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2016 Archaeological Investigations at the Sanders Site (41LR2)

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The T. M. Sanders site (41LR2) is a large and impressive ancestral Caddo mound center and village situated on an alluvial terrace (450 ft. amsl) at the mouth of Bois d'Arc Creek and the Red River. With the permission of the landowners (the Crawford family and the Sanders family), periodic archaeological and geophysical investigations have been conducted across much of the 200+ acres of the Sanders site since 2013; this article primarily discusses the work done in March 2016. These archaeological investigations, including controlled surface collections and shovel testing, recovered significant new information from many of the 39 non-mound habitation areas/artifact clusters, as well as unique information on a burned Sanders phase house feature that had been exposed on the crest of the West Mound. The depth of this feature, at ca. 30 cm bs, suggests that it is the uppermost of at least five zones of structures in or immediately below the West Mound. Overall, ceramic and lithic artifacts are widespread in surface and sub-surface contexts at the T. M. Sanders site; currently there are 39 separate artifact concentrations or artifact clusters recognized on the site, and there are significant numbers of artifacts present on the East and West Mounds. These artifacts indicate that the Sanders site was used by ancestral Caddo peoples during both the Late Archaic and Woodland periods, and much more intensively in the Middle Caddo period Sanders phase, and in the Historic Caddo (late 17th century to as late as 1774) Womack phase. The substantial Sanders phase occupation began ca. A.D. 1100, probably lasting until ca. A.D. 1300, and this occupation included two large village areas—the East Village covers a ca. 880 x 350 m area and the West Village a ca. 900 x 300 m area—on either side of two constructed mounds and a large midden feature on the ridge between the two mounds. The East Mound was the primary locus for the burial of important personages and families in the Caddo community, and was also used much later for habitation by historic Caddo groups, while the West Mound had a series (perhaps as many as five) of important public structures in and likely under the constructed mound. The historic Caddo settlement at the Sanders site was also spatially extensive, based on the distribution of artifact clusters with shell-tempered ceramics, Womack Engraved fine ware sherds, triangular arrow points, many of the scraping tools, and the suspected locations of European trade goods south of the West Mound and east of Bois d'Arc Creek.

Keywords: American Southeast; Caddo; Texas; Lamar County; Archaeology

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INTRODUCTION

On March 4th and 5th, 2016, Bo Nelson and Mark Walters returned to the T. M. Sanders site (41LR2) to inspect the property after Julia Trigg Crawford, the main landowner of the site, informed us that the fields at the site had been prepped for this years planting. This article summarizes the findings from these archaeological investigations, which also included the surface examination of the 40 acres of the Sanders site owned by the Sanders family.

The Sanders site is a large and impressive ancestral

Caddo mound center and village situated on an alluvial terrace (450 ft. amsl) at the mouth of Bois d'Arc Creek and the Red River (Figure 1). The Sanders site was first investigated by archaeologists from the University of Texas in 1931 [1, 2, 3, 4, 5, 6], where the work concentrated on the excavation of a number of burial features in Mound No. 1 or the East Mound, the trenching of Mound No. 2 or the West Mound, and the trenching of thick midden deposits between the two mounds. The collections from this work are at the Texas Archeological Research Laboratory at The University of

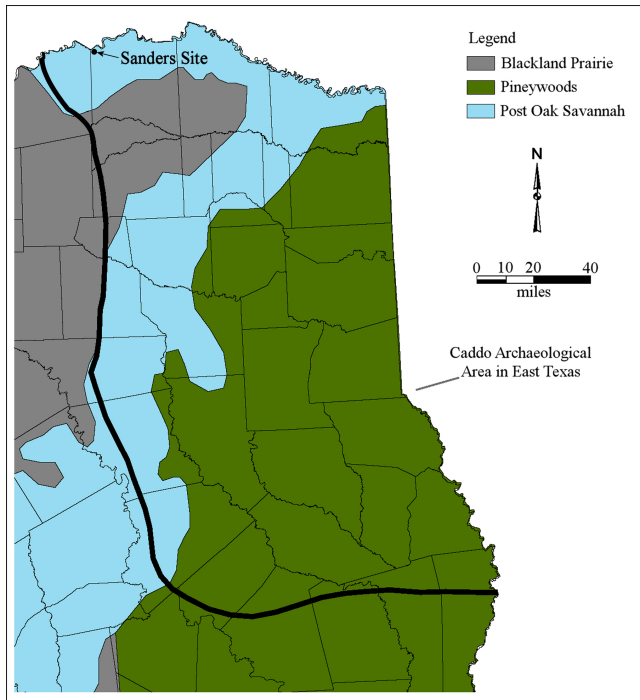


FIGURE 1. The location of the Sanders site in East Texas.

Texas at Austin. Members of the Dallas Archeological Society excavated burial features and obtained surface collections in the 1940s-1950s [7, 8, 9] from the Sanders site. R. King Harris, in particular, amassed a large collection of artifacts from the Sanders site that are now held by the National Museum of Natural History at the Smithsonian Institution [10].

Other than a number of bioarchaeological studies of the human remains from the East Mound burial features [11, 12, 13, 14, 15, 16, 17], there were no professional archaeological investigations conducted at the Sanders site again until 2011, when survey and/or test excavations were carried out in the proposed right-of-ways for the Keystone pipeline where they crossed non-mound habitation areas [18, 19, 20]. This work renewed attention to the significance of the Caddo archaeological deposits at the Sanders site, including both mound and non-mound areas, and with the permission of the Crawford family and the Sanders family, periodic archaeological and geophysical investigations have been conducted across much of the 200+ acres of the Sanders site since 2013 [21, 22, 10, 23, 24, 25]. The 2016 work represents a continuation of this effort.

SURFACE COLLECTION AREAS

The Crawford property is under a new lease by several Mennonite farmers. The new farmers have recently ripped and disked the soil. The ripping involves using a row of thin plows to penetrate from 12-18 inches bs (ca. 30-45 cm bs) to aerate the soils. It is unknown if ripping was employed on the Sanders property, because



FIGURE 2. Mark Walters surface collecting on the West Mound at the Sanders site, looking north.

it is being farmed by a different individual than the Crawford farmers.

The prepared fields have different visibility, due in part to the types of previously planted crops or if they lay fallow. The fallow fields were grass-covered, and after the land preparations have 30 to 40 percent visibility. The fields that were in corn have 50 to 60 percent visibility, and the wheat fields have 60 to 70 percent. The Sanders 40 acres have 70 to 80 percent surface visibility, perhaps from more intense disking of the area (Figure 2).

Because of the lack of recent precipitation in the area, and very recent cultivation, the artifactual materials were not as commonly noted on the surface of the fields compared to artifact densities noted in previous surface collection activities the past several years. Not all defined surface collection areas were examined during this visit to the Sanders site. A large amount of time was spent surface collecting on, around, and between the two mounds on the Sanders family farm. In addition, it was evident by recent footprints that the Sanders property is still being actively surface collected by other people.

Surface artifacts were collected in Area 34 (between the East and West Mounds) on the Sanders property, and surface artifacts were also collected from Areas 5,

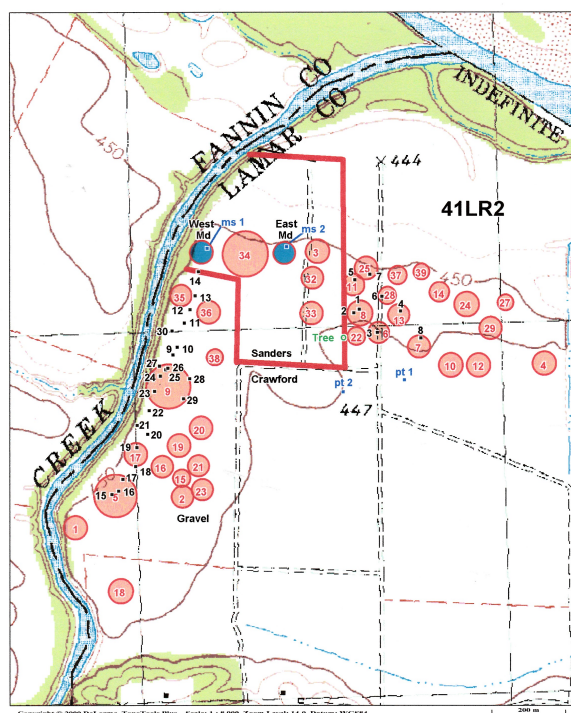


FIGURE 3. Artifact cluster areas at the Sanders site, the East and West Mounds, Features MS-1 and MS-2, and ST 1-30.

6, 9, 11, 13, 16, 17, 25, 29, and 33 on the Crawfords property (Figure 3). An additional five new areas (35-39) were defined from surface artifacts on the Crawfords property. Areas 35, 36, and 38 were previously in grass-covered fallow land south of the mounds. Areas 37 and 39 are located on the east side of the mounds along the northern terrace edge (Figure 3); they may have been exposed because of the ripping agricultural method employed during the preparations for the planting of new crops. Additionally, a few mussel shells were collected on the surface of the East mound from Feature MS-2, indicating the feature may still be intact.

Including the East Mound, the highest densities of ancestral Caddo artifacts on the surface of the Sanders site during the 2016 investigations are in Artifact Cluster areas 6, 34, and 9, with between 79-140 artifacts (mostly ceramic sherds) (Table 1). These areas are along the western edge of the alluvial terrace and overlooking Bois d'Arc Creek, ca. 240-600 m south of the West Mound (Figure 3), or between the East and West Mounds.

SHOVEL TESTING OF HABITATION AREAS AND ARTIFACT CLUSTERS

An additional 16 shovel tests (ST 15-30) were excavated at the site in March 2016 along the landform paralleling

Bois d'Arc Creek, and south of ST 9-14 excavated in earlier investigations (Figure 3). STs 1-8 were excavated in habitation areas well east of the East Mound in Areas 6-8, 11, 13, 26, and 28. Three of the recently excavated shovel tests (ST 15-17) were in Area 5, two shovel tests (18-19) were within Area 17, and 7 shovel tests (23-29) were excavated in Area 9. Four shovel tests (ST 20-22, and 30) were excavated either between Areas 9 and 17 or between Areas 9 and 35 (Table 2).

One shovel test (ST 25) in Area 9 may have encountered a feature or midden deposit, because of the higher amount of ceramic sherds and large bone fragments that were recovered in the excavations, along with the presence of a dark brown silt loam soil zone between 27-66 cm bs. Another shovel test (ST 26) was then placed 2 m from ST 25, but did not encounter any animal bones or as high a density of ceramic sherds (Table 3), although the same dark brown silt loam soil zone (23-60 cm bs) was present in this shovel test, as well as in ST 27 (16-41 cm bs). The mean density of artifacts in the 15 positive shovel tests is only 4.7 per positive shovel test, or ca. 37.6 artifacts per square meter of archaeological deposits. The highest densities of artifacts are in ST 25 (Area 9), ST 15 (Area 5), ST 26 (Area 9) and ST 20 (between Areas 9 and 17).

By depth in the shovel tests, the ancestral Caddo artifacts are present at roughly equal densities from 0-20 cm bs to 40-60 cm bs (Table 4). The animal depth is present and preserved only in the lower depths of the archaeological deposits (20-60 cm bs), and the highest density of ceramic sherds in the deposits are from 40-60 cm bs in ST 15 and ST 25.

WEST MOUND

The West Mound had been recently damaged by the borrowing of sediments from the mound by the farmer that works for the Sanders family. He removed these sediments to fill in a ca. 1.8 m long eroded gully on the north side of the mound. The disturbed area is on the crest of the mound, in its western part (Figure 4), paralleling the tree line and Bois d'Arc Creek, and is ca. 8-10 m in length and 2-3 m in width (Figure 5). This cut reaches a maximum of 50 cm bs. It is likely that a front-end loader mounted on a tractor was used to make uneven cuts into the edge of non-farmed and western portions of the mound.

During this removal of mound sediments exposed remnants of a burned clay house floor were apparent, as well as midden deposits, and burned and darkened sediments that overlaid the house floor, plus large quantities of animal bones, mussel shell, burned clay, silica froth, plain and decorated sherds that were spread across the mound surface. We were able to discern a dark zone running horizontally across the cut into the mound (Figure 6), and clumps of this darkened sediment were observing on the surface

TABLE 1. Artifacts recovered in surface collection areas, March 2016, at the Sanders site.*

Artifact Cluster Number	Lithic Debris	Tools	Plain Sherds	Decorated Sherds	N
East Mound	24	7	67	27	125
5	23	8	27	-	58
6	20	7	93	20	140
9	16	7	49	7	79
11	15	-	15	4	34
13	9	6	36	6	57
16	7	1	5	1	14
17	18	12	10	2	42
25	5	2	7	2	16
29	5	4	26	9	44
33	6	-	6	-	12
34	31	4	85	14	134
35	4	-	21	2	27
36	3	2	11	3	19
37	14	6	12	1	33
38	4	-	11	-	15
39	11	2	8	1	22
Totals	215	68	490	98	871

*Does not include animal bone in Area 11 (n=1), Area 13 (n=1), Area 29 (n=1), and Area 34 (n=1), East Mound (n=8), mussel shell in Feature MS-2 on the East Mound (n=13), or late 19th-early 20th century historic artifacts in Area 9 (n=1), Area 16 (n=2), and the East Mound (n=7).

TABLE 2. Descriptions of shovel tests at the Sanders site that contain archaeological deposits.

ST No.	Description
15	0-18 cm, brown silt loam; 18-42 cm, dark reddish-brown silt loam; 42-72 cm, yellowish-red silt loam; 72-76 cm+, dark red clay loam
16	0-23 cm, brown silt loam; 23-48 cm, dark reddish-brown silt loam; 48-67 cm, yellowish-red silt loam; 67-70 cm+, dark reddish-brown clay loam
17	0-50 cm, brown silt loam; 50-52 cm+, dark reddish-brown clay loam
18	0-17 cm, brown silt loam; 17-76 cm, dark reddish-brown silt loam; 76-78 cm+, dark reddish-brown clay
19	0-20 cm, brown silt loam; 20-45 cm, dark reddish-brown silt loam; 45-48 cm+, dark reddish-brown clay loam
20	0-20 cm, brown silt loam; 20-41 cm, dark reddish-brown silt loam; 41-43 cm+, dark reddish-brown clay loam
21	0-20 cm, brown silt loam; 20-49 cm, dark reddish-brown silt loam; 49-51 cm+, dark reddish-brown clay loam
23	0-18 cm, brown silt loam; 18-47 cm, dark reddish-brown silt loam; 47-52 cm+, reddish-brown clay loam
24	0-23 cm, brown silt loam; 23-53 cm, dark reddish-brown silt loam; 53-56 cm+, reddish-brown clay loam
25	0-27 cm, brown silt loam; 27-66 cm, dark brown silt loam (feature?); 66-72 cm, reddish-brown silt loam; 72-75 cm+, reddish-brown clay loam
26	0-23 cm, brown silt loam; 23-60 cm, dark brown silt loam; 60-68 cm, reddish-brown silt loam; 68-70 cm+, reddish-brown clay loam
27	0-16 cm, brown silt loam; 16-41 cm, dark brown silt loam; 41-55 cm, reddish-brown silt loam; 55-59 cm+, reddish-brown clay
28	0-19 cm, brown silt loam; 19-40 cm, dark reddish-brown silt loam; 40-52 cm, reddish-brown silt loam; 52-55 cm+, reddish-brown clay
29	0-18 cm, brown silt loam; 18-41 cm, dark reddish-brown silt loam; 41-50 cm, reddish-brown silt loam; 50-52 cm+, reddish-brown clay
30	0-25 cm, brown silt loam; 25-52 cm, dark reddish-brown silt loam; 52-60 cm+, reddish-brown clay loam

scattered around the mound; no more detailed profile could be obtained because of the Sanders families desire

not to allow any hand excavations by archaeologists at the Sanders site, only non-invasive surface collections

TABLE 3. Artifact recovery in ST 15-30 at the Sanders site.

ST Number	Lithic Debris	Tools	Bone	Plain Sherds	Decorated Sherds	N
15	1	-	-	12	-	13
16	3	-	-	-	-	3
17	3	-	-	-	-	3
18	1	-	-	2	-	3
19	3	-	-	-	-	3
20	1	-	-	4	1	6
21	1	-	-	-	-	1
23	-	-	-	2	-	2
24	-	1	-	1	-	2
25	-	-	8	8	-	16*
26	2	-	-	4	3	9
27	2	1	-	-	-	3
28	-	1	-	1	-	2
29	-	-	-	1	-	1
30	2	-	-	1	-	3
Totals	19	3	8	36	4	70

*Does not include an iron spike from 0-20 cm bs.

TABLE 4. Depth of artifacts recovered in ST 15-30 at the Sanders site.

Depth (cm bs)	LD	Tools	Bone	PS	DS	N
0-20	13	2	-	9	2	26
20-40	6	1	3	10	1	21
40-60	-	-	5	17	1	23

LD = lithic debris; PS = plain sherds; DS = decorated sherds.

and remote sensing. The zone is up to 10 cm in thickness, and about 30 cm below the present mound surface at the cut. The zone has charcoal flecks and small white specks of bone and mussel shell. It was further observed that there were many large ceramic sherds and bone fragments on the mound surface, and it is likely that these are from the disturbance to the mound, probably originating from below the reaches of previous plowing activities. In addition, the previous area of a possible feature (MS-1) on the West Mound had no visible large mussel shell fragments, and the area may have been covered by fill from the mound cut.

A 2 gallon (ca. 7.6 liters) sample of the burned and darkened sediments laying on and directly above the clay house floor was collected for fine screening through 1/16-inch window mesh. In addition to +20 chunks of burned and darkened earth, there were six unburned animal bones, two burned animal bones, one very small

mussel shell valve fragment, and 24 small pieces of burned clay (Table 5). No charred organic remains were present in the sample, suggesting any wood structural remnants had been cleared away from this part of the mound before the the burned and darkened sediments were dumped atop the clay house floor.

ARTIFACT ASSEMBLAGE

Artifacts recovered in March 2016 surface collections and shovel tests at the Sanders site include more than 900 ceramic sherds, more than 70 chipped or ground stone tools, 259 pieces of lithic debris, as well as pieces of burned clay, many animal bones, and mussel shell valves and umbos (reported on elsewhere) from both the East and West Mound areas. A few late 19th to early 20th century historic artifacts (n=12, mostly bottle glass, and mainly found on the East Mound).

Ceramic Sherds

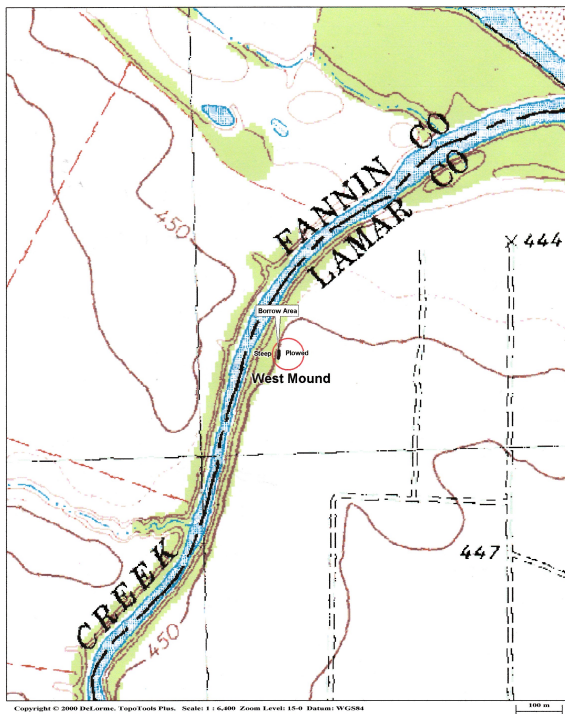
More than 900 ceramic rim, body, and base sherds were collected from the Sanders site in the March 2016 archaeological investigations (Table 6). Approximately 84 percent of the sherds are from grog-tempered vessels, another 11.6 are from bone-tempered vessels, and 4.5 percent are from shell-tempered vessels. The shell-tempered sherds are from all areas of the site (Figure 3): Area 5 (n=4), Area 6 (n=12), Area 9 (n=5), Area 11 (n=1), Area 13 (n=5), Area 25 (n=1), Area 29 (n=1), Area 34 (n=3), Area 37 (n=1), the East Mound (n=4), and the West Mound (n=3).

Each of the different tempered wares have decorated sherds, but the plain to decorated sherd ratios (P/DR)

TABLE 5. Artifacts recovered from the West Mound, March 2016, at the Sanders site.

Provenance	LD	Tools	Pl Sherds	Dec Sherds	Animal Bone	Mussel Shell	B Clay	N
Fine screen sample	-	-	-	-	8	1	24	33
Surface collection	25	2	222	54	2	3	9	317
Totals	25	2	222	54	10	4	33	350

LD = lithic debitage; B Clay = burned clay.

**FIGURE 4.** Location of the recently borrow cut into the West Mound at the Sanders site.**TABLE 6.** Ceramic wares in the March 2016 sherds sample from the Sanders site.

Ware	GT	BT	ST	N
Plain	620	91	36	747
Utility	79	4	4	87
Fine	58	11	1	70
Totals	757	106	41	904

GT = grog temper, BT = bone temper, ST = shell temper.

**FIGURE 5.** Looking west at recent cut in the West Mound.

are high: grog-tempered wares, a P/DR of 4.53; bone-tempered wares, a P/DR of 6.07; and shell-tempered wares, a P/DR of 7.20. This indicates that plain vessels, or vessels with decorations limited to the rim, are common at the Sanders site regardless of which temper was chosen for vessel manufacture.

Of the decorated sherds in this assemblage from the Sanders site, more than 87 percent are from grog-tempered vessels (Table 6); another 9.5 percent are from bone-tempered vessels, and only 3.2 percent of the decorated sherds are from shell-tempered vessels. Utility ware sherds comprise 58 percent of the grog-tempered wares, compared to only 27 percent of the bone-tempered wares, but 80 percent of the shell-tempered wares (Table 6). Fine ware sherds are particularly common in the bone-tempered wares (73 percent), and moderately common in the grog-tempered wares (42 percent).

About 30 percent of the decorated sherds from grog-tempered vessels have incised decorative elements (Supplementary Table 1). The decorative elements are consistent with utility ware Canton Incised vessels [26]:Plate 12 or Sanders Incised (if on a carinated bowl). The one zoned incised-punctated body sherd (0.7 percent of the decorated grog-tempered sherds) is



FIGURE 6. Close-up of recent cut into the West Mound at the Sanders site. Note that burned and darkened sediments in the profile.

likely also from a Canton Incised vessel [26]:Plate 12d, h.

Also common in the utility wares in the 2016 sample are rim and body sherds with rows of punctations; these comprise 18.3 percent of the assemblage. Nine sherds have rows of fingernail punctations, and they are from Monkstown Fingernail Impressed vessels [26]:Plate 55; the one pinched body sherd is also from a Monkstown Fingernail Impressed vessel [26]:109. Another body sherd has rows of cane punctations, and the remaining punctated sherds have rows of tool punctations (Figure 7a).

Less common grog-tempered utility wares have applied nodes and ridges (5.1 percent of the grog-tempered decorated sherds), two have corn cob impressed elements (1.5 percent), one body sherd has parallel brushing marks, and a single rim sherd has a notched lip (Supplementary Table 1). The corn cob impressed sherds may be from 16th and 17th century A.D. Anglin Corn Cob Impressed vessels. Anglin Corn Cob impressed rim and body sherds are marked by roughly parallel or horizontal rows of impressions created by rolling a corn cob across the wet surface of an unfired jar. Corncob impressed pottery have identified in ceramic sherd assemblages in the upper Sabine River

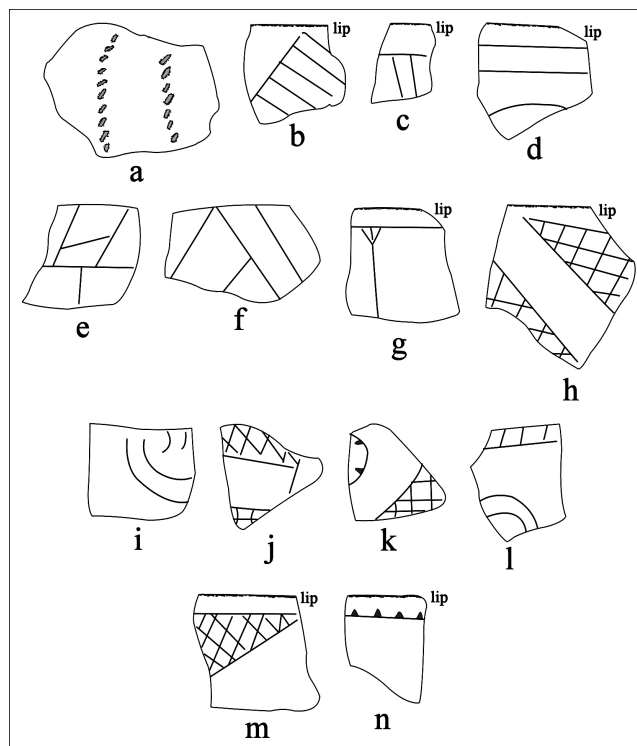


FIGURE 7. Selected decorative elements on grog-tempered rim and body sherds from the Sanders site.

basin in East Texas.

More than 53 percent of the grog-tempered fine ware sherds in the 2016 Sanders site sample are from red-slipped Sanders Slipped vessels (Supplementary Table 1); these comprise 22.6 percent of all the decorated sherds in the grog-tempered sherd assemblage. The red ochre-rich slip was applied to either one or both vessel surfaces. Sanders Engraved sherds ($n=8$) are common in the engraved grog-tempered vessel sherds (Figure 7b-c, f), including two diagonal rim sherds with red-slipped surfaces (Supplementary Table 1). Sanders Engraved and Sanders Slipped vessels are key diagnostic ceramic types of the Middle Caddo period component at the Sanders site [23]:Table 2.

Other fine wares likely associated with the Sanders Engraved and Sanders Slipped types include one Hickory Engraved rim sherd with horizontal engraved lines (Figure 7d). There also is a body sherd with a straight engraved line and diagonal engraved zone with a hatched line (Figure 7e), possibly part of a larger scroll element [10]:Figure 37i, and a rim sherd with horizontal and vertical engraved lines and a hatched pendant triangle element at the junction of the other lines (Figure 7g; also [10]:Figure 36d).

Several of the grog-tempered fine ware sherds are associated with the late 17th-early 18th century Womack phase component at the Sanders site. One is a Simms Engraved rim sherd with excised tick marks on a horizontal engraved line below the lip (Figure 7n), while the others are primarily from Womack Engraved vessels

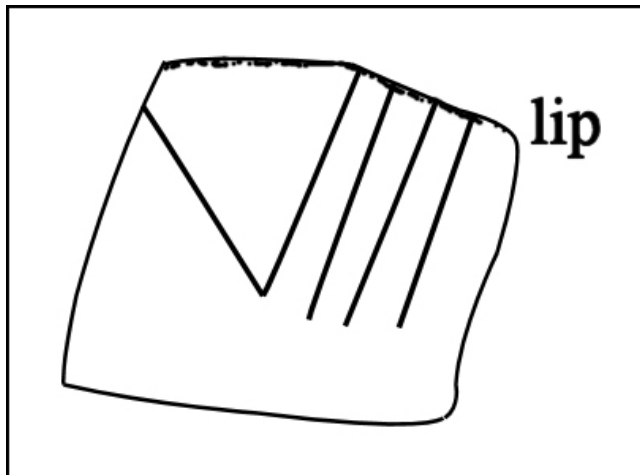


FIGURE 8. Engraved bone-tempered rim sherd from Area 25 at the Sanders site.

($n=7$ sherds) with cross-hatched zones (Figure 7h, 7j), cross-hatched zones associated with circular elements (Figure 7l), cross-hatched zones associated with a circular ticked element (Figure 7k), and curvilinear engraved lines that end in hooked arms (Figure 7i). One rim sherd has an engraved slanting scroll line with an upper cross-hatched scroll fill zone (Figure 7m). Sherds with engraved scroll elements at the Sanders site have been included in the type Bois d'Arc Engraved [10]:59 and Figure 37. The Simms Engraved, Womack Engraved, and Bois d'Arc Engraved sherds are from Area 6, Area 9, Area 11, the East Mound, and the West Mound.

The bone-tempered sherds from utility ware vessels include one horizontal brushed rim sherd (likely from a Bullard Brushed vessel), two non-descript incised sherds, and a body sherd with rows of linear tool punctations (Supplementary Table 1). Fine ware sherds are primarily from Sanders Slipped vessels; these sherds comprise 47 percent of the decorated bone-tempered sherds in the collection. Another sherd, possibly from a Maxey Noded Redware vessel, has rows of fingernail punctations on the exterior surface, while the interior surface is red-slipped. Two of the three bone-tempered engraved sherds are from Sanders Engraved vessels, one with cross-hatched engraved lines and the other with a triangle element and an adjacent set of diagonal engraved lines (Figure 8).

The few shell-tempered decorated sherds are from applied (60 percent), punctated (20 percent), and red-slipped (20 percent) vessels (Supplementary Table 1). The punctated body sherd is from an Emory Punctated-Incised vessel, and the applied sherds may also be body decorative elements on Emory Punctated-Incised vessels, or from a vessel decorated solely with applied elements, as in the shell-tempered applied olla in Burial B-11 [23]:Figure 41 in the East Mound. The one red-slipped body sherd may from the body of

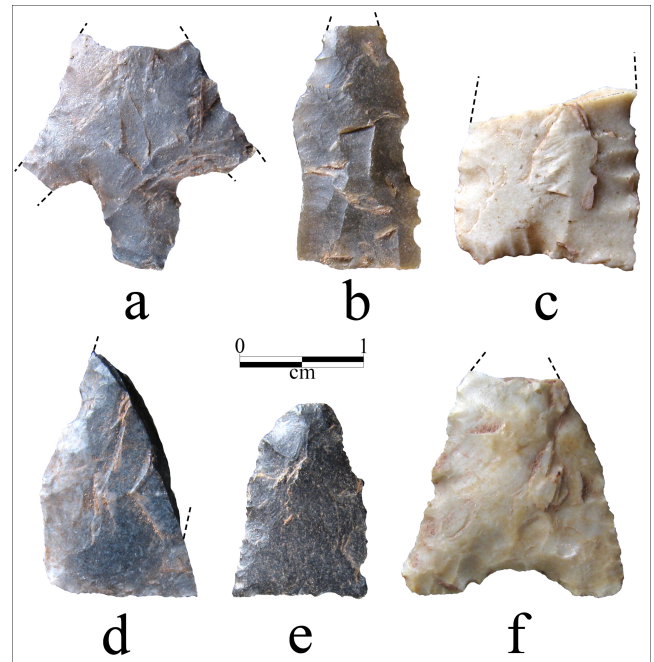


FIGURE 9. Arrow points from the Sanders site: a, West Mound; b, Area 13; c, Area 25; d, Area 29; e, Area 36; f, Area 37.

an Avery Engraved carinated bowl or bottle, or from a Clement Redware vessel.

Chipped Stone Tools

Relative to the amount of lithic debris in the artifact assemblage ($n=259$), chipped stone tools are abundant at the Sanders site (Supplementary Table 2). This includes 11 arrow points, three dart points or dart point preforms, two biface fragments, 30 scrapers, three perforators or drills, one graver, and 21 expedient flake tools. These tools are most common in Area 5, 6, 9, 13, 17, 37, and the East Mound. The non-mound areas are several hundred meters south of the West Mound, in areas paralleling Bois d'Arc Creek or several hundred meters east of the East Mound (Figure 3).

About 88.7 percent of the chipped stone tools are made from Ouachita Mountains cherts likely procured in local Red River gravel beds. Other raw materials represented in the chipped stone tools include novaculite (4.2 percent), jasper (2.8 percent), quartzite (2.8 percent), and siltstone (1.4 percent).

The arrow points in the collection include six triangular arrow point formseither of the Maud or Fresno typesfrom various non-mound habitation contexts (Figure 9b-f) and a single Bonham arrow point from the West Mound (Figure 9a). They are made from various Ouachita Mountains cherts; arrow point fragments were found that were also made of jasper and novaculite (Supplementary Table 2).

Two Woodland period Gary, *var. Camden* dart points (Figure 10a-b) and a Gary point preform

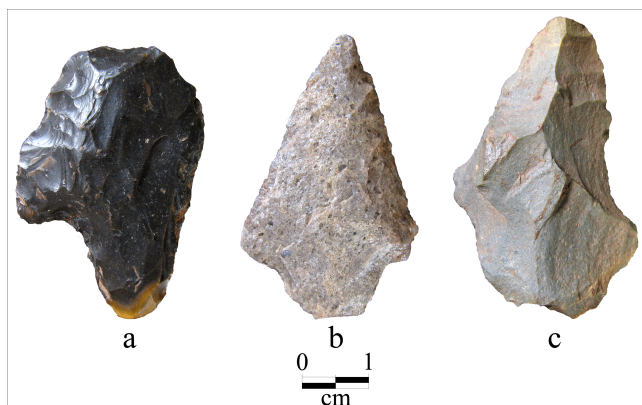


FIGURE 10. Gary dart points and preform from the Sanders site: a, Area 16; b, Area 17; c, Area 5.

(Figure 10c) are also in the 2016 Sanders site artifact assemblage. These dart points are from Areas 5, 16, and 17 in the southwestern part of the alluvial terrace overlooking Bois d'Arc Creek. Two biface fragments from Area 6 and Area 9 may be associated with the other Woodland period diagnostic chipped stone tools.

There are several kinds of scrapers in the chipped stone tool assemblage from the Sanders site; these tools were used in animal hide processing [27]:33-34, probably by Caddo women. There are end scrapers ($n=5$, 16.7 percent), end-side scrapers with unifacial side scraper retouch/use wear ($n=8$, 26.7 percent), end-side scrapers with bilateral side scraper retouch/use wear ($n=4$, 13.3 percent), unilateral side scrapers (30.0 percent), and bilateral side scrapers ($n=4$, 13.3 percent) (Figure 11a-h). Approximately 26.7 percent of the scrapers in the assemblage have bilateral side scraper retouched/use-worn areas. Approximately 97 percent of the scraping tools are made from Ouachita Mountains cherts, while one end-side scraper was made of novaculite (Supplementary Table 2). Scraping tools are particularly common in Areas 9 and 17 in the southwestern part of the ancestral Caddo village, overlooking Bois d'Arc Creek to the west.

Other flake tools include perforators and a drill (Figure 12a-c), each made from Ouachita Mountains cherts, as well as a graver made from the same raw material (Supplementary Table 2). There are also 21 expedient flake tools with either unilateral ($n=17$) or bilateral ($n=4$) retouch/use wear (Figure 12d-e). About 90 percent of these flake tools are made from Ouachita Mountains cherts, with the remainder (both with unilateral use wear/retouch) made from jasper ($n=1$, 4.8 percent) and novaculite ($n=1$, 4.8 percent).

Ground Stone Tools

The single ground stone tool in this artifact from the Sanders site is a body fragment of a greenish-gray siltstone celt from the West Mound; the fragment is 42.0 mm in width. A single piece of celt siltstone lithic

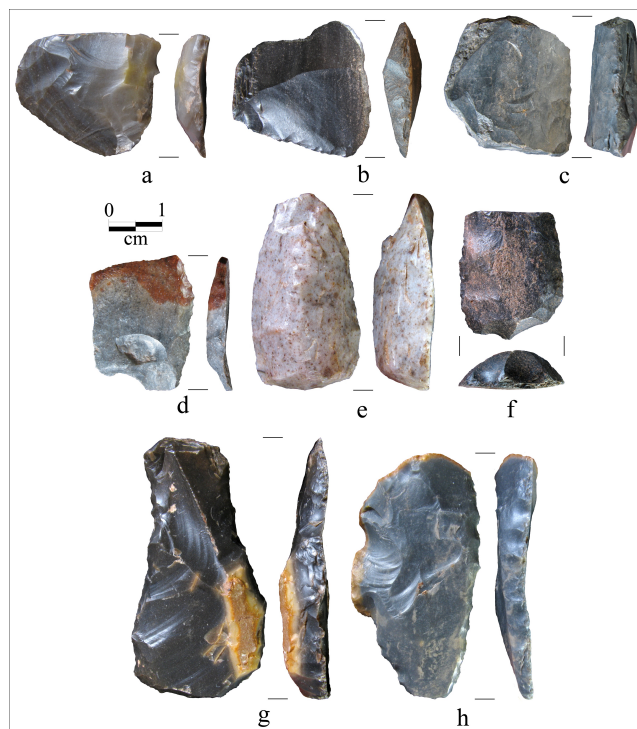


FIGURE 11. Scrapers from the Sanders site: a, Area 5, end-side scraper; b, Area 9, end scraper; c-d, Area 13, side scrapers; e-f, Area 17, end-side scrapers; g, Area 36, end-side scraper; h, Area 39, end-side scraper.

debris was also recovered from the West Mound area.

Lithic Debris

The lithic debris sample from the most recent archaeological investigations at the Sanders site are dominated by a wide variety of cherts whose ultimate source is the Ouachita Mountains: 83 percent of the lithic debris sample is chert (Table 7). These cherts are primarily gray to very dark gray, grayish-brown to dark grayish-brown, to black in color, although there are a few earth-toned cherts with red, brown, and yellow hues. Quartzite lithic debris accounts for another 11.6 percent of the lithic debris sample. This material includes both Ogallala quartzite from upland sources as well as coarse-grained gray and greenish-gray quartzites that originate in Ouachita Mountain formations. The proportion of cortical flakes in the cherts and quartzites almost all of which is smoothed and stream-rolled suggests that the Caddo occupants of the Sanders site were gathering lithic raw materials from locally available Red River gravel beds, and these raw materials were being reduced on site to manufacture tools. The same can be said for the jasper raw material (Table 7).

Novaculite and siliceous shale raw materials comprise only 3.1 percent of the lithic debris from the Sanders site (Table 7), and none of the pieces are cortical. These raw materials originate in the Ouachita Mountains,

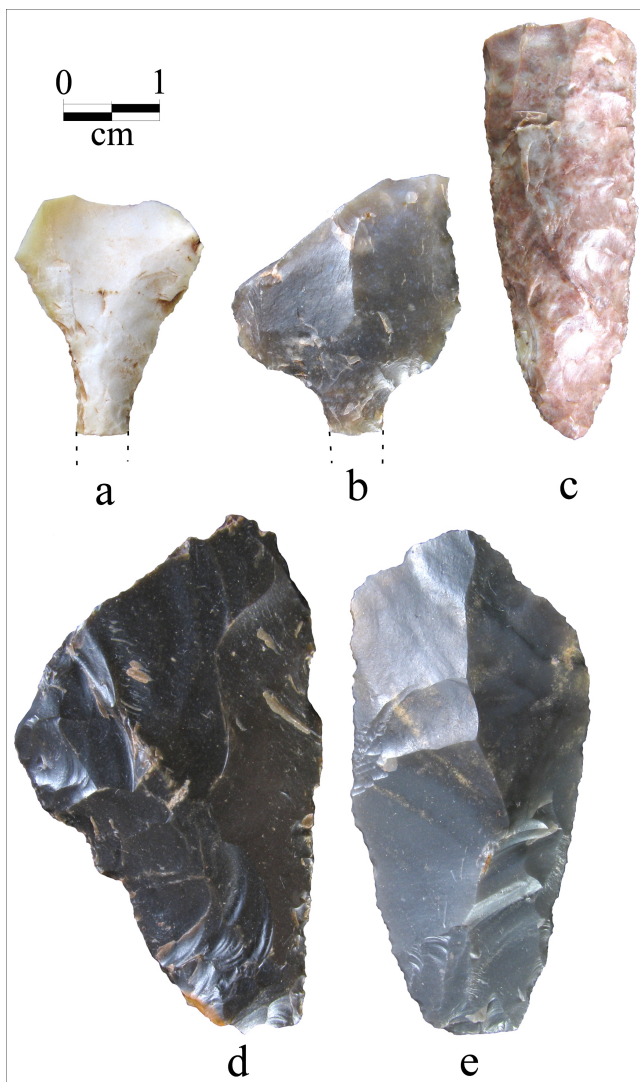


FIGURE 12. Other flake tools from the Sanders site: a, Area 17; b, Area 37; c, Area 9; d, Area 9; e, East Mound.

TABLE 7. Lithic raw materials and percentage of cortical flakes in the lithic debris from March 2016 investigations at the Sanders site.

Raw Material	N	PC	PRMS
Chert	215	32.1	83.0
Jasper	6	66.7	2.3
Novaculite	7	0.0	2.7
Quartzite	30	53.3	11.6
Siliceous shale*	1	0.0	0.4
Totals	259	34.4	100.0

*Celt manufacturing debris.

PC = percent cortical; PRMS = percent of raw material sample.

but are clearly not available for procurement in local gravels; these pieces of lithic debris were likely produced during the resharpening or maintenance of completed chipped stone or ground stone tools (celt).

SUMMARY OF THE ARCHAEOLOGICAL FINDINGS AT THE SANDERS SITE

The March 2016 archaeological investigations, including controlled surface collections and shovel testing, at the T. M. Sanders site recovered significant new information from non-mound habitation areas/artifact clusters, as well as unique information on a burned house feature that had been exposed on the crest of the West Mound. The recovered artifacts from this feature indicate that it is a Sanders phase feature. The depth of this feature, at ca. 30 cm bs, suggests that it is the uppermost of at least five zones of structures in or immediately below the West Mound, as Jackson ([2]:36) indicates that post holes from other structures were exposed at ca. 61 cm bs, ca. 86-96 cm bs (including a ash-filled hearth), ca. 162 cm bs, and ca. 305 cm bs.

Overall, ceramic and lithic artifacts are widespread in surface and sub-surface contexts at the T. M. Sanders site, covering at least 200 acres (Figure 3); currently there are 39 separate artifact concentrations or artifact clusters recognized on the site, and there are significant numbers of artifacts present on the plowed surfaces of both the East and West Mound (Table 8). These artifacts indicate that the Sanders site was used during the Late Archaic and Woodland periods, the Middle Caddo period Sanders phase, and the Historic Caddo (late 17th century to as late as 1774) Womack phase [10]:82-83. In the remainder of this survey, we will discuss the overall character of the recovered and documented artifact assemblages from the site, and consider the intra-site organization of the different ancestral Caddo components as adduced by feature data and the substantial artifact assemblages, including documented collections from the Texas Archeological Research Laboratory and the National Museum of Natural History at the Smithsonian Institution.

The highest densities of ancestral Caddo material culture remains on the surface and in shovel testing at the Sanders site are in four artifact clusters ca. 200-400 m southeast of the East Mound; on both the East and West Mounds and the artifact cluster on the ridge between the mounds; and in two clusters ca. 300-600 m south-southwest of the West Mound and paralleling Bois d'Arc Creek (Figure 13). These same areas have the highest densities of ceramic vessel sherds (Figure 14).

Shovel tests with either significant densities of artifacts and animal bones, and shovel tests that encountered midden deposits, are widespread across the Sanders site, including in the mound area, six artifact clusters southeast of the East Mound and in two artifact clusters south of the West Mound (Figure 15). The

TABLE 8. Artifacts recovered from Artifact Clusters 1-39, the East Mound, and West Mound in recent investigations at the Sanders site [21, 22, 10].

Artifact Cluster	Total Ceramic Sherds	Tools	Lithic Debris	N
1	5	2	19	26
2	32	7	5	44
3	15	3	16	34
4	10	-	4	14
5	102	29	109	240
6	280	14	42	336
7	170	12	54	236
8	252	9	73	334
9	498	15	54	567
10	59	6	31	96
11	72	7	32	111
12	42	-	-	42
13	149	27	48	224
14	42	5	14	61
15	8	1	9	18
16	43	9	18	70
17	18	15	22	55
18	7	1	-	8
19	15	4	6	25
20	24	1	-	25
21	25	2	5	32
22	23	-	16	39
23	24	-	14	38
24	44	6	21	71
25	31	4	23	58
26	32	-	14	46
27	4	1	4	9
28	5	4	8	17
29	50	5	14	69
30	8	2	4	14
31	3	-	4	7
32	28	3	36	67
33	22	4	31	57
34	216	16	75	307
35	23	-	4	27
36	14	2	3	19
37	13	6	14	33
38	11	-	4	15
39	9	2	11	22
East Md.	142	16	67	225
West Md.	367	8	44	419

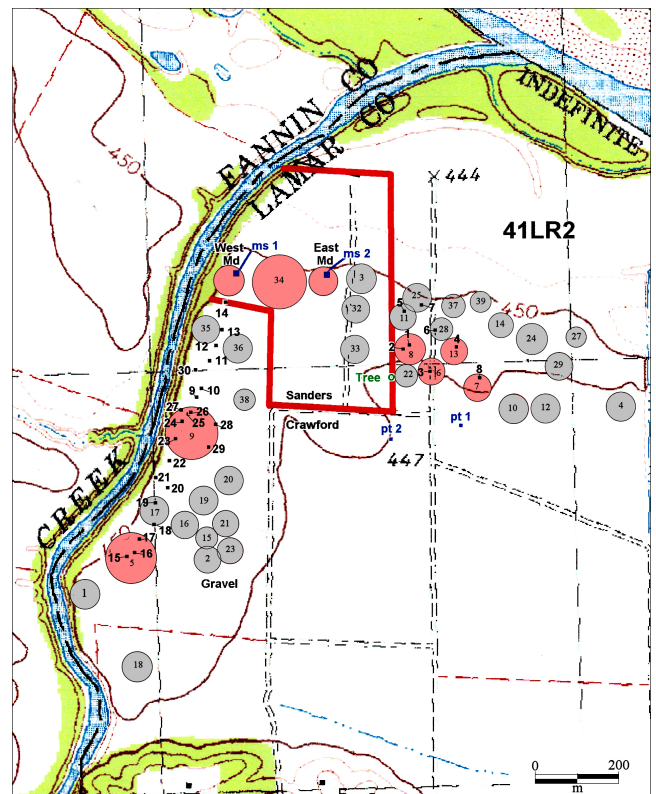


FIGURE 13. Artifact clusters with the highest densities of ceramic sherds, lithic tools, and lithic debris at the Sanders site.

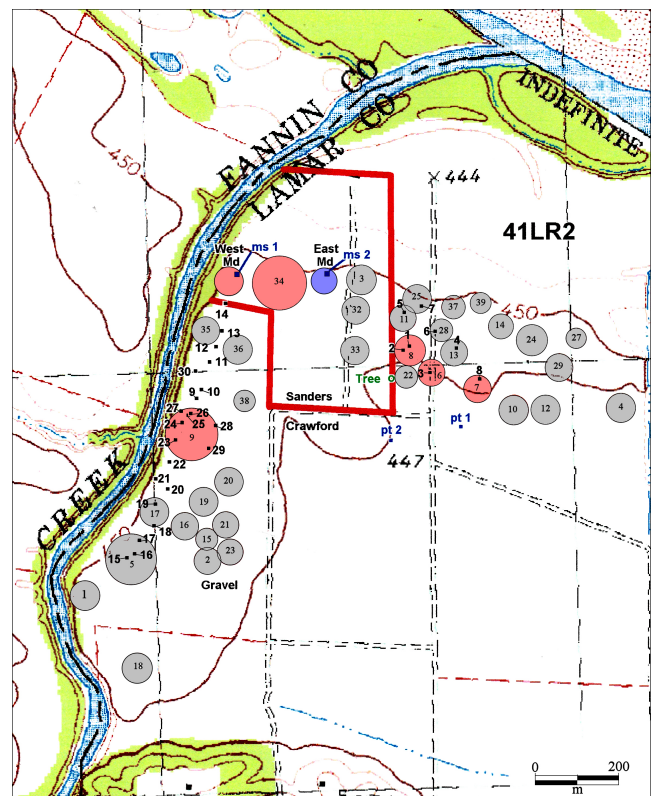


FIGURE 14. Artifact clusters with the highest densities of ceramic vessel sherds at the Sanders site.

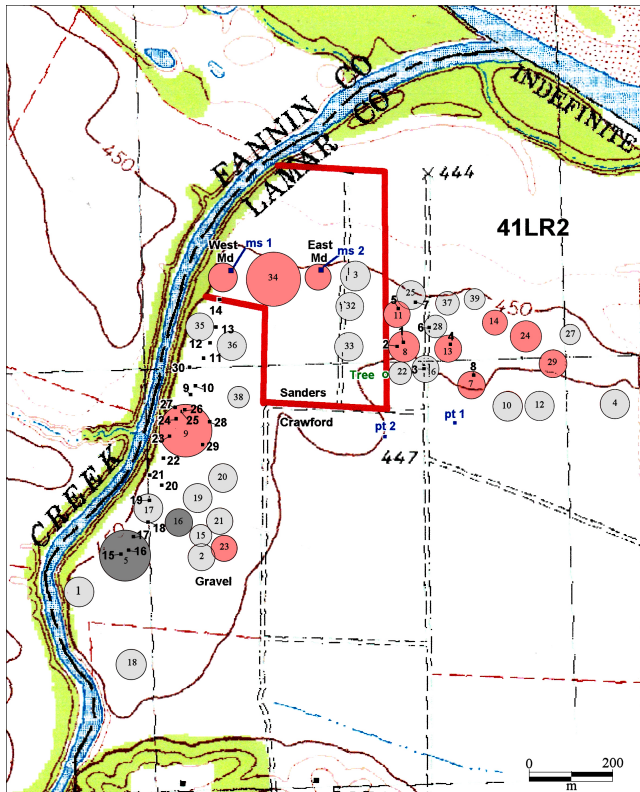


FIGURE 15. Artifact clusters with animal bones and/or midden deposits at the Sanders site.

various clusters defined in Figures 13-15 represent the core of non-mound habitation areas at the Sanders site, as well as the accumulation of midden deposits in the area of the East and West Mounds [2, 4]. The only area with burned clay pieces found during our investigations is in the West Mound, where remnants of a burned Caddo structure were found during the March 2016 investigations.

These areas with significant habitation deposits were used at different times by ancestral Caddo peoples, as previously discussed. The character of the recovered ceramic and lithic artifacts illustrate the spatial organization of these occupations. The Middle Caddo period occupation of the Sanders site is well-represented by the majority of the grog- and bone-tempered ceramic vessel sherds in the various documented assemblage, as well as by numerous stemmed arrow points [10]:Table 21.

Between 77-78 percent of the plain and decorated ceramic sherds at the Sanders site are from grog-tempered vessels (Table 9). Another 12.3-15.1 percent of the plain and decorated sherds are from bone-tempered vessels, and only 7.8-9.9 percent of the plain and decorated ceramic sherds are from shell-tempered vessels. Grog- and bone-tempered sherds are predominant in all but one artifact cluster: Artifact Cluster 27, ca. 560 m southeast of the East Mound.

The shell-tempered sherds found at the Sanders site

TABLE 9. Ceramic wares in the Sanders site artifact assemblages.

Ware	Grog-tempered	Bone-tempered	Shell-tempered	N
Plain*	2206	310	308	2824
Decorated	1038	204	105	1347
Totals	3244	514	413	4171

*Plain sherds are underrepresented because few plain sherds are in the documented TARL and NMNH collections [10]:Tables 11 and 17.

in habitation contexts are associated with the Historic Caddo Womack phase occupation at the site, which was spatially extensive. Including the East and West Mound areas, there are shell-tempered sherds in 30 of the artifact clusters defined at the site to date. The artifact clusters with the highest proportions of shell-tempered sherds, ranging from 20.8 percent (Artifact Clusters 11 and 20) to 75.0 percent (Artifact Cluster 27), are primarily located in village archaeological deposits ca. 50-560 m southeast of the East Mound on the alluvial terrace facing the Red River floodplain (Figure 16). Two clusters (Artifact Clusters 20 and 23) from ca. 400-620 m south of the West Mound also have relatively high proportions of shell-tempered vessel sherds.

The three different tempered wares at the Sanders also have different proportions of decorated utility ware and fine ware vessels, with little significant differences between the grog- and bone-tempered wares compared to the shell-tempered wares (Table 10). All three wares share the fact that fine wares are more abundant in the assemblages than are utility wares: 53.8 percent, grog-tempered; 56.5 percent, bone-tempered; and 55.4 percent, shell-tempered.

The grog- and bone-tempered utility wares are primarily characterized by sherds from incised and punctated vessels (Table 10), with a few other sherds from appliqued, incised-punctated, and lip notched vessels; the punctated sherds have been mainly executed with fingernail and tool (grog-tempered) and fingernail (bone-tempered) elements. The shell-tempered utility wares have much higher proportions of punctated, neck banded, and appliqued decorative elements compared to the grog- and bone-tempered assemblages (Table 10). Most of the punctated sherds have tool punctated elements.

In the case of the fine wares by temper categories, sherds from engraved and red-slipped vessels have relatively comparable proportions at the Sanders site (Table 10): between 26.3-34.2 percent for the engraved and engraved-punctated sherds and 17.0-

TABLE 10. Decorated sherd categories by ceramic wares at the Sanders site.

Decorative method	Grog-tempered	Bone-tempered	Shell-tempered
U Appliqued	2.7*	1.0	<u>8.9</u>
U Appliqued-Incised	0.1	-	-
U Appliqued-Punctuated	-	0.5	-
U Brushed	0.5	1.0	-
U Brushed-Incised	0.1	-	-
U Corn Cob Impressed	0.5	-	-
U Incised	<u>26.9</u>	<u>26.7</u>	6.2
U Incised-Punctated	2.6	2.5	0.9
U Lip Notched	1.0	0.5	-
U Neck Banded	1.4	1.5	<u>10.0</u>
U Pinched	0.4	1.0	-
U Punctated	10.5	8.5	<u>18.7</u>
- Cane	2.9	-	-
- Circular	7.2	8.3	-
- Fingernail	47.8	<u>66.7</u>	31.3
- Tool	42.0	25.0	<u>68.8</u>
F Engraved	<u>34.1</u>	26.3	<u>33.0</u>
F Engraved-Punctated	0.1	-	-
F Red-slipped	18.6	<u>29.2</u>	17.0
F Red-slipped-Appliqued	0.1	-	-
F Red-slipped-Punctuated	0.3	1.0	-
F Trailed	0.6	-	<u>5.4</u>
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Totals	1038	202	112

*Percent; bold and underlined represent significant proportional differences between one ware and the others. U = utility ware; F = fine ware.

29.2 percent for the red-slipped sherds. Red-slipped sherds outnumber the engraved sherds only in the bone-tempered wares. Red-slipped-appliqued and Red-slipped-punctated sherds from Maxey Noded Redware vessels [26]:Plate 51 are present only in the grog- and bone-tempered wares from the site. Keno Trailed sherds are much more abundant in the shell-tempered wares than they are in the grog-tempered wares (Table 10).

In summary, grog- and bone-tempered utility ware sherds are dominated by those with incised and fingernail punctated elements. Most of these sherds are from Canton Incised and Monkstown Fingernail Impressed vessels that are part of the Middle Caddo period, Sanders phase, occupation at the site. Lip notched Sanders Plain sherds, the punched sherds, and the various incised-punctated sherds, are also part of the Sanders phase component. Utility wares that can

confidently be associated with the much later ancestral Caddo occupation include the brushed, brushed-incised, corn cob impressed, neck banded (both grog and shell-tempered varieties of Nash Neck Banded), and the shell-tempered punctated sherds (from Emory Punctated-Incised vessels).

The fine ware sherds in non-mound contexts at the Sanders site are dominated by both engraved and red-slipped decorative elements. The Sanders phase grog- and bone-tempered engraved fine ware ceramics are dominated by sherds from Sanders Engraved and Sanders Plain vessels. Trailed sherds from Keno Trailed vessels (both grog- and shell-tempered) are part of the late 17th-18th century Caddo occupation, one with both grog/bone-tempered Womack Engraved and shell-tempered Avery Engraved, Hudson Engraved, and Simms Engraved vessel sherds. Based on the number

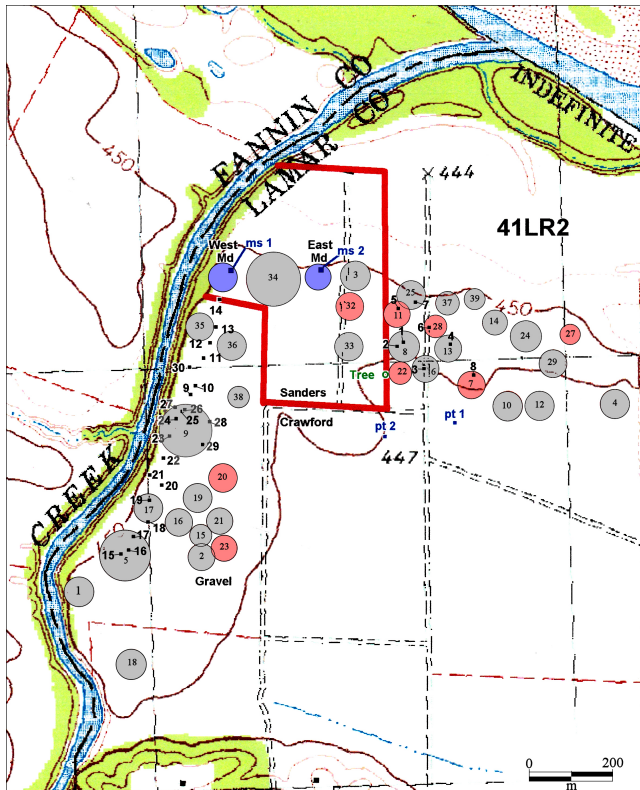


FIGURE 16. Artifact clusters with the highest proportions of shell-tempered ceramic vessel sherds at the Sanders site.

of sherds, Womack Engraved vessel sherds are the most abundant fine ware in non-mound contexts at the site, regardless of the age of the engraved fine wares. The grog/bone-tempered scroll engraved sherds (i.e., Bois d'Arc Engraved) are likely also part of this ceramic assemblage, given its stylistic similarity to certain Womack Engraved decorative motifs.

The manufacture of red-slipped vessels was common in both the Sanders phase and late 17th-early 18th century Womack phase components, although the earlier red-slipped vessels were grog- and bone-tempered (Sanders Slipped) while the later red-slipped sherds were from shell-tempered Clement Redware vessels or the non-engraved portions of Avery Engraved vessels. The few red-slipped-punctated and red-slipped applied sherds are from Maxey Noded Redware vessels.

A large assemblage of chipped and ground stone tools ($n=847$) have been documented from the various investigations at and collections from the Sanders site (Table 11). Arrow points and arrow point preforms are by far the most common chipped stone tool type at the site, as they comprise 53.9 percent of the tool assemblage. More than 70 percent of the arrow points are late 17th-early 18th century triangular Maud or Fresno arrow points with flat or concave bases [10]:Table 21. Scraping tools are also common in the tool assemblage, as they represent almost 20 percent of the

TABLE 11. Chipped and ground stone tools from the Sanders site.

Tool Type	N	Percentage
Arrow point	443	52.4
Arrow point preform	13	1.5
End scraper	27	3.2
End scraper with graver	1	0.1
End-side scraper	50	5.9
Side scraper	90	10.6
Flake tool	113	13.4
Graver	1	0.1
Denticulate	1	0.1
Drill	11	1.3
Perforator	6	0.7
Dart Point	60	7.1
Gouge	1	0.1
Adze	1	0.1
Beveled Knife	6	0.7
Bi-pointed knife	3	0.4
Biface	12	1.4
Celt	7	0.8
Totals	847	100.0

tools; side and end-side scrapers are the most common scraper types.

Expedient flake tools with retouched and use-worn areas account for another 13.4 percent of the tool assemblage, and other more formal types of flake tools comprise 2.2 percent of the tools documented to date from the Sanders site (Table 11). Slightly more than 7 percent of the tools are dart points; primarily of the Woodland period Gary type [10]:Table 20. Gouges, adzes, beveled knives, bi-pointed knives [10]:Figure 43b, and bifaces round out the chipped stone tools in the Sanders site assemblage: they represent only 2.7 percent of the large tool assemblage. Lastly, there are a few ground stone celts (0.8 percent of the assemblage) in the Sanders site collections.

In provenienced collections [24, 22, 10] and Table 8, the highest densities of chipped stone tools are in two artifact clusters ca. 300 m southeast of the East Mound, in the East Mound and the ridge between the East and West Mounds, and in three artifact clusters ca. 300-700 m southwest of the West Mound (Figure 17). Triangular arrow points occur in these clusters and are well distributed in a number of others either east and southeast of the East Mound and south and southwest of the West Mound (Figure 18).

Scraping tools are common in the same areas that

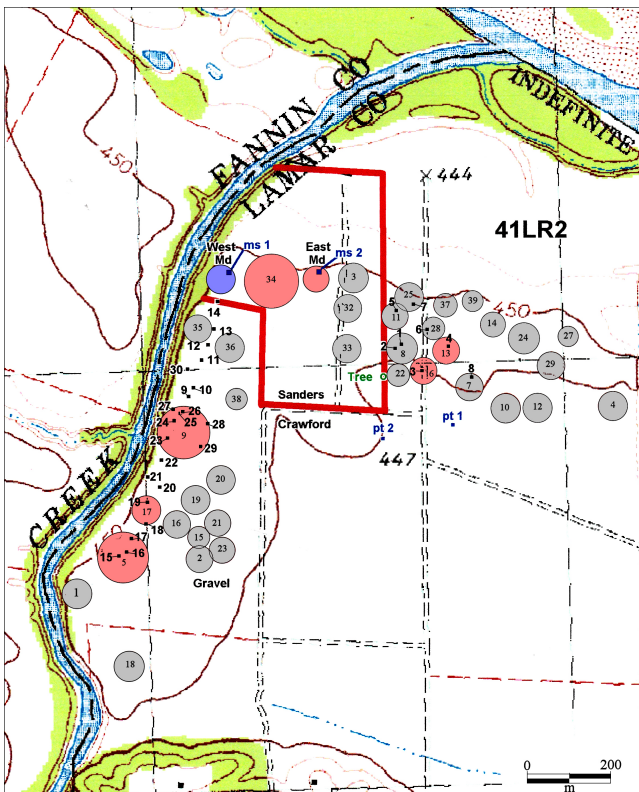


FIGURE 17. Artifact clusters with the highest densities of stone tools at the Sanders site.

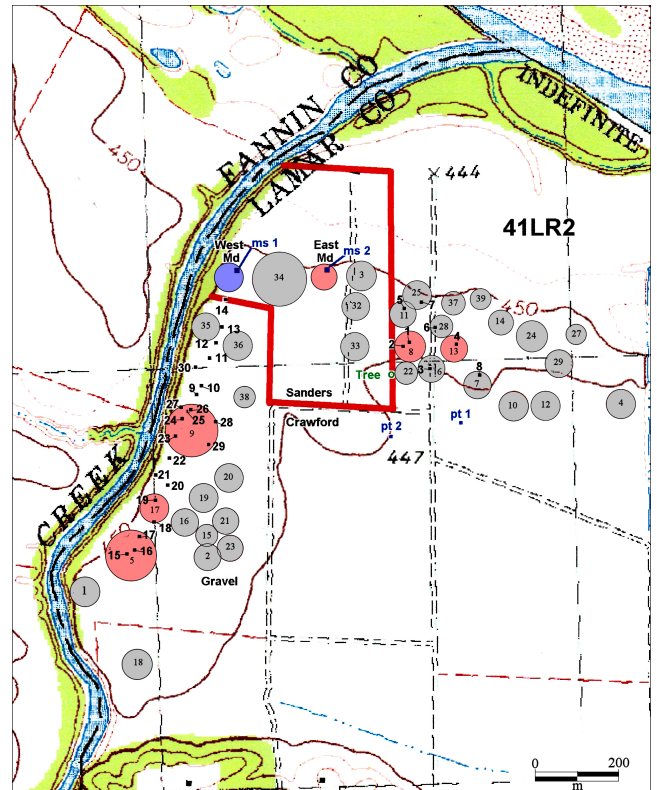


FIGURE 19. Artifact clusters with the highest densities of scraping tools at the Sanders site.

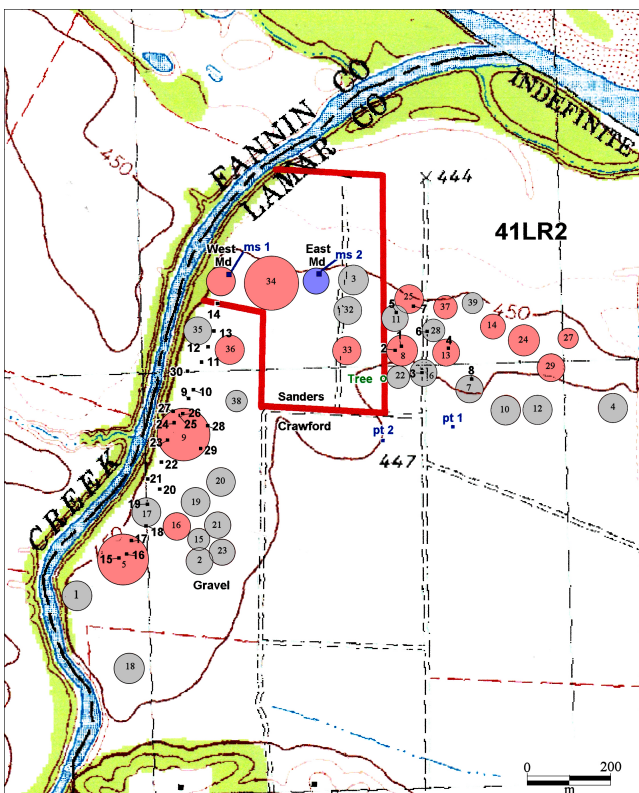


FIGURE 18. Artifact clusters with triangular arrow points (i.e., Maud or Fresno) at the Sanders site.

have the highest densities of chipped stone tools (Figure 17), including on the East Mound, in two artifact clusters southeast of the East Mound, and three artifact clusters south and southwest of the West Mound (Figure 19). These areas are spatially associated with the artifact clusters that have triangular arrow points (Figure 18), and most of the scrapers were likely produced and used during the historic Womack phase.

Provenienced dart points have been found in six different artifact clusters at the Sanders site (Figure 20). Four of them occur together in the southwestern part of the site, ca. 450-700 m south and southwest of the West Mound, on the portion of the alluvial terrace paralleling Bois d'Arc Creek.

The various lines of archaeological evidence obtained from the T. M. Sanders site since the initial University of Texas investigations in 1931 and up to the present day indicate that the site was first occupied during Late Archaic and Woodland period times, but that occupation was not extensive (Figure 20). A much more substantial occupation began ca. A.D. 1100 by ancestral Caddo peoples, probably lasting until ca. A.D. 1300, and this occupation included two large village areas—the East Village covers a ca. 880 x 350 m area and the West Village a ca. 900 x 300 m area (Figure 21)—on either side of two constructed mounds and a midden feature on the ridge between the two mounds (Artifact Cluster 34). The East Mound was

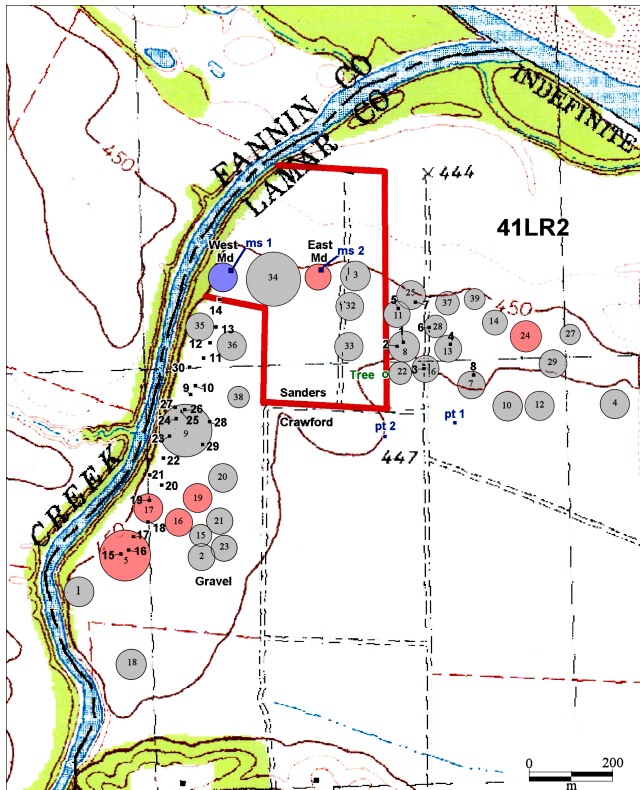


FIGURE 20. Artifact clusters with dart points at the Sanders site.

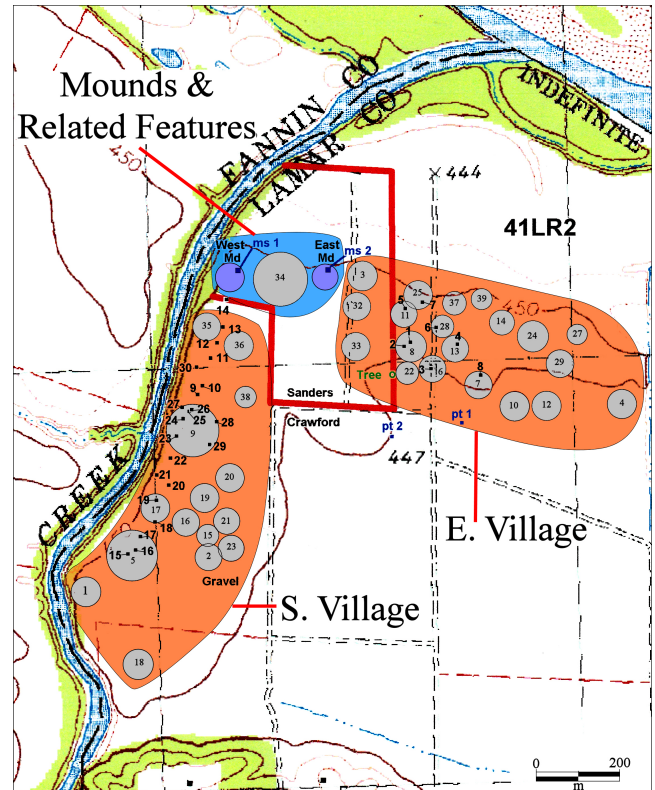


FIGURE 21. East and South village areas at the T. M. Sanders site in relationship to the East and West Mounds and related features.

the primary locus for the burial of important personages and families [2, 4, 28], and also used later for habitation by historic Caddo groups, while the West Mound had a series (perhaps as many as five) of important public structures in and likely under the constructed mound. The historic Caddo settlement at the Sanders site was also spatially extensive, based on the distribution of artifact clusters with shell-tempered ceramics, Womack Engraved fine ware sherds, triangular arrow points, and many of the scraping tools, and the suspected locations of European trade goods south of the West Mound and east of Bois d'Arc Creek [10]:1.

ACKNOWLEDGEMENTS

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