Rock-Ring Features on the Shores of Owens Lake and Implications for Prehistoric Geophyte Processing and Storage

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Seed harvesting and processing are relatively visible components of the archaeological record in prehistoric eastern California. This is due largely to the use of fire in seed processing, the preservation of carbonized remains, and the ease of recovery using flotation means. Despite ethnographic evidence indicating its importance to the native diet, geophyte (bulb, tuber, root) processing is much less visible and has been less discussed in prehistoric settings. Excavations of three small rock-ring features at two sites on the western shores of Owens Lake suggest that two were likely used for geophyte processing and one for storage. We compare these features to similar ones recorded in the northwestern Mojave Desert, outlining similarities and differences.

Introduction

Three rock-ring features were excavated by the UC Davis Archaeology Field School in July, 2006 at sites CA-INY-7093 (aka CCR-S-12) and CA-INY-7094 (aka AC-S-14) to the west of Owens Lake, in southeastern California. Although this region has been well studied archaeologically (e.g., Basgall and McGuire 1988; Delacorte 1999; Delacorte and McGuire 1993; Eerkens 2003; Gilreath and Holanda 2000), to our knowledge such features have not previously been reported near Owens Lake.

This paper examines the cultural and environmental contexts of these features, discusses the results of flotation studies of sediments recovered within the features, reports on AMS radiocarbon dates on two, and compares the features with similar rock rings from the northern Mojave Desert (Eerkens and Rosenthal 2002). Through these analyses we hope to shed light on their function(s) and on prehistoric cooking and storage practices in the Owens Valley.

Background

Archaeological sites INY-7093 and INY-7094 (Figure 1) lie in close proximity to what are today dry washes associated with Cottonwood Creek and Ash Creek, respectively, on alluvial fans emanating from the Sierra Nevada. Vegetation growing on the alkaline gravelly sandy loam in this environment is sparse and primarily made up of fourwing saltbush (*Atriplex canescens*), rabbitbrush (*Chyrsothamnus nauseosus*), black greasewood (*Sarcobatus vermiculatus*), and other shadscale scrub species (Halford and Carpenter 2005:5). Though this region is arid and marginal today, due largely to water diversions by the City of Los Angeles (which dried up Owens Lake in the early 1900s), prehistoric conditions during the Holocene were different, with riparian vegetation lining the shores of Owens Lake and surrounding streambeds. Past vegetation likely included many edible plant species, including bulrush (*Scirpus californicus*), rush (*Juncus balticus*), cattail (*Typha* sp.), flat sedge (*Cyperus esculentus*), spikerush (*Eliocharis* sp.), wild onion (*Allium* sp.), brodiaea (*Dichelostemma pulchellum*), and a range of grasses and other small-seed producing plants (Halford and Carpenter 2005:5). All of these species are known to have served native inhabitants as important seed, root, and tuber food resources (Steward 1933; Liljeblad and Fowler 1986).

Indeed, charred seeds from most of these species have been recovered in archaeological contexts from sites near the shores of Owens Lake (e.g., Basgall and McGuire 1988;

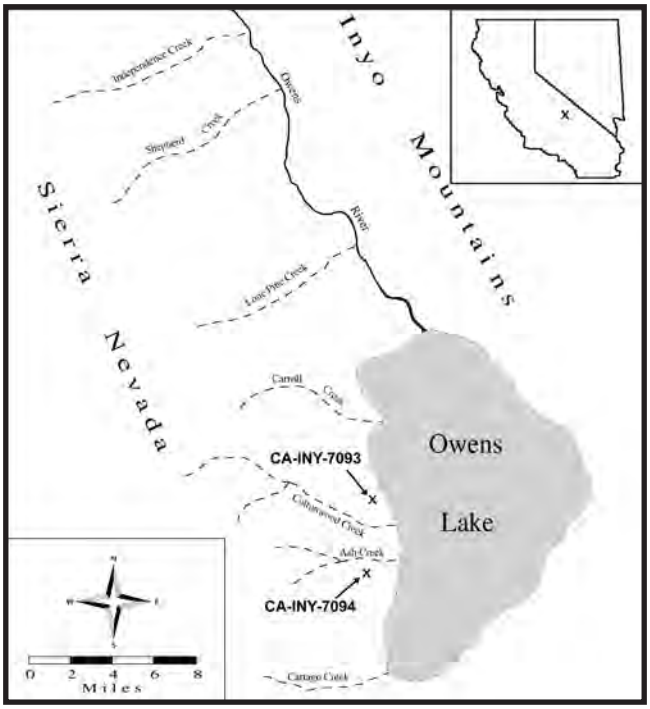

Figure 1. Map showing two sites and Owens Lake region.

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Delacorte 1999; Delacorte and McGuire 1993; Eerkens 2003; Gilreath and Holanda 2000). Notably absent from archaeological contexts are the remains of roots and tubers (e.g., wild onion and brodiaea), despite the fact that these resources are known to have been important to the native diet at the time of contact with non-native people (Steward 1933).

INY-7093 Rock Rings

Two formal rock-ring features, termed RR1 and RR2, were discovered in close proximity (ca. 1 m apart) at the site of INY-7093. These features were approximately 10 m east of a sparse scatter of pot sherds, obsidian flakes, and flaked stone tools, including one Rose Spring point and one Desert Side-notched point. Both features were visible on the surface and measured 0.9 m in diameter. Other than the rocks comprising the circle, no other scattering of rocks, such as fire-affected or fire-cracked rock, was evident on the site surface. RR1 was more exposed, however, forming an easily visible rock ring, while RR2 was only partially visible on its western side.

Each feature was bisected and its western half excavated to a depth of 30 cm below surface in 10-cm levels, both above and below the basal rock lining. Sediment samples were taken from within each feature for flotation analysis. As well, a sediment sample from immediately outside each feature was taken to generate a comparative "natural" background macrobotanical sample. Figure 2 shows RR1 after it was excavated to its basal rock-lining.

Two flotation samples of 1.5 liters each were analyzed from both RR1 and RR2. All four samples came from the 20-30 cm level below surface. Light fractions from the 2-mm, 1-mm, and 0.7-mm samples were analyzed for macrobotanical remains under a microscope. Heavy fractions were also analyzed for possible artifacts or cultural remains. Other than charcoal, RR1 did not yield any clearly identifiable macrobotanical remains, though small charred fragments of what may be tuber remains were recovered. Overall, charcoal density was measured at 0.75 g/liter. No seeds, seed fragments, or bone were present in either the light or the heavy fraction.

Figure 2. Rock Ring 1 bisected and exposed during excavation.

RR2 displayed a notably higher concentration of charcoal (3.65 g/liter) than did RR1. Indeed, observations in the field revealed the presence of a notable lens of charcoal underlying the basal rock lining of the feature. Macrobotanical remains also included small possible tuber fragments. In addition, four seedpods (utricles) of fourwing saltbush were identified in the 2-mm light fractions. The significance of these seedpods is discussed below. Again, no seeds, seed fragments, or bone were recovered in either the light or the heavy fraction.

An AMS assay on charcoal from RR1 produced a conventional date of 203 ± 31 B.P. (AA73446), while charcoal from RR2 produced a date of 153 ± 31 B.P. (AA73447). Unfortunately, large fluctuations in the radiocarbon calibration curve over the last 400 radiocarbon years makes calibrating these dates difficult. However, given the lack of historic-era artifacts at the site, we feel confident in assigning these features to the latter half of the Marana period (650 B.P.-Contact).

INY-7094 Rock Ring

A single rock ring was discovered at site INY-7094, on the west side of Owens Lake. The site consisted of a small scatter of obsidian flakes and bifaces surrounding a large boulder and a smaller rock containing a milling slick. The rock ring was notably larger in diameter (ca. 1.3 m) than the rings at INY-7093, and several of the rocks appeared to be upturned, lying with their long axes perpendicular to the ground surface. As at INY-7093, the feature was bisected and the western half excavated. At 60 cm a change in sediment color and composition was encountered, and excavation terminated. Sediment from the northwestern quadrant was screened in the field, using 1/8-in. mesh, while the southwestern quadrant was collected and bagged by level for later flotation analysis. No artifacts or fire-affected rocks were evident in the deposit, and evidence for burning was lacking. However, two unmodified rocks measuring 35 and 5 cm were uncovered in the center of the feature at 15 and 20 cm below surface. Figure 3 shows the rock ring prior to and following excavation.

Two 1.5-liter flotation samples failed to produce any charred seeds, roots, tubers, bulbs, or other identifiable macrobotanical fragments. Heavy fractions yielded a small number of uncharred rodent bones and three small pieces of charcoal. As these charcoal fragments were so small and few in number in comparison to the total volume of soil floated,

Figure 3. Rock ring at INY-7094 before and after excavation.

and their association with the feature was suspect, they were not extracted for AMS dating. Overall, charcoal density was less than 0.01 g/liter.

Comparison to Mojave Desert Features

The rock-ring features from southern Owens Valley are similar in many respects to features recorded in the northwestern Mojave Desert by Eerkens and Rosenthal (2002). For example, the left side of Figure 4 shows a histogram of feature diameter for 38 such features (mean diameter of 0.9 m), as well as the three features discussed here. As seen, the INY-7093 features overlap with the modal peak, while the INY-7094 rock ring is still within the distribution of features, but falls within the upper range. More telling, the right side of Figure 4 plots the depth of these features to the basal rock lining. Here the INY-7093 features overlap closely with the Mojave features, while the INY-7094 feature is well outside the distribution. Likewise the near lack of charcoal from INY-7094 places it at the lower extreme in the distribution. Like the majority of the Mojave Desert features, the three rock rings from southern Owens Valley were found isolated from midden, domestic features, or other cultural debris. As well, the two features from INY-7093 were found close together, a pattern that is also prevalent among many of the Mojave Desert features.

In their analysis of the Mojave features, Eerkens and Rosenthal (2002) interpret formal rock-lined rings as the remnants of pit-hearths used to roast geophytes. The vast majority of radiocarbon dates on such features range between 1000 and 300 B.P., with just a small number dating before and after this period. Although thermal features were present before and after this period, they tend to have different attributes. Thus, prior to 1000 B.P., the majority of thermal features comprised deeper pits, and after 300 B.P. most thermal features were informal charcoal smears with large numbers of charred seeds. Eerkens and Rosenthal interpret these patterns as suggesting a shift from the use of pits prior to 1000 B.P., to a focus on geophyte processing using formal pit-hearths between 1000 and 300 B.P., to a focus on seed processing after 300 B.P.. The presence of a few pit-hearths dating outside this range (as well as a few informal charcoal smears dating earlier than 300 B.P.) suggests that these differences in economic activities are merely a matter of degree, not of substance. That is, inhabitants of the northwest Mojave Desert had a strong focus on either geophyte processing (1000-300 B.P.) or seed processing (300-100 B.P.), but included both products within their diet in both periods. Clearly, the AMS dates from the INY-7093 features suggest they do not fall into the age range of most of the Mojave Desert features, but occur later in time.

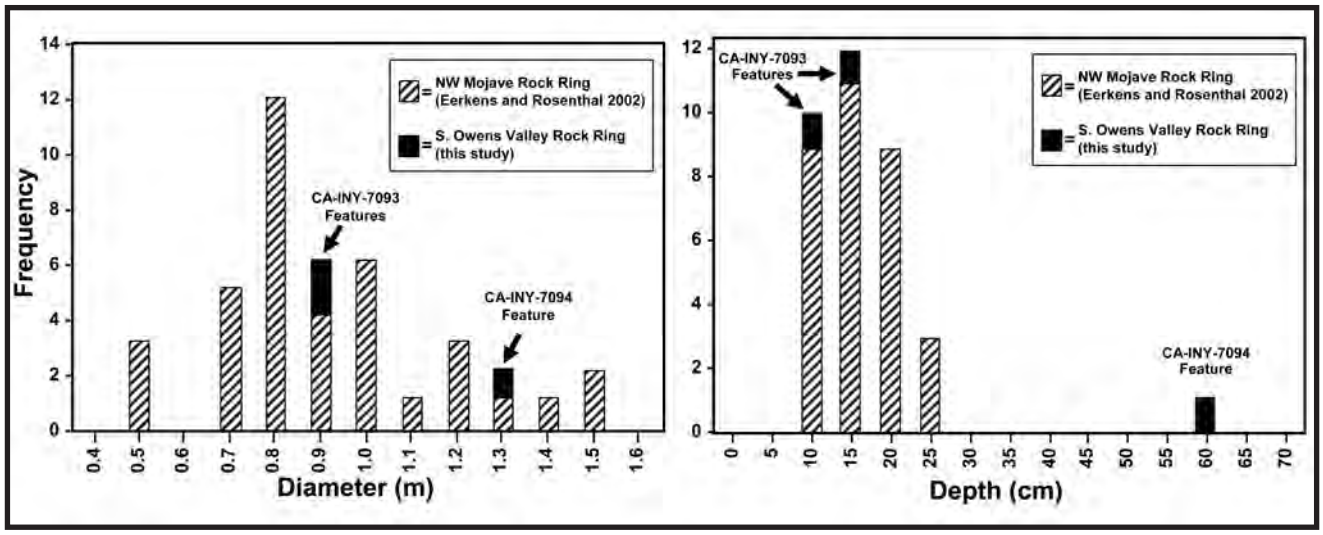

Figure 4. Comparison of diameter and depth of Owens Valley versus NW Mojave features.

Discussion and Conclusions

The size and shape of the INY-7093 features appear to overlap directly with pit-hearths from the northwest Mojave Desert. Based on this, we suggest these two rock-rings served a similar function. If Eerkens and Rosenthal (2002) are correct in their interpretation, this function was primarily the processing of geophytes. Indeed, studies by Wandsnider (1997) suggest that geophytes are best prepared using long-term, low-intensity heat in features such as pit-hearths.

The discovery of saltbush seedpods in the flotation remains from one of these features is interesting in this regard. The fact that no seeds were found among the ample charcoal remains suggests that saltbush may have been used as a source of fuel to roast the contents of the pit-hearth. Saltbush utricles form in mid- to late summer and can remain on the plant through December (Mozingo 1987; Welsh et al. 1987), giving us a rough estimate on the season(s) in which this feature was used. Steward (1933) and Liljeblad and Fowler (1986) indicate that bulb harvesting occurred in the Owens Valley during the fall. Thus, the seasonality of this feature overlaps with that of bulb harvesting and presumably processing. Based on Owens Valley plant surveys (Halford and Carpenter 2005) and the seasonal maturity of edible roots, bulbs, and tubers, we think the most likely resources cooked at INY-7093 include brodiaea and/or wild onion bulbs.

The AMS dates from the two INY-7093 pit-hearths suggest that bulb processing was still an important economic activity in Owens Valley in the Marana period, despite the lack of similar features dating to this time period in the Mojave Desert. As well, that both were found removed at some distance from other domestic debris suggests that geophyte processing often took place at some distance from habitation sites and domiciles. This result is consistent with Thoms (1989:290-291), who suggests geophyte processing was often undertaken by women away from habitation areas (perhaps to conserve fuel or to reduce the weight of transported food products).

The rock ring from INY-7094 is unlike the Mojave Desert pit-hearths. Based on its appearance and the lack of interior remains, we suggest this feature served as some type of storage pit that was subsequently emptied of its contents. Unfortunately, we were unable to date this feature. However, based on similarities to the northwestern Mojave Desert (Eerkens and Rosenthal 2002), it likely predates 1000 B.P. Similar types of pit storage features, though lacking a circular arrangement of upturned rocks at the top, have been recorded at both INY-30 (Basgall and McGuire 1988) and INY-3806 (Eerkens 2003) and date to roughly the same time frame (ca. 830 B.P. at INY-30 and roughly 1180 B.P. at INY-3806). As well, it is interesting that these storage features are all external in nature (i.e., outside of houses).

We hope that this report will key others into the importance of small prehistoric rock-ring features. Often, these features are isolated from sites and other artifactual remains and appear "modern" in age (e.g., look like small campfires). We hope that our study will spur additional research into their distribution, age, and function(s).

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