
Ora-499 SURFACE ARTIFACTS

ARTIFACT TYPE	NUMBER	PERCENT
MANOS		
Bifacial, shaped	1	7.7
Wedge-shaped	1	7.7
METATES	3	23.1
FLAKES	2	15.4
DEBITAGE	2	15.4
HAMMER-POUNDERS	2	15.4
UTILIZED FLAKES	2	15.4
TOTAL	13	100.1

TABLE 22
Ora-499 TOOL EDGE ANGLES

ANGLE	N	PERCENT
50°	1	25.0
55°	1	25.0
65°	1	25.0
100°	1	25.0
TOTAL	4	100.0

$\bar{X}$ = 67.3
SD = 21.1

over long periods of time nor was the activity intense" (McCoy and Phillips 1980:205) is consistent with the present findings, which suggest temporary and specialized activity directed toward the processing and procurement of localized plant resources. Hunting of small or large mammals may have been of some importance but is unsubstantiated from the recovered material.

Site Disturbance

Twelve artifacts were found in the area where there were 28 in 1980 (McCoy and Phillips 1980). They are also further downhill than in 1980. Although the area has been and is subjected to disking and farming activities, movement of artifactual material may have been particularly influenced by water erosion. As is evident in most areas of the site, sheet and gully washing is very active on the slopes of the site. Artifact distribution appears to be reflected by this fact, exhibiting a pattern previously documented for sites with similar topography (Rick 1976). At these sites (i.e., with sloping terrain and heavy water erosion), heavier objects travel farther and are more likely to be in the lower part of the site. At Ora-499 this is the pattern exhibited, with heavier artifacts being in the lower portions of the site (see Maps D-10 and E-10 in Appendices D and E).

K. Ora-725

Site Documentation

Previously recorded by: T. Cooley and A. Schilz (1978).

Later recorded by: Bean and Vane (1979).

Temporary/other site designations: CSRI-410.

Site Location

Located on and east-west trending ridge between Oso and Aliso Creeks, south of El Toro Road.

Previous Fieldwork

Surface cultural material: A survey team (Cooley and Schilz 1978) reported locating metate fragments, manos, a hammerstone, and several fire-cracked rocks. WESTEC (McCoy and Phillips 1980) cataloged nine artifacts for the site area. Waste material consists of 44.4 percent of the total surface assemblage, including a total of two basalt flakes, one quartzite flake, and one chert flake. Artifacts associated

with grinding activities included manos (33 percent of the total assemblage). Chopping/pounding tools make up 22.2 percent of the surrounding face artifacts observed at Ora-725.

Subsurface cultural material: One unit adjacent to the access road was excavated to a maximum depth of 16 inches (40 centimeters). Miscellaneous historic debris (glass, metal) and a single flake were the only cultural material retrived from the test unit. Analysis of pollen somples from Ora-725 suggested climatic conditions similar to the present regime. Common genera in these samples were Asteraceae (sunflower) and Poaceae (grass family), both of which occur in arid to subtropical climatic conditions.

Current Field Investigation

Ora-725 is on a high, narrow ridge oriented in an east-west direction. The site is primarily limited to the eastern portion of the ridge where a steel lattice tower and access road junction exist. Due to these facilities, a substantial portion of the site has been greatly disturbed. Disturbance, however, has not continued since initial construction of the dirt roads and tower. Road maintenance activities apparently are not warranted in this high, well drained area. The deepest cuts observed in the immediate site area do not exceed 4 inches (10 cm) and were probably excavated more than three years ago.

Vegetation in non-disturbed areas of the site consist of species associated with the Coastal Sage Scrub community. Most of these plants are low-lying and densely established. Although surface observations in these areas were difficult to conduct, most areas within the right-of-way were not so heavily vegetated and surface collection of potentially impacted material was unimpeded.

Surface cultural material: Previous archaeological investigation of the site (McCoy and Phillips 1980) determined that no subsurface cultural deposits were present in the area of potential impact (i.e., the access road). As a result of these findings, it was recommended by the SHPO that only surface data recovery be conducted within the access road.

McCoy and Phillips (1980), during their assessment of the site, located only nine artifacts. As stated above, vegetation is heavy in most areas of the ridge and surface visibility very poor. It is not unlikely that many more artifacts exist on the surface but have gone unnoticed due to the heavy ground cover. The present investigation found even less material since it was limited to the inventory and

collection of the right-of-way only. The material collected was unremarkable in that only two tools were found (Table 37), both quite undistinguishable from other tools of their type coming from other sites in the general area. Only one tool, a hammer-pounder, had a comparability to the previous investigation.

Laboratory Analysis

The sample is unquestionably too small to offer even suggestive statements of predominant tool type and function at the site. Of the one recovered utilized flake, it can be stated that its edge angle (63 degrees) on the utilized edge reflects scraping of vegetal material, possibly willow or cactus, both native species to the immediate area.

Research Design Application

Chronology

Little can be said about site chronology. Sample size is small, and there are no diagnostic artifacts. Judging from the lack of patination and the assumed association with other sites in the area, the site may date from the Late Horizon (early Shoshonean).

Site Activity/Function

Vegetal processing was the major and possibly sole activity at the site. The manos found during the previous investigation and the large scraping tools and chopping tools present strongly support this interpretation. The lack of subsurface material (McCoy and Phillips 1980:184) and the limited horizontal extent further suggest a temporary or seasonal use or reuse of the area.

Site Disturbance

In the current study, three artifacts were found in the access road where four had been found before (McCoy and Phillips 1980). Road grading and vehicular traffic (as evidenced by road backfill and tire tracks) have been active on the access roads leading to and away from the site. Grading has probably nad more effect on artifact movement than traffic (see Maps D-11 and E-11 in Appendices D and E).

TABLE 23
Ora-725 SURFACE ARTIFACTS

ARTIFACT TYPE	NUMBER	PERCENT
DEBITAGE	1	33.3
UTILIZED FLAKE	1	33.3
HAMMER-POUNDER	1	33.3
TOTAL	3	99.9

L. Ora-824

Site Documentation

Previously recorded by: J. Oxendine and W. Pink (1979); Bean and Vane (1979).

Later recorded by: M. Cottrell (1980); same area surveyed in 1973 by Archaeological Research, Inc., but site area not reported.

Temporary/other site designations: CSRI-250.

Site Location

On and between two small knolls to the east of a Southern California Edison access road.

Surface cultural materials: This site is variously described as a quartz quarry, flake scatter,cores, tools, and a possible house floor (Oxendine and Pink 1979). The artifacts were manufactured from chalcedony, quartz, and quartzite. Site evaluation by M. Cottrell (1980) confirmed basic site artifact content. Site anlysis by WESTEC (McCoy and Phillips 1980) was confined to the immediate right-of-way of the project. Six artifacts were observed. Included were flakes and debitage, a basalt core and a chert side-scraper. Cursory examination of Ora-824 to the east revealed chalcedony and quartz flakes in an area not yet subjected to disking. Pieces of milky quartz were also noted scattered over the knoll, although cultural alteration of the material could not be established at that time.

Subsurface cultural material: Cottrell (1980) advised that inspection of erosional cuts indicated site depth to be 24 to 32 inches (60 to 80 cm) (McCoy and Phillips 1980:Appendix A). Bean and Vane (1979) also suggested that subsurface cultural deposition was present, based on their surface site survey.

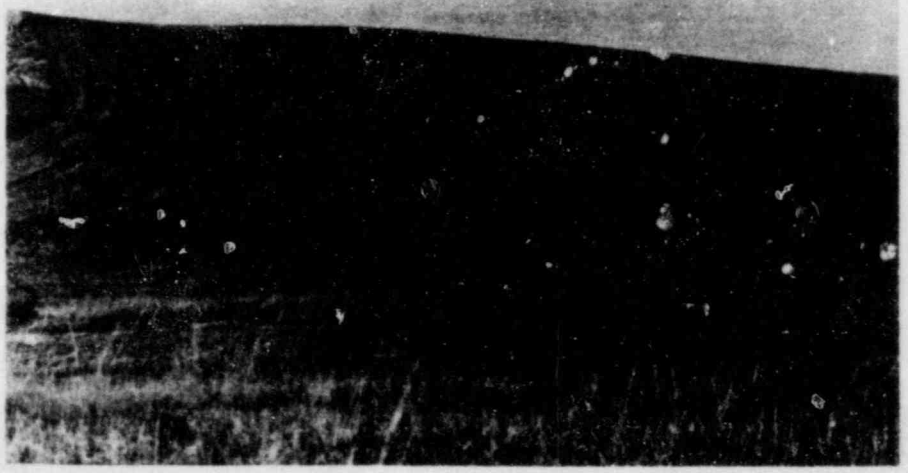
Current Field Investigation

Ora-824 is on the west-facing slope of a gentle hill located directly east of the SCE access road. Two knolls occur on the west side of the road and roughly demarcate the southern, northern, and western limits of the site. Although some disturbance has come about from road construction and maintenance activities, by and large most damage to the site has been incurred from agricultural use of the area. As documented by Photograph 5, disking is the major form of agricultural activity and is apparently done two or three times a year. Erosion has had some effect on site integrity but appears quite minimal in relation to the other sources of disturbance.

Vegetation adjacent to the site is comprised of introduced grasses reflecting its primary use as cropland. Native vegetation occurs to the south in deep gullies and canyons which apparently foster some spring or seepage activity. Some of these stands appear quite lush (Photograph 6) and are defined as riparian communities.

Surface cultural material: As with the previous investigation, only the right-of-way was resurveyed and surface collected. Due to property owner (Mission Viejo) stipulations, an overview of the entire site was not permissible. Even so, discussions with Mission Viejo archaeologist Marie Cottrell (1981) and information gleaned from previous investigations, provided enough support data to adequately interpret the meager sample recovered from the site.

Comparable results were obtained from the McCoy and Phillips (1980) investigation and the present study (Table 24). In both inventories, fewer than eight artifacts were found and in each debitage and flakes were dominant. However, identifiable tools were found found in the previous investigation, but not during the current study. Notable in both studies was a predominance of milky quartz, apparently distinctive for this general area.



DISCING AT ORA-824

PHOTO
5

RIPARIAN VEGETATION
ADJACENT TO ORA-824

PHOTO
6

TABLE 24
Ora-824 SURFACE ARTIFACTS

ARTIFACT TYPE	Present study NUMBER	PERCENT	McCoy & Phillips 1980 NUMBER	PERCENT
CORE	-		1	17
FLAKES	3	43	2	33
DEBITAGE	4	57	2	33
SIDESCRAPER	-	—	1	17
TOTAL	7	100	6	100

Laboratory Analysis

Two utilized flakes were recovered and found to possess edge angles greater than 60 degrees. Both were made from metavolcanic material and were singularly large; one item weighed over 20 grams. The large size, unifacial wear patterns, and angles greater than 60 degrees suggest heavy scraping activities such as seen ethnographically on woodworking stools. (Gould 1980:119; Cantwell 1979:7).

Research Design Application

Chronology

As with the previous study (McCoy and Phillips 1980), chronological assignment for the site was not possible with available data. Large metavolcanic tools and milling artifacts (previously recorded) present at the site suggest that the site fits within the Encinitas tradition (Milling Stone Horizon).

Site Activity/Function

Large scrapers with obtuse angle and milling artifacts suggest that the site is a specialized activity area focused on plant procurement and processing. However, in the absence of a representative sample, this cannot be assumed as the overall function of the site. It is conceivable that the sampled area is an activity zone of a large habitation site. Evidence gathered by a previous investigator (Cottrell 1980) does seem to support this idea. Apparently the site is fairly large and contains substantial cultural deposits.

Sourcing of Lithic Material

Milky quartz was noted by McCoy and Phillips (1980:221) and by the present investigation to be the predominant artifact material type (Table 25). Its uniqueness and high frequency at the site has also been remarked upon by other investigators (Cottrell 1982) who have traced its origin to a quartz outcrop west of and adjacent to the site. Although the area could not be examined during the current investigation, it has been reported that tools are not present at the quarry but that debitage is. The quartz material recovered from the site no doubt derives from this outcrop.

TABLE 25
Ora-824 SURFACE ARTIFACTS

MATERIAL	FLAKE	DEBITAGE	TOTAL
	No.	No.	No.
QUARTZITE	2	-	2
CHERT	-	2	2
QUARTZ	1	2	3
TOTAL	3	4	7

Site Disturbance

Significant artifact movement on the access road did not occur in the last one and one-half years (see Maps D-12 and E-12 in Appendices D and E). Although two additional artifacts were discovered during the current study, artifact distribution was very similar to that seen with the initial inventory. Lack of grading in the last few years, and light vehicular traffic on the access road may explain the lack of pronounced artifact movement.

M. Ora-825

Site Documentation

Previously recorded by: J. Oxendine, W. Pink, B. Crespin (1979); Bean and Vane (1979).

Not otherwise recorded.

Temporary/other site designations: CSRI-418.

Site Location

Located on a northeast by southwest trending ridge above a drainage (a tributary to Aliso Creek).

Previous Fieldwork

Surface cultural material: This site has been described as a flake scatter with possible subsurface component (Oxendine and Pink 1979). Artifacts observed at that time included manos, cores, and flakes. Fire-affected rock was also reported. A total of 41 surface artifacts was catalogued by WESTEC (McCoy and Phillips 1980). These objects, which were widely scattered over the site area, represent five artifact categories: groundstone, waste production, unifacial tools, miscellaneous modified lithics, and ecofactual material. Groundstone artifacts, representing 14.6 percent of the surface assemblage, consist of four manos and two metate fragments. Artifacts indicative of tool manufacturing comprise 70.8 percent of all cultural material catalogued at Ora-825. Flakes are equally divided between chert, basalt, and quartzite. A large chert nodule weighing approximately five pounds was observed in the southeast portion of the site. This nodule appears unmodified, but may have been brought to the site by Native Americans for the purpose of tool manufacture.

Cutting and scraping tools were also mapped at this locale. The distribution of surface cultural material at Ora-825 suggests that a wider range of activities took place in the southern portion of the site.

Subsurface cultural material: WESTEC (McCoy and Phillips 1980) excavated three test units at Ora-825. The maximum unit depth was 40 inches (100 cm). Cultural material unearthed from the subsurface deposit included 41 flakes and debitage. Artifacts were of chert, a lithic material also common in the surface material at this site. Pollen samples taken from within the test units revealed climatic conditions similar to the present. Frequently occuring pollens included Asteraceae (sunflower family), Poaceae (grass family), and Quercus sp. (oak).

Current Field Investigation

Ora-825 is located on a southwest by northeast trending

ridge adjacent to and above a drainage which flows into Aliso Creek. Although much of the ridge is undisturbed and blanketed with native vegetation, the area in the immediate vicinity of the site has been subjected to varying degrees and forms of disturbance. Primarily, the construction and maintenance of the access road leading to Tower 23-3 within the southern portion has had the most pronounced adverse effect on the site. Grading at the terminus of the access road had been done in the last few months and has resulted in the profound movement of approximately 100 cubic yards (76 m^3) of earth. Artifact diversity and density, unfortunately, is highest in this particular area. The remaining protion of the site is somewhat intact save for the access road traversing it. Vegetation within this area is heavy and is mostly Inland Sage Scrub with Opuntia sp. as a dominant. A riparian community exists adjacent to and west of the site.

Surface cultural material: Previous archaeological investigation (McCoy and Phillips 1980) determined that while subsurface cultural materials occurred in portions of the site, no subsurface cultural deposits were present in the area of potential impact (i.e., the access road). As a result of these findings, it was recommended by the SHPO that only surface data recovery be conducted within the access road.

McCoy and Phillips (1980) found that the site contained grinding, scraping, cutting, and pounding artifacts, with milling artifacts accounting for most of the total inventory. Resurvey conducted during the current study of the right-of-way did not show a similar range in artifact types; only cutting and scraping were represented in the collected materials. Faunal remains and fire-cracked rock were present in the southern portion of the site. The difference in inventory was probably brought about by road grading at the site, in the course of which an area was bulldozed, and dirt brought from north of the bulldozed area to be placed on top of the bulldozed area. The different artifact array probably came with the transported dirt. (See Maps D-13 and E-13 in Appendices D and E).

Laboratory Analysis

Two of the three flake tools recovered from the site exhibited edge angles (35 to 42 degrees) reflecting cutting activities. The third item possesses unifacial retouch and an edge angle of 80 degrees, suggestive of intensive scraping activities. Also notable was the predominance of crypto-crystalline material at the site and with the material collected. Over 70 percent of the collected artifacts were of this material type (Table 27).

Research Design Application

Chronology

Chronological or cultural affiliation cannot be readily discerned from the surface material observed and/or recovered. However, the small flake tools collected from the site are suggestive of the Late Horizon (Shoshonean Tradition). Both Warren (1967) and Wallace (1955) concur on this point; that is, that there was a tendency through time to adopt smaller, more refined tool types.

Site Activity/Function

The range of artifact types, the presence of subsurface material (McCoy and Phillips 1980), and the presence of fire-cracked rock suggest a maintenance camp as defined by Binford (1966). While both hunting and gathering were practiced by Native Americans occupying the site, gathering and processing of plant resources probably was the major focus.

Sourcing of Lithic Material

The high frequency of cryptocrystalline material at the site is understandable due to the proximity of a chert-chalcedony quarry. Van Horn (1980:27-28) has done exhaustive studies at this particular quarry (Ora-507) and has documented the various characteristics of the quarried material. From his work and from an informal survey during the current investigation, there can be little doubt that the cryptocrystalline quartz found at Ora-825 originates from this source.

Site Disturbance

Readily apparent at the site was the extensive disturbance resulting from road grading. Recent grading entailed the removal of many cubic yards of dirt from the section of the road north of the bulldozed area and deposition of this material in the southeastern section. The effect of this earth movement has been the transport of numerous artifacts from the upper portion of this site to the bulldozed section (see Maps D-13 and E-13, Appendices D and E).

TABLE 26
Ora-825 SURFACE ARTIFACTS

ARTIFACT TYPE	NUMBER	PERCENT
CORE	1	7
FLAKE	7	47
DEBITAGE	7	47
TOTAL	15	101

TABLE 27
Ora-825 ARTIFACT TYPES AND MATERIAL

MATERIAL	FLAKE	DEBITAGE	CORE	TOTAL
QUARTZITE	-	3	-	3
CHERT	5	1	1	7
CHALCEDONY	2	2	-	4
QUARTZ	-	1	-	1
TOTAL	7	7	1	15

N. Ora-830

Site Documentation

Previously recorded by: J. Oxendine, W. Pink, B. Crespin (1979); Bean and Vane (1979).

Not further recorded.

Temporary/other site designations: CSRI-423.

Site Location

Adjacent to an intermittent stream which flows westward into Santiago Creek.

Previous Fieldwork

Surface cultural material: Oxendine et al. recorded flakes, tools and a metate as well as bedrock mortars along the stream bank. Lithic material was primarily quartzite, chalcedony and chert. Twenty-five surface artifacts were located during WESTEC's field reconnaissance (McCoy and Phillips 1980). Flakes and debitage, a pestle, a metate, a core, a pushplane, a chopping tool, and a retouched flake were mapped. The dominant material types were chert, basalt, and jasper. Fourteen bedrock mortars were tabulated. Cultural activities represented by surface materials at Ora-830 include tool manufacture or maintenance, grinding, chopping, scraping, and cutting (tools found are associated with plant processing and, possibly, woodworking). Waste production material comprised 80 percent of the surface artifacts. Lithic tools comprised 12 percent and milling tools accounted for 8 percent of all artifacts observed.

Subsurface cultural material: Of two test units excavated at this locale, only one produced objects attributed to pre-European occupation. Flakes and debitage were present in all levels of Unit 2 to a depth of 16 inches (40 cm). Miscellaneous historic debris was recovered to a depth of 20 cm. Flake patination was evident, as well as diagnostic evidence pertaining to tool manufacturing technique.

Current Field Investigation

Ora-830 is adjacent to an intermittent stream which flows westward into Santiago Creek. The major portion of the site

is situated within a hollow containing oaks and scrub-like species. Disturbance from natural agents (i.e., water) is pronounced only on the steep access road dropping down to the site from the north. Here gully and sheet wash has channelized and potholed the road in numerous places. Maintenance (i.e., grading) of the road has also had an adverse effect on portions of the site.

Surface cultural material: Only five artifacts were located and collected from the access road traversing the site. Nearly half of these were milling implements associated with the grinding of hard seeds. The remaining tool, a large endscraper, reflects heavy scraping activity. The previous investigation (McCoy and Phillips 1980) identified additional artifact types at the site and these included a core, a pestle, flakes, debitage, a pushplane, a chopping tool and a retouched flake.

Artifacts and features observed but not collected during the current investigation included a milling feature (as previously reported in McCoy and Phillips 1980) adjacent to the creek. The milling station consisted of numerous mortar holes within a granitic outcrop water-worn by periodic creek overflow. Although no artifacts were observed in association with the milling station, a pestle was previously found within the feature during the National Register Assessment (McCoy and Phillips 1980).

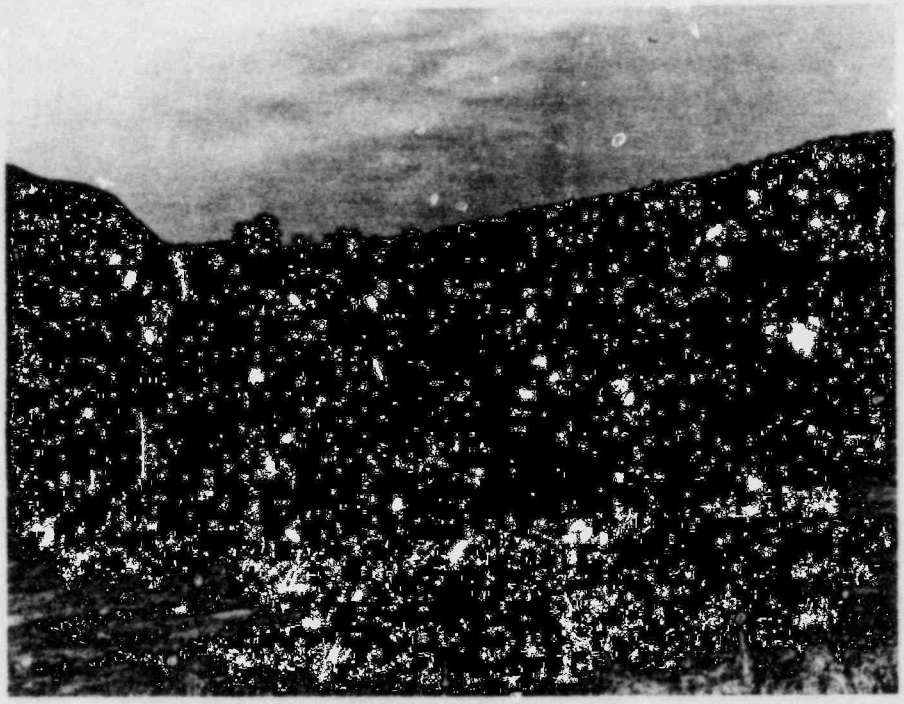
Laboratory Analysis

Only one flake tool, a large endscraper, was located and recovered at the site. The flake exhibits pronounced unifacial retouch on the distal end and possesses an edge angle of 59 degrees. Edge wear is also evident, suggesting heavy duty scraping, possibly of hides or plants. Tainter (1980) feels that this angle falls within the range commonly associated with plant fiber shredding and heavy scraping of wood.

Research Design Application

Chronology

The site, although lacking clearcut diagnostic artifacts, may date from after AD 1000. The presence of mortars and pestles is interpreted as reflecting either the Campbell or the Shoshonean Tradition (Intermediate or Late Horizon). However, the manos, metates, and large scrapers present suggest that the site could date from an even earlier tradition.



ORA-830: ROAD GRADING

PHOTO
7

Site Activity/Function

Without a doubt, the major subsistence focus at the site was the procuring and processing of seeds, nuts and other vegetal resources. Stands of oak and other seed and nut bearing trees and shrubs in the area lend support to this interpretation as does the overwhelming predominance of milling and vegetal processing tools. As a limited activity area, the site would have been occupied on a seasonal basis, possibly during the summer and fall months.

Site Disturbance

Three of five of the artifacts located during data recovery appeared undisturbed from their initial recording (see Maps D-14 and E-14, Appendices D and E).

O. Ora-831

Site Documentation

Previously recorded by: J. Oxendine, W. Pink, B. Crespin (1979); Bean and Vane (1979).

Not otherwise recorded.

Temporary/other site designations: CSRI-424.

Site Location

On Irvine Mesa, south of Silverado Canyon and east of Santiago Creek.

Previous Fieldwork

Surface cultural material: Oxendine, Pink and Crespin (1979) reported finding cores and flakes. The WESTEC site re-evaluation (McCoy and Phillips 1980) resulted in the recordation of 47 widely scattered artifacts. A majority of these items were observed within an existing access road. Seven shellfish fragments were also encountered in an unimproved road at the northern perimeter of the site. Chert was the most frequently occurring lithic material.

Subsurface cultural material: A subsurface investigation by WESTEC (McCoy and Phillips 1980) recovered 11 artifacts from two 3.3 by 3.3 feet (1 by 1 m) test units. Depths of excavation ranged from 8 to 16 inches (20 to 40 cm). Pollen analysis indicated climatic conditions similar to that of present day Southern Grassland Community.

Current Field Investigation

Ora-831 occupies the crown and south facing slope of a small hill located south of Silverado Canyon and east of Santiago Creek. Two tower sites are present on the hilltop as well as a series of dirt roads. Site disturbance has principally come from the grading and maintenance of these roads over the past few years. In some areas of the site, soil removal from grading has exceeded 12 inches (30 cm). In other areas, grading has been less profound and more recent.

Vegetation on the site was dense and composed of native shrubs and small trees of the Inland Sage Scrub community. Dense ground cover prohibited examination of the site in many areas outside the right-of-way corridor.

A majority of the artifacts observed at the site occurred on the south facing slope below the southernmost steel lattice tower. Many of these artifacts were found in recently created grading berms.

Surface cultural material: Previous archaeological investigation (McCoy and Phillips 1980) determined that while subsurface cultural materials may occur in portions of the site, no subsurface cultural deposits were present in the area of potential impact (i.e., the access road). As a result of these findings, it was recommended by the SHPO that only surface data recovery be conducted within the access road.

Comparable artifact type frequencies with the previous inventory of the site were revealed from the current investigation (Table 28). In both studies, flakes and debitage dominated the inventory, with core-base tools (chopping tools, hammer-pounders) second in frequency. Also similar in each inventory is the quantity of items identified (i.e., CSRI--34 items; WESTEC--47 items), suggesting that comparable sampling universes were involved. However, unlike the previous investigation, shellfish remains were not observed.

TABLE 28
Ora-831 SURFACE ARTIFACTS

ARTIFACT TYPE	This study No.	This study %	McCoy and Phillips 1980 No.	McCoy and Phillips 1980 %
CORES	2	5.9	1	2.1
FLAKES	19	55.9	24	51.1
DEBITAGE	8	23.5	17	36.2
HAMMER-POUNDERS	1	2.9	3	6.4
UTILIZED FLAKE	1	2.9	1	2.1
SIDESCRAPER	1	2.9		
ENDSCRAPER	1	2.9		
CHOPPING TOOL	1	2.9		
RETOUCHED FLAKE	—	—	1	2.1
TOTAL	34	99.8	47	100.0

Laboratory Analysis

Edge angle measurements conducted on unifacially retouched and utilized flakes revealed nine artifacts within the 50 degrees to 75 degrees range (Table 29). As suggested by Tainter (1980) and others (Cantwell 1979, Wilmsen 1970), scrapers possessing edge angles within this range are most effectively used for wood and/or bone scraping. The relatively large size of these items (all are over eight grams in weight) and the material type (mostly quartzite) further suggest heavy-duty scraping activities.

The predominant material type for all recovered artifacts was quartzite (44 percent). Cherts were second in frequency and ranged in color from a light gray to a milky white.

Research Design Application

Chronology

The large scraping tools present suggest an early occupation of the site (Table 30). However, the high frequency of these tools may be related to site function and therefore could reflect any time period. Without additional time sensitive data, definitive chronological assessment is impossible.

TABLE 29
Ora-831 TOOL FACE ANGLES

ANGLE	N	PERCENT
50°	2	22.2
55°	1	11.1
60°	2	22.2
75°	3	33.3
105°	1	11.1
TOTAL	9	99.9

$\bar{X}$ = 67.2
SD = 16.5

TABLE 30
Ora-831 ARTIFACT TYPES AND MATERIAL

MATERIAL	FLAKES	DEBITAGE	UTILIZED FLAKE	SIDE-SCRAPER	END-SCRAPER	CORE	CHOPPING TOOL	HAMMER-POUNDER	TOTAL No.	TOTAL %
FELSITE	2	1	-	-	-	-	-	-	3	8.8
BASALT	1	-	-	-	-	-	-	-	1	2.9
QUARTZITE	8	3	1	1	1	-	1	-	15	44.1
ANDESITE	-	-	-	-	-	-	-	1	1	2.9
CHERT	8	4	-	-	-	2	-	-	14	41.1
TOTAL	19	8	1	1	1	2	1	1	34	99.8

Site Activity/Function

The prevalence of large scraping tools and absence of cutting or hunting implements suggest a limited activity area devoted to vegetal processing. The site's proximity to Ora-830, a very obvious extractive camp for plant resources, adds further credence to this evaluation.

Sourcing of Lithic Material

Some of the chert artifacts recovered from the site may have been heat-treated prior to their production. Heat treatment of chert coming from a nearby quarry (Ora-507) has been documented by Van Horn (1980:117-120); the material turns white and becomes crazed. As most of the items found at Ora-831 were white to amber and exhibited pronounced crazing, the source of this material may have been Ora-507. However, without detailed petrological anlyses this conclusion must remain tentative.

Site Disturbance

Artifact distribution did not appear significantly different from the initial mapping of the site (see Maps D-15 and E-15 in Appendices D and E). Both studies revealed high artifact concentration in the lower portion of the site where the access road drops down into a hollow. Although 33 artifacts were found in comparable areas in each of the two studies, it cannot be determined how many of these are the same artifacts originally mapped by McCoy and Phillips (1980). It can be stated, however, that artifact types are different between the two studies. Given the moderate but continual road grading on the site, and the erosional and topographical factors present, artifacts may have a tendency to cluster in this particular area.

VII. DATA RECOVERY PROGRAM SUMMARY

A. Research Design Conclusions

Prior to implementation of fieldwork for the Data Recovery Program of 15 sites dealt with in the current study, a Research Proposal encompassing a series of testable postulates were outlined (CSRI 1981) in order to direct and optimize all facets of data collection. At the time of initial formulation of these postulates, it was felt that a certain amount of flexibility should be built into the research objectives and the field methods to accommodate unexpected discoveries in the field. Only minor changes in research scope was made, however, and most of the basic points of the research design were finally addressed.

Chronological investigation was especially fruitful at Ora-438, where two diachronically separate components were identified using artifact typology, radiocarbon and obsidian hydration dating. Analysis of site activity/function was also productive in that many of the archaeological sites investigated were assigned functions based on the results of the micro and macro analysis of the lithic material.

Sourcing of lithic material was also accomplished for some of the sites and was especially important to the interpretation of lithic material frequency at Ora-438. This included the sourcing of an obsidian specimen that was determined to have originated from the Coso area, thus suggesting an exchange network between central and southern California prior to AD 500.

Another research objective was that concerning site disturbance. It is apparent that limited vehicular activity occurring in areas of low slope gradient and minimal erosional activity (e.g., SDi- 6130) leads to little or no artifact movement. In areas of high slope gradient, such as that at SDi-6140, erosion brings about appreciable artifact disruption. The evidence suggests that the greatest amount of disturbance comes from the maintenance of roads (e.g., grading). In the various sites examined there were instances to show that grading may cover up artifacts already on the surface, bring subsurface artifacts to the surface, move artifacts downhill or in the direction of the grading, or bring dirt containing artifacts to a different place, covering up the original surface of the soil.

The results of this study contribute to the existing data base for both San Diego and Orange counties, the data acquired being most applicable to chronological and functional analyses.

B. Native American Concerns

Throughout the Data Recovery Program, Native American input was solicited. Both a Luiseno, Mr. Henry Rodriguez, and a Juaneno, Mr. Ray Belardes, participated as Native American observers during all phases of fieldwork implementation. Continued input was sought after the fieldwork phase to assure that Native American concerns were being addressed in analysis and report compilation.

In recent years, Native Americans in California have taken a number of steps to preserve their cultural heritage and the resources associated with that heritage. In 1977 they persuaded the California legislature to add Section 5097.9 to the California Public Resources Code. This section created the Native American Heritage Commission, which was given a legal mandate to "provide direction and share responsibility with state agencies in any negotiations with agencies of the federal government for the identification and protection of Indian culturally significant areas that are located on federal lands in California," for "identifying and protecting places of cultural significance to California Native Americans and for safeguarding Indian religious rights." It can "bring legal action to prevent damage to" and to assure Native Americans access to "places of religious significance on public property," and can "recommend to the Legislature procedures to encourage private property owners to preserve and protect sacred places..." (State of California 1978).

Native Americans in California have further been active with other Native Americans, resulting in the passage of Public Law 95-341, the American Indian Religious Freedom Act of 1978. This act declared "That henceforth it shall be the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possessions of sacred objects, and the freedom to worship through ceremonials and traditional rites" (Public Law 95-341).

The California Native American Heritage Commission (NAHC), by virtue of these laws, shares responsibility with various other California State agencies to see that Native Americans' values are not adversely impacted by projects such as the construction of high voltage transmission lines under regulations established by the federal government. In the four years since its establishment, the NAHC has taken vigorous action to identify places held sacred by the various Native American groups in the state, and to require

that the impact of proposed major projects on Native American values be determined by insisting that there be an ethnographic component in Environmental Impact Reports for state projects, and Environmental Impact Statements for federal projects. San Diego County and Orange County Native Americans have been active in the NAHC and have been involved in the establishment of procedures for carrying out the Commission's mandates. Some of the tasks of the Commission in southern California are delegated to the Southern California Tribal Council Chair. It has been arranged, for example, that the Council shall be immediately notified when any earth-moving activity uncovers a burial. There is a consensus among California Native Americans that burials should not be disturbed. There is also a consensus that archaeological sites are best left undisturbed, but there is a difference of opinion about whether sites that are uncovered by construction or other earth-moving activity should be reburied, scientifically excavated, or left to be destroyed.

Ethnographic and ethnological research prior to original survey of the project rights-of-way revealed numerous Native American interests pertaining to the current study area, including comments on construction and maintenance of transmission lines, value of archaeological sites and comments on archaeological techniques (Bean and Vane 1979). Many of these values/desires were reiterated during the present program and the assessment program (McCoy and Phillips 1980). Primary concerns described by Native Americans in discussions are as follows:

(1) Expressed concern for importance of preservation of archaeological sites and of cultural artifacts/features as part of not only their heritage but the history of the United States (CSRI 1979:7-36).

(2) Expressed desire to actively participate in the formulation of their own history, including Native American participation during all phases of archaeological investigation.

(3) Expressed concern for keeping all archaeological site locations separated from the current final Cultural Resource Report so that the public cannot locate and disturb exposed sites.

(4) Expressed concern that driving on access roads would crush artifacts.

(5) Expressed desire that archaeologists not excavate Native American burial grounds.

(6) Expressed interest in retaining collected artifact material as part of their cultural heritage (Juaneno Band of Mission Indians).

(7) Expressed desire to have access to archaeological sites which are important for traditional and contemporary values. Access has been a problem to Native Americans since knowledge of specific sites is often limited due to most lands being owned privately, and land owners in the project area being sensitive to trespass.

(8) Expressed concern that archaeological techniques and intent often are not clearly defined for Native Americans.

(9) Expressed concern that the use of terminology such as "prehistory" and "prehistoric" suggests that Native Americans have no history.

(10) Expressed desire to have monetary compensation for archaeological sites destroyed within rights-of-way.

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