Investigations at a Late Archaic Open Midden Site in the New Mexico Bootheel: A Preliminary Report

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Between 2011 and 2015, the University of Texas at San Antonio (UTSA), under the direction of Robert Hard, conducted investigations at LA 162023, an open site located in Hidalgo County in the northeastern quadrant of the New Mexico "bootheel." The site was reported to the authors by Bureau of Land Management (BLM) archaeologist Tom Holcomb and by Chris Turnbow, a supervisory archaeologist then working for the Office of Contract Archaeology at the University of New Mexico. Our interest was drawn to this site because it included a large, conspicuous midden deposit with very few ceramics but with a large number of projectile points seemingly dating to the Late Archaic/Early Agricultural period. We had recently completed research at Cerro Juanaqueña, a large fortified village site dating to the same general time period, located about 80 km (50 mi) south, near Janos, Chihuahua. At LA 162023 we hoped to find evidence of early agriculture, and perhaps dwellings, in a non-riverine setting.

Although we were disappointed in these objectives, we did recover 148 whole and fragmentary projectile points and we obtained 11 AMS radiocarbon dates on short-lived plant parts. The radiocarbon dates allow us to estimate the span of intensive use at LA 162023. In this paper we will also characterize the range of projectile points tentatively associated with this interval of intensive use.

Natural Setting

LA 162023 is located on the western edge of Laguna de las Moscas, a large closed basin situated primarily in northwestern Chihuahua. The site is adjacent to a large arroyo at the toe of the alluvial apron surrounding the base of the Big Hatchet Mountains several kilometers to the west. In many places the lower edge of the alluvial apron is a partially dissected, terrace-like scarp about 3 m (10 ft) high overlooking the basin floor. LA 162023 is on the edge of this terrace, adjacent to an area where the arroyo opens up and forms a meadow leading down to the actual playa about 1.5 km (1 mi) further east. Groundwater is likely closer to the surface along the toe of the alluvial apron, where gravelly alluvial sediments overlie and interfinger with fine basin floor sediments. This is reflected by dense stands of mesquite concentrated in this zone.

Archaeological Setting

The vicinity of LA 162023 has attracted human occupation for millennia. There is a large Mimbres site (LA 89227) across the deep arroyo to the southeast, and a substantial Post-Classic settlement is located several hundred meters to the northeast. A concentration of roasting features of unknown age is found immediately west of the Archaic period midden, and Late Pithouse period remains have been identified on the edge of the meadow below the midden, and in the northern portion of LA 162023 itself.

Despite abundant evidence of Ceramic period occupation in the immediate area, large numbers of projectile points on or adjacent to the midden seemed to be mostly Archaic forms. Although a few sherds were observed on the surface at LA 162023, the quantity of chipped stone seemed far disproportionate. Ultimately, we did recover a total of 44 sherds, primarily from the surface of the site (Table 1). Nevertheless, the chronometric data presented below confirm our initial impression that

Table 1. Ceramics Found at LA 162023.

Type	Midden Area	Outside Midden	TOTAL
Brownware	19	16	35
Textured Brownware	4	1	5
Plain	2	0	2
Polychrome	1	0	1
Mimbres B/W	0	1	1
TOTAL	14	18	44

the actual midden deposits which were the focus of our investigations date almost entirely to the latter part of the Late Archaic period. In the discussion that follows, we sometimes make a distinction between the midden area, including slopes adjacent to the midden, and areas outside the midden. The area outside the midden is the northern portion of the site and is separated from the midden by several small drainages.

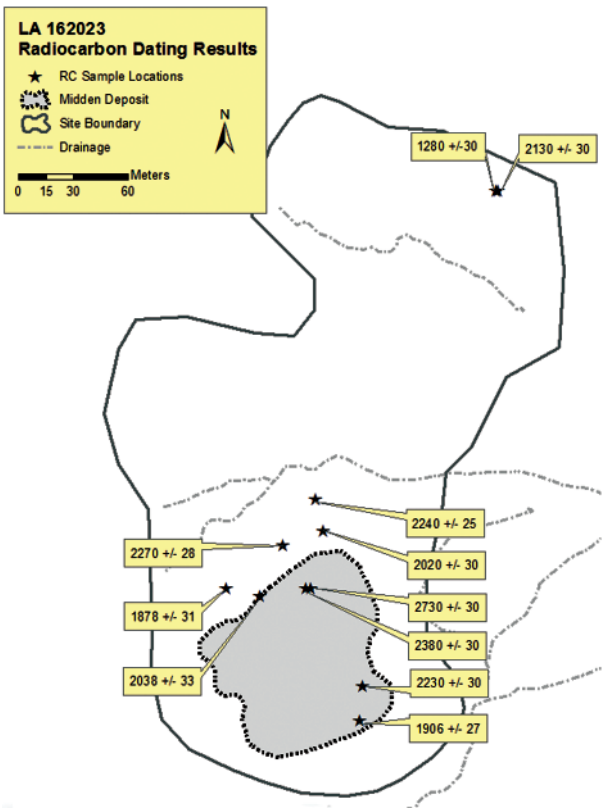


Figure 1. Map showing distribution of radiocarbon dates at LA 162023. Dates are given in conventional radiocarbon years B.P.

Field Investigations

The midden deposit proper is 120 m by 90 m (400 ft by 300 ft) in size and characterized by dark, ashy soil which is barren of vegetation and is littered with thousands of artifacts (Figure 1). It is surrounded by a more diffuse scatter of artifacts and less concentrated midden deposits. The artifacts consist primarily of lithic debitage, although some fire cracked rock and sherds are present. In addition to projectile points, formal artifacts include bifaces, scrapers, cores, choppers, metate fragments, and one-hand manos.

Our investigation of the midden involved three types of activities: surface collection, augering, and hand excavation of test units. Surface collection took place over four field seasons, emphasizing formal artifacts. During the initial season of field work we established a measured grid over the principal midden deposit, and used the grid to point provenience artifacts, as well as excavation units and auger holes. Proveniences of items found outside this grid were established using recreation-grade GPS units. We recorded the location of all formal artifacts and assigned each a unique surface collection ("SC") number. However, as a general rule, only projectile points, sherds, and bifaces were collected. A total of 148 whole or fragmentary projectile points were collected from the surface on or near LA 162023 (Roney et al. 2012).

Initially, augering was intended to better evaluate the depth, integrity, and stratigraphy of the site. We used a hand-operated bucket auger with a four-inch bit, excavating in 20 cm (8 in) increments and screening all material through .3 cm (1/8 inch) screens. In 2011 we excavated 28 auger holes within the midden area, placed along major grid lines. In 2012 we excavated only two auger holes in the midden, and three others in the northern sector of LA 162023, well away from the formal midden (Roney et al. 2014). In 2014 we excavated an additional 13 auger holes spaced evenly along a grid line crossing the midden area (Roney et al. 2016).

By 2015 it was clear from augering and test excavations that the large, exposed midden deposit

contained numerous artifacts and relatively abundant charred material, but these deposits had been severely disturbed by rodent activity. Rather than attempting to discover comparatively pristine contexts, in 2015 we decided to treat the entire midden deposit in the southern portion of the site as a single depositional unit. The primary objective of the augering program was to recover botanical materials from throughout the midden deposit for radiocarbon dating, and to confirm the apparent absence of maize. To accomplish this, we used a stratified judgmental sampling strategy which emphasized areas of dark soil color and high artifact density. Using this approach, we excavated an additional 17 auger holes in or near the midden deposit. Altogether, 63 auger holes were dug within the site boundary.

Finally, our investigations included hand excavation of four 1 m by 1 m (3.3 ft by 3.3 ft) units at three widely separated locations within LA 162023. The auger tests and the test excavation units showed that the cultural midden is 60 to 80 cm (24 to 31 inches) in depth, consisting of sandy loam throughout. No depositionally meaningful stratigraphy was observed, although calcium carbonate content increased with depth. Indurated caliche underlies this deposit, and rodent burrows were frequent in all of the excavation units. We concluded that the cultural deposit has been thoroughly mixed by constant rodent burrowing. Because of this, we considered it to be a single deposit, and attempted to determine its age through AMS radiocarbon dating of short-lived materials.

Radiocarbon Dating

We obtained a total of 11 AMS radiocarbon dates from LA 162023. These results and sample material are shown in Table 2, and details about their provenience are given in Table 3. As discussed above, we attempted to obtain radiocarbon dating samples from throughout the site in order to ensure that the results were not spatially biased. Karen Adams examined all radiocarbon samples and identified the plant parts to find short-lived samples to avoid problems with dating old wood. Charred mesquite seeds (*Prosopis* sp.) were the most common sample type. In addition, a prickly pear seed (*Opuntia* sp.), an unknown seed, and unknown tissue fragments were dated. We dated one charred saltbush (*Atriplex* sp.) wood sample as the best option available from a possible hearth feature in Test Unit 1. Maize (*Zea mays*) was only recovered outside the midden and a single sample was dated. The distribution of dating results is shown in Figure 1. The calibration was performed with OxCal v4.3.2 (Bronk Ramsey 2009) using the calibration curve IntCal13 (Reimer et al. 2013). The two sigma probability calibration curves for the nine dates from the midden are plotted in Figure 2, and the plus symbol indicates the median date. The maize date and a mesquite seed date from Test Units 2 and 3, which lie over 180 m (600 ft) north of the midden are not included in Figure 2.

The nine dates from the midden are internally consistent, and show that this massive feature formed in the later part of the Late Archaic period. The two sigma of the oldest date is cal 930 to 812 B.C. and the youngest is A.D. 66 to 225. We estimate use of the midden as occurring between cal 930 B.C. and A.D. 225. The maize date is cal A.D. 662 to 774 and this age is consistent with some of the sherds listed in Table 1.

Projectile Points

Aside from the midden, the other outstanding characteristic of LA 162023 was the large number of projectile points encountered there. In southwestern New Mexico, as in much of the American Southwest region in general, unexcavated archaeological sites lacking pottery are often dated on the basis of diagnostic projectile points (Justice 2002). In addition, differences in projectile point morphology are increasingly used to support more sophisticated arguments pertaining to social organization (McBrinn 2005), migration (Sliva 2015), mobility, and other aspects of cultural behavior (Beale 2007). For these reasons it is important that we continue to refine our understanding of projectile point morphologies, as well as how they vary through both time and space. This task is complicated because projectile points are relatively rare artifacts,

Table 2. Radiocarbon Dating Results from LA 162023.

Lab No.	Conventional Radiocarbon Age	$\delta^{13}C‰$[a]	Material (all charred)	2 Sigma Calibration	Calibrated Median	In Midden
Beta-302938	2730 ± 30	-10.7	Atriplex sp. wood	930 to 812 BC	871 BC	Yes
Beta-302939	2380 ± 30	-22.1	1 Prosopis sp. seed fragment	727 to 393 BC	455 BC	Yes
Beta-397382	1280 ± 30	-10.2	1 Zea maize cupule fragment	AD 662 to 774	AD 720	No
Beta-397383	2230 ± 30	-22.9	1 Prosopis seed whole	384 to 204 BC	278 BC	Yes
Beta-397384	2130 ± 30	-21	1 Prosopis seed nearly whole	350 to 52 BC	162 BC	No
DirectAMS-18063	2038 ± 33		1 Prosopis seed fragment	164 BC to AD 50	44 BC	Yes
DirectAMS-18064	2020 ± 30		1 Opuntia seed	107 BC to AD 59	19 BC	Yes
DirectAMS-18065	2240 ± 25		1 Unknown seed	388 to 206 BC	276 BC	Yes
DirectAMS-18066	1878 ± 31		2 Prosopis seed fragments[b]	AD 66 to 225	AD 126	Yes
DirectAMS-18067	2270 ± 28		3 Unknown tissue fragments	400 to 210 BC	358 BC	Yes
DirectAMS-18068	1906 ± 27		1 Prosopis seed fragment	AD 25 to 209	AD 98	Yes

a: All results are AMS dates and have been corrected for isotopic fraction. Both labs measure $\delta^{13}C$ values on the prepared carbon by the accelerator and this value is not reported. Beta separately measures the $\delta^{13}C$ value on an IRMS.

b: Tentative ID

Table 3. Provenience of Radiocarbon Dates from LA 162023

Lab No.	Conventional Radiocarbon Age	Provenience	Bag	Level[a]	Depth[b]	Year Collected
Beta-302938	2730 ± 30	Test Unit 1, Feature 1	40	4-5	40-55 cm BD	2011
Beta-302939	2380 ± 30	Test Unit 1	21	7	70-80 cm BD	2011
Beta-397382	1280 ± 30	Test Unit 3	17	3	20-30 cm BD	2014
Beta-397383	2230 ± 30	Test Unit 4	99	7	80 cm BD	2014
Beta-397384	2130 ± 30	Test Unit 2	18	3	20-30 cm BD	2014
DirectAMS-18063	2038 ± 33	Auger Unit 12	406	4	60-80 BS	2015
DirectAMS-18064	2020 ± 30	Auger Unit 10	430	5	80-100 BS	2015
DirectAMS-18065	2240 ± 25	Auger Unit 13	420	4	60-80 BS	2015
DirectAMS-18066	1878 ± 31	Auger Unit 15	421	2	20-40 BS	2015
DirectAMS-18067	2270 ± 28	Auger Unit 11	404	4	60-80 BS	2015
DirectAMS-18068	1906 ± 27	Auger Unit 7	408	6	100-120 BS	2015

a: Levels for Test Units are 10 cm arbitrary levels, levels for Auger Units are 20 cm arbitrary levels
b: BD = Below datum, BS = Below surface

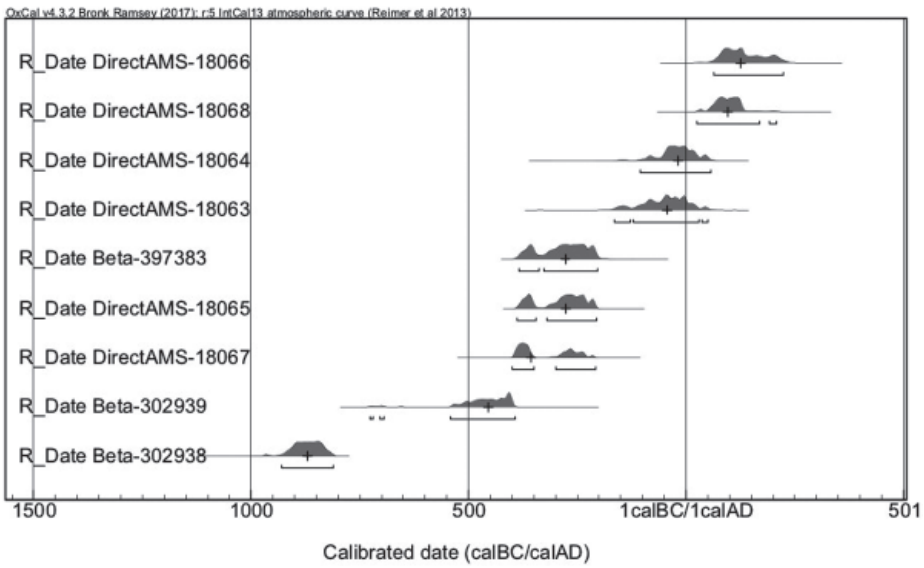


Figure 2. Calibration curves for the nine radiocarbon dates from the LA 162023 midden.

and it is rarer still to recover them in well controlled, chronometrically dated contexts.

We characterize the midden deposit at LA 162023 as a moderately well-controlled context. We assume that the projectile point assemblage and the charcoal which provided radiocarbon dates are results of similar formation processes. That is, both data sets resulted from normal day-to-day activities that took place over an extended period of relatively intensive use. We also recognize that some projectile points could have been lost or discarded before or after the interval of intensive use, but we assume that these instances are few in number. Within the bounds of these assumptions, we argue that most of the projectile points which we recovered date within the interval established by analysis of the radiocarbon dates.

The primary purpose of this discussion is descriptive. Our intention is to characterize the range

of variation observed in the sample of projectile points from this one specific temporal and spatial context. Typological classifications are based on Justice (2002), as well as the analysis which we recently completed of a collection of over 300 projectile points from Cerro Juanaqueña and related sites, also dating from the Late Archaic/Early Agricultural period and located about 80 km (50 miles) to the south (Hard and Roney 2019).

A total of 148 whole and fragmentary projectile points were collected. Thirty of these were too incomplete to classify, leaving 118 classifiable projectile points (Table 4; Figures 3 through 12). An initial step in classification of this collection was to separate the specimens into large and small categories. Throughout much of North America, projectile point assemblages dating later than about A.D. 900 are dominated by small specimens, which many analysts characterize as arrow points intended for use with the bow-and-arrow. These contrast with larger forms intended for use with an atlatl. In drawing this distinction, we followed polythetic criteria proposed by Chris Turnbow (1997) based on weight, length, thickness, and stem width. Generally, small points weigh 15 gm (.035 oz) or less, have lengths of 30 mm (.79 in) or less, are 5 mm (.20) or less in thickness, and have neck widths of 10 mm (.39) or less. By these criteria, 11 of the typeable projectile points are small, and the remaining 107 are large.

As expected in this time period, a great majority of the large projectile points are side- or corner-notched specimens, with expanding stems and straight or convex bases. These forms are generally consistent with the San Pedro and Tularosa Corner-notched types which are distinguished primarily on the basis of size. Using metric data from Justice (2002), we distinguished these two types on the basis of neck width, a measurement which is less likely to vary with breakage and resharpening. Specimens with neck widths of 11.2 mm (.44 in) or more were classified as San Pedro points, while those with narrower neck widths were classified as Tularosa Corner-notched.

The San Pedro type was initially illustrated by Sayles and Antevs (1941), and Haury (1950) later provided an expanded discussion of this type. These projectile points are side- or corner-notched, with expanding stems and a straight to convex basal edge. Alternate classifications for these points include Hueco, Basketmaker II, and En Medio, as well as examples of Types 5, 6, 8, and 15 from Bat Cave. Corner-notched examples from LA 162023 are illustrated in Figure 3 and side-notched examples are shown in Figure 4. Dates for the San Pedro type are usually given as 1500 B.C. to A.D. 300.

Table 4. Projectile Point Types Represented at LA 162023.

Type	Number	% Total	% Typable	Illustration
Cortaro	11	7.4	9.3	Figure 8
Gypsum	3	2.0	2.5	Figure 10
San Jose	1	0.7	0.8	Figure 10
San Pedro Corner-notched	22	14.9	18.6	Figure 3
San Pedro Side-notched	9	6.1	7.6	Figure 4
San Rafael	1	0.7	0.8	Figure 10
Small	11	7.4	9.3	Figure 12
Ventana Side-notched	4	2.7	3.4	Figure 9
Tularosa Basal-notched	2	1.4	1.7	Figure 7
Tularosa Corner-notched	35	23.6	29.7	Figures 5 & 6
Large unclassified	19	12.8	16.1	Figure 11
Fragments	30	20.3	--	Not illustrated
TOTAL	148	100.0	100.0	

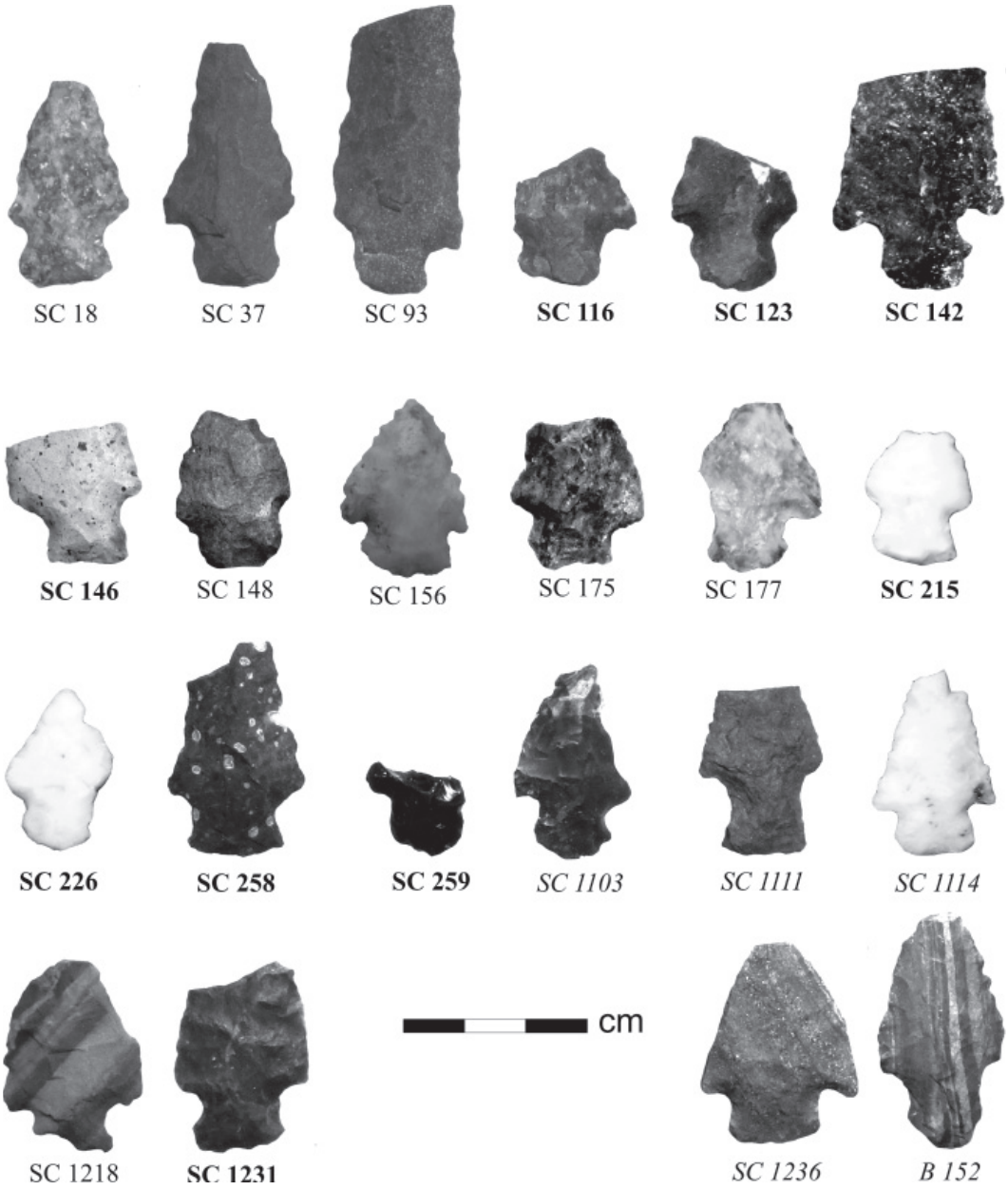


Figure 3. San Pedro corner notched projectile points from LA 162023.

Note: For Figures 3 through 12, **bold labels** identify items found directly on the prehistoric midden; normal font labels identify items found on adjacent slopes; and *italicized font labels* identify items found elsewhere on the site.

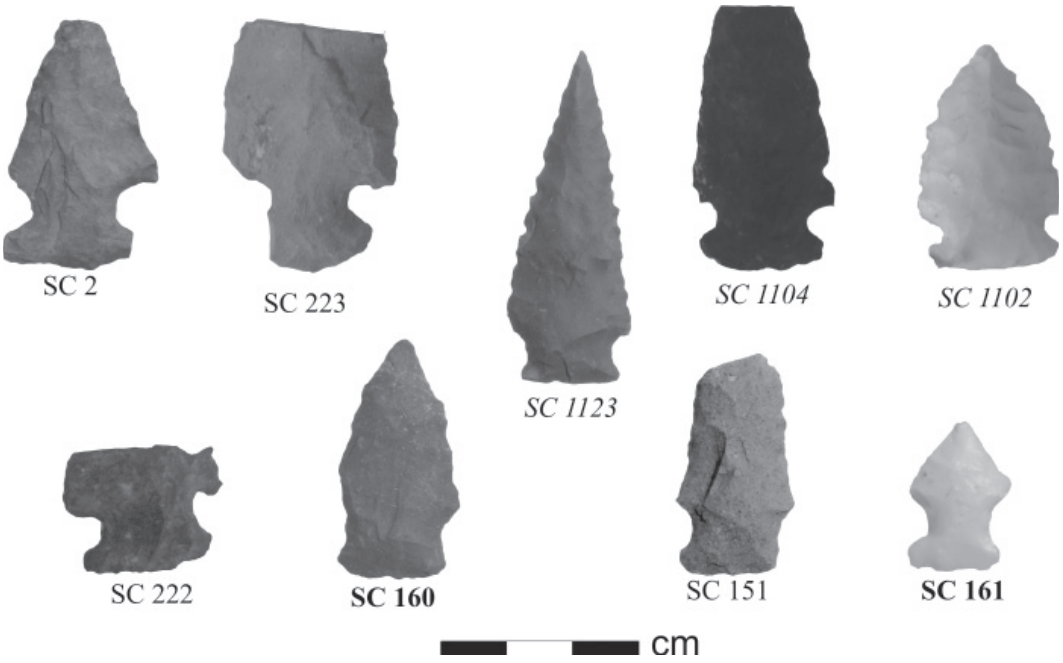


Figure 4. San Pedro side notched projectile points from LA 162023.

Consistent with these estimates, San Pedro points were the dominant type at Cerro Juanaqueña, with its principal occupation ranging from 1300 B.C. to 1100 B.C. (Hard and Roney 2019). Their common occurrence at LA 162023 is also consistent with the 1500 B.C. to A.D. 300 estimate of their age.

Tularosa Corner Notched points are very similar to San Pedro points in overall shape. They are described as relatively small- to medium-sized corner-notched points with a narrow neck width, narrow notches, expanding stems, and convex to straight basal edges. As used here, the distinction between San Pedro and Tularosa Corner Notched points is based on neck width, with an arbitrary dividing point at 11.2 mm (.44 in). Projectile points classified as Tularosa Corner Notched are shown in Figures 5 and 6. Justice (2002) suggests that this type evolved gradually from the San Pedro type, a notion which is supported by comparison of the Cerro Juanaqueña and LA 162023 assemblages. The principal occupation at Cerro Juanaqueña is prior to that of LA 162023, and at Cerro Juanaqueña San Pedro points outnumber Tularosa Corner Notched points by a ratio of 6.5 to 1. In contrast, the assemblage at LA 162023 has roughly equal numbers of San Pedro and Tularosa Corner Notched points.

Another type closely associated with San Pedro and Tularosa Corner Notched is Tularosa Basal Notched, characterized by a strongly triangular shape, a wide blade, narrow basal notches, and prominent barbs (Justice 2002). Although it is sometimes dated between 100 B.C. and A.D. 100 to 900, this type is well represented at Cerro Juanaqueña, and must, therefore, have come into use prior to 1300 B.C. (Hard and Roney 2019). The collection from LA 162023 includes only two examples of this type (Figure 7), but we have obtained radiocarbon dates of around 400 B.C. associated with other examples in the upper Gila region of eastern Arizona (Roney et al. 2015).

Cortaro points, originally defined by Roth and Huckell (1992), are unnotched bifaces with a triangular blade and concave base. They are generally associated with the Late Archaic/Early Agricultural period in the southern Southwest, although their dating is not secure. They are well represented in the LA 162023 collection (Figure 8), as well as in southwestern New Mexico generally (Knight 2003). Sliva (2005:93) suggests that these artifacts may have been multipurpose hafted

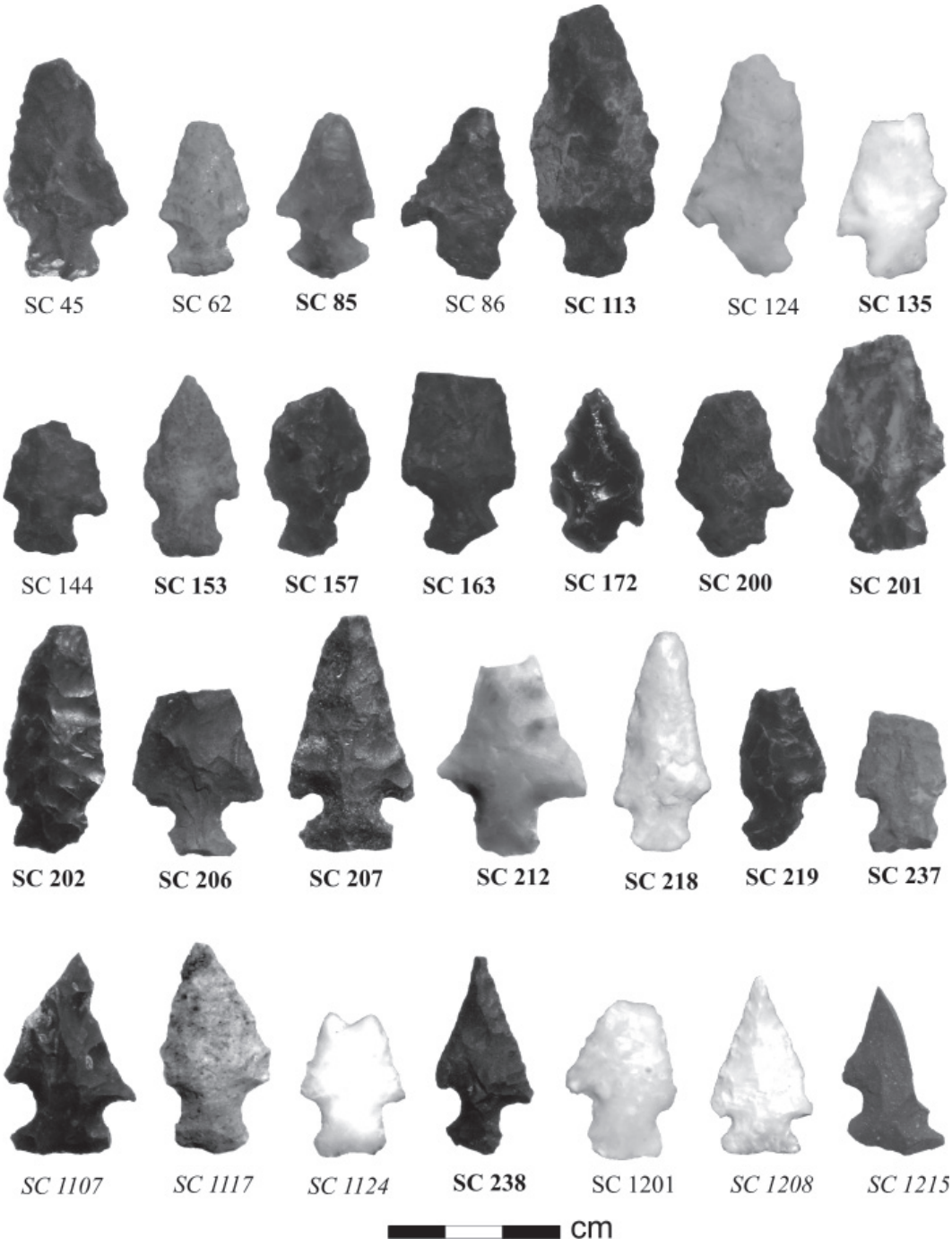


Figure 5. Tularosa Corner Notched projectile points from LA 162023.

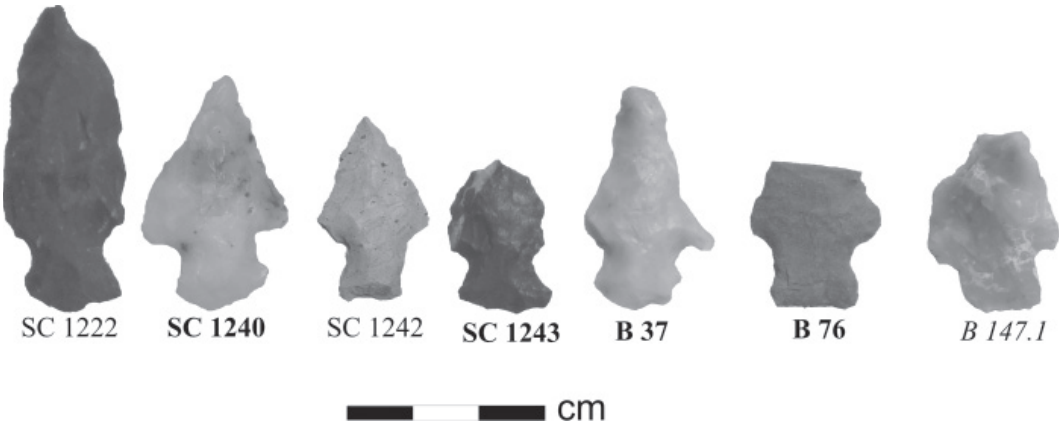


Figure 6. Additional Tularosa Corner Notched projectile points from LA 162023.

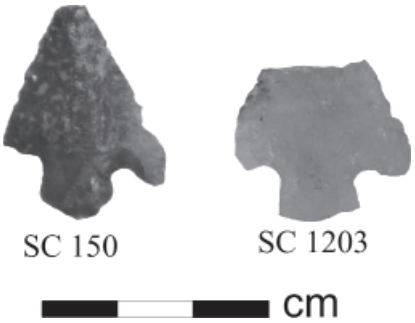


Figure 7. Tularosa Basal Notched projectile points from LA 162023.

bifaces, rather than projectile points. Several of the examples illustrated in Figure 8 show a distinct break in outline between the blade portion and the basal portion. This reinforces the impression that they may have been hafted onto a wide handle, and resharpened while still attached the handle.

Four projectile points from LA 162023 match illustrations and type descriptions for the Chiricahua or Ventana Side Notched type (Figure 9). These specimens are side-notched, with fairly deep concave bases. As a result, the stem exhibits distinctive outward

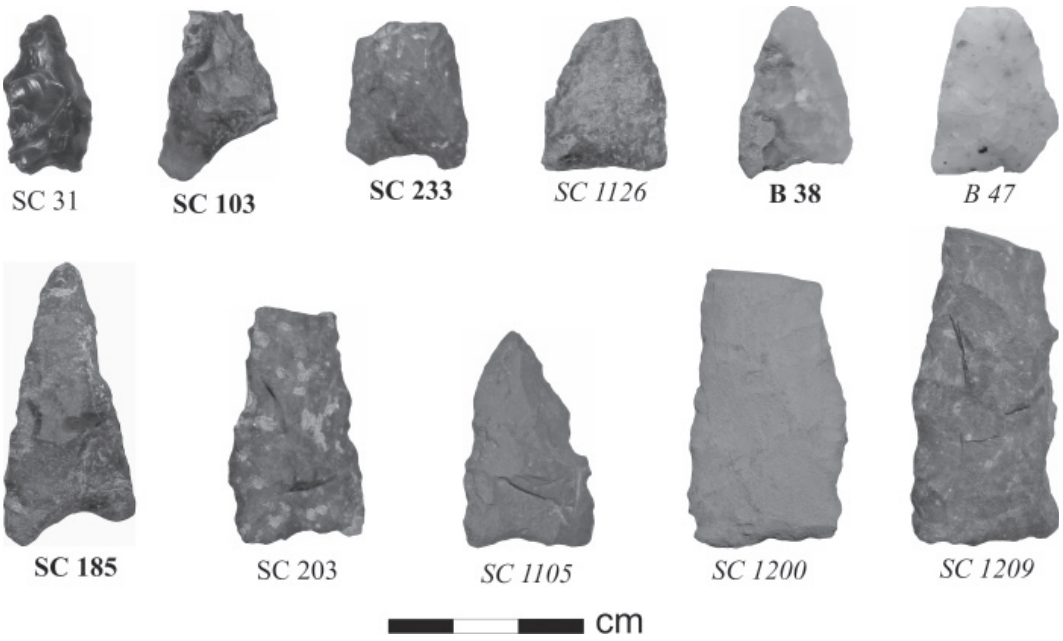


Figure 8. Cortaro projectile points from LA 162023.



Figure 9. Ventana Side Notched projectile points from LA 162023.

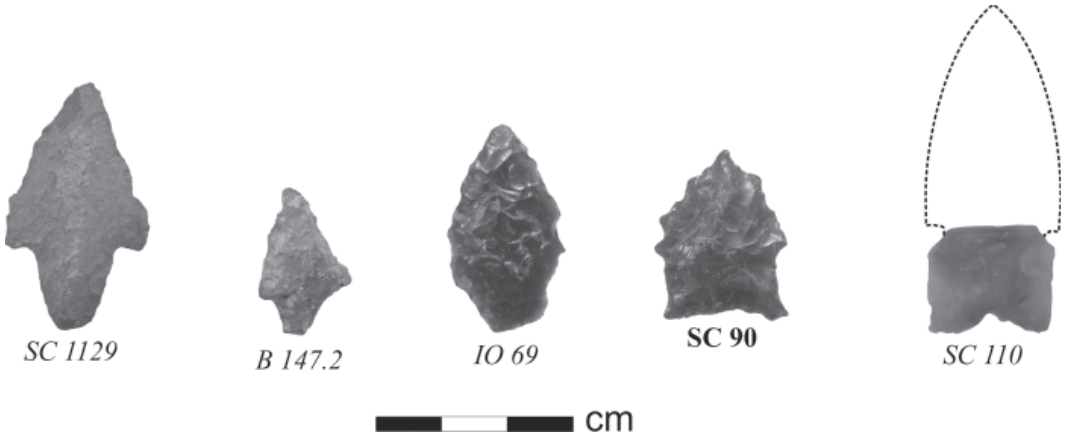


Figure 10. Gypsum, San Jose, and San Rafael Side Notched projectile points from LA 162023.

flaring ears. Justice (2002) assigned an age of ca. 3500 to 1800 B.C. to Ventana Side Notched points. This type was not present at Cerro Juanaqueña and related sites in northwestern Chihuahua. Instead, a small number of concave-based projectile points had shallow basal concavities, more consistent with the Todsen type (MacNeish 1993). Figure 10 illustrates three additional earlier types from LA 162023. The first three examples in the figure are Gypsum points, recognized by their distinctive contracting stems. They are usually thought to span the transition between the Middle and Late Archaic periods. The fourth specimen (Figure 10: SC 90) is classified as a San Jose point, based primarily on its short, serrated, heavily resharpened blade. The final specimen in Figure 10 (SC 110) is an example of a San Rafael Side Notched point, with side notches high on the preform and a separately notched concave base.

These last four types, Chiricahua/Ventana, Gypsum, San Jose, and San Rafael Side Notched, are all thought to have been used during the Middle Archaic period, although Gypsum points may have continued into the early part of the Late Archaic period. The apparent association of these types with radiocarbon dates spanning the interval between 900 B.C. and A.D. 200 is unexpected. Perhaps they reflect a Middle Archaic occupation at this location that was not captured by our sample of radiocarbon dates, or perhaps they were curated specimens collected by later people and brought to this site during its span of intensive occupation. Figure 11 illustrates 19 additional large category projectile points that were not assigned to any defined class in this analysis.

As discussed earlier, projectile points in the small category have short lengths and small stem widths. They are thinner and weigh less than projectile points

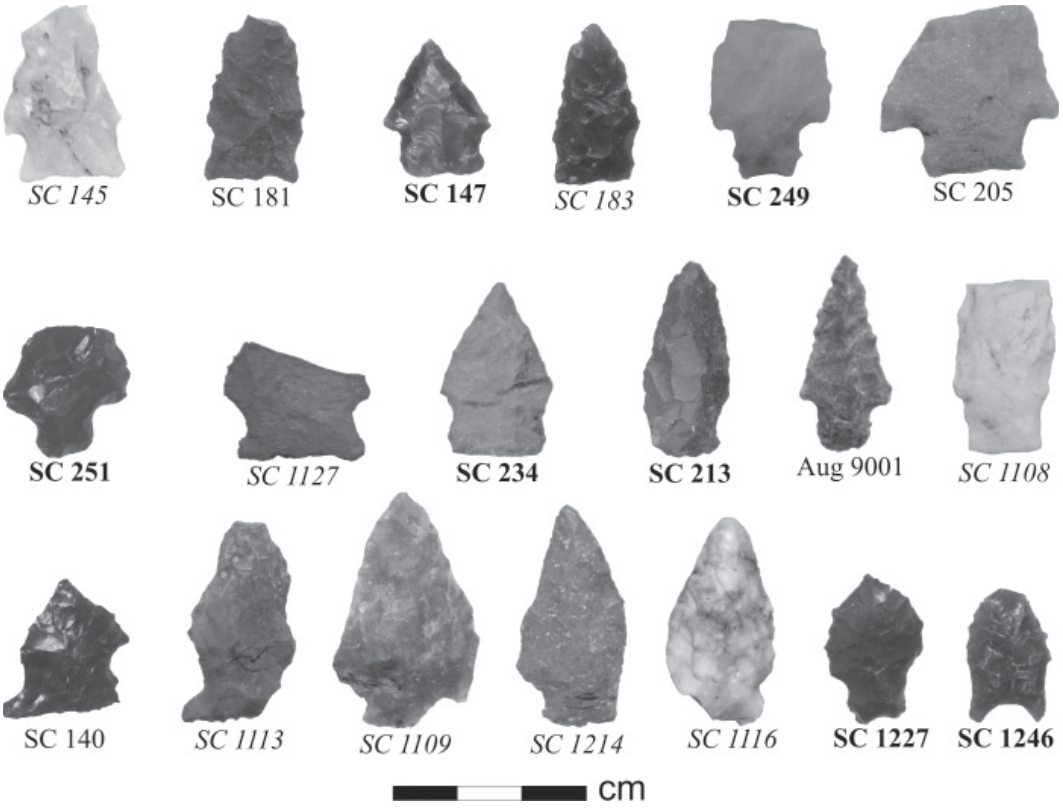


Figure 11. Large unclassified projectile points from LA 162023.

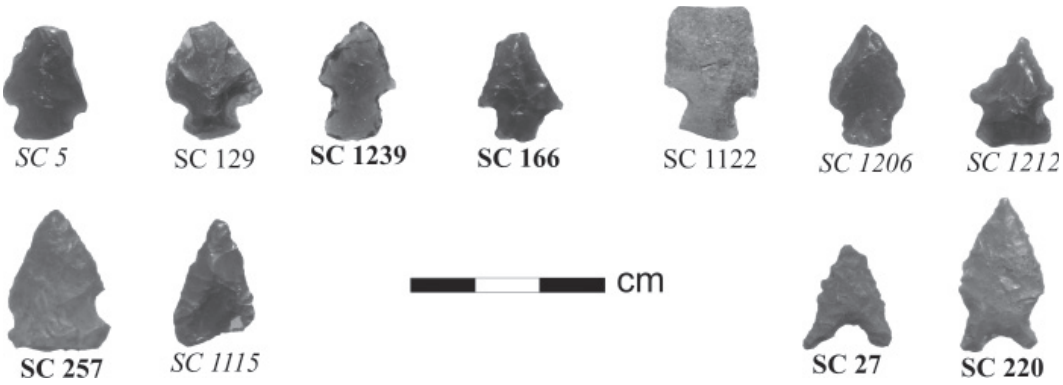


Figure 12. Small projectile points from LA 162023.

in the large category, and they were likely intended for use with the bow-and-arrow. The 11 small projectile points found at LA 162023 are shown in Figure 12. Those shown in the top row generally have expanding stems, convex bases, and short barbs, resembling many of the Late Archaic dart forms. Similar examples were recovered from Cerro Vidal in northwestern Chihuahua, associated with radiocarbon dates in the 400 to 100 B.C. range. Sliva (1999) has suggested that use of the bow-and-arrow may have begun as early as 800 B.C. in the southern Southwest. If so, appearance of these small projectile points in a Late Archaic midden at LA 162023 is not surprising. The last two specimens in Figure 12 have deeply concave bases and serrated edges characteristic of proto-historic Sobaipuri points (Justice 2002:272-274).

Discussion

Occurrences of Ventana Side Notched, Gypsum, San Jose, and San Rafael Side Notched projectile points suggest at least limited use of the LA 162023 landform in the Middle Archaic period, 3500 to 1500 B.C., perhaps extending into the early part of the Late Archaic period. However, multiple radiocarbon dates show that the dense midden deposits on this site accumulated between 930 B.C. and A.D. 225, during the latter half of the Late Archaic period. A majority of the projectile point assemblage is consistent with this inference, as is the relative scarcity of pottery.

Contrary to our expectations, maize was not an important subsistence item during the Late Archaic use of this site. Instead, the only fragment of maize recovered at LA 162023 dated to about A.D. 720, and it was found in the northern portion of the site, separated from the midden by a series of small drainages. Nearby groups at Cerro Juanaqueña, 80 km (50 mi) to the south, and in the Burro Mountains 80 km (50 mi) to the north were making extensive use of maize at the same time the LA 162023 midden was deposited (Hard and Roney 2019; Turnbow 2000).

The radiocarbon dates also imply that the midden deposits on LA 162023 accumulated over a long period of time, potentially more than 1,000 years. This contrasts with the pattern seen at aggregated, fortified settlements occupied during the same chronological interval along the Rio Casas Grandes and the Gila River, where periods of intensive use were limited to a few centuries at most.

Today the most conspicuous wild plant food staple in this area is mesquite. Dense stands of vigorous mesquite are found along the toe of the alluvial apron flanking Laguna de las Moscas. Production of mesquite beans is less dependent upon variable annual precipitation than many other plant resources, and they can be stored for long periods of time. We suspect that this resource in particular allowed relatively mobile hunter-gatherers to overwinter at this location. If so, this strategy was used most often during the second half of the Late Archaic period, a time when other people living in both riverine and upland settings were intensifying agricultural production instead.

Acknowledgments

This work was supported by the National Science Foundation (Award 0514623), the UTSA Office of the Vice-President for Research, and the Bureau of Land Management, Las Cruces Field Office (Purchase Order L15PX01114). Logistical support was provided by the Center for Archaeological Research at UTSA, and by Colinas Cultural Resource Consulting. The project was conducted under New Mexico BLM permits NM-11-197-S, 224-2920-11-D, and 224-8152-14-1.

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