

Brown Ware Ceramics of the Prehistoric Owens Valley

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Abstract

The archaeological record of Owens Valley, east-central California, offers excellent opportunities to study hunter-gatherer pottery use. Owens Valley Brown Ware (OVBW) pottery was used principally to cook food. Utilitarian brown ware pottery in the valley first appeared around AD 1300. Established gradually at first, mostly in residential base camps, the ware became increasingly common at late prehistoric, short-term temporary workstations and permanent villages. From the eve of European contact (ca. AD 1750) and into the early historic period (mid-1700s to mid-1800s), pottery was an integral constituent of the Native tool kit. This paper discusses vessel shape, size, and wall thickness, as well as attributes of the raw materials for manufacturing OVBW pottery. It identifies the geographic and chronological changes that such pottery underwent within the Owens Valley and charts its distribution over space and time. Finally, this study considers the role of ceramics among the area's hunter-gatherers.

Introduction

Utilitarian plain brown ware pottery of eastern California and the western Great Basin resists precise typological classification (Bettinger 1986; Griset 1986; Dean 1992). It is, however, a temporally diagnostic artifact indicative of Marana period (AD 1300 and on into the mid-1800s) (Eerkins et al. 1999:275). Depending on the quality of the clay and the duration of the firing, the color of the finished vessel varied from gray or dull red to brownish gray or black (Liljebblad and Fowler 1986:421). In most instances vessels lack distinctive surface treatment. The absence of decoration, other than rare examples of fingernail punctation and interior and exterior striations (Madsen 1986:209), makes analysis of Owens Valley Brown Ware (OVBW) pottery challenging. Assigning precise

ethnic identities to its makers and users with any degree of confidence is difficult, and precise dating is likewise daunting. However, analysis of this pottery can provide valuable information about how OVBW ceramics were made and how they were integrated into the subsistence systems and economies of their makers. According to Eerkens:

Western Great Basin pots are primarily cooking vessels used to boil seeds and nuts, though roots, berries, and greens were occasionally cooked as well. Meats seem to have been only rarely processed in pots, likely as part of stews containing seeds and other plant products ... There seems to be a fairly strong correlation between the introduction of intensive seed procurement, increased milling activity, and pottery use. Indeed, the increased role of seeds in the diet likely precipitated the adoption of pottery in the region [Eerkens 2003a:3].

Pottery reduced the amount of time and labor needed to prepare vegetal foods, permitting cooks to manage large volumes of seeds more efficiently than by parching them; boiling and slow cooking maximizes the nutritional yield from nuts, seeds, and terrestrial animals (Arnold 1985:127; Stahl 1989; Reid 1990). The evidence presented herein reinforces the notion that OVBW pottery was used to process seeds by the prehistoric ancestors of the ethnohistoric Owens Valley Paiute.

Geographical and Cultural Overview

The Owens Valley is sandwiched between the Sierra Nevada and Inyo mountain ranges in east-central California (Figure 1). Plant communities vary by elevation from the desert scrub-covered valley floors to the pinyon-juniper and alpine environmental zones of the

Inyo, White, and Sierra Nevada mountains. To the north and west, where pottery use declines, the land is more forested; to the south and east the terrain is arid. The region contains several clay-bearing areas; the western side of the valley offered clay sources derived from weathered granite. As well, clay deposits would have been accessible from various locations along the valley

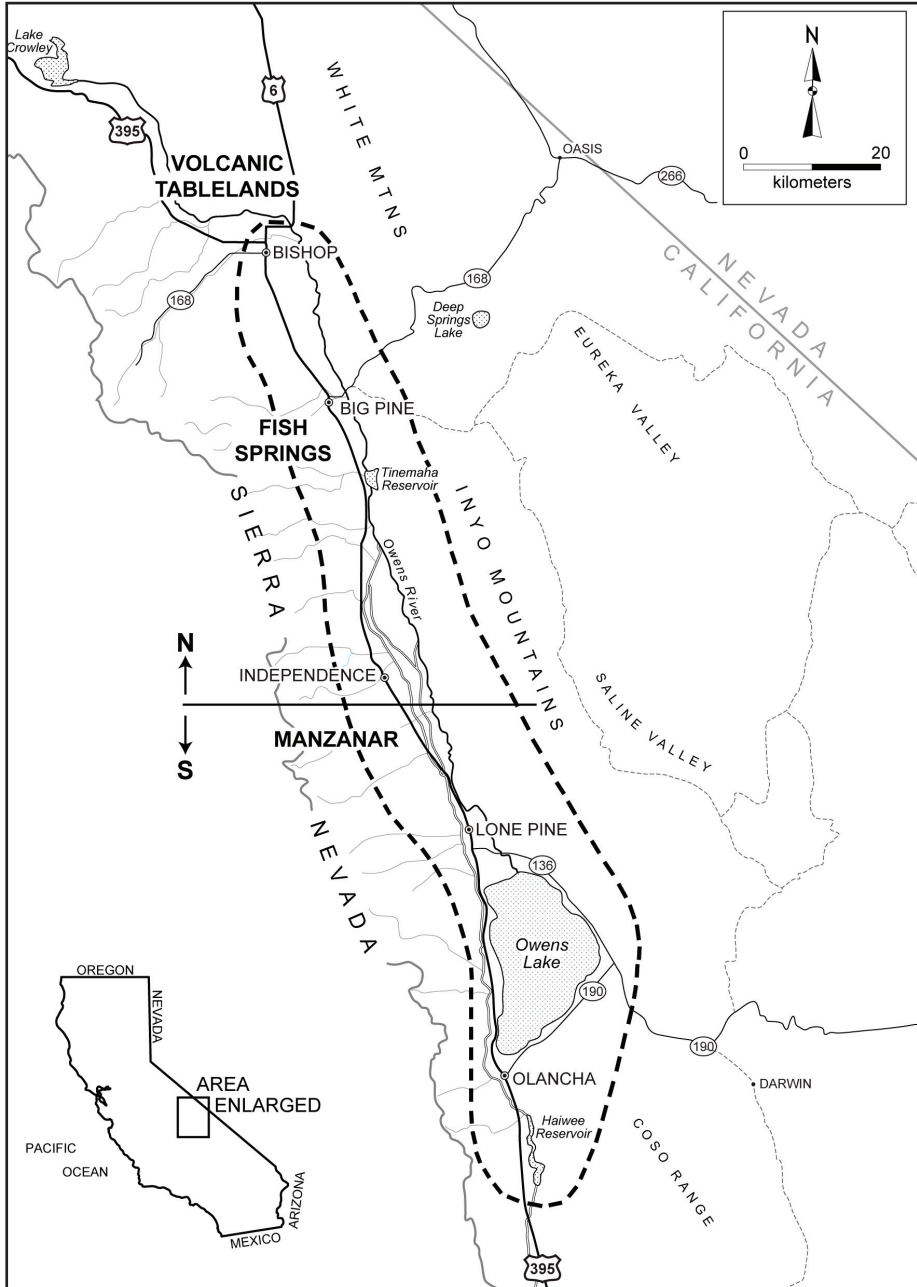


Figure 1. Owens Valley and the project area's northern and southern divisions.

floor, including springs, seeps, tributaries, playas, salt pans, and the banks of the Owens River. To the east the Inyo Mountain range could have provided clay from an array of metamorphic, extrusive, and intrusive igneous rocks or any combination of these materials.

The appearance of pottery, Desert Series projectile points, steatite vessels, and stone disc beads characterize the Marana period, which lasted from about AD 1300 to ca. 1850 (Basgall and McGuire 1988; Bettinger 1989; Delacorte and McGuire 1993). Mounting archaeological evidence suggests that small, dispersed, and mobile family-based residential settlements and short-term specialized activity sites characterized this period (Basgall and Delacorte 2003).¹ Compared to the previous Haiwee period (AD 450 to 1300), the Marana period saw more intensive localized resource use and a heightened awareness of territory among foraging groups (Eerkens 2003b). Brown ware pottery was introduced around AD 1300 (Eerkens and King 2002; Eerkens 2004). The Marana period witnessed a broadening of the subsistence base to include small-package foods such as legumes, rabbit, fish, and freshwater mussel (Delacorte 1999).²

Increased numbers of milling tools, threshing stations, and thin schist milling slabs in the archaeological record indicate that more seeds were being harvested and processed between AD 1300 and ca. 1850 than previously. At alpine villages the intensity of plant collecting is underscored by vast quantities of broken and battered cobble tools with steep working edges, thought to have been used to shred and pulp rootstalks prior to final grinding (Bettinger 1991:482). It is no surprise that pottery was found in association with milling equipment; late Marana period (AD 1750 to ca. 1850) seed-processing tools were light enough to be transported over long distances (Bettinger 1989; Basgall and Delacorte 2003; Overly 2003; Pierce 2004, 2007). Food procurement and processing equipment, such as digging sticks, seed beaters, baskets, and collecting trays, all perishable material, would have traveled with womenfolk on plant collecting expeditions.

Owens Valley Brown Ware

Modern pottery research in the Owens Valley began with Harry Riddell's archaeological site survey of 1946. Riddell defined Owens Valley Brown Ware from his analysis of over 900 potsherds from a variety of Owens Valley sites, and he established CA-INY-2, the Cottonwood Creek site to the west of Owens Lake, as the "type" site for Owens Valley Brown Ware (Riddell 1951).

Harry Riddell's 1951 description of OVBW pottery has remained virtually unmodified for more than 60 years with minor additions as more intensive and extensive research with the pottery has been completed. For example, Dean (2002) and Pierce (2004) indicated that charcoal was sometimes added to clay as OVBW temper. Since most recovered potsherds from the region are fragmentary and because so few whole pots have ever been discovered in situ, the forms of OVBW vessels are difficult to ascertain; however, they appear to have been wide-mouthed bowls, globular small-mouthed jars having either flat or rounded bottoms with incurving or direct rims, and globular pots and bowls with recurved rims (Riddell 1951:21; Riddell and Riddell 1956; Madsen 1986:211). Figure 2 shows the vessel shape inventory accepted for OVBW pottery since originally proposed by Harry Riddell. Liljeblad and Fowler (1986:421) suggested that the variety of shapes and utility purposes of pottery were all modeled on types of basketry. While some ceramic vessels undoubtedly were used to serve or to store food, this appears not to have been their primary function. Heavy soot on the exterior walls of potsherds and the remains of carbonized food residue on the interior vessel walls indicate that ceramic vessels were generally used to cook foods. More than six decades ago, Riddell (1951:23) noted that "... vessel fragments often have the remains of a carbonized crust of food adhering to their interior surfaces. The exterior surfaces are often quite black from contact with charcoal and soot from the cooking fires." Steward (1933:245) indicated that

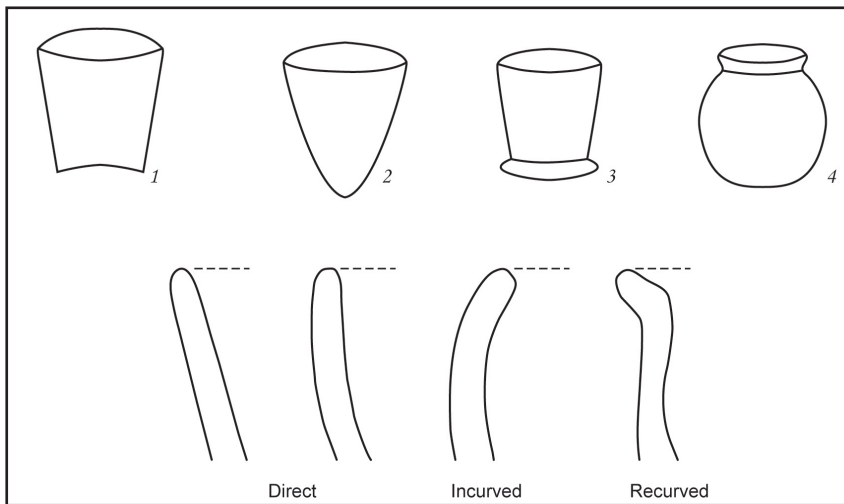


Figure 2. Owens Valley Brown Ware vessel forms and rim shapes (after Riddell and Riddell 1956:Figure 1).

several beverages, such as tule mint tea, were prepared by boiling plants in pottery vessels. The presence of crack sewing, relatively common in OVBW assemblages, indicates that broken vessels were repaired to extend their use-life.³

Riddell (1951:22) stated that the “known range for this ware is the western foothills of the Sierra Nevada Mountains on the west; the Tehachapi Mountains (Kawaiisu territory) on the south; the Panamint Mountains on the east; and at least as far north as Mon-13, which is located in Mono County about 14 miles north of Bishop, Inyo County, California.” This extensive territory is bordered to the north and west by non-pottery peoples and to the south and east by peoples who made pottery by the paddle-and-anvil method. Based on the archaeological site structure, Riddell was unable to precisely define the age of OVBW; nevertheless, he posited:

Since the deposit of the site was so shallow it was quite difficult to obtain any delicate or refined differentiation in depth/artifact relationships, except, of course, the gross and obvious differentiation at the 18 inch level. If the site is considered to have had a continuous seasonal occupation, and there is no reason to believe it

has not, an estimate of about 200 years for the length of occupation of Iny-2 would seem adequate. The terminal date of occupation could correctly be placed shortly after 1850. Since pottery did not occur at the base of the culture deposit it is difficult not to suggest that pottery was either absent or quite scarce at that time. Until other sites are excavated in the Owens Valley region it will not be possible to state just when pottery appeared there. It is very likely that future excavations of stratified sites will bear out the findings at Iny-2, namely that pottery making extends but a short distance into the prehistoric past [Riddell 1951:23–24].

Radiocarbon dated sites from the Owens Valley indicate that OVBW was used between AD 1300 and ca. 1850 (Bettinger and Taylor 1974; Basgall and McGuire 1988; Delacorte 1999). However, an earlier occurrence of pottery has been reported from the region (Eerkens et al. 1999). To date, most of the OVBW ceramics derive from the southern Owens Valley; pottery sites decrease, moving to the north from Olancha (see Figure 1). Survey teams have reported a greater abundance of OVBW pottery at lower elevations than at higher altitudes (Weaver 1986; Delacorte 1990; Delacorte and McGuire 1993; Eerkens 2001).

The purpose of this study is to compare changes in diet and ceramic technology between two temporal subdivisions of the Marana period; the early Marana interval lasted from AD 1300 to 1750 and the late Marana dated from about AD 1750 into the mid-1800s. These chronological divisions, which are based on radiometric data and obsidian hydration values, reflect changes in ceramic technology and diet. The abundance of burnt seeds and charcoal from flotation samples indicates that large quantities of seeds were processed during the late Marana interval (Pierce 2003, 2004, 2007).

Ceramic Evidence

Much of the recent archaeological work undertaken in the Owens Valley has resulted from cultural resource management (CRM) projects sponsored by the California Department of Transportation (Caltrans). Survey and excavation projects along the Highway 395 corridor have provided abundant ceramic data from scores of archaeological sites (Bettinger 1975, 1989; Delacorte 1990; Reynolds 1996; Zeanah and Leigh 2002). The present study integrates original data from fieldwork conducted between 2000 and 2005 with information culled from published and unpublished reports spanning the past 60 years. The field data include 3,592 potsherds from 32 sites along U.S. Highway 395 investigated by the Archaeological Research Center, California State University, Sacramento (Pierce 2002a, 2002b, 2002c, 2003). These sites extended from Fish Springs in the north to just south of the Manzanar National Historic Site (Figure 1). Laboratory analysts recorded and extrapolated morphological data for each potsherd, including orifice diameter from rims, vessel form, vessel size, and wall thickness. Two hundred and thirteen specimens were sent to the University of Missouri Research Reactor Center for instrumental neutron activation analysis (INAA). Six specimens were sent to Patricia Dean at the University of Idaho for thin-section analysis; of these, four samples had been chemically characterized by INAA.

The comparative collection (n = 5,250) incorporated data from 55 previously excavated sites, ranging from Bishop in the north to Olancho in the south (Riddell 1951; Lanning 1963; Griset 1988; Bettinger 1989; Delacorte and McGuire 1993; Basgall and Giambastiani 1995; Delacorte 1995, 1999, 2002; Delacorte et al. 1995; Gilreath 1995; Burton 1996, 1998; Gilreath and Nelson 1999; Eerkens 2001; Delacorte and Basgall 2002). In most cases these reports provided information about sherd frequency, rim and vessel forms, average potsherd thickness, and the diameters of vessel orifices. Overall, this study included 8,842 potsherds from 87 archaeological sites.

In order to compare disparate data sets over a vast territory that is roughly 130 km long by 6.5 km to 16 km wide, the Owens Valley was divided into the northern and southern zones. The Manzanar National Historic Site marked the center of the study area (Figure 1). This subdivision facilitated data comparison, enabling analysts to identify the age of each pottery-bearing site, the function of these sites, and the kinds of pottery associated with a particular site. Archaeological sites fell into three categories: (1) residential bases that exhibited identifiable dwellings and hearths (n = 8); (2) residential camps that lacked obvious dwellings yet exhibited carbon deposits or hearths and were utilized or occupied for moderate lengths of time for harvesting nuts (n = 17), and (3) short-term occupation or casual encampments that lacked dwellings or hearths, representing specific activity loci, such as hunting stations (n = 6). All these 31 sites produced reliable chronometric data. Sixteen sites dated from AD 1300 to 1750, and 15 sites dated from AD 1750 to ca. 1850. Several trends emerge from the ceramic data are discussed below:

Rim Types and Vessel Shape

Of the 33 rims in the study collection, 20 dated between AD 1300 and 1750, and 13 specimens dated from AD 1750 to 1850 (Table 1). Direct rims (open

vessels) were associated with both temporal intervals; however, more incurved and recurved (restricted vessel openings) rims were associated with later deposits. Vessels with restricted openings were better suited to cook and transport food, retaining heat during cooking and reducing spillage when carried from place to place (Rice 1987).

Orifice Diameter and Vessel Size

Rim diameters ranged from 10 to 47 cm, averaging 24 cm with a standard deviation of 6.7 cm. No statistical difference was noted in the mean orifice diameter between direct and restricted forms or between incurved and recurved forms. In general, vessel size decreased through time with the mean diameter averaging 4.0 cm smaller after AD 1750 (Table 2). Late Marana period vessels were smaller and more uniform in size than pottery from the early Marana period.

Vessel Size and Site Type

Evidence suggests that orifice diameters were larger for vessels found at residential base camps than for pots recovered at casual encampments (Table 3). It makes sense that larger and heavier vessels remained at residential base camps; smaller and lighter pots could have been transported or made at casual encampments. The late Marana period was characterized by a reduction in the size of pottery, indicating that portable ceramic vessels may have been integral to the household tool kit.

Wall Thickness

As vessel size decreased and walls became thinner, pottery became lighter and more portable. Overall wall thickness ranged from 3.2 mm to 11.4 mm, with an average of 6.3 mm. However, a decrease in vessel wall thickness was noted between AD 1300 and 1750 when the mean wall thickness was 5.9 mm. Vessel wall thickness and vessel size are not related. A linear

regression shows minimal correlation ($r = .232$, $P = .094$) between orifice diameter and wall thickness (Figure 3). Over time, Owens Valley potters made thinner vessels that were durable and thermally efficient, coinciding with the function of pottery as a cooking utensil (Table 4).

Age, Site Type, and Sherd Frequency

Between AD 1300 and 1750 the majority of sherds were associated with long-term residential base camps; fewer sherds were detected at short-term residential camps, and the fewest number of sherds were associated with specialized utilization sites (Table 5). Toward the end of the Marana period and on the eve of the local gold rush, OVBW pottery was distributed evenly among all site types (Table 6). Initially, larger vessels remained at long-term residential base camps, possibly for future use. Over time, pottery was used and/or made at all three site types and was transported throughout the study region. This reinforces the argument that ceramics played a vital role in the daily lives of foraging peoples; it was both made and used at the same site, or it could to be transported from place to place.

Clay Source Distribution

Various spatial and temporal patterns emerged from analysis of regional clay sources. Source diversity increased in the Marana period from seven identified groups to nine. Aside from the identified foreign source groupings, the percentage of ungrouped sherds (unidentified extra-local or little used local sources) doubled. This suggests that ancient peoples were mining clay from a wide variety of sources.

The total amount of exotic materials increased from less than a fifth (18 percent) of the sample in the AD 1300 to 1750 ceramic interval to over a third (35 percent) of the sample, dating between AD 1750 and 1850. All pottery from the Nevada Test Site (see Figure 4) derived from late Marana sites. In fact,

Nevada Test Site clays occur at half (50 percent) the tested components from this interval. The elevated percentage of sites with pottery that originated from as far away as the Nevada Test Site between AD 1750 and ca. 1850 indicates a high degree of pottery transport. It is also plausible that several of the unknown sources originated from the east or from other equally distant locations. In addition to the influx of known and unidentified extra-local sources, there is a pronounced rise in movement of sherds made from local clays within the valley from ca. AD 1750 onward. Intra-valley transport of pottery in the early Marana period was rare; over two thirds (71 percent) of the pottery from local sources were found in only one study zone. In the final centuries of the Marana period, less than a third (29 percent) of potsherds

made from local sources were restricted to one study zone. Thus, the transportation of pottery to areas outside the Owens Valley is assumed to have occurred after AD 1750.

During the AD 1750 to 1850 ceramic interval, both locally manufactured Owens Valley pottery and pottery produced at distant locations were transported great distances, over mountain ranges and across deserts, away from their original points of manufacture. Pottery made from the most commonly used clay source in the northern Owens Valley was found as far away as 260 km to the southeast. Vessels found near the Nevada Test Site were traded both from the Mojave Desert and from the northern Owens Valley. This distribution probably resulted from foragers carrying

Table 1. Temporal and Spatial Distribution of Rim Shapes.

Age	Region	Direct Rim	Incurved Rim	Recurved Rim	Number
AD 1300–1750	North	71%	–	29%	34
	South	76%	23%	1%	98
AD 1750–ca. 1850	North	71%	21%	7%	14
	South	68%	27%	5%	77

Note: % = percentage of diagnostic forms.

Table 2. Descriptive Statistics of Orifice Diameters by Time Period.

Age	Minimum	Maximum	Mean	Median	Standard Deviation	Number
AD 1300–1750	16.0	47.0	27.4	27.0	7.7	25
AD 1750–ca. 1850	10.0	33.0	20.5	19.0	6.6	22

Note: All measurements in centimeters.

Table 3. Comparison of Average Vessel Orifice Diameters by Time and Site.

Age	Residential Base Camp	Residential Camp	Number of Rims
AD 1300–1750	29.3	24.3	60
AD 1750–ca. 1850	22.6	19.9	32

Note: All measurements in centimeters.

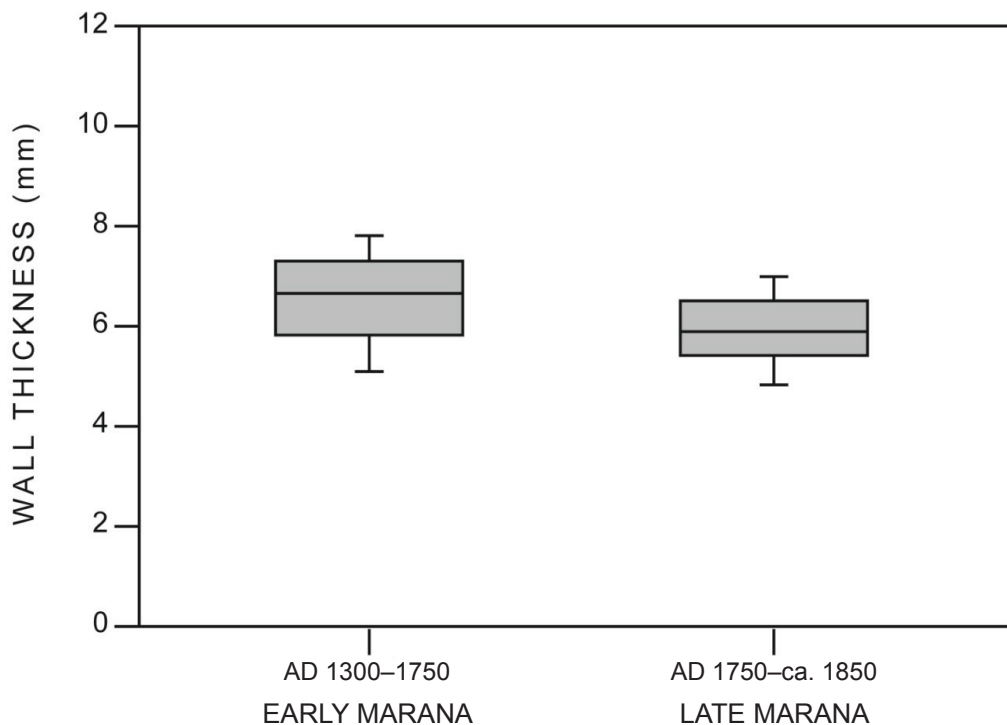


Figure 3. Ceramic vessel wall thickness comparison between the Early and Late Marana periods.

pottery across the landscape; these were not exotic exchange items that were brought to the region by barter or trade.

Conclusion

In the middle of the nineteenth century the practice of cooking foods in ceramic vessels was abandoned. Thousands of hopeful gold seekers flooded the region in 1850 and 1851. Soon thereafter Native ceramics started to be replaced by metal cans and containers (Clewlow and Rusco 1972; Arkush 1987). When Julian Steward conducted ethnographic fieldwork among the Owens Valley Paiute in 1927, 1928, and 1931, small, flat-bottom vessels made by his informants, one of whom may have been 80 years old and thus born before the Gold Rush, closely resembled in manufacture and form those made by Gayton's (1929) Yokuts and Western Mono informants on the west side of the Sierra Nevada (Steward 1933:269;

Moratto, this double-issue). Steward (1933:266) opined, "At that time pottery making, a special art formerly limited to a few women, is now nearly forgotten." Seventy years after Steward, Eerkens stated:

... prior to 700 BP very few pots were made and ... by 500 BP the Paiute were engaged in a modest level of pot production in Owens Valley. Pots quickly and completely drop out of the suite of material artifacts upon contact with European settlers around AD 1850, being replaced by metal containers [Eerkens 2003a:2].

The archaeological record clearly indicates that OVBW pottery was in use for roughly 550 years. Changes in vessel morphology coincide with two temporal periods, AD 1300 to 1750 and AD 1750 into the 1850s. By AD 1750 brown ware ceramics were an integral part of the prehistoric tool kit, playing a major

Table 4. Region-Wide Decrease in Average Thicknesses over Time.

Age	≥ 6 mm	< 6 mm	Frequency
AD 1300–1750	18	5	23
AD 1750– ca. 1850	4	10	14
Total Components	22	15	37

Table 5. Increase in Pottery Bearing Components and Sherd Frequencies Adjusted for Length of Temporal Period (Number Per Century).

Age	Sites	Sherds
AD 1300–1750	4.8	790
AD 1750–ca. 1850	7.5	1216

Table 6. Changes in Average Sherd Abundance by Site Type and Chronological Period.

Age	Residential Base Camp	Residential Camp	Short-Term Sites
AD 1300–1750	297	142	71
AD 1750–ca. 1850	127	182	189

role in the subsistence strategies of the region's hunter-gatherers. The intensification of seed processing and the widespread use of pottery in the Owens Valley probably went hand in hand. By the close of the Marana period, and into the mid-1800s, pottery was transported over long distances and across rough terrain. Restricted rims (incurved and recurved) proliferated at all late period sites. The largest vessels were associated with long-term residential bases; smaller vessels were found at shorter-term residential camps. The thickness of vessel walls declined over time, probably in the interest of portability, and this portability increased the distribution of ceramics throughout the region.

Clay source distribution patterns also changed over time. During the early Marana ceramic interval, clays were collected primarily from sources that were close to pottery-making sites; extra-local clays were rare. Over time, as pottery became more portable and production of pottery became more common, local clays continued

to be used and non-local clays were introduced; by the end of the Marana Period, exotic and new clay sources had increased dramatically in the Owens Valley. Source distributions in both the northern and southern Owens Valley indicate pottery movement occurred in an east-west direction. As well, there occurred a division in the distribution of clay sources between the northern and southern Owens Valley. The northern portion of the valley had clays from local and exotic sources. None of the southern Owens Valley sources were identified in the northern portion of the valley. One sherd from a northern source was found in the southern portion of the valley (Neff and Glascock 2001; Neff 2004).

As prehistoric peoples became more dependent on small seeds, their reliance on pottery increased. Initially, pottery was occasionally used at base camps; ultimately, it became an essential component in the Native tool kit and was utilized at all archaeological site types in the Owens Valley. By AD 1750 ceramic

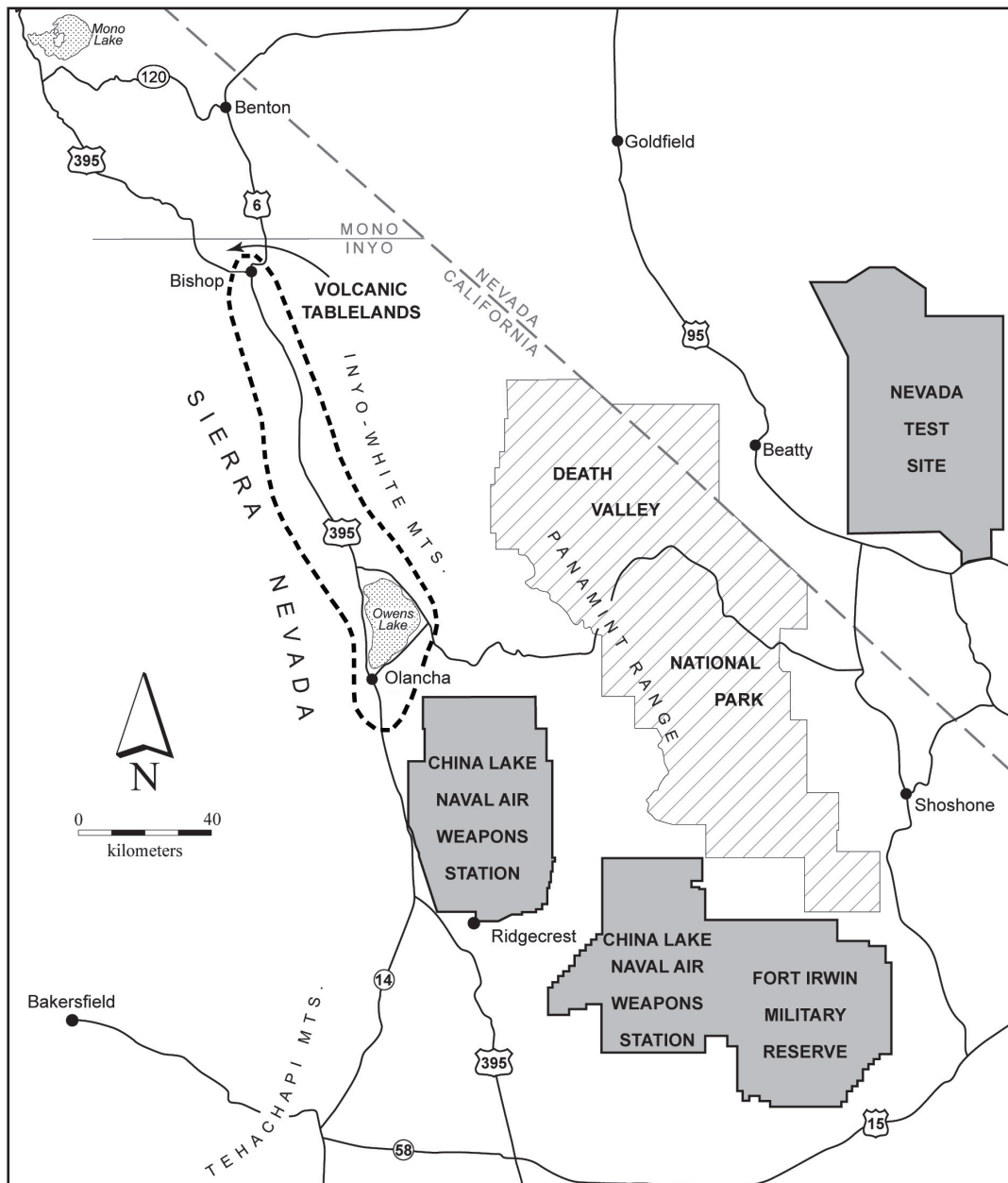


Figure 4. Map of study areas within and adjacent to the Owens Valley, east-central California.

vessels were carried from place to place; they were not cached or left behind as in the past. Once ceramic vessels were recognized as an efficient tool to save time and energy, they were regularly transported throughout the region, facilitating the intensive processing of small seeds wherever they were found.

The plain utility ware ceramics found in the Owens Valley appear to be related to food preparation and consumption. The local production of pottery began in the fourteenth century AD, and the role of ceramics in food processing activities continued beyond AD 1750. The basic forms, bowls and jars, are found from site to

site for over four centuries. The period from 1300 to 1750 was a time when pottery was fully incorporated into the foodways of the ancient peoples of the Owens Valley. Smaller and thinner vessels became common by AD 1750, possibly suggesting that seed processing vessels were firmly integrated into regional subsistence strategies. Another trend is indicated by the size of these vessels and the utilization of clay sources. The pattern indicates that technological change in these ceramics was linked to foodways and settlement patterns. Smaller vessels were being transported. The great distances of pottery transport add proof that ceramics played a major role in the lifeways of the Owens Valley hunter-gatherers.

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End Notes

1. These data contradict the nucleated settlement model that was proposed by Steward (1933, 1938); nucleated settlements are now considered to be contact era phenomena.

2. The presence of manos, metates, and other milling equipment indicates that seed foods were collected and processed between AD 1300 and 1750. However, a marked increase in the frequency of artifacts (e.g., milling tools and broken ceramic vessels), features (e.g., hearths), and site types (e.g., residential base camps, residential camps, and short-term activity loci) during the Marana period reflect intensive seed processing (Pierce 2004, 2007).

3. Drilled sherds are commonly thought to reflect efforts to extend the use life of a vessel. Often referred to as crack-sewing, these repair efforts are performed by drilling a hole on each side of a crack and then tightly sewing the holes together with fiber or sinew.

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