

Archaeological Data Recovery

Near Bedrock Spring,

San Bernardino County, California

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Abstract

In 2001 and 2002, under the aegis of the California Bureau of Land Management (BLM) Archaeology and Cultural Awareness Program (ACAP) and the California Archaeological Site Stewardship Program (CASSP), BLM carried out excavations at a vandalized site, CA-SBR-1197, located at the southeastern periphery of the Summit Range near Bedrock Spring at the north edge of the Lava Mountains in San Bernardino County. The purpose of both ACAP and CASSP is to involve the public in the care and management of cultural resources on BLM lands and to augment BLM's management of important cultural resources.

The original goal of the SBR-1197 excavation was to retrieve any remaining information from the damaged site and then to rehabilitate the surface to avoid attracting artifact thieves to an area which contains other important cultural resources. Although the site had been seriously vandalized, excavation revealed substantially intact deposits below 50–70 cm from the surface. This paper reports on the results of analysis of materials collected, and it emphasizes the importance of volunteers in the preservation and management of archaeological resources on publicly accessible landscapes.

Introduction

Jay von Werlhof was a seminal member of the committee that developed the California Archaeological Site Stewardship Program (CASSP) because of his conviction that properly involving the public in archaeological science raises public awareness and influences how cultural resources are valued by the public and managed by government agencies. Jay was not physically present during the data recovery at SBR-1197, but his philosophy of taking archaeology to the public and involving the interested public in

doing archaeology was put into practice at Bedrock Spring. Certainly, he was with us in spirit.

Many archaeological resources in northern San Bernardino, Kern, and Inyo Counties are publicly well known and have been subject to professional study, illegal artifact hunting, and much public interest for decades. The magnitude of uncontrolled activity at important and degrading archaeological sites, the need to increase the level of attention to these resources, and growing public concern about care of cultural resources throughout the state resulted in creation of the California Archaeological Site Stewardship Program (CASSP), which was built upon experiences with a number of previous volunteer programs aimed at monitoring important cultural resources (Musser-Lopez 2010). In the spring of 1999, the BLM Ridgecrest Field Office, in partnership with Maturango Museum of Ridgecrest, sponsored the first class to train CASSP volunteers. A cadre of trained and dedicated volunteers began monitoring activities at some of the most significant cultural resources on BLM lands in the area. As a result of their activities and the increased level of attention, management needs at monitored locations were identified. One of the targets of site stewardship was the Bedrock Spring Area of Critical Environmental Concern (ACEC). At that time, the BLM was still relying on information used to designate the ACEC in 1980 (United States Department of Interior,

Bureau of Land Management 1980). In addition to regular monitoring of known sites within the ACEC, new maps were prepared using global positioning technology that had not been available when the BLM had last mapped the ACEC. Known cultural resources were relocated and remapped (some of the original recorded locations were found to be inaccurate), and previously unrecorded cultural resources were located, photographed, and mapped. The site steward reported to the BLM that there was an obvi-

ously vandalized prehistoric site (SBR-1197) within the Bedrock Spring ACEC (Figure 1). Since there were several similar sites in proximity, the obviously vandalized state of SBR-1197 could encourage additional vandalism. The site steward reported significant problems with unauthorized vehicle travel throughout the ACEC by vehicles that were accessing the Spangler Hills Off-Highway Vehicle Area to the north of the ACEC. Although unauthorized cross-country routes within the ACEC were signed

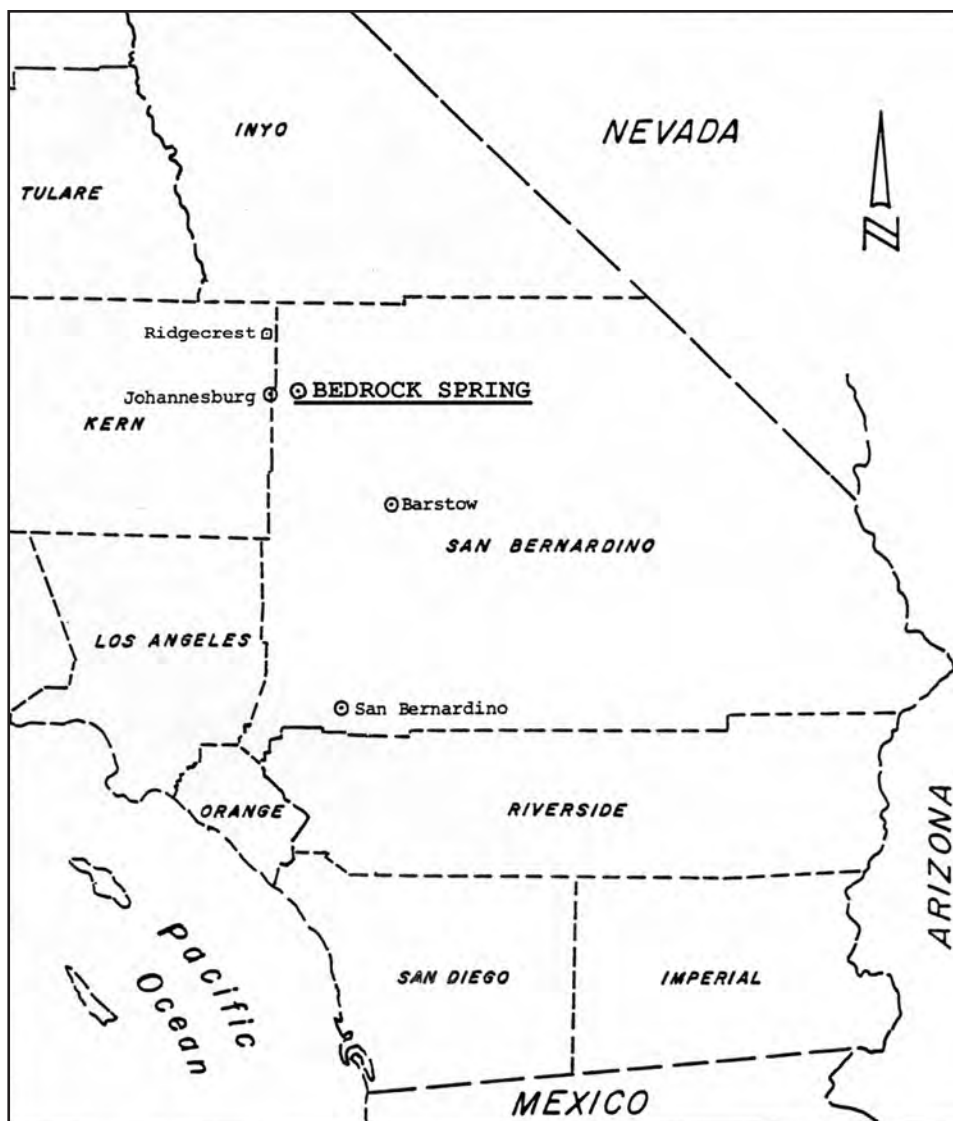


Figure 1. General location of Bedrock Spring and CA-SBR-1197.

as closed to vehicular use to prevent inadvertent damage to cultural resources, the closures had been ineffective, resulting in direct damage to cultural resources and severe erosion which also affected the resources. (Figure 2).

At the time that site stewardship monitoring began within the Bedrock Spring ACEC, the surface of SBR-1197, vandalized some time before 1976, still clearly showed evidence of the illegal digging. The surface of the site had not recovered from the effects of what appeared to be a major episode of unauthorized excavation; back dirt piles were readily apparent and clearly indicated digging activity, the soil surface showed little or no sign of recovery, and almost no vegetation recovery had taken place to hide the scars left by the disturbance.



Figure 2. Unauthorized vehicle use near CA-SBR-1197; small boulder adjacent to vehicle track in upper right portion of photo contains petroglyphs. Photograph by Bill Wight.

As a direct result of the stewardship activities, a public archaeology project was planned with three goals. One was to salvage any data the site may yet contain, although the appearance of the site gave little expectation that significant data still remained. The second goal was to rehabilitate the disturbed ground surface to reduce or eliminate the appearance of a vandalized archaeological site, in other words, to make it disappear to the casual visitor to the area. The third goal was to invite the public to participate in archaeology and to provide an opportunity for the interested public to learn how archaeological science functions, what may be learned from scientifically collected and studied materials, and what is lost to science and to the public when those materials are damaged or stolen.

Approximately 50 volunteers, both professional archaeologists and members of the public, participated in the Bedrock Spring Reverse Archaeology Project in 2001. Most of them returned for Bedrock Spring Redux in 2002. Each episode of data recovery at SBR-1197 was conducted over a period of three field days.

Site Location and Description

SBR-1197 is located in the northwestern corner of San Bernardino County (Figure 1) near the southeastern edge of the Summit Range on the northwest face of a small finger ridge that separates it from Bedrock Spring Canyon to the south. Bedrock Spring Canyon is a major drainage that divides the Summit Range from the Lava Mountains (Figure 3). The Summit Range borders the Searles Lake basin so that SBR-1197 lies near the southwestern edge of one of the large Pleistocene lakes that once existed throughout the Great Basin and Mojave Desert. Bedrock Spring, located on the southern side of Bedrock Spring Canyon, is the only known spring on the north side of the Lava Mountains and is approximately 1.2 km from SBR-1197. Vegetation is typical Mojave Desert creosote scrub with a scattering of Joshua trees. Fauna is typical of species associated with creosote scrub habitat and includes primarily coy-

ote, rabbits (both jackrabbit and cottontail), and various rodents, snakes, and lizards. Mule deer may be present at times, especially in the vicinity of Bedrock Spring. Bighorn sheep, mountain lions, and bobcats are also known to be present in the general area.

SBR-1197 sits on a northwest-facing slope at the base of an eroding sandstone outcrop that sheltered

the site (Figure 4). Known archaeological resources in the vicinity of SBR-1197 include midden areas, rock shelters, rock alignments, pictographs and petroglyphs, milling features, roasting pits, and scatters of thermally fractured and flaked stone. A number of boulders containing petroglyphs are located near the perimeter of the site, and one sits within the site boundary at the lower end of the site, opposite



Figure 3. Lava Mountains with Bedrock Canyon in the background and the Summit Range in the foreground in the vicinity of CA-SBR-1197. Photograph by Bill Wight.



Figure 4. CA-SBR-1197 is situated on a northwest-facing slope at the base of an eroding sandstone formation. Photograph by Bill Wight.

the sandstone shelter which sits at the upper end of the site. Rock art elements include a combination of representational figures (e.g., antlered quadrupeds, perhaps deer or antelope; digitate anthropomorphs) and geometric figures, both curvilinear and rectilinear (Figures 5 and 6). A red anthropomorphic pictograph and a second red figure have been identified at Bedrock Spring (Figure 7). Although it is not known

that the rock art is contemporaneous with occupation at the sheltering outcrop, the fact that one of the large boulders containing rock art sits at the lower boundary of the site is suggestive of cotermporal activity. Excavation was carried out at the base of this boulder, but no cultural materials were located. Several more boulders with rock art are located within .8 km of the site.



Figure 5. Boulder containing rock art located at lower site boundary of CA-SBR-1197. Photograph by Judyth Reed.



Figure 6. Boulder at CA-SBR-1196 containing quadrupeds and other elements, approximately 500 m northeast of SBR-1197. Photograph by Judyth Reed.



Figure 7. Pictographs at Bedrock Spring using DStretch to clarify images. Photograph by Bill Wight.

The range and density of prehistoric resources indicate considerable use of the area. Proximity to the only known significant potable water source in the vicinity and to easily obtainable varieties of stone for tool manufacture made the area an attractive location for occupation. Bedrock Spring likely attracted a variety of game. A number of the nearby sites contain metates and grinding slicks, indicating the processing of plant resources. Historic period cultural resources in the vicinity were associated with use of Bedrock Spring as a water stop for wagon travel along the canyon, limited mining exploration, and cattle grazing.

Ethnographic Background

According to Steward (1938:71, Figure 1) the Kawaiisu, a Shoshonean people, occupied the area “around Trona, and the territory to the south and west to an undetermined extent.” Kroeber (1925:Plate 1) also identified the area as inhabited by Kawaiisu with the Koso and Chemehuevi nearby, but he stated that “the Kawaiisu had more to gain by clinging to the timbered and watered slopes of their mountains [Tehachapi Mountains] than by wandering among the rare vegetation and dry soda lakes of the desert” (Kroeber 1925:601). He

noted that “they owned also the eastward drier slope of the same mountains [Tehachapi Mountains], and perhaps some of the desert beyond” (Kroeber 1925:602). Zigmond (1981) indicated that the Kawaiisu visited the Searles Valley area seasonally. Visits to this area would likely have taken travelers to Bedrock Spring due to the paucity elsewhere of potable water sources. More recently, Underwood (2006) examined the body of ethnographic information available on the Kawaiisu, particularly the work of Maurice Zigmond (1938, 1978, 1981, 1986). He suggested that while most of the ethnographic work describes what Underwood calls Mountain Kawaiisu, there is evidence for a Desert Kawaiisu culture that occupied areas east of the Tehachapi Mountains, “with a dramatically different environment and mode of existence” (Underwood 2006:179).

Excavation Methods and Analyses

During the first excavation phase in 2001, a series of 1 m x 2 m units were excavated within the boundaries of SBR-1197. Units were placed in areas previously subjected to illicit digging, as well as areas that may not have been subject to such activity. Units were excavated in 10 cm levels, and all excavated materials were

screened through 1/8 in mesh. All work by volunteers from the general public was supervised by professional archaeologists, many of whom also volunteered their time and expertise. During this excavation, approximately 50 to 70 cm of overburden was removed before meaningful archaeological material was encountered. This layer of material consisted of natural overburden from windblown sand, material from the partially collapsed sandstone structure that provided a protected

location for those who occupied the site, and dirt piles left from the illicit digging. Prior to the second excavation phase in 2002, a T-trench was dug by backhoe into the site, exposing the soil profile across the entire site (Figure 8). The primary trench was dug from the lower elevation of the site to the upper elevation under the shelter. The cross trench was placed at the upper end of the site in front of the shelter. Units were excavated into the sides of the backhoe trench (Figure 9), and



Figure 8. 2002 T-trench with first units placed into the wall of the trench. The 1 x 2 m unit in the foreground was begun in 2001 and completed in 2002. Photograph by Chris Padon.



Figure 9. Second excavation phase (2002), excavating units in sides of T-trench; in background, excavation of a 1 x 2 m unit begun during the first excavation phase in 2001. Photograph by Chris Padon.

all materials were screened through 1/8 in mesh. Soil samples were collected from the side of the trench. Nineteen units were excavated during the two phases of data recovery.

A sample of lithic artifacts (23 tools and 36 pieces of debitage) recovered during the first excavation phase was analyzed by Archaeological Investigations Northwest, Inc. (AINW) for lithic material identification and for lithic reduction technology and function (Ozburn and Fagan 2002). AINW analyzed 20 of the tools from this sample for blood residues to detect animal proteins (Fagan 2002, 2003). The Northwest Research Obsidian Studies Laboratory conducted x-ray fluorescence analysis (XRF) for obsidian sourcing and conducted obsidian hydration analysis on 14 of the same tools and the 36 pieces of debitage (Skinner and Thatcher 2002). Following the second excavation phase, an additional 10 artifacts were subjected to blood residue analysis (Fagan 2003), and two more obsidian samples were submitted for hydration and XRF (Skinner and Thatcher 2003). Rogers (2006) also analyzed hydration data on 50 artifacts from SBR-1197. Vertebrate faunal analysis was performed by Thomas Wake at the Zooarchaeology Laboratory, Cotsen Institute of Archaeology, University of California, Los Angeles (UCLA) (Wake 2002). Botanical and macrobotanical analysis was performed by Virginia Popper at the Paleoethnobotany Laboratory, Cotsen Institute of Archaeology, UCLA (Popper 2002) and by Seetha N. Reddy, ASM Affiliates, Encinitas, California (Reddy 2002). Radiocarbon analysis was carried out by Beta Analytic.

Analytical Results

Botanical Analysis

Charcoal and soil samples were submitted for macrobotanical analysis (Popper 2002; Reddy 2002). Three plant taxa were identified (Popper 2002:2): Asteraceae (sunflower family), saltbush (*Atriplex* sp.), and

creosote bush (*Larrea tridentata*). The results provide evidence only of fuel use at the site (Popper 2002:2).

Faunal Analysis

Analysis was carried out on 2,122 bone fragments recovered during excavation of eight units (Wake 2002:1). Identified species include mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis*), black-tailed jackrabbit (*Lepus californicus*), cottontail rabbit (*Sylvilagus auduboni*), deer mouse (*Peromyscus maniculatus*), desert woodrat (*Neotoma lepida*), pocket gopher (*Thomomys bottae*), kangaroo rat (*Dipodomys* sp.), pocket mouse (*Perognathus* sp.), striped skunk (*Mephitis mephitis*), badger (*Taxidea taxus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), gopher snake (*Pituophis melanoleucus*), garter snake (*Thamnophis* sp.), chuckwalla (*Sauromalus obesus*), and desert tortoise (*Gopherus agassizii*). Sacramento perch (*Archoplites interruptus*) was represented by one otolith (Wake 2002). All the mammal species identified in this assemblage could have been consumed by occupants of the site (Wake 2002:7). Based upon the relative amount and distribution of faunal specimens, Wake concluded:

Small fauna dominated the overall collection and all individual unit subassemblages at the site. Identified small animals include rabbits, rodents, and desert tortoise. Identified large mammals are rare. Mule deer and bighorn sheep are represented by one specimen each. No pronghorn or domestic animals are identified. Of the mammals, jackrabbits were the most important identified resource. Carnivores are the most diverse vertebrate order present at the site. However they are also relatively poorly represented compared to rabbits and rodents. Large game appears to have played a relatively minor role in terms of ubiquity and consumption. Desert tortoises also played a minor dietary role.

[This] site has a fairly diverse fauna and all the bone specimens are highly fragmented. The site exhibits a fairly high frequency of burned bone (roughly 25%), possibly due to food preparation (roasting) or less likely, natural causes (wildfires) [Wake 2002:10].

The data also indicate that the dependence on rabbits and other small mammals continued over time at the site without significant variation from earlier to later periods of occupancy. The otolith from a Sacramento perch, which “is found only in the greater Sacramento-San Joaquin River drainage system” (Wake 2002:5) somehow traveled over the Sierra Nevada Mountains, and may indicate trans-Sierran movement or contact.

Lithic Technology Analysis

Formal analysis of the entire lithic assemblage from the site has not yet been completed. Fifty-nine artifacts were examined for reduction technology and function (Ozbun and Fagan 2002). Materials identified included obsidian (n = 50), cryptocrystalline silicate (CCS) (n = 8), and rhyolite (n = 1) (Ozbun and Fagan 2002:1). Artifacts included both dart and arrow points or portions thereof, knives or knife blanks, unifacial tools, scrapers (uniface with a bit that exhibits use-wear or rejuvenation), bifacial thinning flakes, and non-diagnostic percussion flake fragments (Ozbun and Fagan 2002:Table 1). Bifacial and unifacial percussion and pressure flaking reduction techniques were identified (Ozbun and Fagan 2002:Table1).

Blood Residue Analysis

Blood residue analysis was done on 30 selected artifacts. Twenty artifacts collected during the first excavation phase were selected:

... on the basis of use-wear and reduction technology attributes that indicated that they

may have been used as tools for activities involving animal procurement or processing. The tools included projectile points, bifacial knives/manufacturing byproducts, scrapers, a flake tool, a preform, and an anvil. There were 18 positive reactions to 6 antisera on 15 artifacts [Fagan 2002:2].

Positive reactions were obtained to bovine, deer, dog, horse, rabbit, and sheep antisera (Fagan 2002:2–3).

Following the second excavation phase, an additional 10 artifacts were analyzed, including six metates, two rocks from hearth features, one obsidian uniface, and one obsidian biface. This analysis produced 52 positive reactions to 14 antisera on 10 samples (Fagan 2003:1, unnumbered table). Positive reactions were obtained to bear, bovine, cat, chicken, deer, dog, duck, guinea pig, rabbit, rat, sheep, horse, pigeon, and goat antisera (Fagan 2003:1).

The antisera used by AINW are obtained from commercial laboratories. It should be noted that the five artifacts (a point, a biface, a biface tip, a metate, and a rock from a hearth feature) that produced positive reactions to OTC (Organon Teknika/Cappel Corporation) sheep antiserum did not produce reactions to sheep antiserum manufactured by Sigma Chemical Laboratories (Fagan 2002, 2003; Ozbun and Fagan 2002). Five artifacts submitted for analysis did not produce reactions to any antiserum (Fagan and Ozbun 2002; Fagan 2002, 2003) (see Table 1 for explanation of antiserum reactions).

The most frequent positive reaction was to rabbit (10 positive reactions), which accords with the faunal analysis that identified rabbit as the most frequently represented species in the faunal collection. Other reactions, in descending order of frequency, are bovine, chicken, and horse (eight each); dog (six); guinea pig and OTC sheep (five each); cat (four); bear, duck, rat, and pigeon (three each); and goat and deer (two each).

Some of the species indicated by the blood serum reactions are self-explanatory. Rat and deer were identified in the faunal collection. Bear are still seen in the region (e.g., southern Sierra Nevada and Coso Mountains), but very uncommonly. Cat antiserum reacts to members of the family Felidae (Fagan 2002:4), both domestic and wild, including mountain lion and bobcat. Bobcats were identified in the faunal collection and are still sighted in the area by local residents, including both authors of this paper. Bobcats are seen with some regularity by staff on China Lake Naval Air Weapons

Station within 32 km of Bedrock Canyon (Russell Kaldenberg, personal communication 2007). Mountain lions have been seen in Poison Canyon, approximately 16 km from the study area, as recently as 2007 (Russell Kaldenberg, personal communication 2007) and in the community of Trona (Russell Kaldenberg, personal communication 2010). Dog, of course, could be any member of the Canidae (domestic dog, coyote, wolf). Coyotes are still persistent in the area; kit fox was identified in the faunal collection. Rat antiserum also reacts to mice and squirrels (Fagan 2002:4), and several

Table 1. Chart Showing Reactions to Antisera Used in Blood Residue Analysis.

Company	Antiserum	Host	Reacts With
OTC ^a	bear	goat	Family Ursidae: black bear, brown bear, grizzly
	bovine	goat	Family Bovidae: domestic cow, bison
	cat	goat	Family Felidae: cat, mountain lion, lynx, bobcat
	chicken	goat	Order Galliformes, Order Anseriformes, Order Columbiformes
	deer	goat	Family Cervidae: white-tail and mule deer, elk, moose
	dog	rabbit	Family Canidae: domestic dog, coyote, wolf
	horse	goat	Family Equidae: horse, donkey, mule, extinct equids
	human	goat	Order Primates: humans, apes, monkeys
	mouse	goat	Order Rodentia: mice, rats
	rabbit	goat	Family Leporidae: rabbit, jackrabbit
	rat	goat	Order Rodentia: rats, mice, squirrels
sheep	goat	Subfamily Ovidae: domestic sheep, bighorn sheep	
NIL ^b	bovine	goat	Family Bovidae: domestic cow, bison
	duck	rabbit	Subfamily Anatidae: ducks, mallards, other ducks
	guinea pig	rabbit	Order Rodentia: guinea pig, porcupine, beaver
	pigeon	rabbit	Order Columbiformes: pigeon, mourning dove
SIGMA ^c	camel	rabbit	Order Artiodactyla: camelids, bovids, cervids, antelope
	goat	rabbit	Bovoid Subfamilies Capridae and Ovidae
	sheep	rabbit	Order Artiodactyla: ovids, less strongly with other bovids, cervids, antilocaprids
	trout	rabbit	Genus Oncorhynchus: salmon, steelhead, rainbow trout

Note: From Ozburn and Fagan (2002) and Fagan (2003).

^aOTC = Organon Teknika/Cappel.

^bNIL = Nordic Immunological Laboratories.

^cSigma = Sigma Chemical Laboratories.

species of rodent were identified in the faunal analysis. Sheep antiserum reacts to both domestic sheep and to bighorn sheep (Fagan 2002), which was identified in the faunal collection. Two artifacts reacted positively to goat antiserum, which reacts with the bovid subfamilies Capridae and Ovidae (sheep and goats).

Bovine antiserum reacts to domestic cow and to bison (Ozbun and Fagan 2002; Fagan 2003). Domestic cattle grazing has occurred in the vicinity of Bedrock Canyon since the 1860s, and cattle certainly may have been consumed by Native Americans living in the area. However, two of the three artifacts that exhibited strong reactions to bovine antiserum are Rose Spring type projectile points (one CCS and one obsidian) (Ozbun and Fagan 2002), which would predate the introduction of domestic cattle. The third artifact that reacted strongly to bovine antiserum is an untypeable dart point fragment. All three artifacts also reacted to other antisera as well (rabbit and deer). "These results suggest that bow and arrow and dart and atlatl were used to hunt bison as well as other animals. The lack of Bovinae blood on other types of tools may indicate that the projectiles were used to hunt bison at some distant location and that the carcasses were not processed at the [Bedrock Spring] site." Ramirez de Bryson (2004:80–81) had positive reactions to bovine antiserum from artifacts collected during geoarchaeological research in the Searles Lake basin. She attributed this to *Bison*, the only bovid species likely to be present in the area prior to the introduction of domestic cattle

Guinea pig antiserum reacts with many rodents, including porcupine and beaver (Fagan 2002). While some members of the rodent family were identified in the faunal collection, neither porcupine nor beaver bone was identified. Both may have been within reach of a mobile population utilizing an area that included the Bedrock Spring vicinity. The current range of the common porcupine (*Erethizon dorsatum*) includes the Sierra Nevada Mountains and Cascades from Kern

County north (California Department of Fish and Game 1988). This same source mentions scattered populations in San Bernardino County but indicates that it is less common in arid portions of its range. An associated map of the current range of the common porcupine shows year-round residence along the western slope of the Sierra Nevada Mountains and the Central Valley area. Since an otolith from a Sacramento perch found only in the Sacramento-San Joaquin River drainage was also identified in the faunal collection, this may be another indication of trans-Sierran movement or contact. If the later inhabitants of SBR-1197 were Kawaiisu from the Tehachapi Mountains, they would have had ready access to not only the Sacramento perch but to porcupine as well. According to Tappe (1942:7), beaver were taken by trappers working for the Hudson's Bay Company as far south as Buena Vista Lake in Kern County, but it was usually considered unprofitable to work farther south than Tulare Lake. Trapping quickly decimated beaver populations, and by the 1930s reintroduction of beaver to a number of areas within California was being considered and was carried out in several localities (Tappe 1942:6). Beaver are currently present on the South Fork of the Kern River.

Some reactions are problematic. For instance, a CCS knife/dart-sized preform exhibiting traits typical of Elko point preforms produced a reaction to horse antiserum, which reacts with mammals from the family Equidae (horses, burros, and zebras) (Ozbun and Fagan 2002). If this artifact is an Elko projectile point, it would postdate the presence of Pleistocene horses and would predate the introduction of modern horses, burros, and mules.

X-Ray Fluorescence Analysis

Fifty-two obsidian artifacts from SBR-1197 were subjected to XRF analysis for obsidian source determination. All but one was attributed to Coso Volcanic Field sources (Skinner and Thatcher 2002:2, 2003:2), which are approximately 80 km northwest of SBR-1197. Of

the 50 specimens examined from the first excavation phase, 30 specimens (60 percent) came from the West Sugarloaf source of the Coso Volcanic Field, five (10 percent) from Joshua Ridge, four (8 percent) from Sugarloaf Mountain, and three (6 percent) from West Cactus Peak (Skinner and Thatcher 2002:2). The remaining eight specimens, because of small size, were assigned to an undifferentiated Coso Volcanic Field source (Skinner and Thatcher 2002:2). Two additional samples were analyzed separately (Skinner and Thatcher 2003). One was assigned to the Sugarloaf Mountain source (Skinner and Thatcher 2003:2). The second was assigned to the Buck Mountain source in the Warner Mountains of Modoc County, in the far northeastern corner of California (Skinner and Thatcher 2003:2). Interestingly, Ramirez de Bryson (2004:82) reported on a single obsidian core found during her study of Searles Lake shorelines that sourced to Glass Mountain in Modoc County. Giambastiani (2009:112) suggested, based on results from an inventory of sample blocks within the Searles Lake basin, that “the prevalence of late Gypsum/early Haiwee-age Joshua Ridge artifacts in the project sample could represent a direct settlement link between the Spangler Hills area and the south end of the Coso locality.” Although the proportion of artifacts from SBR-1197 attributed to Joshua Ridge is low, SBR-1197 is located at the edge of the same basin and was also occupied during the late Gypsum/early Haiwee period.

Obsidian Hydration Analysis

The same 50 artifacts subjected to XRF analysis after the first excavation phase were subjected to obsidian hydration analysis. All 50 came from the Coso Volcanic Field; Basgall’s (1990) hydration rate was used.

A frequency distribution of rind measurements shows a marked concentration of measurements corresponding to the Haiwee Period (650–1275 B.P.). More than three quarters (39 of 50 or 78%) of the

measurements are within the range predicted for the Haiwee Period. The outliers in this distribution include 4 measurements from 2.9 to 3.9 microns corresponding with the range predicted for the Marana Period (200–650 B.P.) and 7 measurements from 6.1 to 8.2 microns corresponding with the range predicted for the Newberry Period (1275–3500 B.P.) [Ozbun and Fagan 2002:7].

A single artifact was subjected to obsidian hydration analysis after the second excavation phase, and it also fell within the range for the Haiwee period.

Rogers (2006) analyzed hydration rim data for the same 50 artifacts from SBR-1197 using a method he developed for correcting rim values for effective hydration temperature and computing age based on his own algorithm. His computation analysis resulted in slightly older dates for most artifacts (Rogers 2006:4). However, the differences in his results did not materially change interpretation of period of occupation at the site. He wrote that “when the data are grouped by period ... it is seen that use of the site began slightly prior to the Haiwee Period, with major use in the Haiwee Period and significantly lesser use in the Marana Period” (Rogers 2006:4). Rogers’ suggested:

... that the predominant period of use was the Haiwee Period, and initial use of the site prior to the Haiwee Period was probably sporadic at best, as was later use in the Marana Period. Thus, the obsidian data suggest initial intermittent use in the late Newberry Period, with major utilization in the Haiwee Period and very little use in the Marana Period [Rogers 2006:4].

Radiocarbon Analysis

Nine radiocarbon dates were obtained from materials from SBR-1197: one from a hearth in unit one, which

was directly beneath the sheltering overhang; eight from charred material; and one from organic sediments. All dates were run by Beta Analytic. Table 2 presents the results of radiocarbon analysis by sample, including both conventional radiocarbon dates and two-sigma calibrated age BP dates.

All the dates fall within the same time frame as the obsidian hydration dates, from Gypsum/Newberry through Rose Spring/Haiwee into Late Prehistoric/Marana.

Dating the Site

Obsidian hydration analyses indicate a degree of turbation throughout the excavated deposit. The site was subjected to illicit digging and artifact collecting in the past. The soils in at least the upper 70 cm or so were obviously disturbed and contained almost no artifactual material. Below 70 cm there were artifacts that illicit collectors would have removed had they dug that deeply, indicating they did not diligently search for artifacts below 70 cm. Nevertheless, they may have carried out activities that caused displacement within the deposit. There are, of course, other activities, both natural and human, that can cause turbation and cause

artifacts of various ages to be found at similar depth, such as reuse of older artifacts or retention of “heirloom” artifacts.

The small suite of radiocarbon dates (Table 2), all derived from samples collected below the obviously disturbed upper 70 cm, are less indicative of turbation; this may be due in part to the small number of samples analyzed. Four samples of charred material from Unit 1, one from a hearth at 100 cm and three from levels to 150 cm, produced Late Prehistoric/Marana dates. A Unit 1 sample from the 150–160 cm level dated to the Rose Spring/Haiwee period. A sample from Unit 2, 90–110 cm, dated to the Rose Spring/Haiwee period. One sample each from Units 4, 9, and 13, all taken from 100–110 cm, dated to the Gypsum/Newberry period.

The radiocarbon and obsidian hydration dates place all occupation of SBR-1197 in the late Holocene, during the Gypsum/Newberry, Rose Spring/Haiwee, and Late Prehistoric/Marana periods. Obsidian hydration analyses place the primary occupation during the Rose Spring/Haiwee period. Both see smaller initial occupations during the Gypsum/Newberry period and

Table 2. Radiocarbon Dates from Ca-SBR-1197 by Unit, Material, and Depth.

Unit #	Material	Depth (cm)	Beta Analytical Sample No.	Conventional Radiocarbon Age BP	2 Sigma Calibrated Age BP	Chronological Period
1	Charred material (hearth)	100	163582	340 ± 50	510–290	Late Prehistoric/Marana
1	Charred material	110–130	163579	510 ± 50	630–600 560–490	Late Prehistoric/Marana
1	Charred material	130–140	174802	640 ± 50	670–540	Late Prehistoric/Marana
1	Charred material	140–150	175068	600 ± 60	670–520	Late Prehistoric/Marana
1	Charred material	150–160	175069	1050 ± 50	1060–910	Rose Spring/Haiwee
2	Charred material	90–110	163580	1470 ± 50	1480–1470 1430–1290	Rose Spring/Haiwee
4	Organic, sediments	100–110	163581	3190 ± 40	3470–3350	Gypsum/Newberry
9	Charred material	100–110	174803	3900 ± 60	4510–4480 4440–4150	Gypsum/Newberry
13	Charred material	100–110	174804	1890 ± 40	1900–1720	Gypsum/Newberry

a much reduced occupation during the Late Prehistoric/Marana period. The fact that Jacob Kuhrtz, an early teamster operating in the area, encountered Native Americans at Bedrock Spring in the late 1850s (Kuhrtz 1906:unpaginated) clearly establishes that they remained in the area into historic times and would certainly have made use of the spring and its environs. Because the upper portions of the excavated area had been illicitly dug, it may be that artifactual evidence of historic use was removed prior to any scientific study of the site.

Conclusions

The range of artifact types and varieties of fauna identified suggest that SBR-1197 was a hunting/foraging base camp. The presence of large game (e.g., deer and bighorn sheep) and small mammals (e.g., rabbits and rodents), the primary focus, indicates varied strategies for faunal procurement. Six metates were recovered, and although reactions to blood proteins were obtained on all of them, they were likely used as well for processing vegetal material. The presence of nearby sites whose surface appearances suggest they may be very similar to SBR-1197, but which have not been studied, may indicate more intensive use of the immediate area than is indicated by data from SBR-1197 alone and may be related to the presence of Bedrock Spring in an area that is otherwise lacking in potable water. Ramirez de Bryson (2004) suggested that there may have been some "ponding" of water in the Searles Lake basin during the Holocene. While such ponds were likely ephemeral, they may have provided enough water to allow more intensive use at some locations for short periods of time.

SBR-1197, when studied in the context of recent archaeological investigations in the northern Mojave Desert, appears to be part of a generalized hunting/foraging resource procurement system that began in the Gypsum/Newberry period and continued through the Rose Spring/Haiwee period and into the Late Pre-

historic/Marana period. Recent research efforts at the Red Mountain Archaeological District (Allen 2007), on China Lake Naval Air Weapons Station (Gilreath and King 2003; Becker 2007; Wells and Backes 2007; Allen 2010), in the Searles Lake basin (Giambastiani 2009), and Blackwater Well (Kaldenberg et al. 2009) have identified significant prehistoric resources dating to this same time period (Gypsum/Newberry through Rose Spring/Haiwee and into Late Prehistoric/Marana). In a survey of areas within the Searles Lake basin, Wells (2003) reported some dates that fall within the Late Prehistoric/Marana period but also identified materials that appear to be much older. Several of these authors have suggested, as does this paper, that the earlier occupations at these locations seem to coincide with the spread of Numic-speaking peoples, whose descendants included the Kawaiisu. Allen (2010:37) wrote that "the B Range and adjacent areas such as Fort Irwin and the western Mojave are key places to examine these ideas since the Numic expansion is often argued to have rolled right through the area from an origin point somewhere in the southern Sierra Nevada or Tehachapi Mountains." The presence of a number of prehistoric sites with similar surface appearance in proximity to SBR-1197 may offer excellent opportunities to examine these issues.

Finally, although SBR-1197 was subjected to unauthorized excavation decades ago and was also affected by gem and mineral collecting and cross-country vehicle use, it has nevertheless yielded information that comports well with other data recovery efforts in the same general area. Some of the other sites reported on had also been subjected to illicit activities and in some cases to early archaeological efforts that would not meet current standards of data collection, yet these sites also have yielded important information. Many if not most sites like SBR-1197 in the Mojave Desert have been thus disturbed, but there remains the potential for important information on the prehistory of the Mojave Desert. It is important for land-managing agencies, scientists, and the public to recognize that damaged

sites may still have significant potential to yield important information. As a final observation, it is also important to note that the data obtained from this study would not have been recovered without the hard work and dedication of volunteers who worked with archaeologists (most of whom were also volunteering their time and skills) to constructively learn how archaeology is done and why it matters. An interested and vocal public can be a powerful tool in protection, preservation, and study of archaeological resources on agency-managed lands, which brings us back to the legacy of Jay von Werlhof.

References Cited

- Allen, Mark W.
2007 *Final Report of the Red Mountain Archaeological Project: An Assistance Agreement between the California Bureau of Land Management and the Cal Poly Pomona Foundation, 2003–2006*. Report prepared by California State Polytechnic University, Pomona. Report prepared for Bureau of Land Management, Ridgecrest Field Office, Ridgecrest, California.
- 2010 Three Archaeological Landscapes of the Mojave B Range, Naval Air Weapons Station, China Lake: Pilot Knob, Indian Spring, and North Eagle Crags. *Pacific Coast Archaeological Society Quarterly* 43(1&2):26–41.
- Basgall, Mark
1990 Hydration Dating of Coso Obsidian: Problems and Prospects. Paper presented at the 24th Annual Meeting of the Society for California Archaeology, Foster City, California.
- Becker, Mark S.
2007 *A Landscape Archaeological Survey of the Christmas Canyon Area, China Lake Naval Air Weapons Station, San Bernardino County, California Pursuant to Section 110 of the National Historic Preservation Act*. Report prepared by ASM Affiliates, Carlsbad, California. Report prepared for Naval Air Weapons Station, China Lake, California.
- California Department of Fish and Game
1988 Common Porcupine. California Wildlife Relationships System, California Department of Fish and Game, California Interagency Wildlife Task Group. Electronic document, <http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentVersionID=17450>.
- Fagan, John L.
2002 *Results of Blood Residue Analysis on Artifacts from Site SBr-1197, Bedrock Spring, San Bernardino County, California*. AINW Letter Report No. 669 prepared by Archaeological Investigations Northwest, Portland, Oregon. Report prepared for Bureau of Land Management, California State Office, Sacramento.
- 2003 *Results of Blood Residue Analysis on Artifacts from Site SBr-1197, Bedrock Spring, San Bernardino County, California*. AINW Letter Report No. 1045 prepared by Archaeological Investigations Northwest, Portland. Report prepared for Bureau of Land Management, Ridgecrest Field Office, Ridgecrest, California.
- Giambastiani, Mark A.
2009 *An Archaeological Survey of 20,121 Acres in the Spangler Hills Open Area and on Adjacent Lands within Searles Valley, San Bernardino County, California*. Report prepared by ASM Affiliates, Inc., Carlsbad, California. Report prepared for Bureau of Land Management, Ridgecrest Field Office, Ridgecrest, California.

- Gilreath, Amy, and Jerome King
2003 *Late-Period Use of Burro Canyon, Inyo County, California*. Report prepared by Far Western Anthropological Research Group, Davis, California. Report prepared for Southwest Division Naval Facilities Engineering Command, San Diego.
- Kaldenberg, Russell L., N. Nelson Leonard, and Judyth E. Reed
2009 Blackwater Well (CA-SBR-2322/H): A Summary Report on Surveys and a Test Excavation at a "Heck of a Good Site" in the North Western Mojave Desert. *San Bernardino County Museum Association Quarterly* 54(4).
- Kroeber, A. L.
1925 *Handbook of the Indians of California*. Smithsonian Institution Bureau of American Ethnology Bulletin No. 78. Government Printing Office, Washington, D.C.
- Kuhrtz, Jacob
1906 Reminiscences of a Pioneer. Transcript of speech, Los Angeles, October 2, 1906. From the papers of George Pipkin, courtesy of Margaret Brush, Trona, California.
- Musser-Lopez, Ruth Arlene
2010 Ancestral and Modern Site Stewardship in the Mojave Desert. *Proceedings of the Society for California Archaeology* 24. Electronic document, <http://scahome.org/publications/proceedings/Proceedings.24Musser-Lopez2.pdf>.
- Ozbun, Terry L., and John L. Fagan
2002 *Summary and Discussion of Analytical Results for a Sample of Lithic Artifacts from the Bedrock Spring Site, CA-SBR-1197, San Bernardino County, California*. AINW Letter Report No. 743 prepared by Archaeological Investigations Northwest, Portland. Report prepared for Bureau of Land Management, Sacramento.
- Popper, Virginia
2002 *Macrobotanical Analysis of Charcoal and One Soil Sample from CA-SBR-1197, San Bernardino County, California*. Report prepared by Paleoethnobotany Laboratory, Cotsen Institute of Archaeology, University of California, Los Angeles. Report prepared for Bureau of Land Management, Sacramento.
- Ramirez de Bryson, Luz
2004 *Geoarchaeological Investigations of Terminal Pleistocene Shorelines at Searles Lake, Kern County, California*. Master's thesis, Department of Geography, University of Wisconsin, Madison.
- Reddy, Seetha N.
2002. *Macrobotanical Remains from Bedrock Springs, China Lake, California*. Report prepared by ASM Affiliates, Encinitas, California. Report prepared for Bureau of Land Management, Sacramento.
- Rogers, Alexander K.
2006 *Obsidian Hydration Analysis for the Bedrock Springs Site, CA-SBR-1197*. Maturango Museum Working Manuscript No. 14. Maturango Museum, Ridgecrest, California.
- Skinner, Craig E., and Jennifer J. Thatcher
2002 *X-Ray Fluorescence Analysis and Obsidian Hydration Measurement of Artifact Obsidian from the Bedrock Spring Site (CA-SBR-1197), San Bernardino County, California*. Laboratory Report No. 2002-43 prepared by Northwest Research Obsidian Studies, Corvallis, Oregon. Report prepared for Archaeological Investigations Northwest, Inc., Portland.

- 2003 *X-Ray Fluorescence Analysis and Obsidian Hydration Measurement of Artifact Obsidian from the Bedrock Spring Site (CA-SBR-1197) and an El Paso Mountains Isolate, San Bernardino and Kern Counties, California*. Report No. 2003-05 prepared by Northwest Research Obsidian Studies Laboratory. Corvallis, Oregon. Report prepared for Archaeological Investigations Northwest, Inc., Portland.
- Steward, Julian H.
1938 *Basin-Plateau Aboriginal Sociopolitical Groups*. Smithsonian Institution Bureau of American Ethnology Bulletin No.120. Government Printing Office, Washington, D.C.
- Tappe, Donald T.
1942 *The Status of Beaver in California*. State of California, Department of Natural Resources, Division of Fish and Game, Game Bulletin No. 3. Sacramento.
- Underwood, Jackson
2006 Discovering the Desert Kawaiisu. In *A Festschrift Honoring the Contributions of California Archaeologist Jay von Werlhof*, edited by Russell L. Kaldenberg, pp. 179–191. Maturango Museum Publication No. 20, Ridgecrest, California.
- United States Department of Interior, Bureau of Land Management
1980 *California Desert Conservation Area Plan*. Bureau of Land Management, Riverside, California.
- Wake, Thomas A.
2002 *Vertebrate Faunal Remains from the Bedrock Springs Site (CA-SBR-1197), Northeast Lava Mountains, San Bernardino County, California*. Report prepared by Zooarchaeology Laboratory, Cotsen Institute of Archaeology, University of California, Los Angeles. Report prepared for Bureau of Land Management, Sacramento, California.
- Wells, Helen
2003 *Intensive Archaeological Inventory of 1000 Acres Adjacent to Ancient Lake Searles in the Christmas Canyon ACEC, San Bernardino County, California*. Report prepared by Ancient Enterprises, Inc., Santa Monica, California .Report prepared for Bureau of Land Management, Sacramento.
- Wells, Helen F., and Clarus J. Backes, Jr.
2007 Robbers Mountain: Revisiting the Archaeology and Rock Art of Bierman Caves. *San Bernardino County Museum Association Quarterly* 53(4).
- Zigmond, Maurice L.
1938 Kawaiisu Territory. *American Anthropologist* 40(4):634–638.
1978 Kawaiisu Basketry. *The Journal of California Anthropology* 5(2):199–215.
1981 *Kawaiisu Ethnobotany*. University of Utah Press, Salt Lake City.
1986 Kawaiisu. In *Great Basin*, edited by Warren L. d’Azevedo, pp. 398–411. Handbook of North American Indians, Vol. 11, William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

