ORGANIZATION OF LITHIC TECHNOLOGY IN ARCHAIC CENTRAL TEXAS:

AN EXAMPLE FROM 41HY160 IN SAN MARCOS, TEXAS

THESIS

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by

Deidra Ann Aery, B.A.

San Marcos, Texas
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ORGANIZATION OF LITHIC TECHNOLOGY IN ARCHAIC CENTRAL TEXAS:

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Committee Members Approved:

C. Britt Bousman, Chair

Christina A. Conlee

James F. Garber

Approved:

J. Michael Willoughby
Dean of the Graduate College

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ABSTRACT

ORGANIZATION OF LITHIC TECHNOLOGY IN ARCHAIC CENTRAL TEXAS:

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SUPERVISING PROFESSOR: C. BRITT BOUSMAN

Site 41HY160 sits next to the San Marcos Springs in San Marcos, Texas. This site can be used to document the history of human use of the area and to analyze their lithic tool technology. The data for the analysis in this thesis were gathered during Texas State University archaeological field schools in 2001, 2002, 2003, and 2006. This analysis utilizes the theory of technological organization to examine the recovered lithic tools, analyze the potential organization of these tools, and how it may be associated with other changes in the region through time. In particular, the degree of resharpening proved to be the clearest aspect related to technological organization. This analysis showed that the greatest variability occurred during the Middle Archaic, a time of great variability in regional climate, and indicates a reduction in degree of resharpening from the beginning to the end of the Middle Archaic.

CHAPTER 1: INTRODUCTION

This thesis examines and interprets the site history and organization of lithic technology of site 41HY160, located at Aquarena Center at Texas State University in San Marcos, Texas. This site lies on an alluvial terrace east of the San Marcos Springs, on a spit of land just upstream of the confluence of Sink Creek and the San Marcos River. The Springs form the headwaters of the San Marcos River. Previous investigations in the area suggest that the Springs have been used throughout the human history of Texas, about 12000 years, and have the potential for stratified deposits (Shiner 1983; Garber et al. 1983; Ringstaff 2000; Bousman et al. 2007).

This research uses the theory of organization of technology to analyze the assemblage from the 2001, 2002, 2003, and 2006 field excavation seasons at the site. This approach examines the technological assemblages in the archaeological record of hunter-gatherers and compares them to technological assemblages in the hunter-gatherer ethnographic record. This is used to try and recreate the lifeways of the people that manufactured the items in the archaeological assemblage, and to get a better understanding of how they utilized the landscape and the resources it provides. This examination is most frequently applied to lithics, and so utilizes the most abundant and best preserved of archaeological materials to gain a better understanding of the past.

This study will have to take into account issues of landform formation, preservation, and the nature of the archaeological record. Previous geoarchaeological research around the Springs (Goelz 1999; Ringstaff 2000; Nordt 2007) take these issues and processes into account and will be used to better interpret the data.

The purpose of this research is to determine if the organization of technology can be applied to the lithic technology at site 41HY160, and if so what does it indicate. This research utilizes comparative ethnographic and archaeological studies as a basis for examination. These studies will be used as comparison for types and levels of organization, and how these types of organization relate to mobility. This data will also be compared to regional studies of lithic technology and related to site formation and regional climate.

Ultimately, this thesis will form a complimentary addition to the existing research of the San Marcos Springs, provide an example of utilizing organization of technology at a single site with changing lithic styles, and be used in recommendations regarding the future use of the surrounding area.

Figure 1. Looking South over Spring Lake. Aquarena docks in foreground, Texas State University Old Main in background. Photo courtesy Sandra Weir.

CHAPTER 2: NATURAL SETTING

Modern Environment

Climate

The climate of the Eastern Edwards Plateau is classified as subtropical subhumid climate (Bomar and Larkin 1983). This climate exhibits hot summers and dry winters. East of the Plateau, this climatic zone nears the humid subtropical climatic zone; summers in this zone are hot and humid and winters are mild and dry (Bomar and Larkin 1983). For the most part, marine climatological variations from the Gulf of Mexico and the Pacific Ocean influence the climate in this region from spring to fall, and artic variations influence the climate during the winter. (Bomar and Larkin 1983).

Hydrology

Site 41HY160 is next to the headwaters of the San Marcos River and only a few miles from the Blanco River, on a spit of land north of the confluence of the San Marcos River and Sink Creek. The Blanco and San Marcos River basin makes up the north-central portion of the Guadalupe River basin in Central Texas (Figure 2). The Blanco River begins as a series of streams and springs in northeastern Kendall County. From there it flows southeast for 87 miles through Blanco and Hays Counties, until it reaches its mouth at the San Marcos River in the city of San Marcos (Jasinski 2001). The San Marcos River headwaters flow from San Marcos Springs in San Marcos, Hays County. It is joined by the Blanco River four miles downstream. From there, the San Marcos River flows southeast for 75 miles through Hays, Guadalupe, Caldwell, and Gonzales counties, until it reaches its mouth at the Guadalupe River, two miles west of the city of Gonzales (Smyrl 2001).

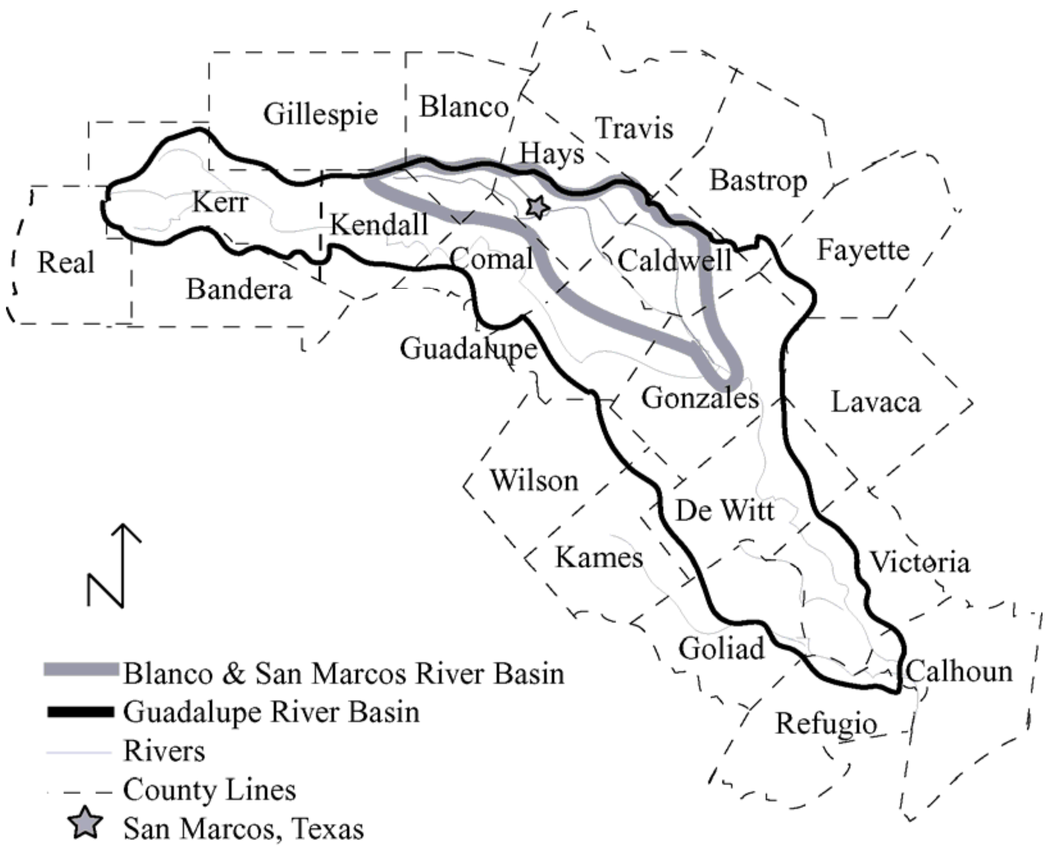

Figure 2. The thick black line outlines the Guadalupe River basin. The thick grey line outlines the Blanco and San Marcos River basin. (Map adapted from http://www.gbra.org/Public/Resources/Maps/MainBasinMap.aspx)

The Blanco and San Marcos Rivers arise from aquiferous and fault-line springs (Figure 3) on the Edwards plateau overlying the Edwards aquifer (Brune 1981). The complex series of fault-lines and recharge zones is still not fully understood in the area (Steinhauer 2006) and the region contains few perennial water sources (Johnson 2001).

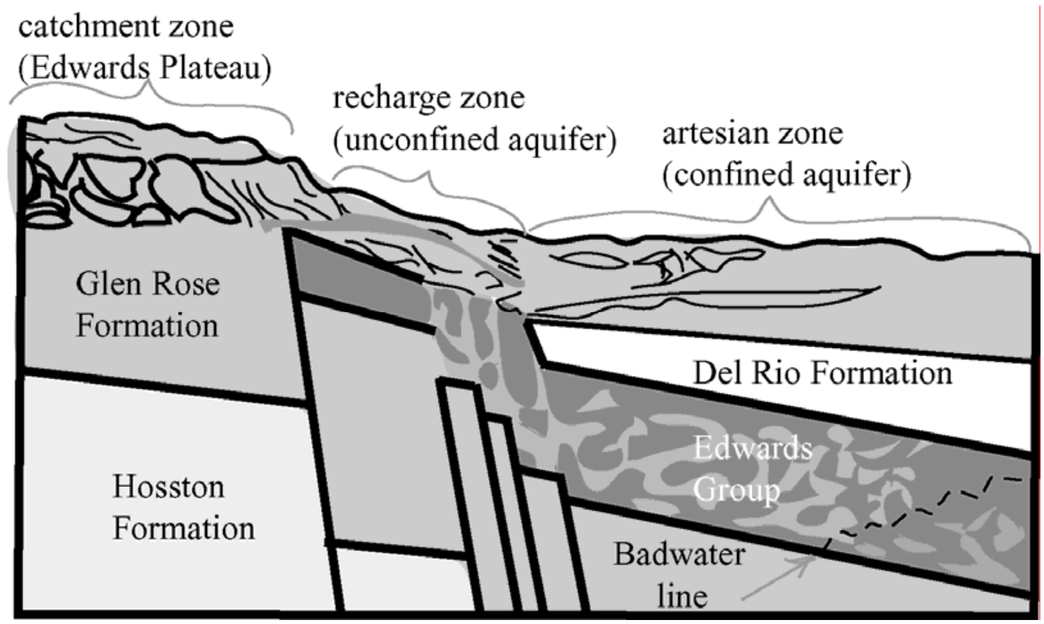

Figure 3. Typical cross-section of the Edwards Aquifer adapted from http://www.esi.utexas.edu/outreach/caves/edwardsaquifer.php.

The Blanco River rises as a series of intermittent and perennial streams and springs from the karstic stone of the Edwards Plateau. The clear-watered stream flows at a relatively gentle slope that cuts down into the bedrock. This cut becomes dramatic just a few miles downstream, in an area called The Narrows. Here, the Blanco River cuts a 75 foot gorge and is joined by several springs seeping out of the cliffsides (Anonymous 2001). Further downstream, after the river flows through the city of Blanco, a series of springs in an area called Devil's Backbone add to the flow of the river. The average discharge of the river is 93 feet per second, but this reduces greatly in times of drought and over-pumping of the aquifer; on several occasions in modern times the river has dried up a few miles north of its confluence with the San Marcos River (Texas Parks and Wildlife 2006).

The San Marcos River headwaters are located a few hundred meters upstream of the confluence of the San Marcos River and Sink Creek. The headwaters consist of a series of springs; the San Marcos Springs gush forth from 200 fissures (Figure 4) and 3 faults near the edge of the Balcones Escarpment (Brune 1981). These are the second largest cluster of springs in Texas, where the flow rate has been measured in excess of 4000 liters per second, and have never been known to go dry (Brune 1981). Indeed, prior to historic damming, visitors wrote about water shooting three or more feet from the surface of the creek, occasionally bringing up large rocks (McClintock 1846). Four miles downstream, the clear-water flow of the San Marcos River is supplemented by the Blanco River. From here, the San Marcos River flows off the Edward's Plateau and into the Blackland Prairie and Post Oak Savannah; 75 miles downstream it joins the Guadalupe River (Smyrl 2001).

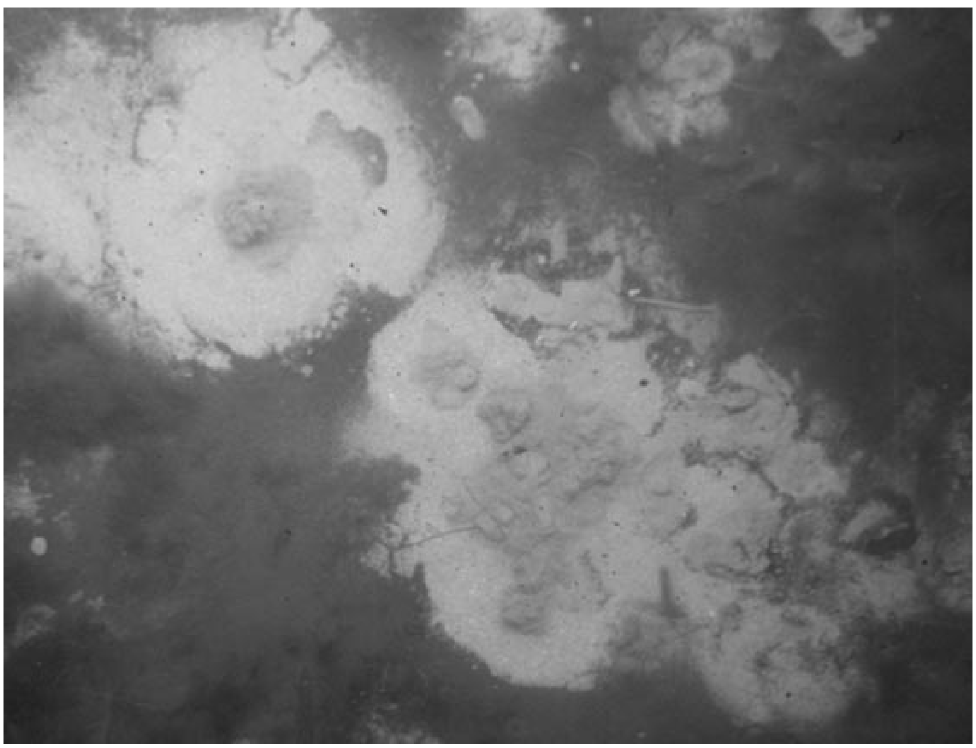

Figure 4. The San Marcos Springs boiling up from the bottom of Spring Lake.

East of site 41HY160, the Leona formation presents another source of water. This alluvial aquifer has seeps and springs along its edges from which southeasterly flowing groundwater emerges (Follett 1966). Although the shallow nature of this groundwater and the high potential for contamination from surface sources can reduce the quality of the water, it has been utilized during historic droughts for agricultural purposes (Hemphill 2004).

Bedrock Geology

The underlying geology of the region around site 41HY160 consists of bedrock and fault lines. The site lies very near the rather abrupt transition between the Edwards Plateau and the Blackland Prairie (Figure 5).

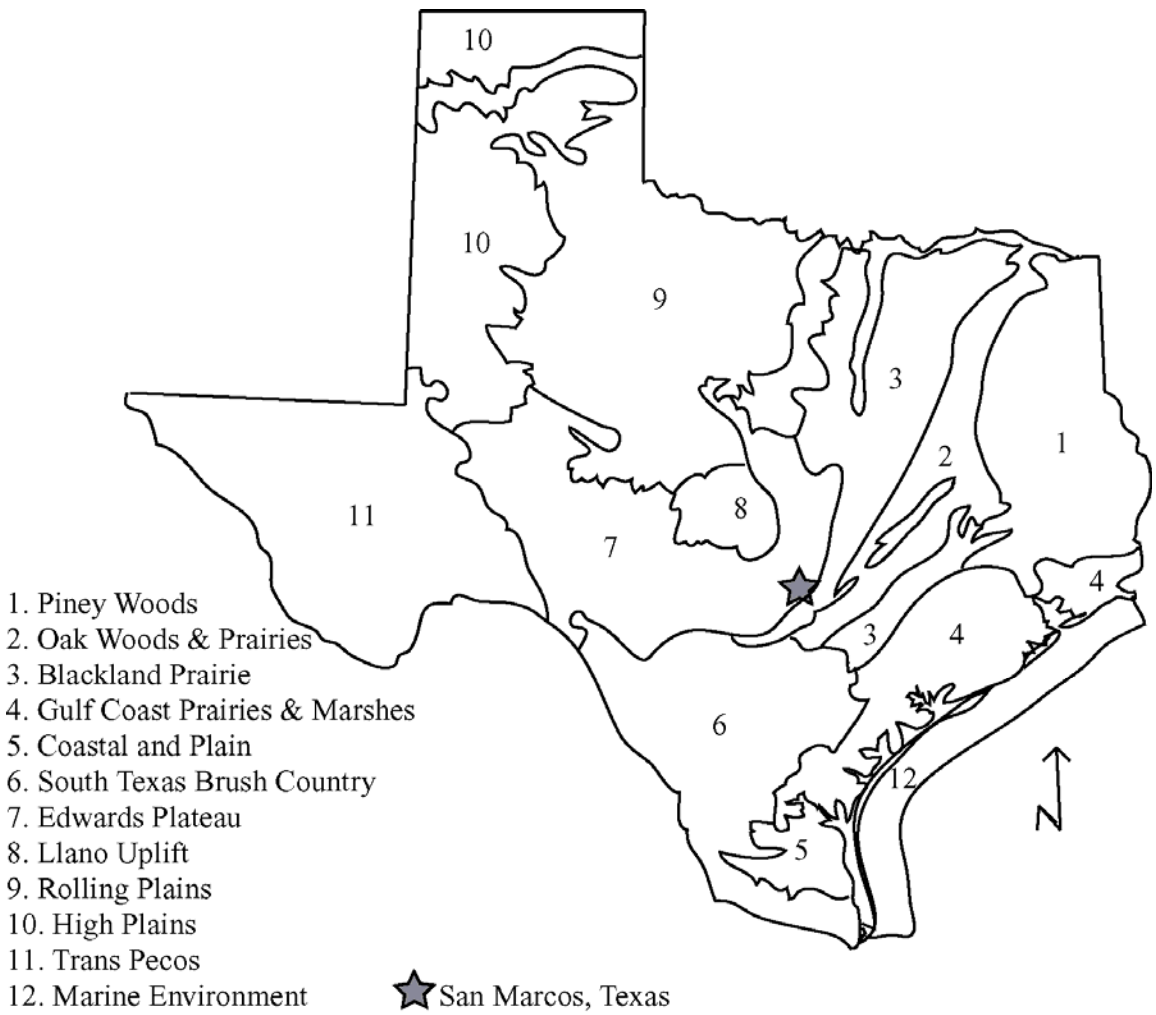

Figure 5. Natural Zones of Texas showing Edwards Plateau and the location of the city of San Marcos, Texas. Adapted from http://www.tpwd.state.tx.us/.

The Edwards Plateau. The Edwards Plateau sits at the southernmost point of the North American Great Plains, and the site is located within southeast section of the plateau. The bedrock in the region surrounding the site mostly consists of Cretaceous limestone bedrock formations covered in thin, easily eroded sediments (Johnson 2001). These formations include the Upper and Lower Comanche Series, which subdivided into the Trinity, Fredericksburg, and Washita Groups; in the northwest portion of the Edwards Plateau, Cambrian and Precambrian rocks, largely granite, form the Llano uplift (Johnson 2001). This limestone contains chert formed throughout the various formations; this chert is exposed and eroded by the drainages and become deposited as cobbles throughout the San Marcos and Blanco River basin. It should be noted that a survey of the gravels in the southeastern Edwards Plateau drainages revealed that quartzite, which shows up in the archaeological record as grinding stones, hammerstones, and cooking stones, does not occur naturally in the San Marcos and Blanco River valley (Elton Prewitt, personal communication Spring 2007). Any quartzite found in the area would have had to be anthropogenically transported. The nearest resources are the Colorado and Brazos River valleys to the north, and the Uvalde Gravels to the south; this is likely due to the presence of predominately pre-Cretaceous quartzite bearing formations in those drainages, and the absence of these formations in the San Marcos and Blanco River valley (Sellards et al. 1949; Spearing 1979; Bureau of Economic Geology 1992; Chandler and Lopez 1992; Reed et al. 1996).

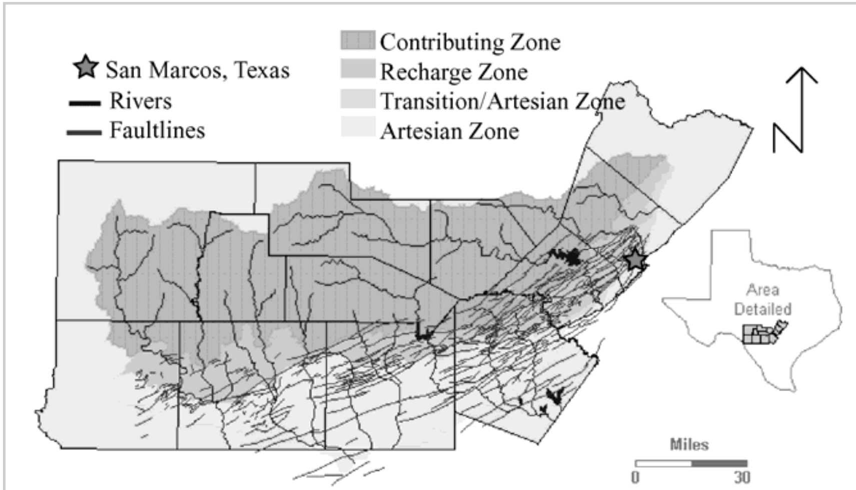

Figure 6. Faultzones around San Marcos, Texas. (adapted from http://www.edwardsaquifer.net/faults.html and Collins and Havorka 1997).

In addition, the limestone bedrock contains numerous caves, caverns, and faultlines (Blome et al. 2005). These faults can be found throughout the Edwards Plateau, but are most frequent in the southeast region. The most complex series of faults (Figure 6) comprise the Balcones fault zone where the Edwards Plateau meets the Blackland Prairie through the city of San Marcos, Texas (Grimshaw and Woodruff 1986). The faulting in this area separates some of the limestone inclusions. The limestone bedrock west of the faults contains dolomites and marls; the limestone east of the faults contains chalk and clay units. One of these faults lifted during the Miocene and changed the flow of the Blanco River from the Colorado River basin north of the area to the current flow of San Marcos River to Guadalupe River basin, causing a sharp bend in its path, changing the local hydrology long before humans entered the region (Grimshaw and Woodruff 1986).

Blackland Prairie. Thanks to fault lines and erosional events, the Edwards Plateau rises discernibly above the Blackland Prairie (Diamond 2001). The Blackland Prairie is defined by gently rolling topography and deep, fertile vertisols crisscrossed by wooded stream channels (Diamond 2001). These soils overlay bedrock of Eocene and Paleocene origin; this bedrock is of the Claiborne Groups and the Wilcox and Midway Group (Bureau of Economic Geology 1992; Diamond 2001). Between the Plateau and Prairie, there are isolated alluvial deposits mid-quaternary in origin. Further downstream from the site, in Gonzales County where the San Marcos River meets the Guadalupe River, the alluvium overlays the Carrizo Sand Formation (Griffin 2006).

Quaternary Sediments and Soils

The landscape of the Blanco and San Marcos River basin around site 41HY160 can be sorted into five major geomorphic units (Figure 7): Upland Limestone Bedrock, Pleistocene/Upland complex, Pleistocene alluvium, Early Holocene Alluvium, and late Holocene Alluvium (Nordt 2007).

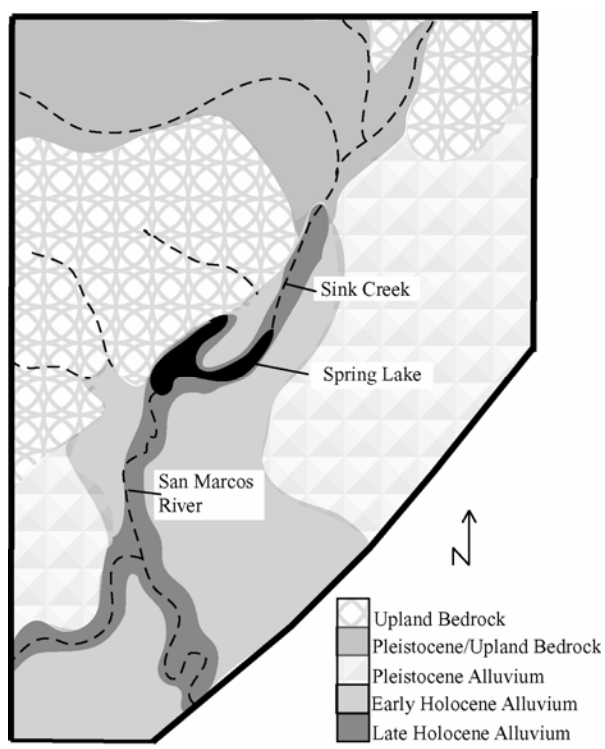

Figure 7. Five major geomorphic units composing the landscape of Sink Creek Valley (Adapted from Nordt 2007 and Batte 1984).

The Upland Limestone Bedrock is exposed Edwards Plateau bedrock; the Blanco River gets its name from the exposed white and gray bedrock in the riverbed and thalweg (Johnson 2001). The Pleistocene/Upland complex was likely deposited during the late Pleistocene to early Holocene and consists of a 1-2 meter veneer of gravelly alluvium with subsoil carbonates and clays (Nordt 2007). The Pleistocene alluvium forms terraces and contains deep soils of the Houston Black, Krum, and Lewisville series (Batte 1984). These terraces, up to 12 meters deep, formed in alluvial valleys present at least as early as the late Pleistocene. These terraces have been truncated of the A and upper B horizons, and the C horizon is missing or severely altered (Young 1986). In geological literature, the paleosols from these remnant terraces go by the name “Terra Rosa” and can be identified by reddish to brownish clays and extensive calcium carbonate formation (Figure 8). Some of the Terra Rosa that can still be found in Central Texas is not *in situ*, but washed into sinkholes, caverns, and faults during the events that removed most of the Pleistocene deposits in Central Texas. However, one of the known *in situ* outcrops found in Central Texas lies within the Blanco and San Marcos River basin, in and around where the rivers meet (Young 1986).

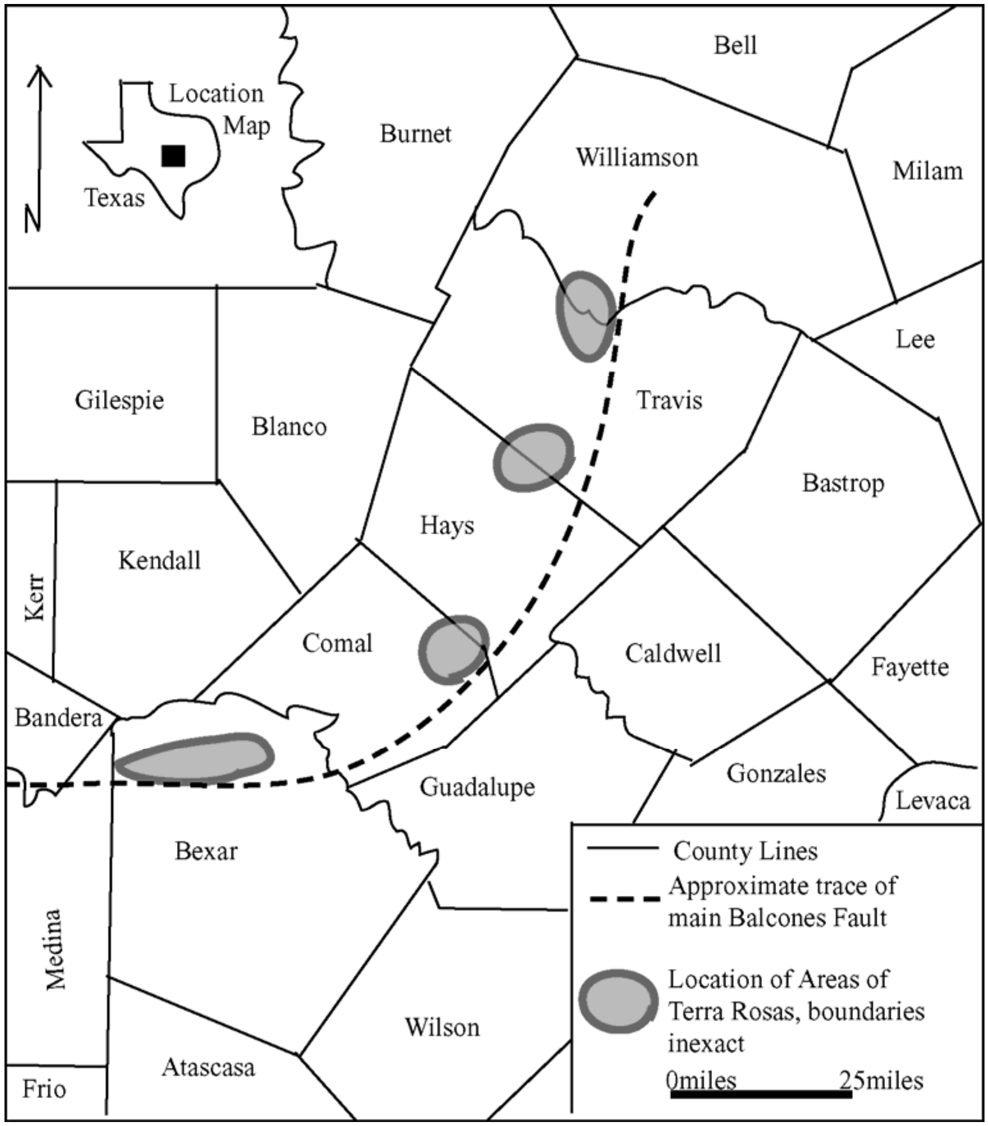

Figure 8. Major Terra Rosa outcrops in Central Texas (adapted from Young 1986).

In addition to these geomorphic units, the Leona Formation lies east of site 4HY160. This formation consists of Quaternary sediments eroded and deposited from the Edwards Plateau by the Blanco River before stream piracy changed the river to its current course (Follett 1966; Hemphill 2004). The Leona Formation can be recognized by its composition of stratified gravels, sands, and clays (Follett 1966). The Leona Formation overlays the Pecan Gap Chalk, Navarro and Marlbrook Marl Group, Midway Group, and the Wilcox Group. These formations have varying degrees of permeability and contribute to the makeup of the Leona Formation as an alluvial aquifer (Hemphill 2004).

Most of the sediments noted in the river basin are Holocene deposits. The Early Holocene depositions on the Edwards Plateau, up to 2.5 meters deep, contain Tinn and Oakalla series soils. The Late Holocene alluvium is mostly confined to the modern floodplains and contains weakly developed Oakalla series soils (Nordt 2007).

The landscape in the Blanco and San Marcos River basin south of 41HY160 sits off the Plateau and on the Blackland Prairie. The majority of the soils here tend to be clayey and loamy, well drained, deep to very deep, and gently rolling in nature. The major soil types found here include Arol, Benchley, Burlewash, Bryde, Cadell, Carbengle, Crockett, Edge, Eloso, Flatonia, Frelsburg, Gillett, Greenvine, Griter, Luling, Monteola, Papalote, Rosanky, Rosenbrock, Schattel, Shiner, Singleton, and Weesatche series; these soils tend to form in weakly cemented sandstone, shale, marl, clays, and loamy and clayey sediments (Griffin 2006). These soils overlay bedrock of Tertiary marine sandstones, shales, and claystones that may emerge on the surface in some areas (Griffin 2006). In addition, some upland soils in the area are sandy and loamy. These upland soils are in the Silstid and Padina series, soils formed in thick beds of loamy and sandy sediments that tend to have well defined drainage patterns (Griffin 2006). Sandstone or gravel topped terraces also comprise some of the upland areas, especially on pre-Holocene relic landforms (Kotter 1981).

Fauna, flora

Ecoregions. Site 41HY160 sits near the confluence of three ecological regions of Texas (Figure 9): Edward's Plateau, Blacklands Prairie, and Post Oak Savannah (Gould 1969). Within these ecological regions, several vegetative types occur.

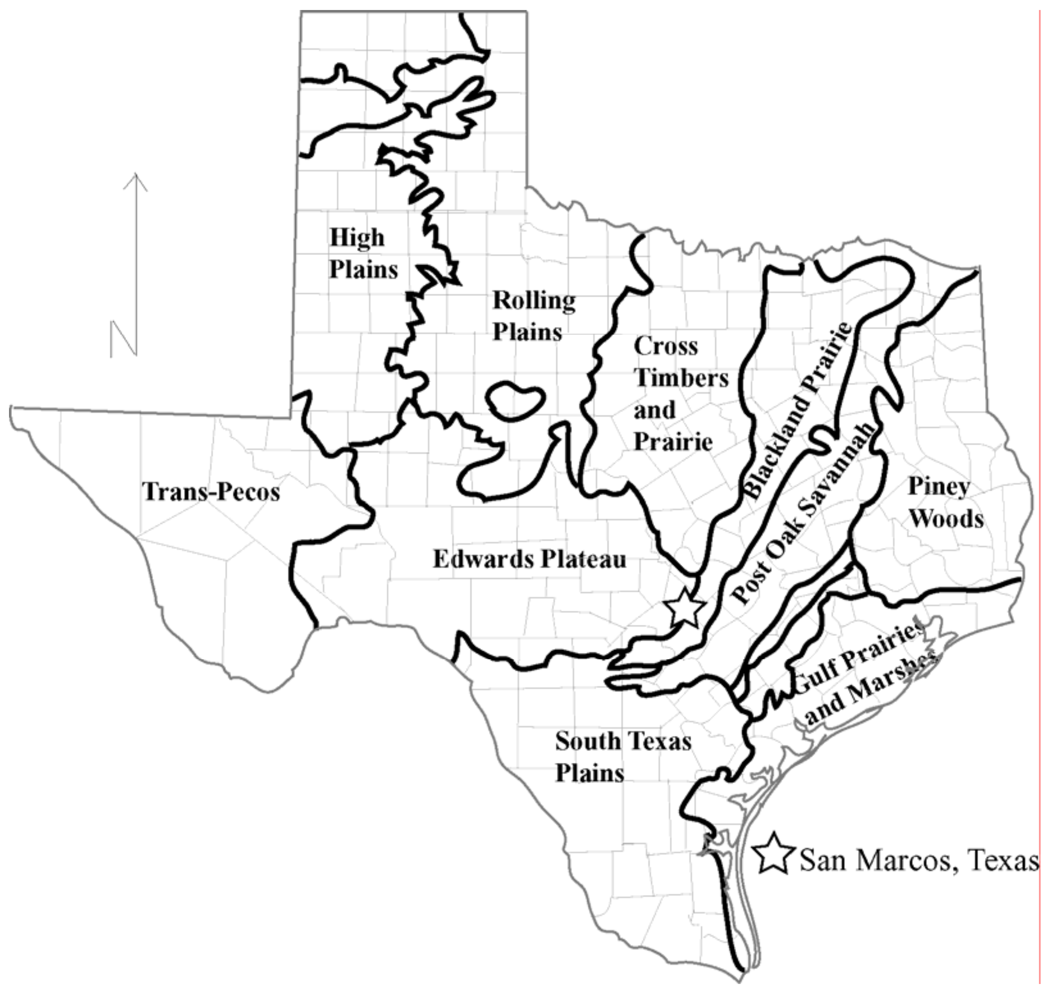

Figure 9. Ecoregions of Texas (adapted from McMahon et al. 1984).

Live oak-Ash juniper parks and live oak-mesquite-ash juniper parks occur on gently rolling uplands on the Edwards Plateau; major plants in the area include texas oak, shin oak, cedar elm, netleaf hackberry, flameleaf sumac, agarito, Mexican persimmon, Texas pricklypear, kidneywood, saw greenbriar, Texas wintergrass, little bluestem, curly mesquite, Texas grama, Halls panicum, purple three-awn, hairy tridens, cedar sedge, two-leaved senna, mat euphorbia, and rabbit tobacco (McMahan et al. 1984).

Live oak-ash juniper woods are found on shallow soils on the limestone hills and escarpment of the Edwards Plateau; plants associated with this area include Texas oak, shin oak, cedar elm, evergreen sumac, escarpment cherry, saw greenbriar, mescal bean, poison oak, twistleaf yucca, elbowbush, cedar sedge, little bluestem, Neally grama, Texas grama, meadow dropseed, Texas wintergrass, curly mesquite, pellitory, noseburn, spreading sida, woodsorrel, and mat euphorbia (McMahan et al. 1984).

Post oak woods, forest, grassland mosaic and post oak woods/forest are found in the sandy soils of the post oak savannah; common plants in this type include blackjack oak, eastern red cedar, mesquite, black hickory, live oak, sandjack oak, cedar elm, hackberry, yaupon, poison oak, American beautyberry, hawthorn, supplejack, trumpet creeper, dewberry, coral-berry, little bluestem, silver bluestem, sand lovegrass, beaked panicum, three-awn, sprangle-grass, and tickclover (McMahan et al. 1984).

Pecan and elm forests grows primarily in the bottomlands of river basins that cross the Edward’s Plateau; other common plants in this area include American elm, cedar elm, cottonwood, sycamore, black willow, live oak, Carolina ash, balk cypress, water oak, hackberry, virgin’s blowr, yaupon, greenbriar, mustang grape, poison oak, Johnson-grass, Virginia wildrye, Canada wildrye, rescuegrass, frostweed, and western ragweed (McMahan et al. 1984).

Biotic provinces. Site 41HY160 sits on the edges of the Balconian and Texan biotic provinces (Figure 10). Few creatures are exclusive to either province, and in 1986

Diamond and Riskind described how the landscape contact between the two provinces increases the natural diversity.

Figure 10. Biotic regions of Texas, Adapted from Blair 1950 and Texas Parks and Wildlife 2001.

The Balconian biotic province contains a number of species, though few are restricted to the region. Fifty-seven mammalian species are identified, including the nine-banded armadillo, fox squirrel, white-footed mouse, black rat, house mouse, raccoon, and white-tailed deer. In addition, over 400 avian species have been recorded, including doves, swifts, hummingbirds, woodpeckers, martins, mockingbirds, warblers, cardinals, and sparrows. Historically, migratory herds of bison and pronghorn antelope could be found in the area (Blair 1950).

The Texan biotic province has numerous mammalian species typical of grasslands, including opossum, mole, squirrel, gopher, mouse, rat, cottontail rabbit, and jackrabbit. This province also has a number of anuran species, including several species of toads and frogs. Historically, bison and antelope could also be found in this area (Blair 1950).

Exploitable resources

Southeastern Central Texas plays host to a number of resources that are potentially exploitable by humans. Overall the ecology of central Texas shows a typical ecological edge effect; the resources of multiple vegetative regions and biotic provinces, coupled with reachable water resources and chert outcroppings, allowed the populous access to a multitude of food and industry-materials that, in turn, often lead to plentiful sustenance and the ability to reduce mobility during more plentiful seasons (Keller 1976).

Chert. Chert is a siliceous formation that can be chipped to make stone tools (Whittaker 1994; Andrefsky 2005). It is used all over the Americas to form tools for cutting, hunting, bashing, and scraping. On the Edward’s Plateau, chert occurs as nodules and cobbles (Spearing 1979). In Sink Creek and the San Marcos River Valley, the chert occurs as stream-rolled pebbles and cobbles in much the same shape and size variety as baked potatoes. As a highly durable resource, chipped chert is the most commonly found artifact in the region and at 41HY160.

Quartzite. Quartzite is a crystalline rock that is also very useful to hunter-gatherers. Quartzite cobbles are used for boiled stone cooking, hammerstones, and grinding stones. It does not occur naturally in the San Marcos and Blanco River basin, but does occur naturally in the Colorado River basin to the north and the Brazos River basin to the east, and in the Uvalde Gravels in the Nueces River Valley to the southwest (Sellards et al. 1949; Spearing 1979; Bureau of Economic Geology 1992; Chandler and Lopez 1992; Reed et al. 1996).

Limestone. Limestone composes the bedrock in the region and is the main component of the most common type of site associated with central Texas, the burned rock midden (Weir 1976). Limestone rocks of various shapes and sizes were used throughout central Texas prehistory to line hearths and firepits. These rocks are generally assumed to be gathered locally and probably not mined. With this qualification, the most likely source of hearth and heating rocks are the limestone formations visible on the surface, as described in the Edwards Plateau section of this chapter, that occur in "formation massive and faulted" that allows water to weather and weaken the rock, ultimately causing it to break off in chunky or tabular shapes depending on the faulting within the rock (Spearing 1979; Perlman 2007) They are also became incorporated in the matrix used for earth oven cooking, leaving tell-tale mounds as the matrix washed out (Leach and Bousman 2001). The limestone is useful to humans because once warmed it will maintain heat for a long time, especially if insulated; this has been demonstrated in experimental earth ovens that maintained cooking temperatures for a full two days (Leach and Bousman 2001).

Plants. The region contains many plants that are useful to humans; what specifically was available varied from season to season and on the mesic/xeric shifts in climate. Some plants include nut-bearing trees, acorns, sotol, seeded grasses, mesquite, and prickly pear (Weir 1976). All these plants are edible by humans, though with varying degrees of processing. Some of these plants were also used for other purposes. Some of these purposes include plenty of brush and small trees around that could be used for digging sticks, habitation structures, and projectile components; there are also grasses and other fibrous plants that could be used for clothing, sandals, mats, and baskets. Indeed, minute traces of basketry impression have been found on burned clay in the vicinity of site 41HY160. Yet another non-food plant use is prickly pear pads for pouches and canteens, documented in Hinds Cave in Val Verde County, southwest of Central Texas (Andrews and Adovasio 1980).

Animals. The large fauna of the area were fairly uniform through the Archaic. Most abundant were deer; bear, wolf, elk, and pronghorn were also present, with bison present during the moister periods (Dillehay 1974; Weir 1976; Baker 1994; Baker and Steel 1994). The smaller fauna of the region, throughout the period, is similar to that of the surrounding areas and typical of oak-savannah. Data shows the presence of snakes, rodents, rabbits, freshwater bivalves, snails, turkeys, quail, fox, coyote, raccoon, carp, catfish, horned lizards, and others in the archaeological record as being present during human habitation of the region (Dillehay 1974; Weir 1976; Baker 1994; Baker and Steele 1994). Over 2,000 human coprolites found in a rock shelter located southwest of central Texas indicate that the humans that utilized that rock shelter had a varied diet that included a variety of sizes and types of animals, along the variety found within the region (Stock 1983; Schafer et al. 2001). Additionally, the hides and bones of the creatures could be used for clothing, decorative purposes, and tools.

Paleoclimates and past environments

Climate

The paleoenvironment of Central Texas has been inferred based on analysis of fossil pollen and supplemented with geological, archaeological, paleontological, and non-pollen botanical remains. This data has been compared to other such data from other regions in North America for confirmation of continental-wide trends and to determine how the region compares with surrounding regions. The evidence comes from a number of sources (Figure 11), but the most commonly utilized for climatic study in Central Texas are Boriack Bog and Weakley Bog.

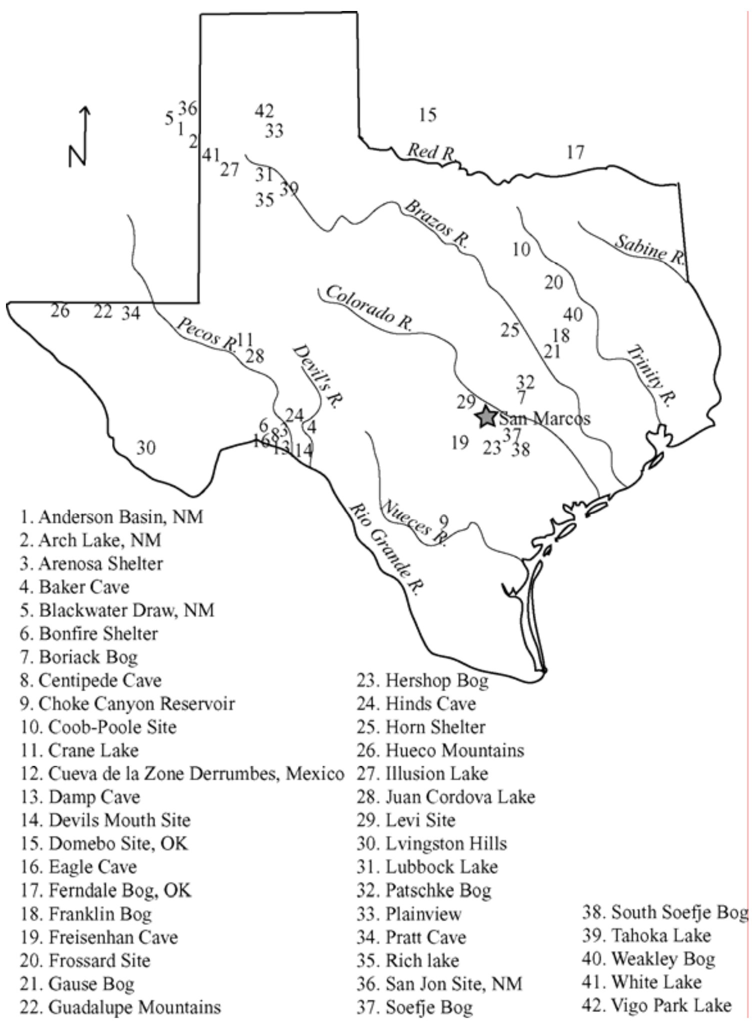

Figure 11. Sources of climate data for Texas (adapted from Bryant and Holloway 1985).

Late Pleistocene. In general, the late Pleistocene (126,000-10,000 B.P.), corresponding with the Paleoindian cultural period, experienced wetter winters and a cooler climate than the proceeding Holocene. Shifting glacial melt-waters caused a series of warm/cold, wet/dry periods at the end of the Pleistocene, and temperatures began to increase between 11,000 and 10,000 B.P. (Toomey et al. 1993; Toomey and Stafford 1994; Balinsky 1998; Bousman 1998; Nordt et al. 2002).

Early Holocene. Several periods of moderate climate oscillation occurred during the Early Holocene (10,000-7500 B.P.). The Terminal Pleistocene temperature increase between 11,000 and 10,000 B.P stabilized until 9000 B.P., conditions moistened between 9500 and 8750 B.P., and then a rapid drying period occurred between 9000 and 7500 B.P. (Bryant 1977; Balinsky 1998; Bousman 1998; Nordt et al. 2002). These dates overlap due to inaccuracies in readiocarbon dating and different sources. Overall, the climate during the transition from the Early to the Middle Holocene was drier than before, and supported a higher overall grassland cover than woodland, a trend that remained predominant into the Late Holocene in some locations (Bousman 1994).

Middle Holocene. The Middle Holocene (7500-4000 B.P.) marks the beginning of the altithermal drought. However, a few periods of brief mesic conditions have been identified, such as a period around 7000 B.P. (Nordt et al. 2002). Otherwise, the mid-Holocene was generally a dry, hot period in Central Texas (Nordt 1992; Johnson and Goode 1994; Ellis et al. 1995; Nordt et al. 2002). The dates from the Altithermal vary depending on the source of the data, and may be 6000 to 4800 B.P. (Bousman 1994;

Nordt et al. 1994), 7000 to 2500 B.P. (Toomey and Stafford 1994), around 4400 to 4500 B.P. (Fredlund 1994; Balinsky 1998), and 5000 to 2500 B.P. (Johnson and Goode 1994).

Late Holocene. The Late Holocene (4000-present) marked a return to intermittent warm/dry and cool/wet periods, with a general cooling trend beginning around 400 years ago (Bousman 1994; Nordt et al. 2002). During this time, data from different locations appears to show short-term variability in the regional climate. For example, data from Fort Hood suggest a warm/dry period between 3000 and 1500 B.P. (Nordt et al. 1994), but data from Hall's Cave indicates a wet episode dating to 2500 B.P. (Toomey and Stafford 1994). More recently in time, data from Weakley Bog indicates a dry/cooling episode between 1600 and 1500 B.P. and between 500 and 400 B.P. (Bousman 1994; Nordt et al. 2002).

The general trends through time, as they have been determined through the described data, have been compiled by Bousman et al. (2007), Nickels et al. (2001), and Collins (1995). This data has been charted alongside geological epoch, cultural periods, and diagnostic tool styles, and is presented in Figure 12.

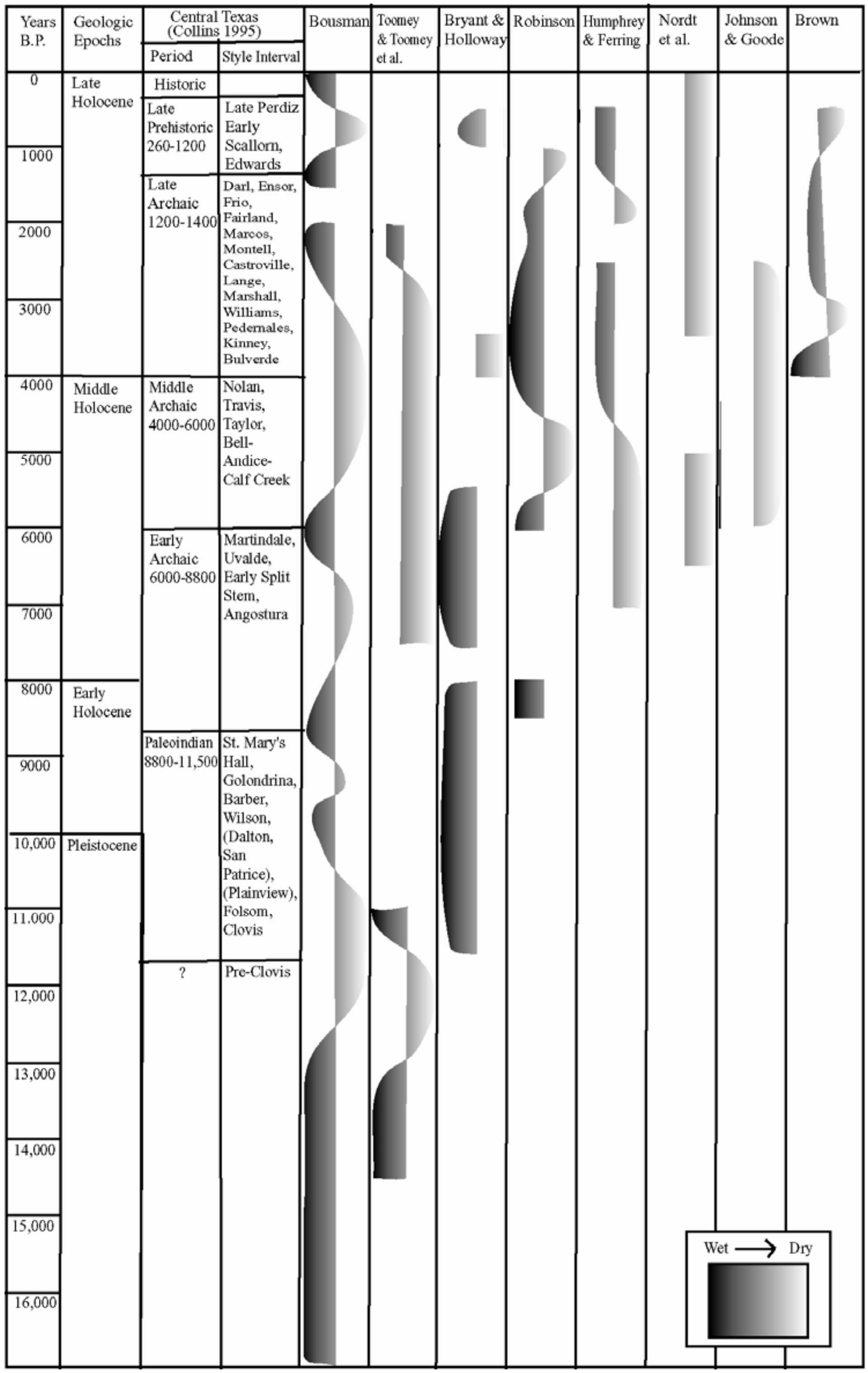

Figure 12. Climate and Chronology of Central Texas adapted from Bousman et al. 2007; adapted from Collins 1995 and Nickels et al. 2007 (Robinson 1979, 1982; Bryant and Holloway 1985; Toomey 1993; Toomey et al. 1993; Humphrey and Ferring 1994; Nordt et al. 1994, 2002; Bousman 1998; Brown 1998).

Flora/Fauna

Prior to the Holocene, the flora and fauna differed from those in Central Texas today. It was home to megafauna and other now-extinct creaures. Late Pleistocene horse and mammoths found in the region indicate grassland vegetation and represent possible human food items. (Baker et al. 2002). In Spring Lake, excavations conducted by Joel Shiner (1982, 1983) uncovered the remains of megafauna, including mastodon, mammoth, and giant bison, suggesting the flora and fauna near site 41HY160 were similar to the rest of the eastern Edward's Plateau.

At the beginning of the Holocene, the climate of the area began changing to near-modern conditions, and the flora and fauna followed accordingly. In general, trees and grasslands similar to those present today began to grow in the region. However, during times of long, extreme drought things would have been slightly different. More than likely, during the most xeric periods there would have been fewer trees, and plants more frequently found on the western Plateau, like sotol, would have increased in numbers. The people in the region likely ate more sotol and sotol-like plants during the xeric periods, because they show a dramatic increase in caries (Bement 1994); caries are more common when a high sugar or simple carbohydrate foodstuff becomes the bulk of the diet, and sotol is one of the few known edible plants in the region that fits this description (Johnson and Goode 1994). In general, remains of plants and animals found in archaeological settings show that the flora and fauna found today, and certainly that recorded historically, were present during the Archaic period. The plants are well described in the modern vegetative zones section already described, and the animals include rabbits, deer, antelope, and, during mesic shifts, the occasional bison (Collins 1995).

Paleo-Pedogenesis

Several studies have examined the geomorphology of the sediments in the immediate area around 41HY160. These include the geomorphology evident in standard archaeological excavations and three coring studies (Goelz 1999; Gunter 1999, Nordt 2007). These cores revealed the topography of the underlying bedrock of the surrounding valley and showed that up to nine meters of sediments have accumulated in the area, with an average thickness of about 8.4 meters (Goelz 1999). In these deposits, a bulk humate radiocarbon date of 11,470±100 B.P. (Beta-132062, $\delta^{13}C$=-26.7‰, calibrated age 13,444 B.P.) was obtained from deposits at 8.5 meters, and a bulk humate date at 2.4 meters dated to 3660±50 B.P. (Beta-132061, $\delta^{13}C$=-21.7‰, calibrated age, multiple intercept, 3979, 3936, 3933 B.P) (Goelz 1999).

The cores reveal five uncomformably bound units (Nordt 2007). The oldest unit, A, up to 2.5 meters thick, consists of channel gravels on the eroded bedrock of the Sink Creek valley. Some of these gravels contain a yellowish brown to brownish mud matrix. In addition, in some areas these gravels are capped by an apparent dark gray to black marsh deposit about half a meter thick that contains preserved plant materials (Nordt 2007). The 11,470 date comes from these deposits, as does a 9585±40 B.P. (CAMS-85777, calibrated age 10,750-11,100 B.P.) date from plant materials in the upper portion of the marsh deposit (Nordt 2007).

The next youngest unit, B, consists of a clayey marsh deposit inset into Unit A and limited to the area directly around the known springhead (Nordt 2007). The relationship of Unit B to channel gravels indicates channel entrenchment happened after 9585 B.P. and before 7365±40 B.P. (CAMS-85776, calibrated age 8050-8280 B.P.) (Nordt 2007).

The next oldest unit, C, overlies a brief erosional event and indicates renewed channel activity (Nordt 2007). Unit C consists of channel gravels in a reddish brown to strong brown mud matrix (Nordt 2007). Clays and marsh deposits cap Unit C; these marsh deposits appear to be complex, much more complex than those in Unit B (Nordt 2007). A single sample from the top of Unit C dates to 5975±40 B.P. (CAMS-85778, calibrated age6740-6860 B.P), and the bottom of Unit C dates to no earlier than 7365 B.P. (Nordt 2007).

The next oldest unit, D, unconformably buries Units A, B, and C and marks the beginning of the Middle Holocene deposits (Nordt 2007). This deposit consists of thick clayey deposits, up to seven meters thick, and forms the Middle Holocene terrace of Sink Creek valley (Nordt 2007). Nordt (2007) also determined that carbonate accumulations in this Unit indicate a few thousand years of pedogenesis, and deposition likely began shortly after 5925±40 B.P. (CAMS-85779, calibrated age 6670-6800 B.P.) and finished around 3300 B.P. ±40 (CAMS-85780, calibrated age 3470-3570 B.P.). Deposition may have continued after this, but surface decalcification indicates that landscape stability and pedogenesis were occurring after the most prolific period of Unit D deposition (Nordt 2007).

The youngest unit, E, deposited after Unit D, but the deposits are of unknown origin (Nordt 2007). Unit E consists of dark grey or black calcareous clayey to clay-loam surface horizons over weakly developed brown and clayey subsoils (Nordt 2007). In at least two areas, Unit E overlies truncated Unit D sediments (Nordt 2007).

The coring studies have provided a fairly clear view of the depth and location of deposits in the area surrounding 41HY160; a flake recovered from the lowest deposits (Bousman, personal communication) provides a tantalizing clue as to the potential for buried cultural materials in the vicinity. A schematic cross section of the Sink Creek valley illustrates this further (Figure 13).

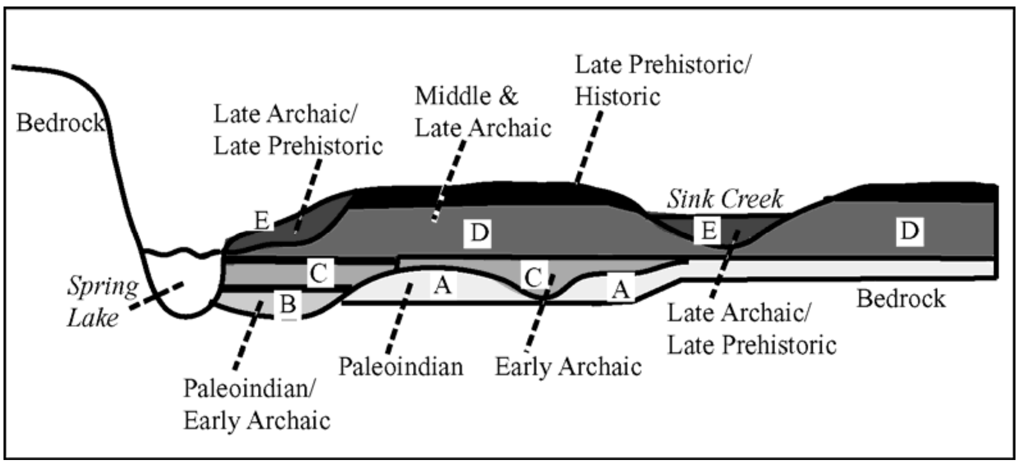

Figure 13. Schematic geographic cross section of Sink Creek valley, showing depositional units and potentially associated cultural time periods (adapted from Nordt 2007).

CHAPTER 3: ARCHAEOLOGICAL BACKGROUND, CULTURAL CHRONOLOGY, AND FORMATION PROCESSES AND THE ARCHAEOLOGICAL RECORD

Previous investigations

The area immediately around site 41HY160 has been the host for several investigations into the archaeologically rich deposits. Besides 41HY160, five other prehistoric sites in and around the San Marcos Springs have been delineated. These are 41HY37, 41HY147, 41HY161, 41HY165, and 41HY306 (Figure 14). The history of investigations and geoarchaeology at site 41HY160 is detailed in Chapter Four.

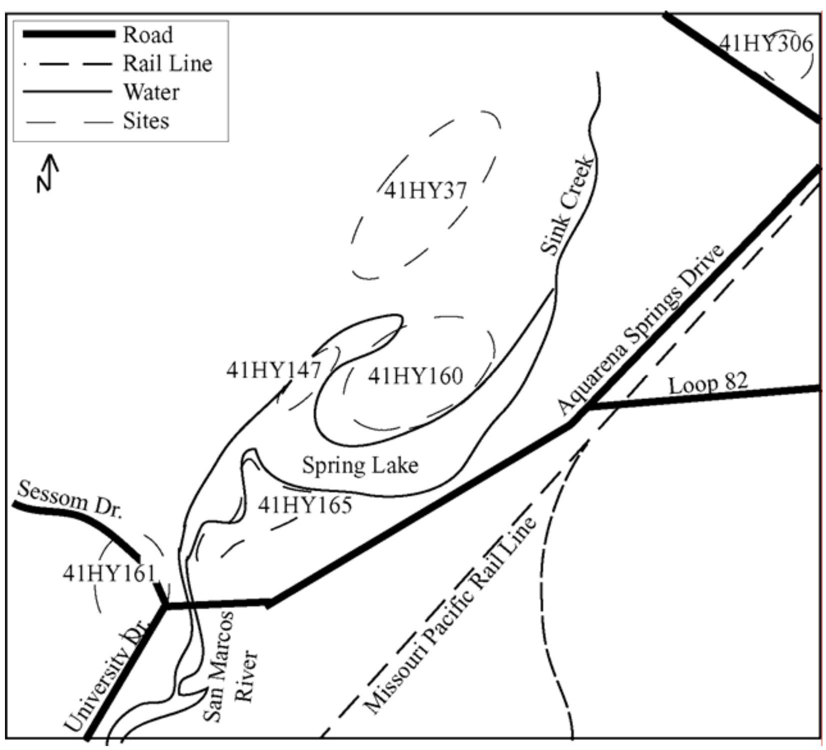

Figure 14. Location of described sites around Spring Lake and near 41HY160.

41HY37: Burleson Homestead

Site 41HY37 sits atop the ridge north of Spring Lake. The majority of the site consists of the historic Burleson homestead, the home of Anglo settler and Texas Revolutionary hero General Edward Burleson, who dammed the Springs to make Spring Lake (Bousman and Nickels 2003). It also contains a prehistoric component; Early, Middle, and Late Archaic diagnostic projectile points were found associated with burned rock features. These were discovered during a 1983 field school conducted by James F. Garber (Garber and Orloff 1985).

41HY147: Spring Lake Site

Site 41HY147 is located within the artificially dammed Spring Lake on the slopes of the escarpment that makes up one side of the lake. In 1978 Shiner shifted his investigations from 41HY161 to this site and found strata containing Paleoindian artifacts and mixed Paleoindian and Archaic artifacts. Although Shiner did not reconstruct past lifeways, he did prove that people have utilized the spring for much of the time humans have been in Texas. Shiner also found some "exotic" materials with the Paleoindian artifacts, such as non-native gar scales and large quartz crystals that are not associated with any local terrestrial sites. Shiner theorized that these may be offerings, showing an important status of the Springs in prehistoric times (Shiner 1981). The quantity of material and availability of natural resources also led Shiner to theorize that Paleoindians visiting the springs may have reduced their mobility to take advantage of the local resources; this has, however, been contested (Shiner 1983; Johnson and Holliday 1983). This site was revisited in 1990 and 1991 by Southern Methodist University graduate student Paul Takac (Takac 1990, 1991a, 1991b). Takac recovered a number of Paleoindian projectile points in addition to those already recovered by Shiner.

41HY161: Ice House/Fish Pond

This site was initially an underwater investigation by Joel Shiner in 1978. This site, located below the historic dam just south of the springs and south southwest towards the fish ponds, yielded a number of mostly Archaic artifacts, but was largely disturbed. Shiner soon moved his underwater investigations to 41HY147. Beginning in 1982, James F. Garber (1983) directed a series of Southwest Texas University field schools around San Marcos Springs, including site 41HY161.

Later, Garber and David Glassman excavated two human burials in the central and southern portion of the site endangered by drainage construction (Garber and Glassman 1992). Unfortunately, most of this portion of the site was likely disturbed during excavation for the Federal Fish Hatchery ponds in the 1890s (Stoval et al. 1986).

Further investigations were conducted in 1997 and 1998 by Ford and Lyle (1998) and Lyle et al. (2000) prior to a parking lot construction project at Joe’s Crabshack, and then a water pipeline around the fish ponds. These investigations included shovel tests, backhoe trenches, monitoring, and excavation units. These investigations uncovered a Late Archaic component stratified above a Late Paleoindian component in the southwestern portion of the site. The most recent excavation occurred in 2004. Erik Oksanen and Dave Nickels supervised excavations for the Sessoms Creek Diversion that would impact the site; this excavation uncovered intact Early Archaic deposits (Oksanen 2007).

41HY165

Site 41HY165 is located on an inner bend on the left bank of the San Marcos River immediately downstream of the confluence with Sink Creek, between sites 41HY161 and 41HY160. It was initially recorded in 1984 as part of the field school supervised by Garber and was further investigated between 1996 through 1998 (Ringstaff 2000). The 1996 through 1998 investigation were directed by Chris Ringstaff and Kat Brown, and led to an analysis of the geoarchaeology of the site by Ringstaff, presented in his MA thesis for Texas State (Ringstaff 2000).

41HY306

Site 41HY306 is located north of the Aquarena Golf course, on an alluvial terrace east of Sink Creek. It was the site backhoe trench exploration in 1999 before a water line was installed. The artifacts here consist largely of debitage; little else was found (Arnn and Kibler 1999).

Culture Chronology

Site 41HY160 is located within the Blanco and San Marcos River basin and on the Eastern edge of the Edwards Plateau. This area contains preserved sites from all of the known major periods of Texas prehistory and history. From Paleoindians, known from artifacts excavated from Spring Lake, to Spanish missions, this region is rich in cultural remains of the peoples that utilized the springs, streams, rivers, plants, animals, and landscape available here. As far as can be determined, the dates of cultural periods at the site should correspond to cultural period dates elsewhere on the eastern Edwards Plateau.

Paleoindian

The cultural period known as Paleoindian is the earliest identified human use of this area and spanned from circa 11,500 to about 8800 B.P. This period occurred during the terminal Pleistocene and is associated with megafauna, high human mobility, and the earliest known human occupations of Central Texas (Collins 1995). The cultures associated with Clovis, Folsom, and Plainview projectile points inhabited Central Texas at this time; transitional/late Paleoindian cultures projectile points found in the area include San Patrice, Big Sandy, St. Mary's Hall, Barber, and Golondrina (Shiner 1983; Collins 1995). As of publication, no pre-Clovis sites have been identified in this area. Considering the sheering of valleys that occurred across North America in the time period preceding Clovis, such a site is highly unlikely to exist (Collins 1995). Clovis sites in Central Texas include burials, campsites, caches, kill-sites, and quarries (Collins 1995).Though most Paleoindian sites in the area consist of upland surface lithic scatters (Black 1989), buried sites have also been identified in Central Texas alluvium (Nickels et al. 2007). These sites include Berclair Terrace in Bee County (Sellards 1940), Berger Bluff in Goliad County (Brown 1987), Kincaid rockshelter in Uvalde County (Collins et al. 1989), Wilson-Leonard in Williamson County (Collins et al. 1993; Collins 1998), and Gault in Williamson County (Collins and Brown 2000).

Archaic

The Archaic stage in central Texas spanned from 8800-1200 B.P. and constitutes two-thirds of Texas prehistory (Collins 1995). This period represents a probable reduction in hunter-gatherer range and human cultural adaptation to local conditions as the climate swung between extremes of mesic and xeric conditions (Collins 1995). The

Archaic also marks the beginning of burned rock middens, one of the most common types of site in Central Texas (Weir 1976; Collins 1995).

The Central Texas Archaic is divided into three periods, Early, Middle, and Late (Collins 1995). These periods are largely defined by changes in projectile point styles, and some researchers sub-divide these periods into projectile point style phases (Collins 1995). In addition, these periods act as culturally-based demarcations along continuums of climate and possibly cultural changes.

Early Archaic. The Early Archaic period dates from 8800-6000 B.P. (Collins 1995). In Central Texas, the Early Archaic is a time of exploitation of local, smaller resources such as deer, fish, and plant bulbs, a trend that likely started as the megafauna became extinct by 11,000 B.P. (Weir 1976). Early Archaic sites in Texas are fairly sparsely distributed and rather small in size; groups were likely small bands of related individuals with an economy based on the utilization of a wide range of resources (Story 1985). In particular, the distribution of known sites during this dry period in Texas prehistory indicates a concentration around reliable water sources, such as those available on the eastern edge of the Edwards Plateau (McKinney 1981; Collins 1995). Projectile points associated with this period include Angostura, Gower, Uvalde, and Martindale (Collins 1995). A handful of recorded Early Archaic sites lay thinly scattered throughout Central Texas (Weir 1976); this may be an effect of small, highly mobile groups moving widely across the landscape, landform erosion and/or truncation, or a combination of these two factors.

Middle Archaic. The Middle Archaic period dates from 6000-4000 B.P. (Collins 1995). This period is a time of many changes in human utilization of Central Texas resources. First of all, the increase in number of sites and the appearance of cemeteries probably indicates an increase in population and a decrease in mobility, possibly even a move towards territorialism (Weir 1976; McKinney 1981; Story 1985). During the early part of the Middle Archaic, mesic conditions were present and bison were hunted with specialized toolkits that originated in the prairies and prairie margins west of the Ozarks (Prewitt 1981; Johnson and Goode 1994; Wyckoff 1995; Collins 1995). During the latter half of the middle Archaic, humans in central Texas experienced the most xeric conditions known during human habitation of the area (Collins 1995). Burned rock middens, which first appeared about 8000 B.P., appear to increase in number during the xeric times, suggesting an adjustment in subsistence strategy and utilization of more diverse edible resources (Weir 1976; Bousman 1993; Collins 1995); however, more recent data, such as the formation studies by Leach and Bousman (1997) call into question the dating methods used to determine this increase in burned rock middens in the Middle Archaic. Projectile points associated with this period include Andice, Bell, Early Triangular, Nolan, and Travis (Collins 1995).

Late Archaic. The Late Archaic period dates from 4000-1200 B.P. (Collins 1995). If the number of recorded sites are indicative of human population size, then the Late Archaic was a time of increased population in Central Texas (Weir 1976; Prewitt 1981; Collins 1995). Burned rock middens, a continuation from the Middle Archaic, reach their peak size and distribution during the Late Archaic (Collins 1995). Towards the end of the Late Archaic, a reduction in the number of burned rock middens likely accompanied a return to more mesic conditions (Prewitt 1981; Collins 1995). It has also been proposed that hunter-gatherers of Central Texas exhibited influences from the agrarian societies of the Southwest and the Southeast (Prewitt 1981), and may have even engaged in trade (Johnson and Goode 1994). Projectile points associated with this time period include Bulverde, Pedernales, Castroville, Fairland, Frio, Ensor, and Darl (Collins 1995).

Late Prehistoric

For the sake of ease of definition, the Late Prehistoric period spans the time between the appearance of the bow and arrow and early European contact. This generally dates from 1200-300 B.P. and is divided into two phases, Austin and Toyah (Collins 1995).

Austin phase. The Austin phase spans from 1200-900B.P. This phase is similar to the Late Archaic, a similarity that has prompted some archaeologists to place the transition between the Archaic and the Late Prehistoric after this phase (Johnson and Goode 1994). However, the very obvious presence of arrow points (Prewitt 1981), indicating a transition to bow and arrow from the atlatl, traditionally places this phase in the Late Prehistoric (Collins 1995). The named styles of the Austin Phase arrow points are Scallorn and Granbury (Prewitt 1981). In addition to this transition in projectile technology, this phase is also defined by a greater utilization of cemeteries, both noncremated and cremated remains (Prewitt 1981) and increased hostilities evidenced by arrow-wound fatalities in humans (Prewitt 1974).

Toyah phase. The Toyah phase in Texas prehistory marks a strong cultural horizon in the region and dates from 800-300B.P. (Collins 1995). The most prevalent cultural remains of this phase include Perdiz and Cliffton arrow points, plain and brushed pottery, four-bevel bifaces, cane arrow-shafts, wooden arrow foreshafts, bone beads, large thin bifaces, end scrapers, prismatic blades, imported Caddoan goods, and a general adaptation to the exploitation of bison (Prewitt 1981; Collins 1995). Cemeteries, burial practices, and human on human violence appear to continue from the Austin phase (Prewitt 1981). Whether the widespread presence of these goods represents a single ethnic group or a quick spreading techno-complex is still up for debate (Johnson 1994; Ricklis 1994; Collins 1995).

Protohistoric/Historic

The Protohistoric/Historic period of this region begins with the early Spanish explorers. Technically, the Historic period begins when Europeans began to explore the area and write accounts of their explorations, in Central Texas this is during the 17th Century (Bolton 1915; Newcomb 1961; Berlandier 1969). However, this was not a uniform time across Central Texas, so the term "Protohistoric" is sometimes utilized to designate that time period when European began to record their travels in the area, and European influences, such as disease, trade goods, refugees, and political repercussions, began to impact the native inhabitants, sometimes in advance of the actual contact with Europeans. The term Protohistoric is also used for when first contact is not precisely known. Alternatively, the term early historic may be used to describe the time of the earliest European contacts (Collins 1995)

The Historic period in Central Texas began with the five-year journey of Cabeza de Vaca through Texas and Mexico in 1528 (Hallenbeck 1940). The earliest known accounts of the native inhabitants of Central Texas describe groups feeling the pressures of Spanish settlement to the south and Apache encroachment to the north (Wade 2003).The people traveled in small bands, sometimes utilized large multi-group camps, hunted deer and bison, and used and traded in bison products (Collins and Ricklis 1994). In addition, the horse began to be used, especially by bison hunters (Collins and Ricklis 1994; Collins 1995). There is also evidence of interactions with the Hasinai Caddo, an agrarian group from East Texas who would travel to Central Texas to hunt bison and live with the indigenous groups, in the form of historical written accounts and the presence of Caddoan ceramics in Central Texas (Foster 1995)

During the 16th and 17th Centuries, the Spanish began establishing missions in Texas; one was established in San Marcos but was not occupied for long (Hester 1989; Collins 1995, Greene 2001). The records of Spanish priests chronicle the earliest portions of the Historic period in Central Texas, beginning in the latter half of the 17th Century (Collins 1995). Spanish expeditions into the area of San Marcos include Alonso de León in 1690, Domingo Terán de los Rios in 1691, Governor Gregoria de Salinas Varona in 1693, Pedro de Aguirre in 1709, Captain Domingo Ramón in 1716, Governor Martin de Alarcón 1718, Marques de San Miguel de Aguayo in 1721, and Brigadier Pedro de Rivera in 1727 (Hoffman 1935; Foster 1995; Jackson 1995). San Xavier Mission and San Francisco Xavier Presidio had temporary locations near San Marcos in 1755, and the villa of San Marcos de Neve was established along the San Marcos River in 1807 (Horrell 1999). Mexico was a country by 1827, and Texas was a country by 1836. By the mid 19th Century, Texas had joined the union, Anglos began settling in the area, and General Burleson had dammed the headwater of the San Marcos River to create Spring Lake (Greene 2001, Leffler and Ogivlie 2001).

Formation Processes and the Archaeological Record

To truly understand the history of preservation at site 41HY160, it is essential to understand the geomorphology of the region, namely the Blanco and San Marcos River basin. Although the original inhabitants decided where to locate their site within the landscape, it is the local geomorphological processes that preserve and destroy sites (Waters and Keuhn 1996). Without an understanding of landscape geomorphology, long term changes in human cultural remains, climate, and biotic communities cannot be properly understood (Collins 1995). The geomorphological processes, as well as how they relate to and may have affected anthropogenic sediments, can be detailed through time in the area around 41HY160.

Landscape Evolution

At some point prior to 11,000 B.P., approximately 90% of the meltwater from Laurentide Ice Sheet discharged into the Gulf of Mexico as a series of jökulhlaups, or glacial outburst floods, across central North America, largely through the greater Mississippi River drainage system; a discharge that may have reached as much as $10^6 m^3$/second at its peak (Shaw 1989; Licciardi et al. 1999; Flower et al. 2004; Aharon 2006). This is evidenced by paleo-planktonic records of surface salinity in cores taken on the continental shelf in the Gulf of Mexico and by large slack water deposits in the Gulf of Mexico (Teller 1987, 1990; Licciardi et al. 1999). Jökulhlaups tend to scour sediments in their course, sometimes down to bedrock (Russel et al. 2005). Cooke et al. (2003), use strontium isotopes and floral and faunal remains to show that the Edwards Plateau in particular experienced sediment denudation around ^{14}C 11,000-12,000 B.P. In a review of dated soils, most of the present sediment accumulation can be dated to less than 11,000

B.P. (Blum et al. 1994); locally, in an area of Sink Creek Valley with roughly nine meters of deposits, sediments less than half a meter above the bedrock date to ^{14}C 11,470±100, or 13,150 to 13,800 B.P. calibrated (Goeltz 1999). There are few exceptions in Central Texas, in the form of a few truncated remnants, namely the Pleistocene Terra Rosa and the Late Quaternary Leona Formation (Follett 1966; Young 1986; Hemphill 2004). The jökulhlaups are a potential cause for the relative scarcity of sedimentation in Central Texas dating to before approximately 14,000 B.P. It is reasonable to assume that sometime around or before 14,000 B.P., there was little to no sediment in Sink Creek Valley, and flooding is one potential cause (Figure 15).

The flood and sediment erosion would have likely wiped out all or nearly all evidence of any pre-Clovis inhabitation, if they existed, in the area. Though the likelihood is exceedingly unlikely, any observer in the presence of an intact Clovis-component layer should note if there appear to be intact soils below the Clovis; this would be the only likely place for pre-Clovis deposits to be identified, if they exist. However, the deep, waterlogged nature of Clovis deposits in Sink Creek Valley may make finding or identifying such a component highly difficult, if they exist.

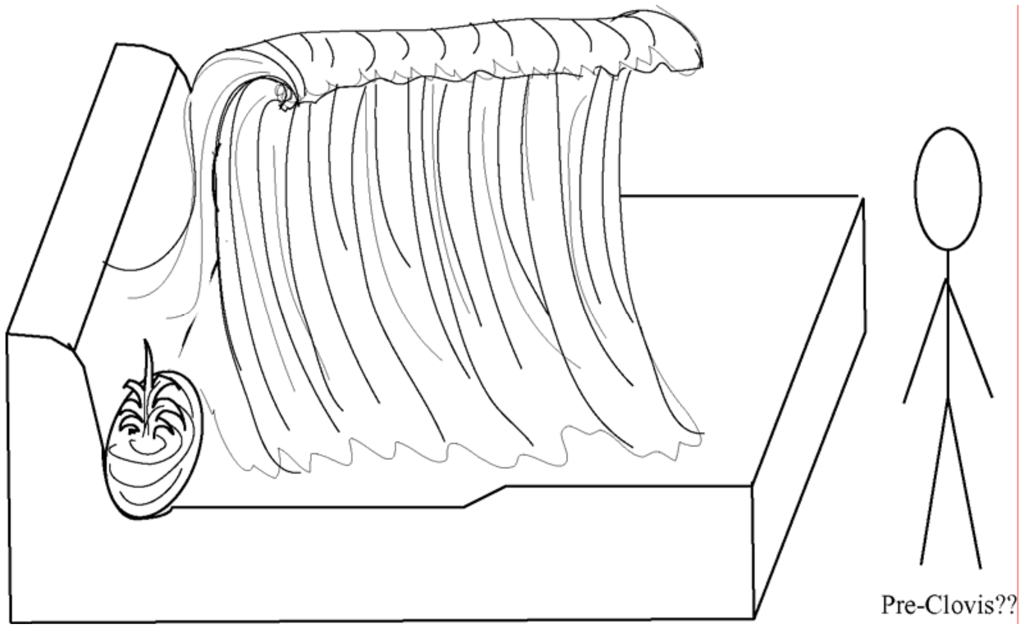

Figure 15. Approximately 14,000 B.P., large floods likely removed most of the sediment around 41HY160. Any potential for pre-Clovis deposits was probably also removed in this flood.

Central Texas stream entrenchment began sometime between 15,000 and 11,000 B.P. (Blum and Valastro 1989; Nordt 1992), and entrenchment in Sink Creek Valley began sometime before 11,450 B.P., mostly in the western portion of the valley (Nordt 2007). There is an incised channel in the bedrock about halfway between the modern Sink Creek channel and Spring Lake (Nordt 2007), and this channel may have been the Sink Creek channel during this time of entrenchment. Between 11,450 B.P and 9598 B.P., a veneer of channel gravels were deposited on the bedrock floor, and a marsh deposit accumulated around the Springs and towards Sink Creek (Nordt 2007) (Figure 16). Multiple layers in this marsh formation appear to indicate multiple episodes of marsh formation and a relative instability of the floodplain or Spring (Nordt 2007).

These deposits have the potential to preserve Paleoindian features and artifacts, such as the Clovis artifacts discovered in Spring Lake (Shiner 1983; Nordt 2007). Although the Paleoindians probably did not occupy the marsh area, they could have utilized the area and occupied nearby terraces and uplands (Nordt 2007). Additional evidence that Paleoindian features may be found in these deposits are a flake found below sediments dated to 9585 B.P. and the fact that Early Archaic cultural materials are found much higher in the stratigraphy, only a few meters below the surface (Nordt 2007).

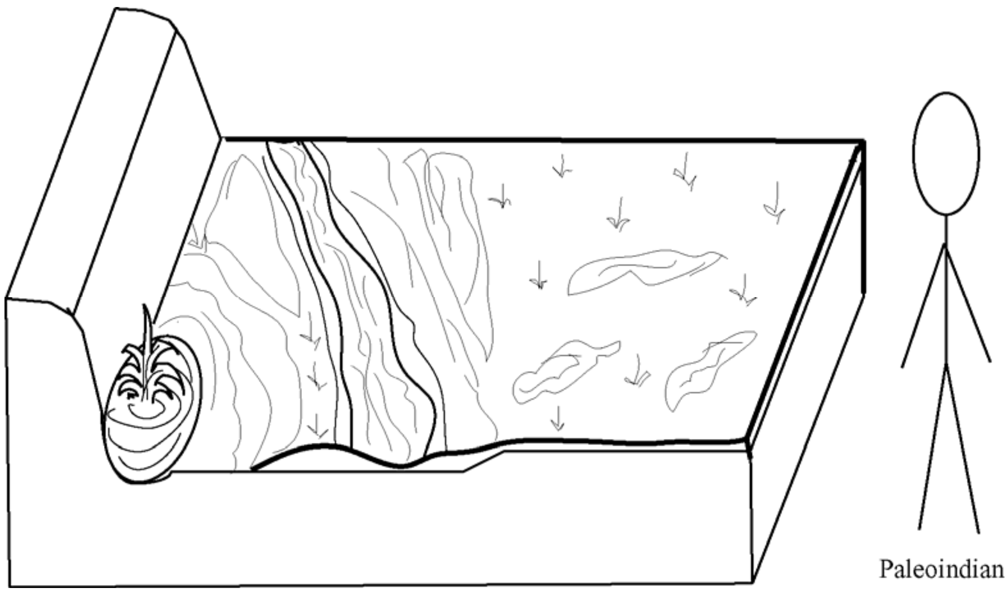

Figure 16. 11,500-9500 B.P., channel entrenchment, deposition of bedload gravels, deposition of marsh sediments and plant materials, Paleoindian use of the area.

Between 9585 and 7365 B.P., another episode of channel entrenchment occurred, and terminated the earlier marsh formation (Nordt 2007). At this time, the Sink Creek channel is very near the springheads. Concurrent with the end of this time period, water tables dropped and aggradation slowed, allowing a second marsh deposit to form (Nordt 2007) (Figure 17).

This time period may be associated with Paleoindian and Early Archaic features; context would be best preserved in the marsh deposits, but like previously, they may have only been utilized, not occupied (Nordt 2007).

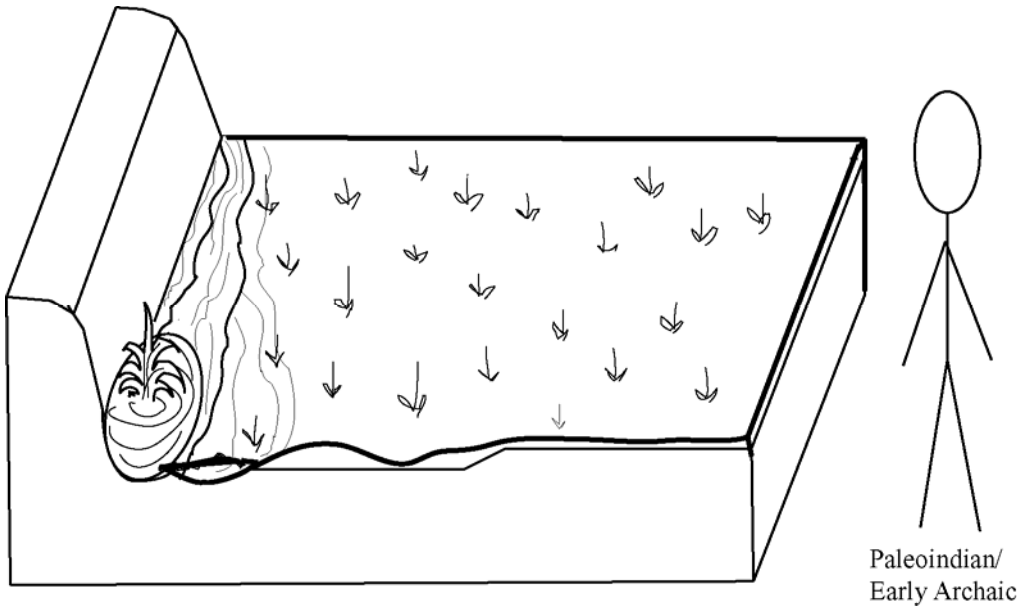

Figure 17. 9500-7400 B.P., Floodplain destabilizes as channel cuts down towards the springs, a new marsh deposit forms, Paleoindian and Early Archaic use of the area.

Between 7365 and 5900 B.P., channel aggradation renewed, and marsh deposits were buried by overbank deposits. During this time, water tables and channel discharge may have increased, creating deposits at a fast rate (Nordt 2007). The deposits indicate multiple episodes of overlaying channel gravel and marsh deposits. The presence of eroded upland soils in these deposits may indicate a sinuous channel. Additionally, the floodplain appears to have expanded eastward, toward the modern Sink Creek channel (Nordt 2007) (Figure 18).

This time period is associated with the Early Archaic; context would be best preserved in the marsh deposits, the overbank clays, or in the expanding littoral zone (Nordt 2007).

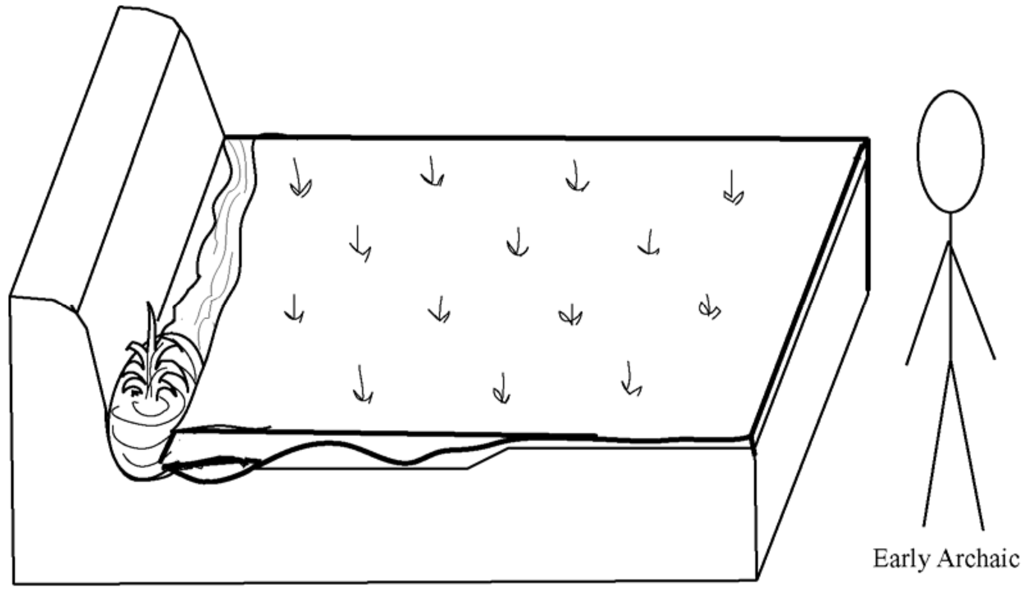

Figure 18. 7400-5900 B.P., renewed channel aggradation, expansion of floodplain, Early Archaic use of the area.

Between 5900 and 3300 B.P., there were extreme changes in the fluvial geomorphology in Sink Creek valley (Nordt 2007). During this time period, the valley, including the Springs, were overwhelmed with fine-grained deposits (Nordt 2007). These deposits may have been from floods during a hot, dry time in the climate, and may be from slackwater deposits backing up from the confluence of the San Marcos and Blanco Rivers just downstream (Nordt 2007). Some springs were covered up, and the littoral zone adjacent to the Springs was covered (Nordt 2007). As for the channel, it was branching, had suspended load, and likely had incursions of slackwater from the nearby rivers (Nordt 2007). Deposition at this time would have been so rapid as to prevent most pedogenesis (Figure 19).

The base of this deposit may contain Early Archaic occupations. In addition, Middle Archaic materials may be preserved in the upper portion of the deposit, and the rapid deposition may preserve discrete occupational zones (Nordt 2007). The surface of the deposit may also preserve Middle Archaic features, and possibly Late Archaic as well; these may be compressed or mixed due to a decrease in deposition rate (Nordt 2007).

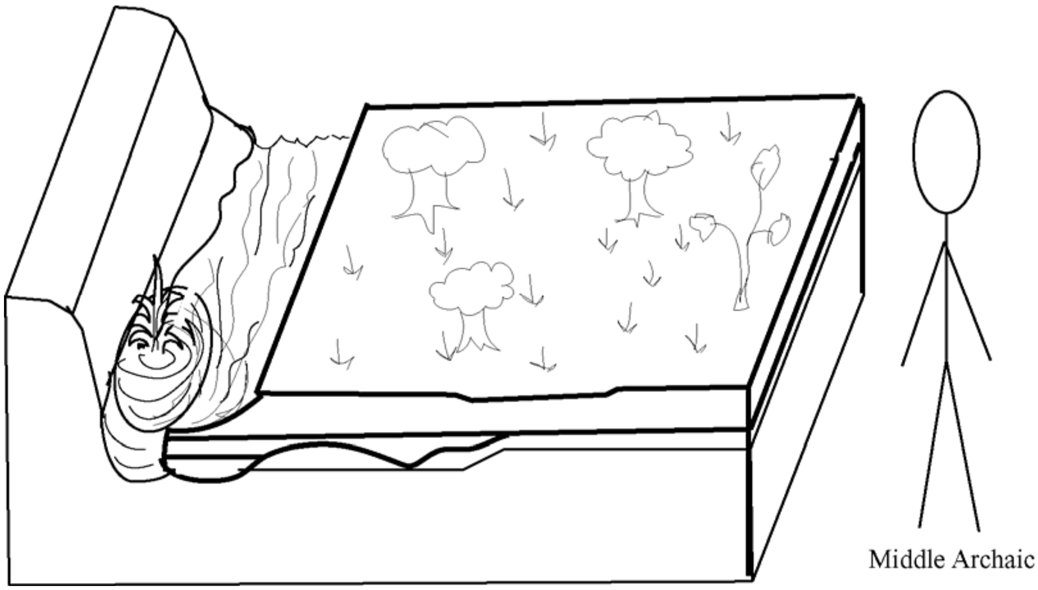

Figure 19. 5900-3300 B.P., fine grained deposition inundates the valley, channel anastomozing, Early Archaic at the bottom, Middle Archaic near the top, Middle and Late Archaic at the surface.

After 3300 B.P., the Sink Creek channel began its migration to its current location in the middle of the valley, and flood deposits greatly decreased (Nordt 2007). What flood deposits did occur are located around the Springs (Figure 20), in a small channel near the Springs, and just around the channel (Nordt 2007). Additionally, a side channel, now filled, flowed towards the Springs from the main channel at some point after 3300 B.P. (Nordt 2007).

The minimal nature of the deposition during this time period means that most of the cultural features from the Late Archaic to the Late Prehistoric form a palimpsest above the previous deposition (Nordt 2007). However, the few locations of deeper fill, around the Springs and in the abandoned side channel, may preserve discrete occupational zones (Nordt 2007).

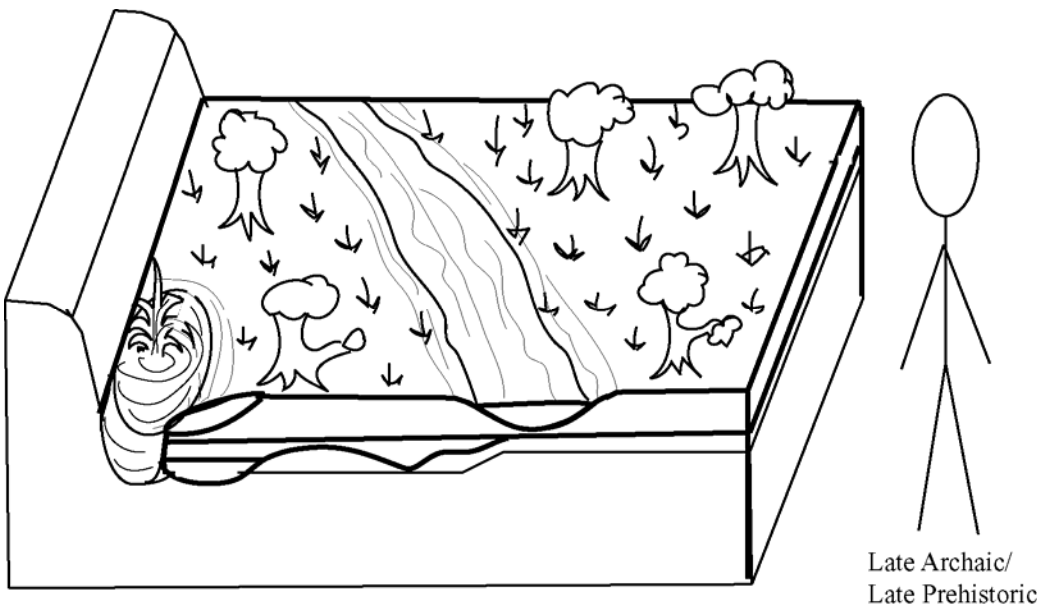

Figure 20. 3300 B.P. to present, channel migration, minimal deposition, Late Archaic and Late Prehistoric use of the area.

In recent times, a veneer of sediments covered part of the previous deposits, and may contain Late Prehistoric and Historic features (Nordt 2007). In addition, historic use of the area has altered some of the landforms and fluvial geomorphology. Artificial damming of the Springs has created Spring Lake and widened the end of the Sink Creek channel. The use of the area as a tourist destination has disturbed some of the upper deposits, removed or relocated deposits, and has covered some of the deposits with impermeable surfaces.

Post-Depositional Processes

The wary observer should be aware of the regional sedimentation and pedogenesis trends, and try and correlate them to the local trends at a given site. Some, all, or none of these general trends may be apparent, and levels of sedimentation, pedogenesis, and erosion vary through the landscape. Special care should be given to identify potential turbation events that would decrease the site's integrity.

Using the available data, seven generalizations can be made regarding depositional, post-depositional, and site processes in the area. First, the clayey nature of these deposits may have affected the vertical position of artifacts on the Edwards Plateau as much as 20-30cm as they float and sink within the matrix (Waters 1992; Nickels 2000; Nickels et al. 2007). Second, east of the Edwards Plateau and on the Blackland Prairie, where vertical cracking and soil-mobility can cause mixing as much as two meters in depth, extreme caution should be expressed in determining site integrity; the presence of slickenslides and/or gilgai microrelief may indicate such mixing (Duffield 1970; Collins 1995). Third, the alluvial nature of the sedimentation, and the tendency of the local waterways in the Late Holocene to cut away at their banks, cut and fill temporary chutes, and drift in location across the river valley will severely affect preservation and location of sites (Blum et al. 1994; Collins 1995). This will affect site depth and presence, and may skew results regarding actual site placement, especially at sites suspiciously larger and more numerous on the non-depositional side of a river (Collins 1995). Fourth, prehistoric anthropogenic activity, historic anthropogenic activity, and pedoturbation need to be recognized as potentially severe site modifiers, and feasible precautions in excavation and observation should be made to recognize these disturbances (Collins 1995; Goldberg and Macphail 2005). Fifth, in hilly areas or areas of tectonic lift, bluffs and colluvial sediments may bury and/or mix deposits (Collins and Holliday 1985; Collins 1991; Collins 1995). Sixth, minor seismic activity, up to magnitude five on the

Richter scale, has been known to occur in the area (Osmond 1963; Davis et al. 1989; Collins 1995). Based on seismic activity in other areas, this may have influenced anthropogenic activity, degraded rockshelters and blufflines, produced soil liquification or ejection events in alluvial soils, and the alteration of the flow of water (Schumm 1977; E. Collins et al. 1980; E. Collins 1982; Talwani and Cox 1985; Rapp 1986; Collins 1991; Collins 1995). And seventh, it is possible that a landform surface that has been exposed and accumulating evidence of anthropogenic activity for a while can be quickly covered, causing pene-contemporaneity of temporally disparate artifacts (Collins 1995).

Keep in mind that these processes may not be readily apparent until that field observations are compiled long after field and lab work are finished. Also, it has been noted that deep riverine deposits on the Edwards Plateau and deep sandy-loam deposits on the Blackland Prairie have been identified as the local areas most likely to contain well-preserved and well-stratified cultural deposits within the Blanco and San Marcos River basin (Collins 1995; Ringstaff 2000).

Summary of Geomorphological Investigations at Sites near 41HY160

In 1995, Collins illustrated the known pedogenic activity at several Central Texas sites (refer to Chapter Two, Paleo Pedogenic Activity), and related this to known site integrity (Figure 21).

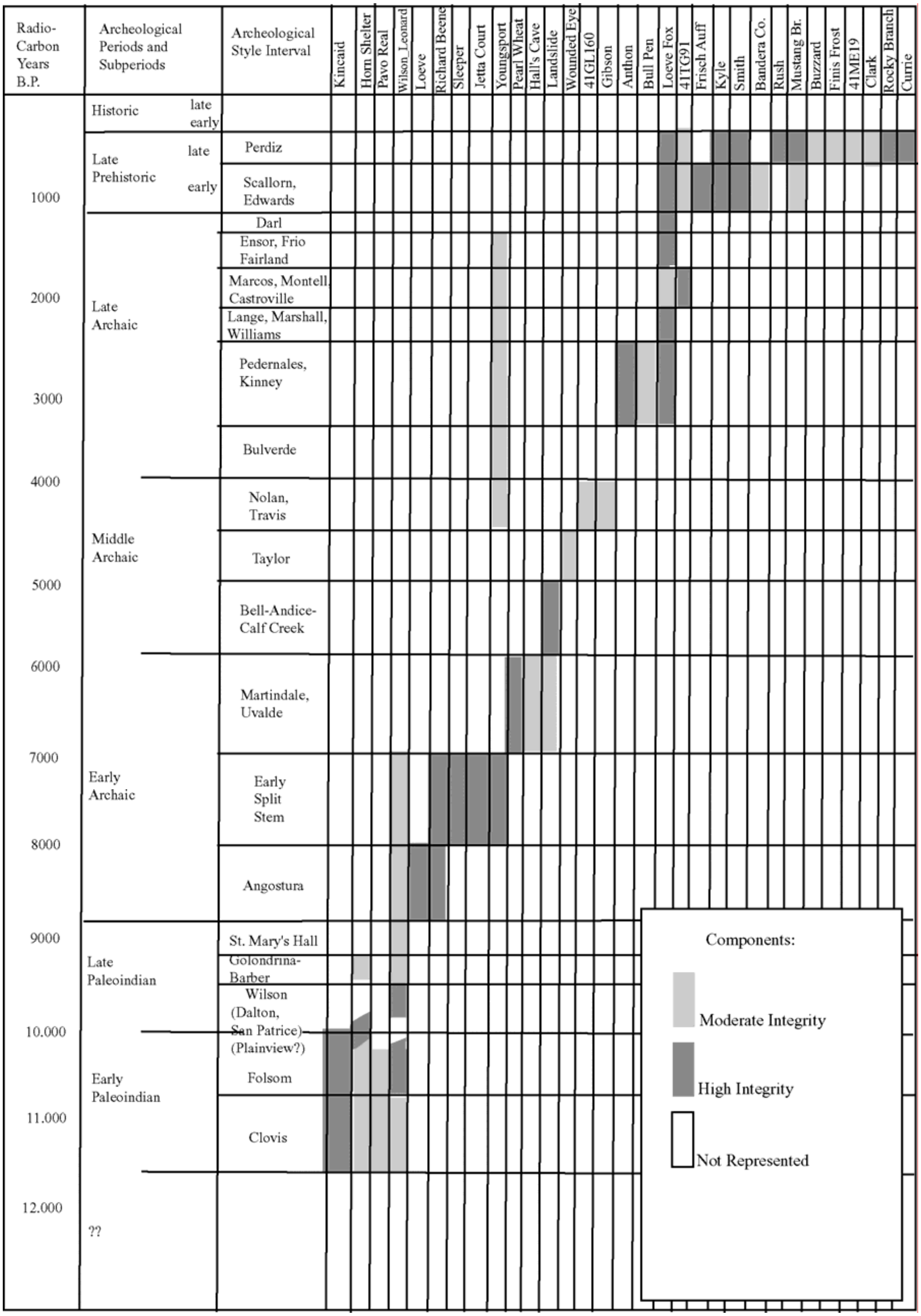

Figure 21. A review of site integrity and associated cultural units across Central Texas. Adapted from Collins, 1995.

It should be evident that the highest site integrity exists for the time period associated with the Early Paleoindian, Early Archaic, and Late Prehistoric cultural periods. This is followed by the time periods associated with Late Paleoindian and Late Archaic cultural periods. Deposits associated with Middle Archaic cultural deposits, it seems, exhibit the lowest site integrity.

There exist a few geomorphological investigations in areas in Hays County near site 41HY160, and these can be used to determine how the area around site 41HY160 relates to the general geomorphology exhibited in Central Texas. These include Ringstaff's (2000) investigation at 41HY165, and Nordt's investigations around in Sink Creek valley around 41HY160 (Nordt 2007).

41HY165. Christopher Ringstaff analyzed the geoarchaeology of site 41HY165 for his master's thesis at Texas State. This site, located at the inundated confluence of Sink Creek and the San Marcos River on the southern shore of Spring Lake, sits on a point bar between two alluvial terraces, the terraces of Sink Creek and Spring Lake. The profile here revealed three major soil units.

The shallowest unit, Unit Three, consisted of one or two parts depending on location. The upper fifteen centimeters consisted of historic fill gravel, thin humic soil, and an abrupt boundary with the lower portion of the unit (Ringstaff 2000). The lower portion of Unit Three was 35cm at its thickest, consisted of silty clay loam, a clear smooth boundary with Unit Two, and soil formation allowed by slow aggradation. The cultural material associated with unit three consisted of historic debris and projectile points associated with Late Prehistoric, Transitional Archaic, and Late Archaic cultural periods. Bison teeth were associated with late Late Archaic and Transitional Archaic materials (Ringstaff 2000).

Unit two is about 40cm thick, silty clay, and shares attributes of both A and B horizons as a buried soil. Cultural materials associated with Unit two include a single Transitional Archaic projectile point, frequent Late Archaic points, and one Middle Archaic point. This unit contained the majority of bison material, and a carbon sample from the bottom of the unit dated to 2300 B.P (Ringstaff 2000).

Unit one, the lowest unit and and at least 90cm thick, is composed of silty clay loam, exhibits a buried soil profile, and ends at excavation termination with a C horizon of unaltered alluvial sediment. Cores indicate this C horizon may be as thick as six to nine meters (Ringstaff 2000). Ringstaff noted that the transition between Units one and two was clear and abrupt, and appeared to mark an unconformity. The upper portion of Unit one is associated with Early Archaic and Paleoindian projectile points. This portion also contained a bison bone fragment and tooth (Ringstaff 2000).

41HY160. Lee Nordt conducted extensive analysis of the geomorphology during 2001 phase 1 investigations at 41HY160 (Nordt 2007). His analysis is based on a number of cores he supervised during 2001 (Nordt et al. 2001). Nordt’s analysis of the geomorphology and geoarchaeology of 41HY160 served as the primary source for the geomorphological discussion in this thesis.

CHAPTER 4: SITE DESCRIPTION

Site 41HY160 sits atop an alluvial rise just east of the San Marcos Springs in San Marcos, Texas (Figure 22).

Figure 22. Location of San Marcos, Texas.

Spring Lake is located in San Marcos, Texas (Figure 22). Site 41HY160 lies within the inside of the horseshoe curve. Spring Lake is an active, aquifer-fed spring, damned in the historic period and never known to have gone dry (Brune 1981). Spring Lake has a long, continuous history of use dating back over 12,000 years. (Shiner 1981; Bousman et al. 2007).

The site was first identified by Jim Garber in 1982 as part of Texas State archaeological field schools (Garber et al. 1983). During the first field school, several units were excavated around Tee Box 6, one up to 2.4 meters in depth. This excavation recovered over 35,600 lithic artifacts. These included 504 lithic tools and 53 projectile points. The projectile points identified are characteristic of the Late Prehistoric, Transitional Archaic, Late Archaic, early Late Archaic, Middle Archaic, and Early Archaic cultural intervals (Bousman 2007). In addition to lithic artifacts, faunal remains of bison, deer, and antelope were recovered. Recorded during the excavation were thirteen features including burned rock middens, hearths, a trashpit, a posthole, and a special activity area possibly used for ceramic production. Field schools were held in the vicinity of 41HY160 at the rate of two summer sessions per year between 1982 and 1985, but the results have not been analyzed (Garber personal communication 2007). Additional field schools were conducted by by David Driver in 1991 and by Kathy Brown in 1998 (Bousman 2007); in addition, in 1997 a shovel test pedestrian survey was conducted by Dawn Ramsey (1997).

The next phase in the history of research at 41HY160 was coring conducted in 1999 as part of a geoarchaeological assessment prior to Phase 1 testing in 2001. This work was conducted by Prewitt & Associates and consisted of 17 nine-meter cores in the river valley to investigate the late Quaternary geological history of the area; a description of this coring is located in Chapter 3. These cores revealed the general nature of the surrounding area. A schematic geological cross section, originally referenced in Chapter 3, can be used to illustrate the variations in presence and depth of identified horizons (Figure 13).

Above the Cretaceous bedrock, there are variable depths of late Pleistocene Alluvium. Above this are early to late Holocene Alluvium and/or Colluvium, depending on location (Nordt 2007). In some areas, there is also fill material, such as an area in front of the historic hotel that used to be a swimming pool. Initial analysis of cultural remains and radiocarbon dates from the cores indicated that there was potential for cultural materials representing all the major prehistoric cultural periods recognized in central Texas, from Paleoindian to Late Prehistoric (Nordt 2007).

Figure 23. Geoarchaeological core drilling. Photo courtesy of CAS.

The third phase in investigations at 41HY160 was in the form of a Phase 1 investigation in 2001 conducted by the Center for Archaeological Studies (CAS) (Bousman et al. 2007). These investigations included mapping, unit excavations, archaeomagnetic sampling, soil susceptibility sampling, geoarchaeological coring (Figure 23), photography, and laboratory analysis (Bousman et al. 2007).

As part of the Phase 1 studies, Nordt (2007) utilized previous cores and newly drilled cores to construct the geomorphology of the site, including sedimentation rates, types, and dates. Using these data and the data of previous archaeological investigations, Bousman (2007) showed that site 41HY160 has "remarkable potential to provide significant new information to the prehistoric record of Texas." This potential is in the form of undisturbed deposits and the potential for inclusion of components of all the major periods in Texas prehistory, although an artificially high water table means that Early Archaic and Paleoindian components may be difficult at best. Bousman and Nickels et al. (2007) proposed several research questions that could be addressed in the testing strategy. These questions were in regard to economy, environment, technology, mobility, habitation structures, and site preservation.

Then, Nickels (2007) analyzed the stratigraphy, chronology, and site formation processes that were able to be interpreted from the recovered data. He points out that argilliturbation and trampling may have impacted the vertical position of artifacts, especially small artifacts. Keeping in mind the alterations these events can cause, Nickels identifies several potential stratified occupation zones, most specifically in Unit 6, the unit that became the base unit for the mitigation excavations conducted in the 2001, 2002, 2003, and 2006 Texas State field schools. Nickels (2007) also conducted soil magnetic susceptibility tests on soil columns from three units. Magnetic susceptibility can be used to separate cultural and natural strata (Gose and Nickles 1998). He found that soil susceptibility and mean flake length followed correlating trends, with the susceptibility peaking just below flake length peaks. Nickels et al. (2007) also identified high value nodes in the vertical distribution of materials, representing volume or intensity of human use. Two of the units had several peaks in this distribution, but a lack of peaks in Unit 6 suggests the area around this unit was used with relative consistency in intensity through time. Nickels also notes a very low amount of material for radiocarbon dating, indicating that relative dating by using stratigraphy and diagnostic artifacts will have to be used to date most of the features and artifacts.

Nickels (2007) also described the cultural features. These consisted of five fire-cracked rock features, one of which was slab-lined. Radiocarbon dating and projectile points associate all five of these features with the Late Archaic. Archaeomagnetic samples from these features appear to indicate that the slab-lined features is likely the only one intact since use, the rest are scattered. Furthermore, vertical schematic representations of the features, along with associated artifacts, appear to indicate that the features may be scatters from different cultural periods sitting on top of one another.

Shaffer (2007) analyzed the vertebrate faunal remains, and Dering (2007) analyzed the archaeobotanical assemblage from the Phase 1 testing of 41HY160. The faunal remains consisted of a sample of 4,388 specimens, and did not include anything unusual or unexpected for the region. The plant remains were in the form of 22 flotation samples and were examined for seed and wood fragments. 15 of the samples were from a core, ranging from 6.6 meters to 8.7 meters below the surface; the other seven samples were from Unit Four. Wood types identified included willow/cottonwood, juniper/cypress, and indeterminate hardwood. In addition, several species of fauna were identified, five of which are considered important in ethnobotanical terms; these are goosefoot, hackberry, grape, prickly pear, and acorn. The archaeobotany of the area appears to indicate the area was occupied periodically during the late spring/early summer and in the late summer/early fall, keeping in mind that some of the identified species can be eaten earlier or later in the growing season.

Finally, the Phase 1 investigations uncovered a number of stone tools (Nickels and Barrera et al. 2007). Of the 18,378 chipped stone artifacts, there were 18 projectile points, 82 bifaces, 213 unifaces, 19 cores, and 18,046 unmodified debitage. In addition, three groundstone pieces were identified, a limestone metate recycled as a hearthstone, a limestone mano fragment, and a complete quartzite hammerstone.

The fourth and current stage of investigation at site 41HY160 began shortly after the Phase 1 investigations. This stage has been a mitigation investigation taking place in 2001, 2002, 2003, and 2006. The results of this stage of investigation are the source of the presented research and analysis. The investigation block utilized in this thesis is located next to the Texas River Center parking lot in an area known as the Pecan Grove, uphill from Spring Lake. The test units focused on an area determined to have excellent potential for encountering stratified cultural components.

CHAPTER 5: RESEARCH PERSPECTIVE

"If lithic technological studies are to continue to contribute useful information toward human pre-historic behavior and evolution, we must investigate how and why technology has benefited humans in the past." (Bousman 1993)

Lithics artifacts are one of the best preserved artifacts in the archaeological record. Indeed, lithic artifacts compose the most abundant form of prehistoric artifact. (Andrefsky 2005). Therefore, it should be no surprise that during the data recovery project at 41HY160, the most abundant artifacts encountered in this chert-rich area were made from lithic materials. The proposed research perspective for this report, the organization of lithic technology amongst Archaic hunter-gatherers at a single site in Central Texas, utilizes this material to investigate the progression of human life pathways around the San Marcos Springs.

Organization of Technology

Stone tools and technology are recognized as dynamic implements in prehistoric cultural systems (Binford 1979; Koldehoff 1987; Kelly 1988; Carr 1994). Essentially, technological organization may be a measure of risk and cost, usually applied to hunter-gatherer societies. Amongst other factors, the manner and nature of the tools a group uses, in conjunction with resource and food abundance data, can be used to predict method of hunting, seasonal patterning, and mobility in extant cultures; these factors can then be applied to the remnants of hunter-gatherer technology in the archaeological record (Torrence 1989; Bousman 1993; Bamforth and Bleed 1997). In this chapter, the organization of technology will be discussed in terms of history, theory and approach, and how it will be applied at 41HY160.

Theoretical Background

In the 1980s and early 90s, many archaeologists experimented with organization of technology applications, with varying degrees of reproducibility in the results (Carr 1994). The overarching difficulty with many of these studies was producing useful, repeatable models and realistic expectations of the archaeological record. However, through time the usefulness and limitations of organization of technology models began to become clearer. Theories based on ethnographic comparisons to archaeological assemblages regarding organization of mobility, risk managment, and technology begin to follow clear, more repeatable pathways.

Evolution of Theory. In 1960, R.J. Braidwood used an example from Near East Mousterian and Neolithic archaeological sites to try and explain how the transition from hunter-gatherers to settled villagers did not occur in defined stages, but rather along a continuum based on technology and mobility (Braidwood 1960). Braidwood identified two different stages of hunter-gatherer mobility, and labeled the stages as “gathering” and “collecting.” These stages are a progression of variables, where gathering people became collecting people, and collecting people became settled villagers (Braidwood 1960). The gathering stage would be characterized by varying degrees of wandering and hunting, while the collecting phase was an increase in selective and intensified activities characterized by seasonal patterns and restricted wandering (Braidwood 1960). Braidwood identified a reduction in mobility in the archaeological record between Mousterian and early blade cultures, and this transition was accompanied by a "tantalizing" transition in technology to a blade-based lithic technology (Braidwood 1960).

In a 1966 article, Lewis and Sally Binford elaborated upon this by providing more examples of Mousterian and Aurignacian assemblages, and suggested that subsistence and technological changes are more likely to occur in ecological transition areas and are transmitted rapidly over a region; they also linked functional technological and subsistence changes in the archaeological record to environmental change. They argue that the different "types" of Mousterian assemblage could be classified by their unique technologies and bound by their shared technologies; they also used a series of Cartesian graphing method to support their speculations of how the shared and different technologies function in relation to one another, as well as how they are a functional response to environmental and social factors (Binford and Binford 1966).

In 1973, Binford defended his position, introduced the idea of curation as a factor in technological organization, and introduced ethnographic studies as a source on which to base organization theories in order to give them stronger validity (Binford 1973). He did this by presenting data regarding his observations of the Nunamiut Eskimo and Carmel White and Nicholas Peterson's 1969 observations of Australian Aborigines (Binford 1973). Among these observations, Binford noted that some tools were expedient and some were curated. Expedient tools took little time to make, were used for a short period of time, and were typically used within close proximity of where they were made. Curated tools, on the other hand, take a longer time to make, are stored or carried from the point of manufacture for future use in an activity, potentially a specific activity, and are made with a greater degree of care and detail than expedient tools (Binford 1973). Binford notes that both the Nunamiut and the Eskimo have curated and expedient tools, and their technologies are highly efficient systems based on the environments in which the cultures are located. Binford also remarks on a manner in which this strategy of curated and expedient tools can be applied to archaeological sites in the New World; namely that different cultural traditions may exhibit different technological organizations in regards to the degree of expedient manufacture compared to the degree of investment in an archaeological assemblage (Binford 1973).

By the time of his 1979 and 1980 articles, Binford had added an example from Kalahari San ethnographies; he had also begun to associate technological organization with settlement systems, and had defined a continuum of hunter-gatherer mobility (Binford 1979, 1980). It is within this definition of a hunter-gatherer mobility continuum that most of the research into the organization of technology has been conducted, especially mobility (Binford 1979, 1980). Binford identified the San as highly mobile foragers, with high residential mobility and low logistical mobility; he identified the Nunamiut as minimally mobile collectors, with low residential mobility and high logistic mobility (Binford 1979, 1980). Residential mobility can be defined as the frequency of translocation of residences and destinations. Logistic mobility can be defined as movement of task groups. Keeping in mind that these mobility definitions, forager and collector, are points along a continuum, the basic features of forager and collector were defined in these articles and will be discussed in detail later in this chapter.

In the 1980s and 1990s, organization of technology research expanded. Nelson (1991) provided a manner of dividing organization of technology research into five levels of analysis, all grouped under the notion of strategies for the reduction of risk (Weissner 1982, 1983; Torrence 1983); these levels of analysis are outlined in figure 24. It is under this outline that the history of technological organization research will be configured.

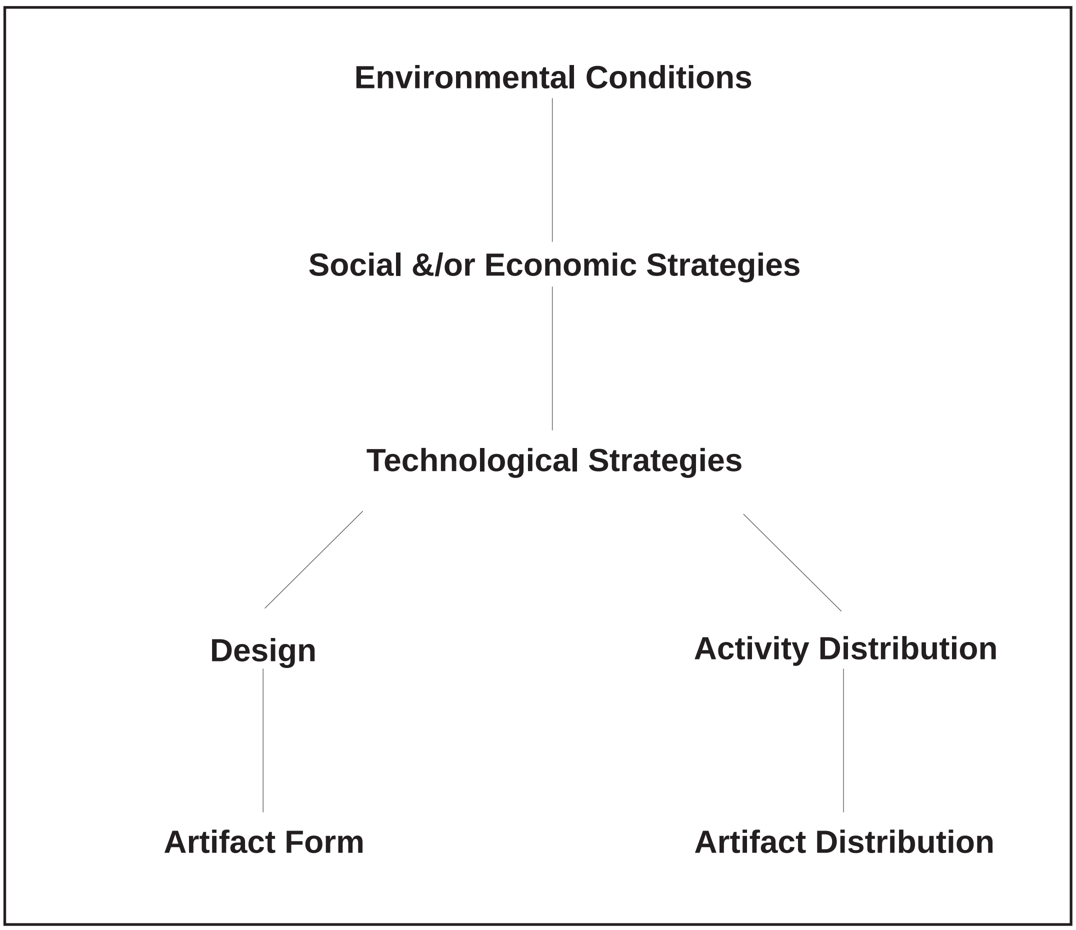

Figure 24. Flow chart describing levels of study in technological organization, adapted from Nelson 1991.

The most general level is environmental conditions and involves size and patchiness of resource areas, potential hazards, and resource predictability, distribution, periodicity, productivity, and mobility (Nelson 1991). Technological organization at this level comprises human responses to the natural environment, and, as such, is included in most research about the organization of technology. In addition to Binford's research, there exists other research of note in this arena. Bamforth (1986) studied technological efficiency, and included raw material resource availability. Bamforth argues that the nature and distribution of raw materials play a critical role in technological organization; regional geological conditions need to be accounted for in the study of technological organization. Bleed's (1986) research on the design of hunting tools included optimality based on environmental conditions. Although the focus of the article is about the design alternatives that may optimize an organizational system, Bleed notes that methods of organization are designed around the natural environment and the raw materials come from the natural environment. Gamble's (1986) study of the Paleolithic settlements of Europe discussed environmental conditions as an important component of settlement systems. Other research includes Torrence's (1983) analysis of hunter-gatherer economy, Shott's (1986) examination of ethnographic settlement systems, and Kelly's (1988) study of temporary changes in organization based on short term occupations of a resource-poor region. Settlement systems, theories of why and how humans move about the landscape, are also components of this general level. An example of technological organization studies that discuss settlement systems are two by Torrence (1983, 1989).

The second level is social and economic strategies, which includes how hunter-gatherer socioeconomic organization adapts to the environment. At this level lay the bulk of optimality and foraging theories, social organization and exchange, and settlement systems/human patterns of mobility. This level is more directly evident in the ethnographic record than the archaeological record, and links technological strategies to responses to environmental conditions (Nelson 1991).

Optimality and foraging models, originally developed for non-human foragers (McArthur and Pianka 1966; Charnov 1976), provide a systematic framework in which to analyze human foraging. These models break down activities by cost, measured in energy and time expended, handling activities, technological production, and transportation of tools and materials (Carlson 1979; Wilmsen and Durham 1988; Bleed 1986; Shott 1986; Torrence 1983; Kelly 1988; Smith 1991).

Along this same line, some researchers have utilized optimality and foraging models as a means to address adaptation of social strategies, organization, and exchange to the environment. These studies seek out the environmental variables that may have affected both social and technological organization in humans, and to seek out how the social and technological aspects may have been adapted to the environment (Jochim 1979; Orlove 1980; Winterhalder 1983; Smith 1983; Foley 1985; Clark 1987; Morrow 1987; McAnany 1989).

Last included in this level are settlements systems; settlement systems and human mobility patterns address how humans move about the landscape in order to utilize resources (Binford 1980; Kelly 1983). Some of the early work that was done in this area include Bettinger (1977), Thomas (1983), Torrence (1983), and Kelly (1986).

All of this, in turn, comes into play in the archaeological record as technological strategies, the technologies humans use to utilize the environment. Foremost of the theories in this level is reduction of risk. First clearly stated by Wiessner (1982), most organization of technology studies are really a study of how humans cope with risk. As Bleed (1986) put it, "Technology [is society's] customary means of manipulating the physical environment." In other words, humans use technology as a coping mechanism to reduce their risk within their environment. The most complete studies to date of how technological organization is shaped by reduction of risk are Torrence (1989), Bousman (1993), and Bamforth and Bleed (1997). These three studies will be discussed in more detail later in this chapter. Other studies in the technological strategies level include studies on how social organization responds to risk (Wiessner 1983), and specific aspects of technological organization and how they apply to certain aspects of coping with risk.

The levels below technological strategies split into two paths, headed by design and activity distribution. Design involves the idea of form; artifact form is the physical manifestation in the archaeological record of this idea. Similarly, artifact distribution is the physical manifestation of activity distribution in the archaeological record. It is at this level that most archaeological investigations of the organization of technology are based; they frequently include or allude to the other levels, but it is here that the meat of the discussions takes place.

Design includes how the ideas of reliability, maintainability, transportability, flexibility, and versatility are manifested in tool form. Artifact form is the actual physical manifestation of design (Nelson 1991). Studies of design are common in most studies regarding the organization of technology, from Binford (1979), Bleed (1986), Shott (1986), and Bamforth (1986) to Kuhn (1989), Torrence (1989), Bousman (1993), and this thesis.

Activity distribution is the manner of describing how evidence of activity areas within a site is distributed and how activity-specific sites are distributed. Artifact distribution is the physical manifestation of activity distribution (Torrence 1991). For example, residential campsites will have a different activity distribution than a hunting camp or lithic procurement site. Some of the studies regarding activity distribution include Kelly (1986), Bleed (1986), and Bamforth (1991).

It is from these roots that the theory of organization of technology has grown and continues to grow.

Nature of Ethnographic Record. The ethnographic record for hunter-gatherers is rather scant. Some records exist for at least 168 cultures (Murdock and Morrow 1970, Binford 1980) and can be used for comparisons on some, though not all, of the outlined parameters. The fullest records are available for the Kalahari San, northern North American tribes, and to a lesser extent Australian Aboriginees. Although records are available to some extent for the /Gwi, !Kung, !Xo, and Nharo of the Kalahari San, most of the ethnographic studies used in organization of technology reference the !Kung (Yellen 1977; Lee 1979; Binford 1980; Wiessner 1983). Similarly, the far northern North American tribes typically referenced are the Nunamiut and Ingalik (Binford 1979, Binford 1980, Shott 1989, Osgood 1940). Finally, the groups of Australian Aborigines referenced include the Pitjantjatjara , the Ngatatjara, the Walpiri, the Pintupi, the Pinubi, and the Alyawara (Brokensha 1975; Hayden 1977; Gould 1980; O'Connel 1987).

Most examinations of organization of technology focus on the San and Eskimo/ Inuits (Binford 1980, Carr 1994). Not only are some of these cultures the ones originally incorporated into Binford's (1979) initiation determination of technology as a key component of organization and formation processes, but data on these cultures is relatively abundant compared to other recorded cultures. There likely exists enough detail in the reports of other hunter-gatherer cultures, such as early accounts of native

North Americans, but this will require an intensive ethnography review outside the purview of this report.

The archaeological pertinence of these ethnographies lay within the records of discard. Archaeologically, the remains of lithic tools and evidence of lithic tool making compose the most visible evidence of technological organization of discarded items (Bousman 1993), so the differences in the discard patterns of cultures which organize their technology differently play a key role in understanding the organization of prehistoric cultures.

Mobility and Reduction of Risk. Differential residential and logistic mobility in hunter-gatherer societies can be viewed as a response to risk (Binford 1979; Weissner 1982, 1983; Bousman 1993). As described in the ethnographic literature, these differences in residential and logistic mobility should produce different artifact assemblages and distribution, and will be discussed in greater detail later in this chapter. Binford (1979) described mobility of hunter-gatherers along a continuum, with "foragers" having high residential and low logistic mobility, and "collectors" the opposite. Since it is a continuum, cultures can be described in relation to each as being more forager or more collector. There are also non-accidental temporary shifts in both aspects of mobility, due to temporary social or environmental influence, where traditional foraging groups take on aspects of collector organization, and vice versa (Weissner 1983; Bousman 1993).

On the forager end of the mobility continuum lay the Kalahari San. At this end of the spectrum, groups are expected to be small and exploit an extended foraging radius on a seasonal pathway. The forager residential mobility organization strategy moves the residential camp to resource locations and brings resources back to camp for processing in order to utilize the resource (Binford 1979, 1980). This end of the spectrum also predicts groups will produce expedient, general use, and maintainable tools (Bleed 1986). The assemblage of a forager site may include a number expedient tools, such as utilized flakes and quickly made bifaces; general use tools that have a form that can be utilized for multiple purposes, such as hafted late stage bifaces that could function as a knife and a dart point without alteration of form; and maintainable tools, such as tools that bear the scars of being resharpened multiple times, possibly to exhaustion (Bleed 1986; Torrence 1989; Bousman 1993; Bamforth and Bleed 1997). The general use nature of the forager assemblage should be expected to produce a relatively general assemblage (Torrence 1989; Bousman 1993; Bamforth and Bleed 1997). The nature of the residential and logistic mobility of foragers is likely a way to cope with the risk involved with resources that are wide ranging and erratic in available, as well as a relatively less predictable environment (Bousman 1993).

On the collector end of the mobility continuum lays the Nunamiut and Ingalik. Collectors tend to stay longer at residential sites than foragers, and “map onto” resources through residential moves, following a fairly predictable course through the year and returning to predictable resources year after year (Binford 1979, 1980). Collector residential organization strategy involves organizing task groups that can cover greater distances than an entire residential group could, to exploit resources, frequently in bulk, and to bring these resources back to the residential camp (Binford 1979, 1980). The collector assemblage may contain reliable tools, such as over-designed tools with multiple backup features like the Angmasalik toggle-headed seal harpoon (Oswalt 1976);

diverse tools, such as an assemblage with multiple specialized tool forms; and specialized tools such as the seal harpoon or wide, thin projectile points that may not stand up well to being used as a knife to cut grass (Bleed 1986; Torrence 1989; Bousman 1993; Bamforth and Bleed 1997). Collector assemblages may also include caches of finished tools, moderate to minimal amounts of resharpening of formal tools, and obvious recycling of tools (Bleed 1986; Torrence 1989; Bousman 1993; Bamforth and Bleed 1997). The specialized nature of the collector assemblage should be expected to produce a diverse assemblage (Torrence 1989; Bousman 1993; Bamforth and Bleed 1997). The nature of the residential and logistic mobility of collectors is likely a way to cope with resources with a high risk of failure to obtain them and/or when resources can be obtained in large packages or exploited in bulk; in addition, the degree of advanced planning required to create tools that respond to these factors may also indicate an expectation of reliable resources (Bousman 1993).

Organization of Technology Studies in Central Texas

Central Texas is an area roughly outlined by the Edward's Plateau to the south and east, the Llano Estacado to the north, and the Stockton Plateau to the west (Weir 1976; Prewitt 1981). For the purposes of this report, only the Archaic cultural period (8800 B.P.-1200 B.P.) will be examined. The Central Texas area was home to a number of hunter-gatherers throughout prehistory (Weir 1976; Collins 1995), and a few organization of technology studies have been conducted in the region. A sample of these is described here.

Wilson-Leonard site

The Wilson-Leonard site is a deeply stratified site along a creek in southwest Williamson county that contains artifacts and deposits from all known prehistoric periods in Central Texas (Collins 1998). At the Wilson-Leonard site, Bousman et al. (2002) onserved patterns that delineate periods of collecting interspersed with periods of foraging between the Early and Late Paleoindian periods. The collecting aspects are obvious enough that, out of context, the materials found in some of the Paleoindian strata might be mistaken for classic Archaic artifacts. This evidence is in the form of stemmed projectile points found stratigraphically between the Early and Late Paleoindian components, burials with offerings, wide range of exploited animals and plants, and evidence for a moderate-sized territory (Bousman et al. 2002). It is hypothesized that this is evidence of social experimentation as a means to deal with a changing environment at the transition between the Pleistocene and the Holocene; the experimental nature is supported by the stemmed point evidence being neither regular nor linear in progression from the Paleoindian to Archaic periods in Texas (Bousman et al. 2002).

Kincaid Shelter

Elsewhere in Central Texas, caches in caves represent a behavioral aspect which may be considered closer to the collector end of the spectrum. These cave caches date to the Early Paleoindian period through the Archaic period. Of special note is Kincaid shelter in Uvalde County (Collins et al. 1988). This cave contains evidence of long and repeated use by humans in Central Texas, in the form of a large variety of artifacts in stratified context (Collins et al. 1988). The Paleoindian period is represented by a number of artifacts, largely in disturbed contexts due to modern activities, and a thick anthropogenic limestone pavement lining the clayey floor of the cave. The pavement has been interpreted as a sign that the occupants may have stayed at the location for an extended period of time (Collins et al. 1988). Even the Paleoindian lithic projectile technology varies here, in the form of a several Paleoindian points in addition to Clovis and Folsom (Collins et al. 1988). It is quite feasible that this site represents a more “collector”-like departure from the very “forager” cultural patterns typically attributed to humans in Pleistocene America; the energy required to execute the pavement indicates either long stays or repeated stays at the same location.

Mission San José y San Miguel de Aguayo

Excavations at Mission San José in the city of San Antonio frequently uncovered lithic tools and manufacturing debris from indigenous inhabitants. Steve Tomka (1999) analyzed this material, compare it to material from other sites in from Central Texas and North America. He noted that the abundance of quality chert for stone tools and episodic bison presence appear to be strong influences on Central Texas tool assemblages. The influence of bison presence is specifically outlined during the Late Archaic and Historic periods, where bison presence is accompanied by an increase in bifacial knives and hafted end scrapers.

Tomka (1999) first discusses the presence of bison in association with prehistoric cultural assemblages throughout Central Texas. Tomka (1999) notes that processing experiments with large animals indicates that bifacial and hafted tools are easier to manipulate over a long period of time and less likely to break than utilized flakes or a cobble with a hastily sharpened edge (Elliott and Anderson 1974; Jones 1980; Odell 1980). What this means for analysis of technological organization in Central Teas is that a direct ratio of expedient to formal tools to determine relative logistic mobility in a given area, as suggested by Parry and Kelly (1987), cannot be used successfully unmodified, but must incorporate the presence of bison as a modifier (Tomka 1999).

Tomka (1999) continued his examination of technological organization with a discussion of Mission Indians. Within the missions, Tomka (1999) notes that at missions that regularly provided domestic livestock meat to the indigenous people living within it, such as Mission San José, expedient tools made up the majority of the lithic tool assemblage. Lithic tool assemblages at missions that provided meat less regularly, such as the Alamo, had a higher degree of biface thinning flakes, indicating a somewhat less expedient technology. Tomka (1999) concludes that the relatively sedentary Mission Indians at both missions had similar residential mobility, and thus the differences in technology were determined by processing requirements. Tomka fails to mention the resource procurement strategies of the Mission Indians at the Alamo; if resource procurement groups left to obtain resources, a similar strategy to collectors, this aspect of mobility should play a role in technological organization.

Anthon Site

Glenn Goode (2002) examined the Anthon Site, a campsite in Uvalde County on a terrace of the Nueces River, and its lithic materials. Though tools from the Late Archaic through the Late Prehistoric were present, he focused his analysis on the earliest part of the Late Archaic, specifically Pedernales and Kinney projectile points. This analysis focused on use-wear. Goode (2002) found that the Pedernales points showed evidence of being used as projectile points, but the Kinney points appeared to have been mostly used as knives. Goode (2002) also noted that the similarities between the style and production of these two points suggest they were created by the same cultural tradition. Goode (2002) supports this model with a regional quantification of Pedernales and Kinney points, which determined they are found together in large numbers in the Edwards Plateau and the South Texas Plains natural regions. Goode concluded that these two points are likely complimentary tools in a lithic toolkit (Goode 2002).

Elsewhere in Texas

Plainview Site and Levi Rockshelter. Bousman (1993) gives a preliminary assessment of technological organization using resharpening as criteria by comparing Paleoindian projectile points from Plainview site, on the Llano Estacado, to Levi Rockshelter in Central Texas. The points from Plainview are resharpened nearly to the point of exhaustion, whereas the Angostura points from the Levi Rockshelter were largely unsharpened, likely due to a design with a tendency to be broken by impact snaps (Bousman 1993). The Angostura points were also much thinner and exhibited finer flaking than Plainview. A preliminary analysis deemed the Angostura points as having more potential residual utility when discarded than the Plainview points. Differential availability of materials may have played a part in the differences between the two sites, so only a preliminary diagnosis of forager style technology of the Plainview points and a collector style technology of the Angostura points were determined Bousman (1993).

Site 41MM340. Site 41MM340 is a Late Archaic site along Little River in Milam County, east of the Edwards Plateau (Mauldin et al. 2003). Three aspects of lithic technological organization were investigated at this site (Tomka 2003). These are the investigation of the variability in Pedernales projectile point stems, changes in mobility based on raw material and tool characteristics, and evidence for collector-style gearing up behavior.

An analysis of Pedernales point bases from the site, the region, and eastern Central Texas showed that some regional differences in the style of stem form exist, but the general manufacturing strategy appears to be rather homogenous; this may reflect regional variability in style within the same technology, or regional variability in analyst classification (Tomka 2003).

The other two aspects referred to mobility. In this study, Tomka (2003) renews his debate (Tomka 1999, 2001) of Parry and Kelly's (1987) theory that, when raw material availability is removed as a variable, such as at a single site through time, that the ratio of expedient to formal tools indicated relative mobility. Tomka's (1999, 2001) first argument is that tool form is more conditioned by processing requirements than mobility. At this site, most tools exhibit extensive reworking. Additionally, the ratio of expedient to formal tools, excluding projectile points, varies from 1.3:1 to 14.7:1. This variability is interpreted as most activities conducted on site could be accomplished with expedient tools, and that the deeper levels, exhibiting higher ratios, were likely brief occupation episodes resulting in fewer discarded formal tools (Tomka 2003). Tomka (2003) also found that the ratio of projectile points to other formal tools paralleled the ratio of expedient to formal tools, possibly suggesting that the earlier occupations were primarily hunting/weapon refurbishing occupations.

Tomka (2003) also used a formula assuming that all manufacturing failure bifaces were projectile point manufacture failures, and a ratio of biface manufacturing failures to discarded points results in a failure rate of 50% during the course of occupation at the site. Using this method, Tomka (2003) determined that two of the identified analytic units showed a greater level of gearing up, an aspect of collector organization, than the others, by means of a higher manufacturing failure biface to discarded projectile point ratio. Tomka (2003) also noted that, although most of the discarded points were broken or exhausted, several were not exhausted and may indicate a replacement before failure strategy.

The Lino Site. Located in South Texas, the Lino site is a stratified Late Archaic campsite on a terrace of the San Idelfonzo Creek in Webb County. Among the research perspectives of this investigation was an examination of lithic resource procurement as a part of technological organization (Quigg et al. 2000). In this study, a collection of locally available cobbles were analyzed for material variability, color, texture, and size. This, in turn will be compared to the material type, color, texture, and size of lithic tools and debris at the site. Additionally, the levels of processing at the site were to be noted, from traces of initial testing and reduction to final finish work (Quigg et al. 2000). This study found that under macroscopic analysis, less than 1% of the material at the site could not be clearly defined as local; everything else could be identified as local in origin (Quigg et al. 2000).

The examination continued with ultraviolet light to test differentiation in material fluorescence. The UV examination showed that, although under normal light the local material was similar to Edwards chert from Central Texas, it fluoresced differently, adding weight to the determination of local material (Quigg et al. 2000). Overall, the UV examination showed that the debitage was of local origin, and the discarded tools were of a material from upstream in the nearby Rio Grande River (Quigg et al. 2000). As for the levels of reduction being conducted at the site, it was concluded that it exhibited little variation (Quigg et al. 2000).

The lithic tools and manufacturing debris showed that general knapping tasks were conducted throughout all occupations, and biface reduction from early to late stages occurred during all periods save the oldest components. The oldest two components had less evidence for late stage bifaces than the more recent components (Quigg et al. 2000). The authors also note that the Tortugas and Matamoros points were of variable size, and attributed this to extensive resharpening, on the other hand, the Refugio points were of a more consistent size, attributed to relatively less resharpening (Quigg et al. 2000). The

Texas Central Gulf Coast. Ricklis and Cox (1993) examined hunter-gatherer lithic technology in the Texas central Gulf Coast. They found that, with increased distance from procurement site, three technological organization strategies are visible in the archaeological record that may have been a means to cope with this distance.

First, they found that a ratio of a higher number of flake to tools existed nearer the lithic procurement source (Ricklis and Cox 1993). A higher ratio of flakes to tools may indicate the relative cost associated with lithics, and may represent the production of new tools; this is important because collector tool assemblages are generally more “costly” to produce than forager tool assemblages (Bleed 1986).

Second, they discovered that the type of flakes indicated a decrease in primary reduction and an increase in edge rejuvenation the further a site was from a lithic procurement site. This was done by separating the flakes into primary, secondary, tertiary, and biface-thinning flakes and then quantifying those categories for each site.

Third, they discovered that the number of utilized flakes increased and average flake length decreased with increased distance from a lithic procurement site (Ricklis and Cox 1993); this is important because the depositors of the site materials show signs of similar mobility, so the variation in technology may be a strategy for coping with a reduction in lithic resource availability. Additionally, they found that the average length of Perdiz arrow points declined with distance from a lithic procurement site, and this is attributed to the accompanying decrease in flake size on which the arrow points were made. Overall, they identified procurement, transport and reduction of raw material; extended material use life; and material substitution and scavenging as technological strategies employed by the prehistoric hunter-gatherer inhabitants of the Texas central Gulf Coast (Ricklis and Cox 1993).

Bear Creek Shelter. The reinvestigation of the Bear Creek Shelter, located near the banks of the artifically flooded Lake Whitney in Lake Whitney, Texas, included some references to the organization of technology. First, the investigations found no change in essential lithic reduction, here a core and biface technology, when the projectile technology changed from darts to arrows (Lynott, 1978). It also found no evidence of bison hunting economy in the shelter to accompany the transition between Austin and Toyah phases in the Late Prehistoric cultural period; concurrently, there is no change in assemblage technology except for arrow point style (Lynott 1978).

Lithic Technological Organization Analysis at 41HY160

In regards to existing models regarding the organization of technology, there exist a limited number regarding lithics that are directly and wholly applicable to site

41HY160, but aspects of numerous models are applicable. In regards to North America, most of these studies focus on a single cultural unit, such as Paleoindian traditions, especially Folsom. The studies and models that are more useful in examining the organization of technology at 41HY160 are those that examine a single site through time. Of the lithic, non-Paleoindian North American examples, most of the pertinent models applicable to 41HY160 rely on a basic chi-square analysis using the observations "little to no resharpening," or "very resharpened" to gauge level of resharpening, and use raw comparisons of ratios of expedient to formal tools throughout the occupations of a single site.

The examination of lithic tools at 41HY160 will rely heavily on Bleed (1986) Torrence (1989), Bousman (1993), and Bamforth and Bleed (1997). These articles illustrate how to apply technological and optimal foraging models to archaeological data, especially lithics. The recommendations from these articles form the basis for analyzing the organization of lithic technology at 41HY160, augmented with data regarding local resource abundance and the local changes in climate, flora, and fauna.

The overarching question for this research is "How did archaic hunter-gatherers organize their lithic technology at site 41HY160 in central Texas, and how did these strategies change through time?" To answer this question, several other questions must first be answered.

What are the optimality models evident for hunter-gatherers in the ethnographic record, and how do they differ based on mobility?

This question has been addressed in this section already. Basically, hunter-gatherers exist along a continuum of mobility with highly mobile foragers on one end and more sedentary collectors on the other. Foraging groups move frequently, as a group, and exploit resources along a seasonal pathway. Collectors will map onto a landscape and move infrequently, preferring to exploit resources by utilizing specialized resource exploitation groups from a central residential camp (Binford 1979, 1980). It has been suggested, using optimal foraging theory, that these differing pathways are a response to risk and a manner to reduce the probability of loss (Wiessner 1982; Bousman 1993).

How may these models apply to Archaic Central Texas? How might they differ?

These models can be applied to Archaic Central Texas because all evidence points to hunter-gatherer lifeways in this area at this time (Weir 1976; Prewitt 1981; Collins 1995). Such evidence includes the lack of agriculture, lack of permanent habitation structures, and human land-use in historical reports of early contact with indigenous Texans. The major differences will occur because the ethnographic accounts are not from Central Texas, so the resources and environment will be different, and only discard data, limited by preservation, is available from site 41HY160 for comparison to ethnographic data. In general, the aspects of the models that regard resharpening, toolkit diversity, and the relation between perceived time of manufacture and perceived time of use will be applicable.

How will these models be visible in the archaeological record?

The archaeological record does limit which aspects of the models may be applied. The archaeological record includes only the discard, whether purposeful or accidental, of items, and only includes evidence for human behavior, not human behavior itself. To this end, the record of discard in the ethnographic record becomes crucial; it may be related to behaviors and activities, and will be used to inference such, but it is only the discard that can be useful for comparison with the archaeological record.

Further limiting the application of ethnographic models is the level of preservation at site 41HY160; little besides rock and bone were recovered, and the most prolific artifact was rock in the form of lithic tools and manufacturing debris. Maintenance tools may not be readily recognized in this context, but projectile points are easy to recognize and are easily classified as an extractive tool. By this logic, ethnographic models that include extractive tool forms and their discard should be the most pertinent.

Based on ethnographic models, the following Table (1) will be used to identify how these models will be apparent in the archaeological record.

Table 1. Expected aspects of extractive tools for Forager and Collector organization, based on data from Binford 1979, 1980; Bleed 1986; Torrence 1989; Bousman 1993; Bamforth and Bleed 1997.

Aspects	**Foragers**	**Collectors**
Resharpening	Frequent	Infrequent or N/A
Toolkit diversity	Low	High
Style/Specialization	General, Low	Specific, “Excellent”, High
Production time: apparent use life	low	High
Recycling	May not be apparent	Possible, would be apparent

There are three major factors that may cause variability with the study of organization of technology, and these are outlined in Table 2.

Table 2. Factors affecting the aspects used to determine Forager or Collector organization, based on data from Binford 1979, 1980; Bleed 1986; Torrence 1989; Bousman 1993; Bamforth and Bleed 1997.

Factor	**Control**
Raw material durability	Focus on tools of a single material, known to be durable in the area, e.g. chert
Raw material accessibility	Focus on a single area, through time, e.g. 41HY160
"Traditions" in tool manufacture	May not be readily visible in the archaeological record. Could possibly be controlled for by looking for similarities in tool manufacturing throughout the region, outside the region, and in both places through time to see if a change appears to be a reaction to a change in organization or an outside cultural influence.

In using these charts, it is important to keep in mind that mobility data are described as a relationship between cultural units, and not defined categories. In addition, when applied archaeologically it is a description of method of organization, not a direct source of mobility determination.

What lithic tools and aspects of lithic tools will pertain to the models when applied to Archaic Central Texas?

Based on the previous studies in the area of 41HY160, the tool that will most likely be used to determine collector or forager organization will be projectile points. These are clearly recognizable extractive tools, and are expected to occur in relative abundance during the excavation. The tools will be examined to look for measures of reliability, maintainability, and expediency. These measures may not necessarily be directly visible in projectile points, but are assumed from a series of factors.

Reliability is assumed from stylistic “excellence” and/or specialization; reliability in extractive tools is most strongly associated with collector organization (Bleed 1986; Torrence 1989; Bousman 1993; Bamforth and Bleed 1997). In projectile points, this may be represented by specialized forms, such as deep barbs and long, thin blades (Bousman 1993). However, if the assemblage proves to have a wide range of aspects that create a continuum of apparent specialization, this representation may not be useful, and there are not any models that dictate a strong method of determining degree of specialization beyond two categories, more and less. Reliable tools may also be represented by a relative low occurrence of resharpening, because either the specialized form prevents resharpening or the cost of replacement while the point still had a high amount of potential use-life was less risky than the cost of point failure during extract activities (Bousman 1993).

Maintainability is indicated by a form that does not impede maintenance and evidence of maintenance (Bleed 1986; Torrence 1989; Bousman 1993; Bamforth and Bleed 1997). In projectile points this may be represented by features such as increased thickness and fewer specializations like deep barbs (Bousman 1993); it may also be implied by a greater degree of resharpening and/or a greater variety of resharpening degrees in the assemblage (Bleed 1986; Torrence 1989; Bousman 1993; Bamforth and Bleed 1997).

Expedient tools are typically associated with quickly made choppers and utilized flakes and not projectile points (Bleed 1986; Torrence 1989; Bousman 1993; Bamforth and Bleed 1997). Furthermore, no artifact replication experiments by a single operator exist for all of the expected projectile point styles to determine how long it might take to create the different styles.

Additional Questions

From these data, the following questions are asked and found in Chapter 9:

1. Are models based on extant evidence visible at site 41HY160?
2. Can lithic tools at site 41HY160 be designated as maintenance or extractive, and if so, how?
3. Can lithic tools at site 41HY160 be assigned measures of reliability, maintainability, and expediency, and if so, how?
4. What do the optimality models reveal about the mobility patterns discernable in the archaeological record at 41HY160?
5. Does the organization change through time? If so, when, and does it correlate with other changes visible in the archaeological record?
6. What aspects of environment, ecology, and geography evident in the archaeological record might account for these patterns?
7. How do the optimality models apparent at 41HY160 compare to ethnographic models and other North American archaeological models?

CHAPTER 6: METHODOLOGY

The data recovery investigations for site 41HY160 used the methods detailed in this chapter. These are described in three sections: field, laboratory, and analysis. The field methodology details the processes used in the field for data recovery. The laboratory methodology explains how the data and materials were prepared and processed. Finally, the analysis describes how the artifacts were analyzed. Materials from Unit 6, a test unit excavated as part of a separate data recovery project in 2001, were included in the laboratory and analytical treatments.

Field Methodology

Data recovery excavations at site 41HY160 began after a 2001 testing project found the potential for stratified and intact buried deposits at the site. The fieldwork was conducted in June 2001, 2002, 2003, and 2006. The field crew varied between six and thirteen students depending on the field season, for a total of 43 student excavators. In 2001 the crews were supervised by Kat Brown and Britt Bousman, in 2002 and 2003, the crews were supervised by Britt Bousman and employees of the Center for Archaeological Studies, and in 2006 the crew was supervised by Britt Bousman and Deidra Aery Black. The students excavated 41HY160 as part of a field school class through Texas State.

The normal work week consisted of four six hour days and one three hour day. Only manual excavations took place during this phase of investigation at site 41HY160, all within the three by four meter excavation block (Figure 25).

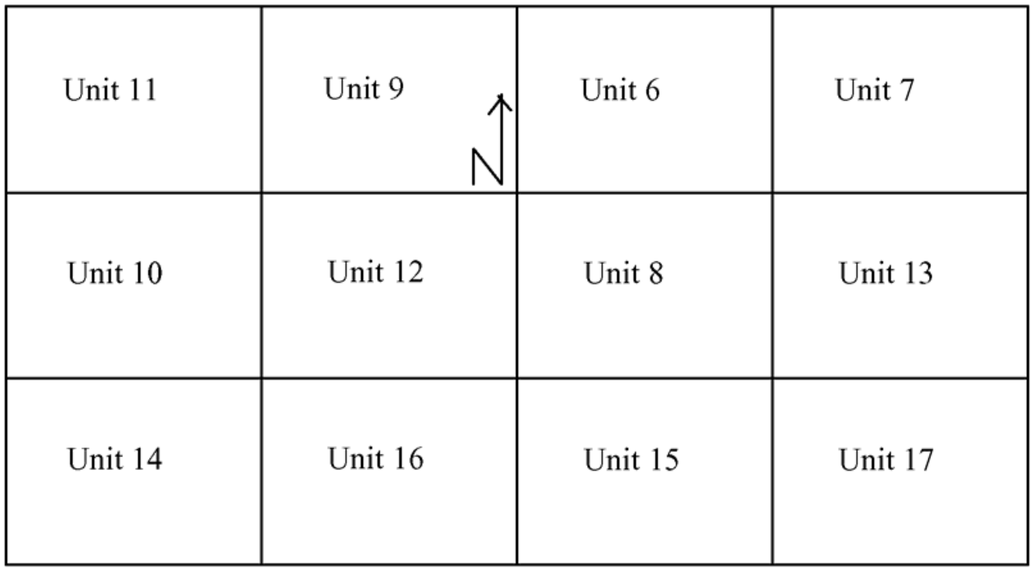

Figure 25. Layout of the 2001-2003, 2006 excavation block.

Excavation: 2001 Field School

Before the 2001 field school, a testing project had identified *in situ* cultural components in three out of six one by one meter units. Of these, Unit 6 was determined to have the most complete and undisturbed sequence, as well as the ability to expand the unit into an excavation block. This unit, located in the pecan grove and next to the parking lot for the Texas River Center, had been excavated to approximately 150cm below surface and yielded abundant and many diagnostic artifacts before excavations extended down to the water table and prompted termination. Unit 6 was to become a portion of the field school excavation block.

Upon initiation of the 2001 field school, excavation units seven, eight, nine, and ten were established (refer to Figure 25) and a datum consisting of a nail hammered into a nearby tree was established near ground level. The excavation of Unit 6 had shown there were no clearly distinct stratigraphic boundaries, only soil horizon boundaries, so the units were excavated in arbitrary ten centimeter levels. This allowed horizontal provenience to be maintained at a one meter squared by ten centimeter level, though most features and diagnostic artifacts were point-provenienced. In order to maintain accuracy throughout the season and through the field seasons, nails were placed in the unit walls at the base of each level and a string and nail grid was maintained on the floor of the block. Also, all students kept detailed daily logs in addition to the field notes, unit/level forms, feature forms, feature logs, et cetera. Ultimately in 2001, Unit 7 was excavated to a depth of 80cmbd, Unit 8 to 80cmbd, Unit 9 to 100cmbd, and Unit 10 to 80cmbd.

A temporary water screening station was established near the field laboratory. All the excavated matrix was water screened through ¼ inch hardware cloth. Due to the clayey nature of the matrix, the material was soaked in water overnight to expedite the screening process. In 2002, an experiment was conducted in which baking soda was added as a deflocculating agent to speed the breakdown of the clay; this experiment demonstrated that soaking in water was as effective as using baking soda as a deflocculating agent. Due to the ineffectiveness of the baking soda and the environmentally sensitive nature of the area, no other attempts at using deflocculating agents were made. The soaking process consisted of filling five gallon buckets two-thirds full with excavated sediment, labeled with the unit and level provenience, and filling the buckets with water within five centimeters of the top. When necessary, the mixture was stirred to aid the water's dissolution of the clay in the matrix. The water for the process of soaking and screening was provided by tapping into water spigots on the grounds of Aquarena Center. This water comes from municipal water supply and was directed by two garden hoses with cut-off spray nozzles attached. In addition, the water screening locations were selected so that water pooled and eventually drained into the underlying terrace without draining directly into Spring Lake. All artifacts recovered from water screening were placed in labeled paper bags; to maintain provenience only one bucket's worth of artifacts were placed in one bag, with the bucket label placed inside the bag. To prevent crushing of delicate artifacts, any recovered fire cracked rock was placed in a secondary bag and a new label created and inserted.

In addition to water screening, the field crew also collected artifacts in direct excavation contexts. Diagnostic artifacts such as large bones and projectile points were point plotted and bagged individually with provenience recorded on the bag. Feature elements such as fire cracked rock were mapped and collected. Carbon samples were collected in foil, piece plotted, and individually labeled. Photos were taken with a 1.6 megapixel Sony Mavica mvc-FD90 digital camera. In addition, the excavation process resulted in a number of forms, including unit/level forms, feature forms, feature logs, carbon sample logs, profile maps, and plan view maps. After the field day was over, the units were covered in tarps and plywood. After the field season was over the units were backfilled with sediment and covered by plywood.

Excavation: 2002 Field School

The 2002 field school added to the base methodology of the 2001 field school. First, the permanent datum was relocated, a nail in the base of a palm tree at the southeast corner of the block. This was used to establish wooden stakes as temporary datum above the eastern and northern walls of the block; the temporary datums on the northern wall, used to measure the western six blocks, were ten centimeters lower in elevation than the one above the eastern wall. In addition, nails were placed in the ground at several locations at ground surface outside the block in order to provide better triangulation as the units became progressively deeper. Finally, 4-mil plastic bags replaced the paper field bags.

In the 2002 field season, students continued excavation on the previously opened units and opened units 11, 12, 13, and 15. At the end of the field season, Unit 7 was at 123cmbd, Unit 8 at 119cmbd, Unit 9 at 114cmbd, Unit 10 at 103cmbd, Unit 11 at 73cmbd, Unit 12 at 82cmbd, Unit 13 at 69cmbd, and Unit 15 at 55cmbd. During this field season, photographs were taken with a 1.6 megapixel Sony Mavica mvc-FD90 digital camera. At the end of the field season, the units were protected by backfilling with sediment and covering the units in tarps and plywood.

Excavation: 2003 Field School

In 2003, the field school added more techniques and opened up the rest of the block. During this season, some of the fire cracked rocks in the features were determined to be large enough to take archaeomagnetic samples. After being mapped, several rocks in each sampled feature were chosen for drilling. Azimuth and dip were recorded and marked for each sample and drilled with a paleomagnetic drill. These were stored in labeled plastic bags separate from the other artifacts. Additionally, photos were taken using a Canon EOS rebelX 35mm camera and Kodak 200speed color film.

At the end of the field season, the eastern six blocks were at approximately 110cmbd and the western six blocks were a 120cmbd. At this time, profiles were drawn of the walls and soil samples were taken from the eastern, southern, and western walls for susceptibility testing. Afterwards, the block was backfilled with sandbags, covered in tarps and plywood, and a small (approximately 25cm tall) wood and wire fence was erected to prevent pedestrians from falling in the depression remaining after the backfill.

Excavation: 2006 Field School

In 2006, the block was reopened for a Texas State University field school. The backfill was removed and a temporary shade structure was erected. In addition, slump caused by settling and rainfall was removed since it decreased the borders of the block by five to ten centimeters on all sides and the bottom. This slump was water screened and labeled as general provenience. Next, the block and ground surface nails were located and replaced with larger nails; these and new “backsighting” nails were mapped in using a total data station (TDS). During the course of excavation and screening the landscape and block were mapped using the TDS. Existing buildings, roads, and excavation units from field schools dating back to the early 1980s were also mapped with the TDS.

During the 2006 field season, most methods remained the same as the previous three seasons, though no features were discovered that were judged eligible for archaeomagnetic sampling. The most marked change from previous seasons was a series of protocols established to get a representative photographic view of the site. First, every morning a progress photo was taken of the block. At the end of each level, a photo was taken of the unit. Photos were also taken of every feature and every piece-plotted artifact. At the end off the field season, photos were taken of all four profiles.

Another change in the 2006 field season was the relocation of the water screening station. It was moved to a depression in a little used area of the Aquarena Center, south of the excavation block and close to water spigots (Figure 26). At the end of the season, the entirety of the block was at 150cmbd. At this point, samples were taken of the identified soil horizons and a profile was made of the east wall. The block protection protocols and end of season backfill remained the same as 2003.

Figure 26. Field school students water screen soil and look for artifacts, 2006 field season.

Laboratory Methodology

All sample and cultural materials recovered during the various 41HY160 field schools were transported daily to the CAS laboratory for processing, sorting, and cataloging.

Washing and Initial Sorting

After each field season, all artifacts, excluding clay, charcoal, and matrix samples, were hand-washed with tap water and toothbrushes (Figure 27). These were then airdried and stored by unit and level in 4-mil plastic bags and labeled with paper labels. Any matrix adhered to burned clay was gently brushed away with a dry, soft toothbrush. After washing, some of the artifacts were initially sort to separate artifact classes. However, a review of these in July 2006 showed this process was incomplete. At this time, all material was resorted into analytical classes within the unit/level designations. All non-lithic artifacts were counted, weighed, and inserted into an artifact catalog in Microsoft® Excel. All lithic materials were separated for further analysis as defined by the research question.

Figure 27. 2003 Field school students wash, dry, and perform an initial sorting of the excavated artifacts.

Non-Lithic Sample Processing

Sediment samples from 2006, and susceptibility and archaeomagnetic samples from 2003 were submitted to further processing. Bones and charcoal were stored for future research.

Matrix samples were taken from within and underneath each feature identified in the 2006 field season. One liter, by volume, of each sample was submitted to flotation at CAS. Each sample was carefully measured and poured into a clean five gallon bucket filled three-quarters full of tap water. This mixture was then stirred with a wooden stake for approximately 30 seconds; stirring was repeated as necessary every three to five minutes to assure all of the matrix was in suspension. After the suspension was allowed to settle for approximately fifteen minutes, a double layer of cheesecloth was used to skim the surface to a depth of ten centimeters below the water's surface to procure the light fraction. Afterwards, the remaining mixture was poured through a 1/8-inch metal sieve to procure the light fraction. The light and heavy fractions were allowed to air-dry on plain brown paper. Also, the bucket and stake were washed between samples to prevent cross-contamination. Samples in excess of one liter were rebagged and labeled for future research. Fraction samples were bagged, labeled, and stored for future research.

Lithic Processing

Lithics were analyzed separately as a key component to the research perspective. First, formal tools and cores were separated from the flakes and shatter. During flake analysis, flakes with obvious retouch or usewear were removed and added to the tools.

When in doubt, usewear was subjected to criteria based on the observations of Bird et al. (2007) on the location of edge damage caused by human activity.

Flakes. Flakes were first divided by material, either the local high-quality Edwards chert or non-local material. Then, they were divided into categories of whole, broken, or shatter. Whole flakes were defined as chippable material with intact platform, termination, and margins; minimal edge damage, such that at least 75% of the margins could be identified, was tolerated in this category. Platforms are the proximal striking surface, terminations are distal tips opposite the platform, and the margins are the outer sides of the flake; the platform, termination, and margins surround the flake faces. Broken flakes were defined as chippable material with at least one attribute of the whole flakes, but not all of them. Shatter was defined as broken chippable material with no identifiable flake attributes, such as platform, termination, force ripples, margins, or bulb of percussion. The shatter and broken flakes were quantified.

The whole flakes were divided into types of blade, notching, biface thinning, burin spall, thermal spall, and normal. Blades are flakes that are at least twice as long as they are wide, with roughly parallel margins; length is the line from platform to the termination, and width is the widest point perpendicular to the length. Notching flakes are lunate flakes that are generally small in size, and in profile have a strong pressure bulb just below the platform. Biface thinning flakes are flakes that have a crushed or lipped platform, diffuse bulb of percussion, and typically a faceted dorsal surface. Burin spall are long, thin flakes with a multi-faceted, ridged dorsal surface, and appear to be the removed edge of a bifaces or unifaces. Thermal spall, the positive of the potlids found on chert, are round or ovoid flakes with no platform; these are not struck flakes, but the result of high heat. Normal flakes are all flakes that do not fit into these categories. The type categorized flakes were divided into three cortex categories of none, 1-25%, and greater than 25%. From here the whole flakes were divided into size categories of less than one centimeter, 1-1.9cm, 2-3.9cm, and 4cm and greater based on length before being quantified. This data was entered into a Microsoft® Excel spreadsheet. At all times, divisions of unit and level were maintained for provenience.

Analysis

Lithic materials that were separated for further analysis include cores, utilized flakes, unifaces, bifaces, and projectile points. During this analysis, Britt Bousman and Elton Prewitt were consulted for verification of results. Each piece of this material was photographed on two sides using an eight megapixel Canon Powershot A630 digital camera with a one centimeter scale. These were then described in regards to general nature, level of finish, and degree of retouch and entered into a Microsoft® Excel spreadsheet (Appendix C). The individual pieces were then bagged separately.

Utilized Flakes

The ventral and dorsal sides of each utilized flake were photographed and the area of use or retouch was noted.

Cores

Two sides of each core were photographed in an attempt to record the entire core. The nature of core reduction and relative size were noted.

Bifaces and Unifaces

The two flat faces of bifaces and unifaces were photographed to show the nature of the tool. If a biface or uniface was determined to be of a "finished" quality, it was converted to a line drawing using Adobe® Photoshop 6 and any resharpending scars were outlined. A finished biface or uniface, as per Andrefsky (2005), Whittaker (1994), and Crabtree (1972), has been heavily thinned to create a uniform, fairly symmetrical tool with small, regular pressure flaking along the working edge(s); projectile points are examples of one category of finished bifaces. This line drawing was then analyzed using ImageJ® software to determine the surface ratio of the whole face to retouch scars and the percent of the perimeter marred by retouch.

Projectile Points

The two flat faces of projectile points were photographed and examined the same as bifaces and unifaces. Type identification were made using the 1999 reprint of A Field Guide to Stone Artifacts of Texas Indians (Hester and Turner 1999), updates from Collins (1995), and personal consultation with Elton Prewitt.

CHAPTER 7: ARTIFACT DESCRIPTIONS

Artifacts recovered from site 41HY160 included both historic and prehistoric artifacts. The historic artifacts are found in and above a gravel layer likely used as a parking lot for Aquarena Center, and the prehistoric artifacts are both stratified below this and mixed in with this. In total, 26,446 non-lithic artifacts, 8,1885 chert flakes, and 278 lithic tools were recovered and analyzed. The lithic artifacts will be discussed in chapter 8.

Historic Artifacts

The artifacts that were easily verifiable as historic included glass, metal, toys, and objects associated with the area's use as a parking lot.

Glass. 20 pieces of glass were recovered within 40cm of the surface (Appendix B). Upon macroscopic visual inspection, the exact nature of most of these fragments is not easily determined; however, the thickness and color of most of the glass resembles beverage bottle glass and tempered vehicle window glass.

Metal. Ninety-six pieces of metal were recovered within the 30cm of the surface. (Appendix B). The bulk of the metal was identified as pull-tabs and push-taps from aluminum beverage cans.

Other Historic Artifacts. There were other historic artifacts found, mostly parking lot gravels and bits of plastic. In total, there were 437 historic artifacts recovered that were not metal or glass (Appendix B).

Non-lithic Prehistoric Artifacts

The greatest number of artifacts recovered were not diagnostic to period but were categorized as prehistoric. The non-lithic prehistoric artifacts largely consist of burned clay and bone; these also included charcoal, shell, potsherds, and miscellaneous organic matter.

Burned Clay. Small bits of burned clay where found throughout the excavation block. Most of this clay was found in the screens as it separated from the surrounding matrix and was recovered in marble-sized chunks. These were weighed and noted by unit and level (Appendix B). There were also two large bits of burned clay found in Unit 9, Level 8, which total 79.0 grams. Upon macroscopic inspection, most of the burned clay did not exhibit any impressions other than some possible grass impressions, but one piece, recovered from Unit 6 may have an impression of twilled basketry.

Bone. Many bone fragments were recovered from the excavation unit, mostly in the form of 19,701 small, fractured bits. Mixed in with the crushed bits were whole rodent bones, bison teeth, and a canid tooth, possibly from a dog. As of publication, these bones have not been submitted to further analysis. The bison teeth come from Unit 10 Level 9 and Unit 13 Level 5. The canid tooth was found in Unit 10 Level 13. The rest of the bone breakdown can be found in Appendix B. Of note were two small bones that had been sharpened into an awl-shape, of a size suitable for weaving baskets; these were found in Unit 16 Level 7 and Unit 16 Level 12 (Figure 28).

Figure 28. Bone Tools from site 41HY160. A is from Unit 16, Level 12, and has multiple scars and obvious shaping. B is from Unit 16 level 7, and has some shaping marks to it, but to a lesser degree than A.

Other Non-Lithic Prehistoric. The other identified non-lithic prehistoric include charcoal, shell, potsherds, and miscellaneous organic matter. The charcoal ranges in size from flecks to a tennis-ball sized burned dirt dauber nest. None of the charcoal was of a big enough size to radiocarbon test given the nature of the soils. The shell is of a fragmentary nature, consistent with local freshwater origin. The potsherds are mostly plainware body fragments with mostly oxidized firing, typical of those found with Toyah culture sites; one sherd has a brushed outside. Fittingly, these sherds were found in some of the later prehistoric levels in association with Perdiz and Perdiz-like arrowheads; none of the Perdiz-like arrow points were identifiable as Cliffton arrow points. The minimal non-bone organic material recovered includes a few seed pods, some bits of untyped wood, and a mass of unidentifiable organic matter (Appendix B).

Non-Artifactual Debris

There were several recovered pieces that did not have an obvious anthropogenic origin or modification. These most common of these materials are limestone fossil shells, frequently found in the limestone in and around the site. The fossils were found throughout the excavation. The next most common are four small pieces of limonite, each less than .5 cubic centimeters in size, pieces. This material is a hydrated iron oxide mineral that is a key component of ochre (Nesse 1991). All four pieces were found between 130 and 150cmbs, but their small size means that others may have been present and were not caught in the screen.

Features

In total, 31 features were documented. Of these, 1 was a large patch of oxidized soil, 1 was a clear circular hearth-like cluster of burned limestone (FCR), and 29 were scatters of FCR with varying degrees of cohesiveness (Table 3). A horizontal collapse of the placement of these features can be found in Figures 60, 61, and 62 in chapter 9, and maps of these features can be found in Appendix A.

Table 3. Location and Brief Descriptions of Features identified at site 41HY160.

Feature #	**Unit**	**Depth**	**Brief Description**
1	9	80cmbs	FCR
2	7	80cmbs	FCR
3	8	90cmbs	Scattered FCR
4	9	120cmbs	Scattered FCR
5	9	120cmbs	Scattered FCR
6	7	120cmbs	Scattered FCR
7	11	80-70cmbs	Circular cluster FCR
8	11	90cmbs	Cluster of FCR below feature 7
9	15	60-50cmbs	Scattered cluster FCR
10	12	90cmbs	Small cluster FCR
11	15	60cmbs	Small cluster FCR
12	12	110cmbs	Small cluster FCR
13	12	120cmbs	Small cluster FCR
14	14	60cmbs	Small cluster of 3 FCR
15	15	70cmbs	Small cluster 7 FCR
16	13	70cmbs	Small cluster FCR
17	14	80-70cmbs	Small cluster FCR
18	15	90cmbs	Scattered cluster FCR
19	13	120-110cmbs	Cluster of FCR

Table 3, Continued

Feature #	**Unit**	**Depth**	**Brief Description**
20	14	110-100cmbs	FCR and flake concentration
21	12, 8, 16, 15	130cmbs	Small cluster and scatter of FCR
22	13, 17, 15, 8	130cmbs	Large scatter of FCR
23	7	130cmbs	Small cluster FCR
24	16	130cmbs	Small cluster FCR and bone
25	15, 17	140cmbs	Small cluster FCR
26	10, 14	150cmbs	Large section of oxidized soil containing a few FCR
27	8	150cmbs	Small cluster FCR
28	16, 14, 10	150cmbs	Small cluster FCR between Feat. 26 & 29
29	12, 16	140cmbs	Small cluster and two square meter scatter of FCR
30	9, 12	130cmbs	Small cluster FCR
31	7	150cmbs	~3/4 square meter concentration of FCR

CHAPTER 8: LITHIC RESULTS

There were both ground and chipped stone found at the site, and the chipped stone comprised the largest number of artifacts recovered.

Ground Stone

Two definite ground stones were recovered from the excavations, both quartzite (Figure 29). One is a broken grinding stone from Unit 17 level 4, and is ground on one surface. The other is a hammerstone found in feature 28, Unit 14, Level 14, with multiple percussive marks on both ends of the ovoid stone, and potential grinding, perhaps from use as a mano, on one of the faces.

Figure 29 (L-R). A is a hammerstone with potential ground surface, Unit 14 Level 14; B is broken ground stone, Unit 17 Level 4.

There were other potential groundstones found. In feature 19, Unit 13, Level 11, a broken piece of ground limestone was incorporated into a burned rock feature. This rock was sampled for archaeomagnetic sampling and was unavailable for photograph. In addition, there were 25 small fragments of broken quartzite found throughout the excavation. These may be evidence of other groundstone that were carried to and from the site (Appendix B); considering the lack of quartzite in the river valley (see chapter 2), it would have been an expensive material.

Chipped Stone: Tools

The chipped stone tools excavated at 41HY160 were identified as modified flakes, bifaces, cores, core tools, unifaces, and projectile points. Whenever possible, more detailed identifications were made, such as identifying bifaces as morphologically drills, gravers, and adzes, and unifaces as scrapers and concave scrapers. In addition, projectile points were typed when possible and described in the detail necessary to answer the primary research questions. All of the chipped stone from this site, upon macroscopic examination, is chert of Edward's Plateau origin. Material not dissimilar from the worked material is easily observed just a few meters away in the creek and on top of the cliff just above the San Marcos Springs, on site 41HY37.

Modified Flakes

In total, only eight modified flakes were identified. Given the large number of flakes present throughout the site, it is not unreasonable that some of the flakes not identified as modified flakes were used but left no obvious macroscopic trace. The breakdown of location and description of the identified modified flakes are as follows

(Table 4). Photographs with lines indicating modified edges are available in Appendix G.

Table 4. Location and description of modified flakes at 41HY160.

Unit	Depth	Description
6	20	Modified Flake
6	60	2 modified flakes: 1 medial section and 1 proximal section snapped after modification
6	70	2 modified flakes: 1 whole flake with regular flaking along one edge dorsal side, 1 distal fragment with flaking along distal end and ventral side before breaking
6	90	Modified flake, distal tip missing, regular flaking along four straight edges on ventral surface
6	150	Modified flake, regular flaking along two straight edges on dorsal surface.
17	140	Flake tool with a broken gravis beak, unifacial flaking

Cores

Thirty-two cores were identified, and ranged from larger, tested cobbles to small, exhausted cores (Table 5). These cores were found throughout the excavation block. See Appendix H for photographs. Four cores appeared to be utilized as tools. Two cores had one edge sharpened into a scraper, and were found in Unit 13, 80cmbs and Unit 16, 140cmbs. At least two of the cores had crushing damage along one edge, possibly from being used as a chopper. These were found in Unit 11, 100cmbs, Feature 26, Units 10 and 14, 140cmbs.

Table 5. Location and description of cores and core tools.

Unit	Depth	Description	Core/ Core Tool
6	30	Large flake used as a core	Core
6	40	Minimally utilized core, evidence of edge preparation for striking surface	Core
6	120	Core fragment	Core
6	120	Core	
7	140	Heat-treated core fragment	Core
7	150	Tested and rejected core	Core
10	50	Core fragment	Core
10	150	Heat-treated exhausted core	Core
10	150	Heat-treated exhausted core	Core
11	100	Core fragment	Core
11	120	Core, with a burin blow removed (platform preparation)	Core
12	100	Core fragment	Core
12	120	Core fragment	Core
12	140	Heat-treated exhausted core	Core
12	140	Heat-treated exhausted core	Core
12	140	Heat-treated exhausted core	Core
12	150	Flat, exhausted core	Core
13	90	Core fragment	Core
13	150	Heat-treated exhausted core	Core
13	150	Heat-treated exhausted core	Core
15	50	Exhausted Core	Core
15	130	Heat-treated core fragment	Core
15	140	Heat-treated exhausted core	Core
15	150	Heat-treated exhausted core	Core
16	130	Heat-treated exhausted core	Core
16	140	Heat-treated core fragment	Core
16	140	Heat-treated exhausted core	Core
17	80	Core fragment	Core
10	140	Large core, with crushing damage along three edges	Core Tool
11	100	Small Core, crushing damage where two edges meet	Core Tool
13	80	Core fragment, made into a uniface on one edge	Core Tool
16	140	Heat-treated core, made into a scraper on one edge	Core Tool

Unifaces

Very few unifaces were found in comparison to the number of bifaces. Eight unifaces, all morphologically scrapers, were identified in the assemblage. In addition, two bifaces were identified that were only minimally flakes on one side, and all shaping and resharpening occurred unifacially; these two were also morphologically scrapers. The location and description of these scrapers is broken down in Table 6; Appendix E contains photographs of the unifaces.

Table 6. Location and description of unifacial tools.

Unit	Depth	Description
6	30	2-bit scraper, one bit convex with multiple stepped resharpening flakes (at least 3 incidents)
6	120	biface fragment, snap fracture, "working" end (cf scraper, adze) has multiple step fractures from resharpening on a unifacial plane, becoming slightly concave
6	130	unifacial scraper w/ 7 possible bits (2 concave)
8	150	heat-treated unifacial scraper fragment, flaked all edges
10	70	made like an endscraper, burned, associated with feature 1
10	150	heat-treated unifacial scraper fragment all around
10	150	heat-treated uniface with 3 scraper bits
12	150	"bi-uniface"… biface failure fragment turned into unifacial scraper, associated with Feature 29
14	130	heat-treated scraper fragment, unifacial trimming
17	70	Uniface with 1 flat scraper edge, 2 concave scraping bits

Bifaces

There were 89 bifaces found. Most were not type-able and many of these had evidence of manufacturing error, such as stepped hinge flakes and rolling snapped fractures originating at flakes. In addition, one drill fragment, one gouge, and four adzes, one with a graver pit, were also identified (Table 7). Photographs are presented in Appendix F.

Table 7. Location and description of bifaces.

Unit	Depth	Description	Specialized Biface Designation
6	40	Heavily burned distal fragment, snap fracture, cf. Dart point	
6	60	Early stage manufacturing error	
6	80	Early stage manufacturing failure fragment, snap fracture	
6	80	Distal fragment, late stage manufacturing failure, cf. Dart point	
6	90	Lateral fragment with a portion of the proximal "base" intact; mid-stage biface, possible snap fracture.	
6	100	Lateral fragment with 2 burin scars	
6	100	Proximal late stage fragment, burned, possibly base of triangular biface	
6	110	Heavily burned medial fragment	
6	110	Thermally treated mid stage fragment, probably proximal end, beginnings of an alternate bevel	
6	120	Proximal end sub triangular fragment, snap fracture	
6	120	Lateral early stage fragment	
6	130	Medial lateral late stage fragment, remaining edge slightly concave (c.f. Stemmed tool shoulder), 2 snap fractures and 1 burin blow	
6	130	Mid stage manufacturing failure, heat-treated	
6	140	Mid stage fragment, 2 snap fractures	
6	150	Late stage biface fragment, distal tip, snap fracture, cf dart point	
7	150	Thin, burned medial fragment	
7	150	Badly burned triangular biface, proximal portion, snap fracture on distal end	
8	80	Mid-stage man failure	
8	80	Late-stage manufacturing failure, snap fracture	
8	150	Clunky biface fragment, snap fracture, burinated off of fracture & 2 burin blows off of first burin scar, 3 burin blows off of those burin scars; 6 blows total	
9	70	Late stage manufacturing failure, transverse snap	
9	100	Small: distal tip fragment, impact fracture	
9	100	Mid-stage manufacturing failure, snap fracture	
9	120	Mid-stage manufacturing failure, snap fracture	
9	120	Late stage manufacturing failure, both horizontal and lateral snap fractures	
9	120	Early stage manufacturing failure	
9	150	Late stage manufacturing failure, used, one edge trimmed/resharpened on both sides	
9	150	"Subtriangular biface	
10	70	Late stage manufacturing failure, snap fracture, associated with feature 1	
10	80	Mid-stage biface	
10	130	Stacked failure subtriangular late stage biface manufacturing failure	
10	140	Late stage biface fragment, snap fracture	
11	100	Late stage manufacturing failure	
11	100	Late stage manufacturing failure, snap fracture	
11	110	Late stage manufacturing failure	
11	110	Medial section, alternately beveled right, both distal and proximal snap fractures, thermal damage	
11	120	Heavily damaged medial fragment, series of snap fractures	
11	130	Late stage biface manufacturing failure, snap fracture on tip	
11	150	Mid-stage manufacturing failure -unremoved platform on tip	

Table 7, Continued

Unit	Depth	Description	Specialized Biface Designation
11	150	Mid-stage manufacturing failure -unremoved platform on tip	
11	150	Heat-treated mid-stage bifacewith unifacial scraper bits	
11	150	Mid-stage fragment with unifacial scraping bit	
11	150	Thin medial lateral fragment, burned	
12	70	Distal fragment, snap fracture	
12	80	Early stage manufacturing failure, snap fracture; cortex present	
12	90	Heavily damaged fragment	
12	90	Fragment with distal and lateral snap	
12	110	Distal tip fragment, snap fracture, thermally altered	
12	120	Medial fragment, 3 snapped fractures	
12	140	Mid stage manufacturing failure by overshot flake, then burinated at least twice	
12	140	Late stage manufacturing failure	
12	140	Late stage manufacturing failure (too thin too early, snapped)	
12	140	Heat-treated, heavily damaged fragment	
12	150	Burned fragment, snap fracture, 2 burin blows off of one corner	
12	152	Late stage manufacturing failure	
13	90	Corner of fragment, snap fracture, intersecting sides	
13	90	Late stage manufacturing failure, possible utilized on alternating left edge, snap fracture	
13	90	Medial fragment, snap fracture distal, proximal, and lateral	
13	130	Late stage manufacturing failure, subtriangular	
13	130	Late stage manufacturing failure that's been burinated off the failure break	
13	150	Middle stage manufacturing failure, beveled, unmoved platform	
14	70	Mid-stage manufacturing failure	
14	90	Distal fragment, snap fracture	
14	110	Mid stage manufacturing failure, snap fracture	
15	70	Distal fragment, snap fractures, probable manufacturing failure	
15	90	Fragment, snap fracture, thermally altered, thermal fracture on lateral edge	
15	130	Fragment, burinated then snapped	
15	140	Heat-treated thin fragment	
15	150	Distal fragment broken and resharpened once, then snap fracture	
16	130	Heat-treated medial biface fragment	
16	140	C.f. San Gabriel biface	
16	150	Midsection of a biface, unsure if failure or broken in use, snap fracture has been burinated, burin edge used, another burin of the long burin, resharpening of second burin did not follow the lines of the first burin	
16	150	Heat-treated thin fragment	
17	70	Fragment with 1 lateral fracture and then thermally fractured	
17	80	Distal fragment, manufacturing failure	
17	90	Distal fragment, snap fracture	
17	100	Late stage manufacturing failure	
17	130	Subtriangular biface with a snap fracture, gently beveled on one side, a hint on the other side	
17	130	Thin fragment	
17	140	Asymmetrical fragment, 2 snap fractures	
17	150	Heat-treated fragment	
17	150	Heat-treated fragment	

Table 7, Continued

Unit	Depth	Description	Specialized Biface Designation
8	150	Lateral, heat-treated fragment with edge grinding on the proximal half, c.f. point base (COULD be stem of wells, section of paleo)	Biface/ point base
11	120	Might have been adze, but 1 lateral edge worked into graver beak	Adze/graver
10	150	Half of a bifacial adze bit	Adze
12	150	Adze, c.f. Guadalupe Adze	Adze
13	130	Asymmetrical late stage manufacturing failure that was subsequently shaped and used as a small adze	Adze
10	50	Bifacial drill fragment, proximal end only (missing the bit);	Drill
6	100	Distal fragment, almost unifacial, 2 or 3 notches, cf gouge	Gouge

Projectile Points

There were 134 points and parts of point identified in the assemblage (Table 8). Of these, 82 contain all or fragments of the blade and stem, 19 are broken barbs, 6 are performs, 15 are stem fragments, 11 are distal tip fragments, and 1 is a preform reworked into an adze. Of the 82 points that were relatively complete, 32 were discarded with all margins complete, from tip to base/stem.

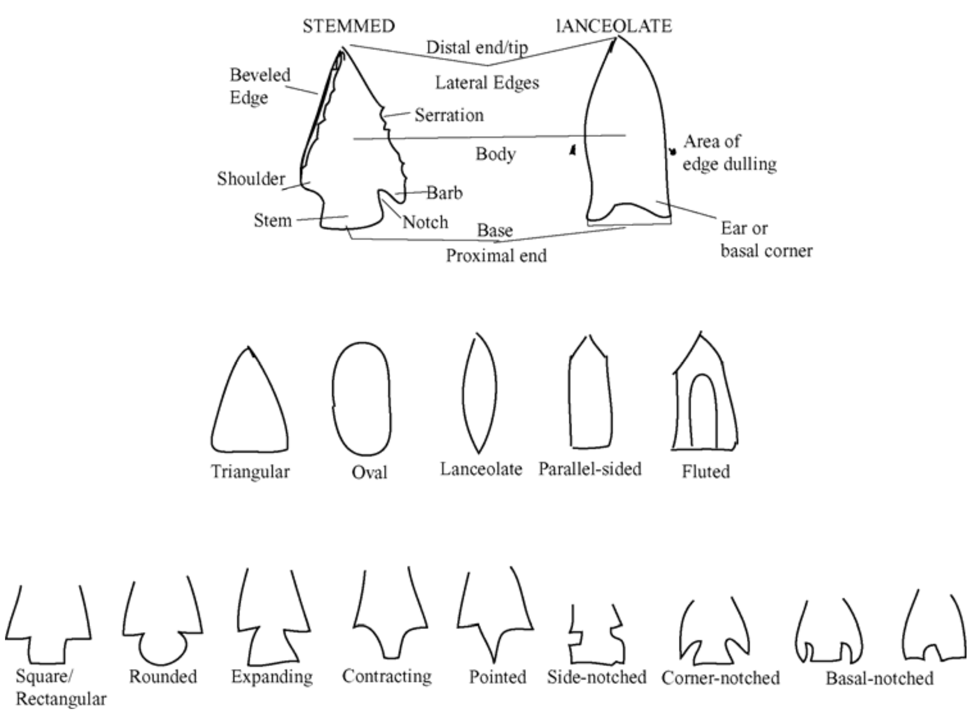

Figure 30. Parts of a projectile point (adapted from Hester and Turner 1999).

Table 8. Location, description, and type of projectile points. In this table, items labeled point retain at least a fragment of the blade and the stem or base; other parts are the part of the point, as defined in figure 30, with no other part represented in the fragment.

Unit	**Depth**	**Description**	**Type**	**Point, Part?**
6	90	Snap fracture on blade, 1 barb, manufacturing error, blade is very thin and base has stacked hinge scars	Bulverde	Point
6	90	Heat-treated, 1 barb snapped, 1 barb removed with burination, slight beveled base, slight bevel to blade (alternate to base), resharpened at least once, tip has small snap fracture, 2 small potlids (one removed a section of the side)	Marshall	Point
6	90	Slight left beveling, distinct shoulders, concave base	Darl	Point
6	120	1 ear of base missing (snap fracture), 1 barb mostly removed by flake (remaining space between barb and stem resembles concave scraper bits), resharpened at least once before major fracture, evidence that tip came off w/ impact (long impact flake scar on one side), 1 side of blade then repeatedly reworked unifacially (ultimately removing that barb), possibly reworked as a knife or scraper	Pedernales	Point
6	130	Heavily resharpened, one barb sharpened off, tip of one base ear mostly gone (impact fracture or manufacturing error)	Pedernales	Point
6	150	Missing distal tip (snap fracture), some rough retouch, slightly beveled blade, slightly beveled base, slight edge grinding on one side of base	Hoxie	Point
6	150	Some retouch, edge grinding at least one side of base	Hoxie	Point
7	40	1 corner notched unifacial arrow point, c.f. Scallorn, snap distal end	Scallorn	Point
7	40	Distal fragment, finely serrated, tip snap fractured, 1 barb and stem snap fractured, c.f. Perdiz;	Perdiz	Point
7	40	1 medial unifacial arrow point fragment, tip impact fracture, 1 barb snap fracture, c.f. Perdiz;	Perdiz	Point
7	40	Unifacial arrow point made on a flake, tip impact fracture 1 barb, snapped	Perdiz	Point
7	40	Arrow point stem, snap fracture, c.f. Perdiz, 1 burin blow 1 corner, 2 burin blows other	Perdiz	Point
7	90	Slightly beveled, tip impact fracture, little/no reworking	Nolan	Point
7	90	Distal snap fracture, 1 barb removed by burin blow	Ellis	Point
7	100	Alternately left bevel stem, resharpened, then distal end snap fracture	Nolan	Point
7	110	Looks like a Early Archaic point was reworked with a Middle Archaic stem on it, alternately beveled on blade thermally altered, stem heavily fractured, 1 shoulder snap fracture,	Unidentified	Point
7	110	Diagonal snap fracture on blade	Almogie	Point
7	140	C.f. Marshall, Andice, or Pedernales, likely a Marshall - basal thinning, both barbs broken off, not resharpened, tip impact fracture	Marshall	Point
7	150	Light-moderate edge grinding	Pedernales	Point
8	20	Reworked blade, tip impact after reworking, 1 ear of	Pedernales	Point

Table 8, Continued

Unit	Depth	Description	Type	Point, Part?
		stem missing, both barbs snapped		
8	80	Lateral medial fragment	Unidentified	Point
8	80	Snapped distal tip, 1 barb snapped	Bulverde	Point
8	80	Little/no resharpening	Travis	Point
8	8	C.f. Travis/Bulverde, probably Travis - blade reworked, alternate left bevel near tip	Travis	Point
8	90	Minor snap fracture, 1 barb missing, blade reworked alternate left bevel near distal tip	Bulverde	Point
8	100	Alternate right bevel on stem, reworked distal tip, small snap fracture	Nolan	Point
8	110	Edge smoothing on stem, snap fracture distal end, 1 side has 2 burin blows, opposite lateral side removed by single burin blow	Pedernales	Point
8	120	Alternate right bevel, 1 corner snap fracture, moderately burned, corner removed by burning	Taylor	Point
8	140	Same base thinning as Andice, just not notched, gentle leaf and bevel, serrated, tip impact fracture	Early Triangular/ Taylor Thin Based	Point
8	140	Burned and broken, broad flakes on blade, tip impact fracture	Early Split Stem	Point
8	150	Heavily burned distal tip, steep right alternate bevel, expanding too much to be Hoxie, could be Gower or other Early Archaic	Gower	Point
9	110	Reworked blade creates alternate right bevel toward distal tip	Ensor	Point
9	120	Weakly shouldered Travis, distal tip reworked at least once, major tip impact fracture	Travis	Point
9	140	Broken, reworked on distal end, long flake on barb and base, missed long flake on 1 barb (thinning flakes) that limited depth of notching, 1 flake was too far	Andice	Point
9	150	Light edge grinding, hint of shoulder and alternate beveling, snap fracture, likely a Hoxie	Hoxie	Point
10	90	Large impact fracture that remove 1 shoulder & 1 barb, other barb snap fracture	Pedernales	Point
10	100	Alternate right bevel stem, blade reworked, then tip impact fracture	Nolan	Point
10	110	Alternate right bevel stem, no bevel on blade, snap fracture distal tip, little/no reworking	Nolan	Point
10	110	Alternate right bevel stem, tip impact fracture, 1 edge has 3 burin blows off one edge of tip fracture, 1 burin blow has removed 1 corner of stem	Nolan	Point
10	150	Stem fragment, c.f. large Marcos	Marcos	Point Stem
11	40	Mostly unifacial arrow point, 1 shoulder lacking, reworked distal tip	Perdiz	Point
11	110	Thin, large tip impact fracture, reworked once before last fracture	Nolan	Point
11	120	Reworked concave base is out of the ordinary for a Travis, but otherwise morphologically Travis	Travis	Point
11	120	Alternate right bevel, resharpened, left bevel on 1	Nolan	Point

Table 8, Continued

Unit	Depth	Description	Type	Point, Part?
		face from resharpening, light stem grinding		
11	120	C.f. Marshall, slightly thermally altered, tip impact fracture, 1 barb burinated 3 times, on the same side the corner of the base is burinated	Marshall	Point
11	140	Burned medial fragment, c.f. dart point	Unidentified	Point
11	150	1 barb snapped, 1 burinated (3 blows, 3rd unsuccessful with a hinge termination)	Unidentified	Point
11	150	1 Barb had attempted burination, no edge smoothing, stem on 1 corner is unusual shape, similar to Martindale, but no edge grinding. Morrill to Martindale in shape	Morrill	Point
11	150	Late Early Archaic not an early split stem, broken and resharpened, alternate bevel, 1 barb snap fracture, other barb 3 burin blows	Unidentified	Point
12	60	Very thermally fractured dart fragment	Unidentified	Point
12	90	1 ear of stem missing, reworked distal tip	Pedernales	Point
12	90	Alternate right bevel stem, tip impact fracture, prepared striking platform on base	Nolan	Point
12	100	Serious tip impact fracture, alternate left bevel on stem, alternate left bevel blade (unusual) and seriously thermally burned/ fractured all over, missing shoulders and 1 corner of base	Nolan	Point
12	100	Alternate right bevel on stem, broken and reworked at least once, 1 corner of base removed with a snap fracture	Nolan	Point
12	100	Stem with 1 shoulder, snap fracture, barb of remaining shoulder broken	Bulverde	Point
12	100	Tip impact fracture, lots of impact damage	Pedernales	Point
12	130	Very gentle alternate right bevel, 1 corner has been broken off, tip broken and reworked	Early Triangular/ Taylor Thin Based	Point
12	130	Very damaged, alternate left bevel, steep thinning on base, Corner missing, distal tip manufacturing failure	Baird	Point
13	80	Halfway between Pedernales and Bulverde, tip impact fracture with hinge termination, and then reworked	Pedernales/ Bulverde	Point
13	100	blade alternate left bevel, stem beveled on each edge on same face (not alt bevel stem), broken and reworked	Unidentifiable	Point
13	140	Smooth edged Pedernales, little/no reworking, 1 small broken bit on 1 barb	Pedernales	Point
13	150	Late early Archaic; no edge grinding, similar to Gower, except squaring of stem puts it in Morrill (does not have gentle flaking and beveling of Gower)	Morrill	Point
14	70	Tip impact fracture, 1 edge burinated with 2 burin blows, 1 barb snap fracture, possibly reworked	Ellis	Point
14	70	Gentle alternate left bevel on reworked blade, snap fracture, 1 barb removed	Marcos	Point
14	80	Short stemmed for a Bulverde, distal snap fracture with 1 barb missing, little/no reworking	Bulverde	Point
14	100	Alternate right bevel on stem, alternate left bevel on blade, thermally altered, distal thermal fracture	Nolan	Point

Table 8, Continued

Unit	Depth	Description	Type	Point, Part?
15	80	Broken, reworked, light edge grinding, slight alternate left bevel on stem	Pedernales	Point
15	150	Late Early Archaic; no edge grinding, some snap fractures, snap on blade, classic asymmetry of point, hint of alternate beveling	Morrill	Point
15	150	Flared stem, small, not more than a dozen like this found in Central Texas, all in Early Archaic context (personal communication Elton Prewitt), heavily used, snap fracture, 3 burin blows	Untyped	Point
16	50	Arrow point flake, c.f. pending type, manufacturing failure, made on flake; missing stem, 1 barb, and distal tip	Untyped Arrow	Point
16	70	Split base classic of type, snap fracture, 1 corner burinated 5 times, 1st one removed barb, reworked	Montell	Point
16	80	Untyped dart point, tip impact fracture, snapped stem	Untyped	Point
16	100	Tip impact fracture, alternate right bevel on blade, snap fracture on 1 corner of base	Taylor	Point
16	110	Wide blade, tip impact fracture, shoulders somewhat abrupt	Travis	Point
16	150	Impact fracture, stem is similar to Wells, not enough shoulder to be wells, slightly edge-ground, slightly tapering stem	Unidentified	Point
16	150	Steeper beveled and different basal thinning than Taylor, base is flared	Baird	Point
17	80	Large, slightly expanding, gently convex stem, strong shoulders, slightly barbed, thin, well-made, chip impact fracture	Unidentified	Point
17	110	Distal tip impact fracture, lateral snap fracture that removed 1 corner of base, gentle alternate left bevel on blade	Early Triangular/Taylor Thin Base	Point
17	120	Heavily resharpened, long thinning flake, 1 corner of stem broken, c.f. Marshall.	Marshall	Point
17	130	Gentle alternate right bevel on blade, reworked, reworking introduced steep left bevel, long thin base, slightly convex base has been modified, 2 burin blows on broken corner	Early Triangular/ Taylor Thin Base	Point
17	130	Concave base, burned, missing corner of base (thermal fracture), alternate right bevel on blade, resharpened top half of blade, serrated bottom half of blade shows signs of likely being hafted	Taylor	Point
16	130	Medial section of dart point, impact fracture on tip, snap fracture on proximal	Unidentified	Point
6	60	Point barb, c.f. Andice, Bell	Andice/Bell	Point Barb
6	90	Dart point barb, c.f. Andice, Bell	Andice/Bell	Point Barb
6	120	Dart point barb	Unidentified	Point Barb
7	50	1 distal tip point snap fracture; dart point barb fracture	Unidentified	Point Barb
7	90	Dart point barb c.f. Marshall, Ellis, Marcos, Castroville	Marshall/Ellis/ Marcos/Castroville	Point Barb
7	90	Dart point barb c.f. Marshall, Ellis, Marcos, Castroville	Marshall/Ellis/ Marcos/Castroville	Point Barb

Table 8, Continued

Unit	Depth	Description	Type	Point, Part?
7	150	Dart point barb	Unidentified	Point Barb
7	150	Dart point barb, c.f. Andice, Bell	Andice/Bell	Point Barb
9	150	Burned dart point barb fragment	Unidentified	Point Barb
10	70	Dart point barb c.f. Marshall, Ellis, Marcos, Castroville	Marshall/Ellis/ Marcos/ Castroville	Point Barb
10	140	Heat treated dart point, removed as part of manufacturing failure , overshot notching flake	Unidentified	Point Barb
11	100	Dart point barb, c.f. Castroville, maybe Bell,	Unidentified	Point Barb
11	150	Heat-treated dart point barb	Unidentified	Point Barb
11	150	Heat-treated dart point barb	Unidentified	Point Barb
11	150	Heat-treated dart point barb	Unidentified	Point Barb
12	140	Dart point barb, c.f. Andice, Bell	Andice/Bell	Point Barb
14	90	Dart point barb, c.f. Andice, Bell	Andice/Bell	Point Barb
16	150	Dart point fragment, either barb or a Martindale-like base fragment	Martindale	Point Stem
17	90	Dart point barb, c.f. Andice, Bell, Castroville	Unidentified	Point Barb
16	150	Dart pt fragment, either barb or base, could be a Martindale-like base fragment	Martindale	Point Base
8	80	Late stage manufacturing failure, Bulverde preform	Bulverde	Point Preform
12	100	Subtriangular late stage manufacturing failure, likely a Travis preform	Travis	Point Preform
13	110	Late stage manufacturing failure, possible a Nolan preform (stem starting to bevel), edges ground down as either platform prep or use-wear	Nolan	Point Preform
14	100	Base w/snap fracture (preform for dart)	Unidentified	Point Preform
16	100	Subtriangular late stage bf man failure; possible Nolan preform (hint of stem alt bevelling)	Nolan	Point Preform
16	130	Projectile point manufacturing failure; prepared platform on tip	Unidentified	Point Preform
6	80	Stem and part of shoulders; impact scar, snap fracture, slight alternate beveling to stem, heavily burned after snap	Pedernales	Point Stem
7	90	Stem fragment, right bevel, snap fracture, 2 burin blows one side of fracture	Nolan	Point Stem
7	120	Dart point stem, snap fracture, 1 edge has a single burin blow, opposite edge 4 burin blows	Unidentified	Point Stem
8	150	Fine flaking, thinning flakes off both sides of base, likely a stem of a very large Andice, but could be base of a lanceolate point	Andice	Point Stem
9	150	Late early Archaic base; no edge grinding; snap fracture, ends of base ears intentionally squared off.	Unidentified	Point Stem
10	120	Dart point base, snapped stem, alternate left bevel, concave base suggests not a Nolan, possibly a Marshall	Nolan/ Marshall	Point Stem
11	110	C.F. stem of an Andice that has been burinated in 2 direction and heavily damaged prior to burination	Andice	Point Stem
11	140	Heat-treated dart point stem, C.F. Bulverde	Bulverde	Point Stem
12	150	C.f. Martindale stem, though non-edge ground	Martindale	Point Stem

Table 8, Continued

Unit	**Depth**	**Description**	**Type**	**Point, Part?**
13	90	Nolan stem, alternate right bevel, snap fracture	Nolan	Point Stem
13	150	Late Early Archaic, no edge grinding, similar to Gower, except squaring of stem puts it in Morrill category and it does not have gentle flaking and beveling of Gower, squaring on ears, snap fracture	Morrill	Point Stem
14	130	Dart point stem, Marshall or Bulverde, more likely Marshall	Marshall	Point Stem
15	60	Nolan stem, beveled, some slight alt left bevel, snap fracture at shoulder	Nolan	Point Stem
16	140	Dart pt stem fragment, light edge smoothing	Unidentified	Point Stem
17	80	Bulverde stem fragment, thermal fractures	Bulverde	Point Stem
7	150	Distal dart point fragment	Unidentified	Point Tip
10	60	Distal dart point fragment, tip impact fracture, snap fracture on proximal end	Unidentified	Point Tip
11	100	Distal dart point fragment, tip impact fracture, snap fracture on proximal end	Unidentified	Point Tip
12	120	Distal dart point fragment, alternate bevel, l edge serrated toward proximal end	Unidentified	Point Tip
12	150	Burned beyond recognition, distal dart point fragment	Unidentified	Point Tip
13	60	Distal dart point fragment, snap fracture on proximal end	Unidentified	Point Tip
13	90	Distal dart point fragment, snap fracture on proximal end	Unidentified	Point Tip
14	70	Distal dart point fragment, shouldered, stem lacking, tip impact fracture, alternate eft bevel on blade	Unidentified	Point Tip
14	140	Distal dart point fragment, heat-treated	Unidentified	Point Tip
16	50	Distal arrow point fragment	Unidentified	Point Tip
16	90	Corner of a stem, possibly Nolan because of bevel on one side, snap fracture	Nolan	Point Stem
12	150	Dart point base fragment, reworked into adze, bit approx. 48-50 degrees	Unidentified	Point/ Adze

Chipped Stone: Flakes

The majority of the chipped stone consists of 81,885 flakes. In a rough division of complete, incomplete, and shatter, most of the flakes are incomplete. (Figure 31).

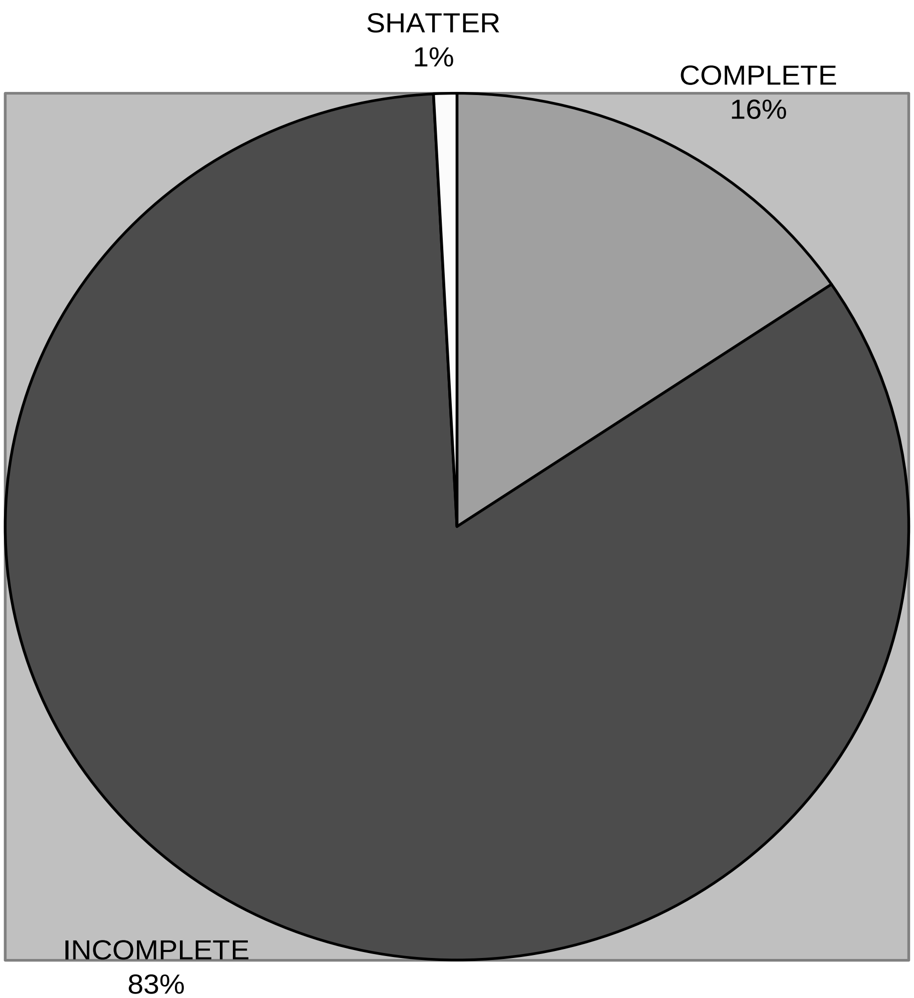

Figure 31. Percent of shatter, complete, and incomplete flakes for all units, all levels.

To further break this down, a count of complete, incomplete, and shatter, distributed on a line graph by depth, shows several peaks in overall flake counts, especially the incomplete flakes The following graphs (Figures 32-43) illustrate the count of complete, incomplete, and shatter, divided by unit and depth.

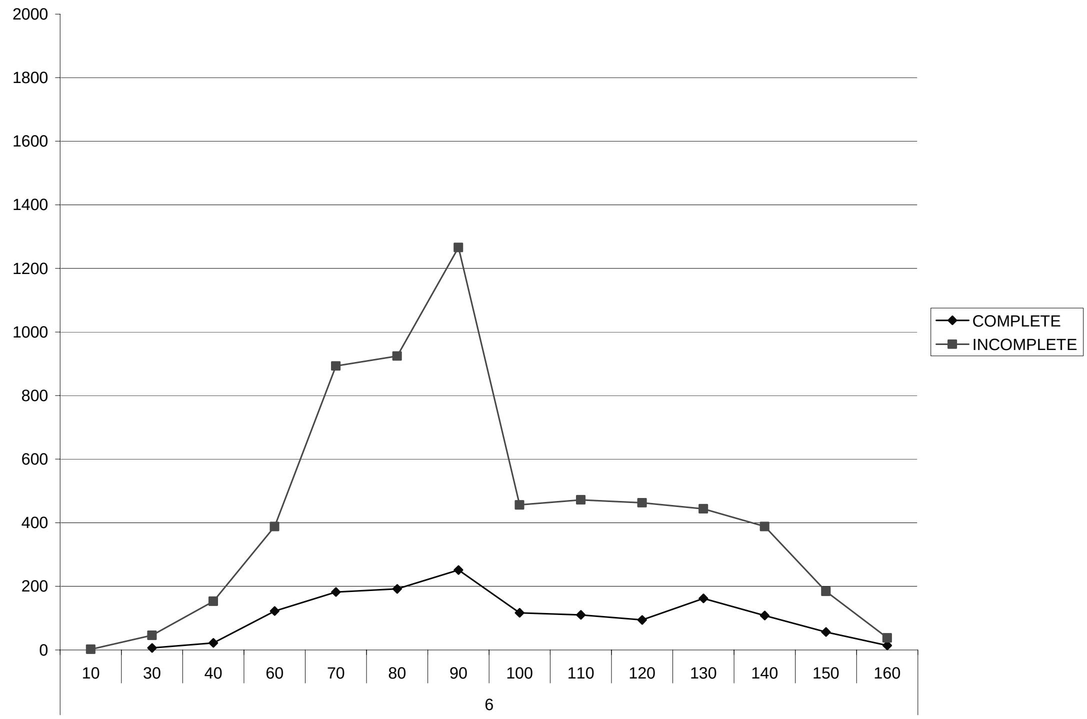

Figure 32. Counts of complete and incomplete flakes for Unit 6; no shatter was identified in this unit. Vertical axis is number of flakes, horizontal axis is bottom depth of the 10cm level to which the flake count corresponds.

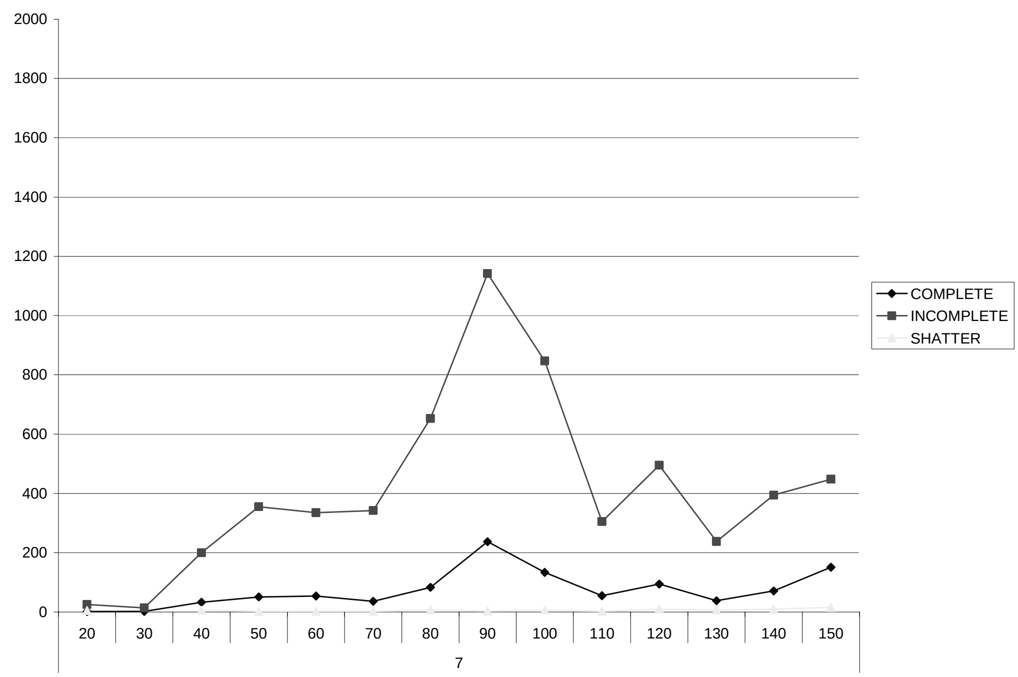

Figure 33. Counts of complete, incomplete, and shatter flakes for Unit 7. Vertical axis is number of flakes, horizontal axis is bottom depth of the 10cm level to which the flake count corresponds.

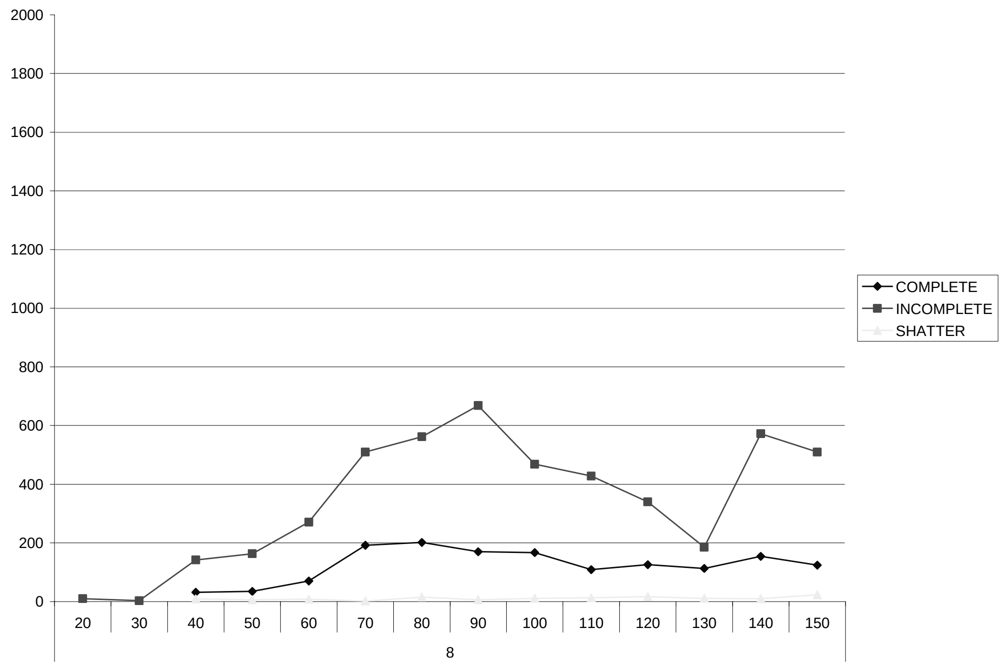

Figure 34. Counts complete, incomplete, and shatter flakes for Unit 8. Vertical axis is number of flakes, horizontal axis is bottom depth of the 10cm level to which the flake count corresponds.

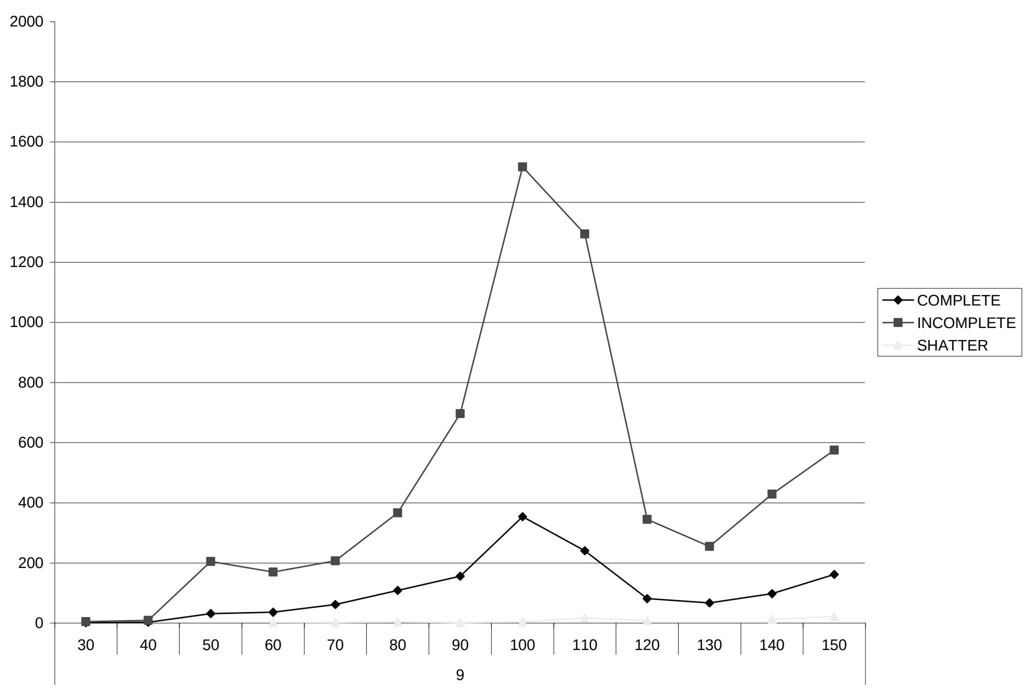

Figure 35. Counts of complete, incomplete, and shatter flakes for Unit 9. Vertical axis is number of flakes, horizontal axis is bottom depth of the 10cm level to which the flake count corresponds.

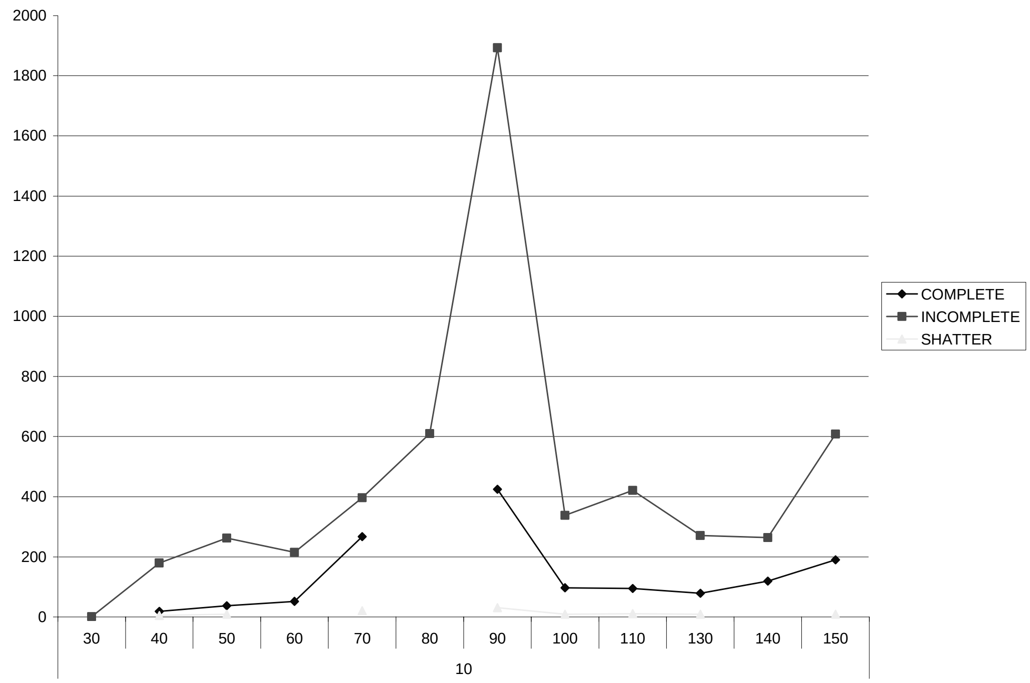

Figure 36. Counts of complete, incomplete, and shatter flakes for Unit 10. Vertical axis is number of flakes, horizontal axis is bottom depth of the 10cm level to which the flake count corresponds.

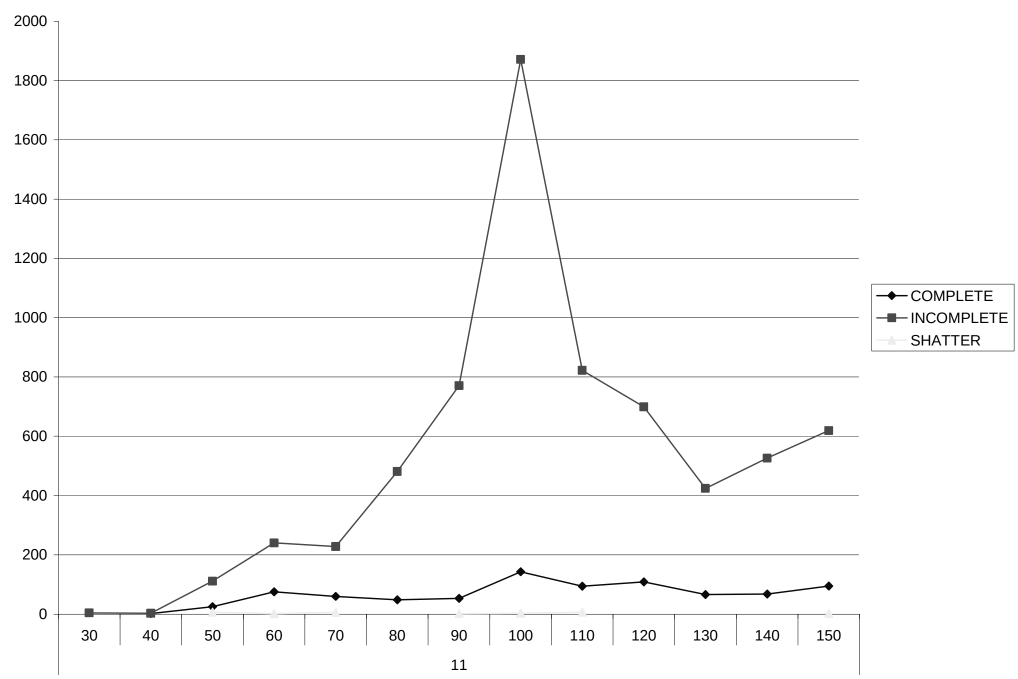

Figure 37. Counts of complete, incomplete, and shatter flakes for Unit 11. Vertical axis is number of flakes, horizontal axis is bottom depth of the 10cm level to which the flake count corresponds.

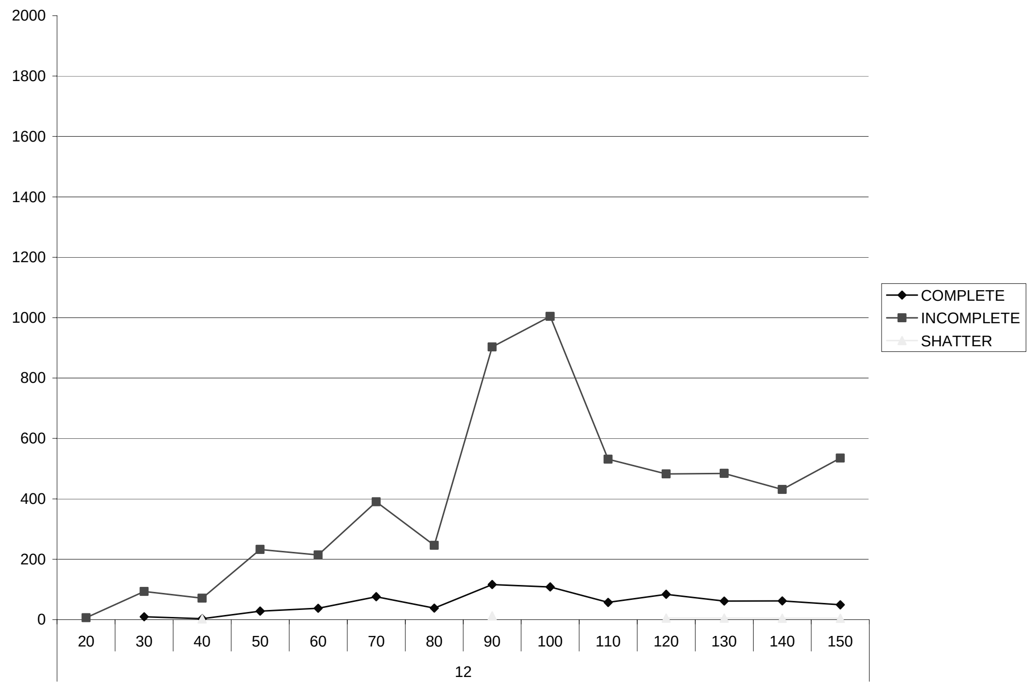

Figure 38. Counts of complete, incomplete, and shatter flakes for Unit 12. Vertical axis is number of flakes, horizontal axis is bottom depth of the 10cm level to which the flake count corresponds.

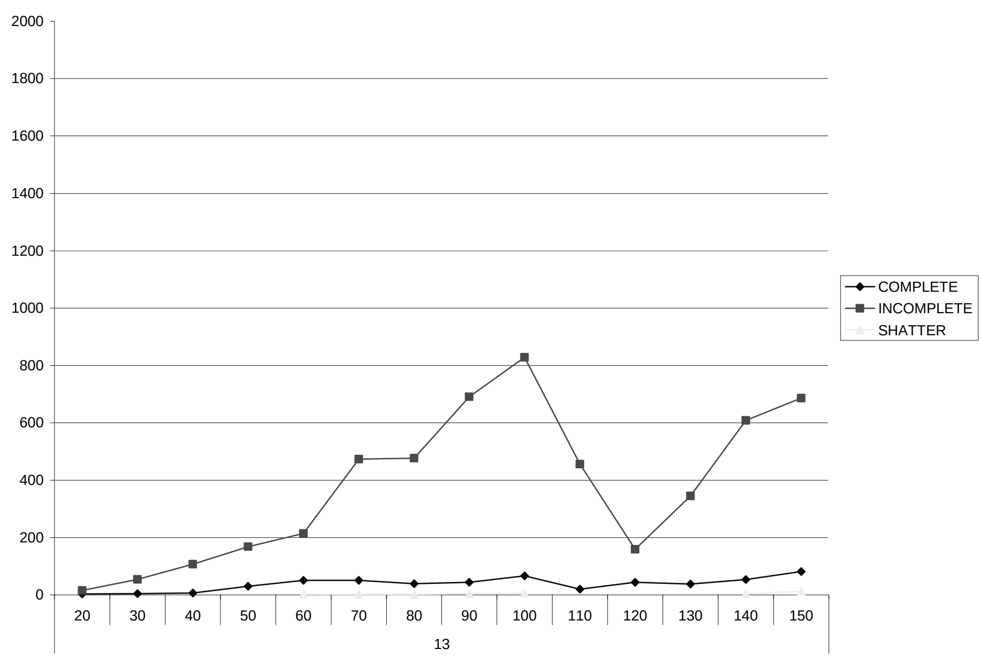

Figure 39. Counts of complete, incomplete, and shatter flakes for Unit 13. Vertical axis is number of flakes, horizontal axis is bottom depth of the 10cm level to which the flake count corresponds.

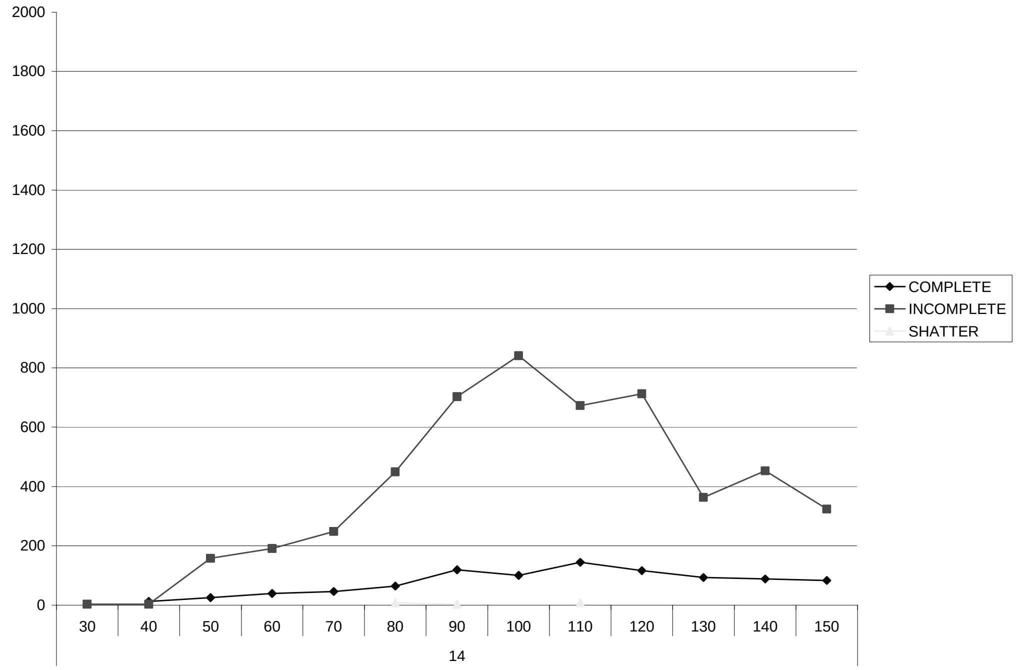

Figure 40. Counts of complete, incomplete, and shatter flakes for Unit14. Vertical axis is number of flakes, horizontal axis is bottom depth of the 10cm level to which the flake count corresponds.

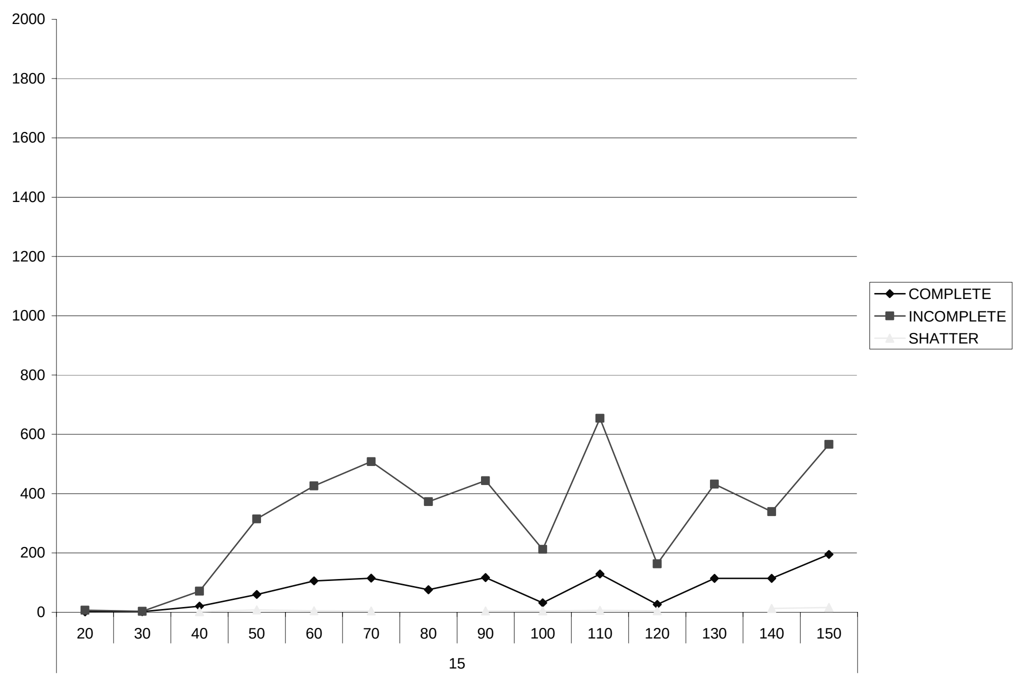

Figure 41. Counts of complete, incomplete, and shatter flakes for Unit 15. Vertical axis is number of flakes, horizontal axis is bottom depth of the 10cm level to which the flake count corresponds.

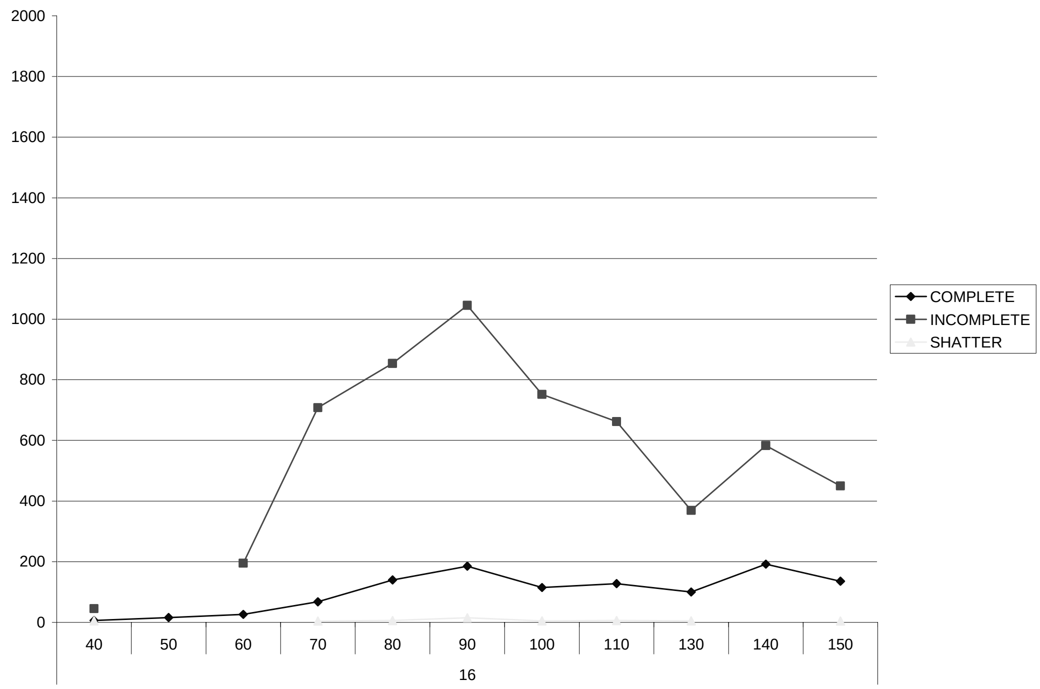

Figure 42. Counts of complete, incomplete, and shatter flakes for Unit 16. Vertical axis is number of flakes, horizontal axis is bottom depth of the 10cm level to which the flake count corresponds.

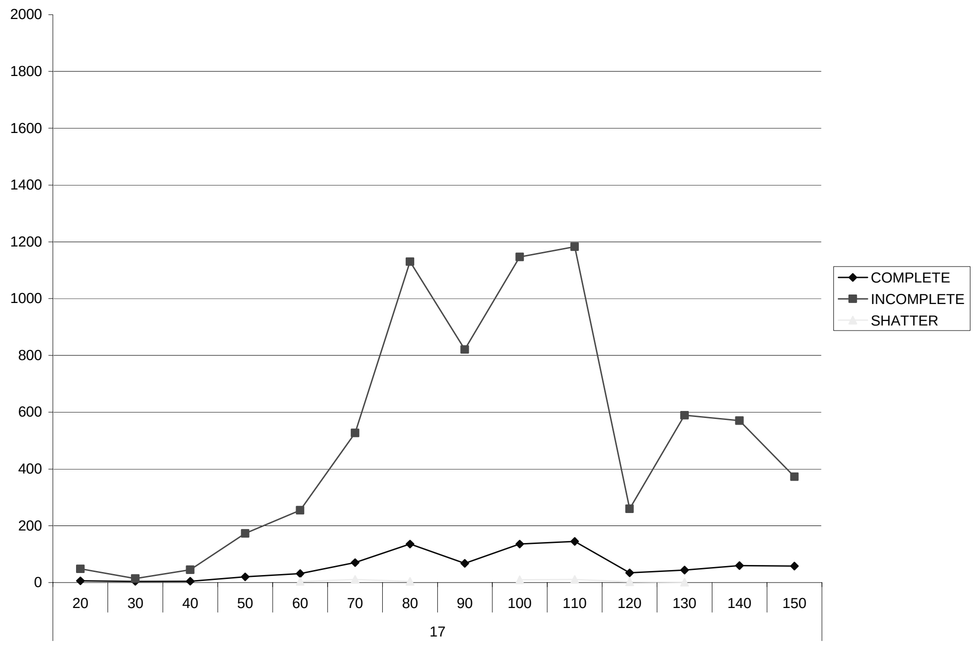

Figure 43. Counts of complete, incomplete, and shatter flakes for Unit 17. Vertical axis is number of flakes, horizontal axis is bottom depth of the 10cm level to which the flake count corresponds.

Looking at these data in regards to how the units are distributed in the block, a few patterns emerge. In the northernmost four units, 11, 9, 6, 7 from west to east, the raw flake counts peak at 100,100, 90, and 90cmbs respectively. In addition, 11, 9, and 7 have a secondary, smaller peak at 150cmbs respectively, and unit 7 has a tertiary peak at 120cmbs. The next set of units, 10, 12, 8, and 13, west to east across the middle of the block, have flake count peaks at 90, 100, 90, and 100 respectively; all four have a secondary but smaller peak at 150, 150, 140 and 150cmbs respectively. The southern four units, 14, 16, 15, and 17 west to east across the block have flake peaks at 100, 90, 110, and 80cmbs, respectively. They also have smaller peaks at 140, 140, 150, and 130cmbs, respectively. In addition, 17 has a large peak at 100-110cmbs, and a smaller peak at 80cmbs.

In addition to this analysis, the complete flakes were further examined for size, amount of cortex on the dorsal surface, and flake type. These were then translated to percentages that the different variables constituted of the collection. In general, most of the flakes did not have cortex, and the majority of flakes were in the 1-1.9cm in length (Figures 44 and 45).

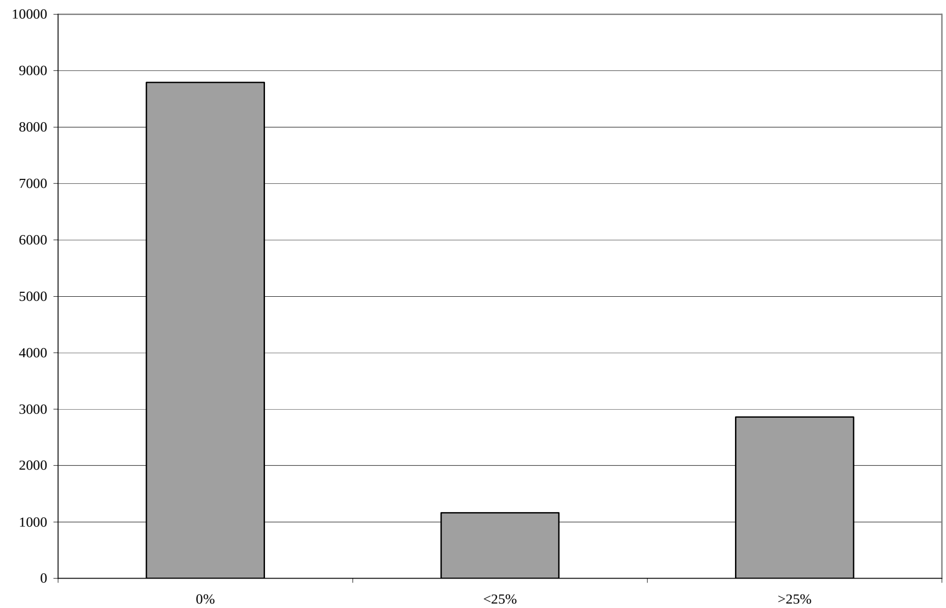

Figure 44. Total count of flakes in each category of dorsal cortex present, all units all levels.

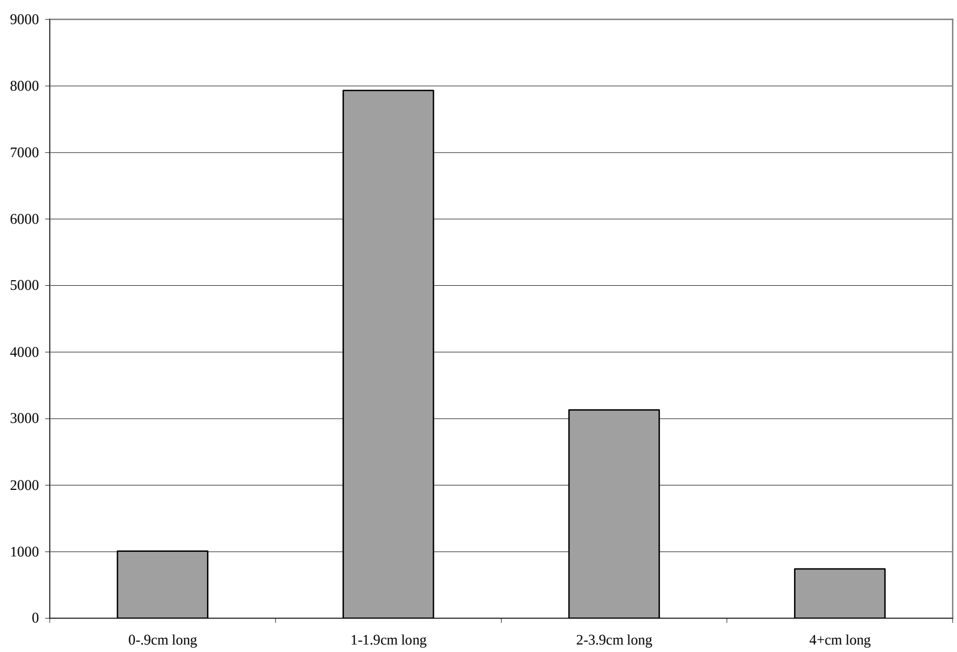

Figure 45. Amount of flakes in each size category, all units, all levels.

In addition, a view of the types of flakes present show that, overall, the bifaces thinning flake is by far the most common type of flake (Figure 46).

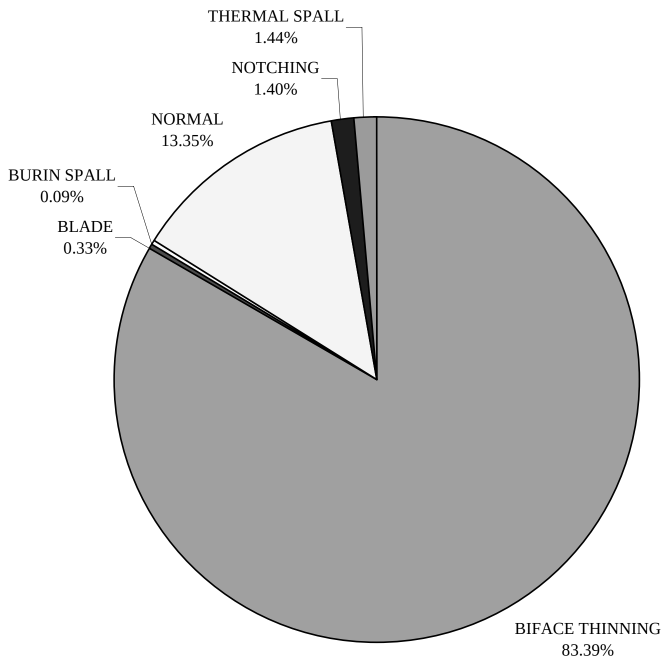

Figure 46. Percent of each type of flake present, types are defined in chapter 6; percentage is for all units, all levels.

Breaking these data down further, by unit and level, is also revealing. In general, bifaces thinning flakes are at their lowest percentage at and above 50cmbs, coinciding with lower overall flake counts. In addition, notching flakes are only found in a few spots, mostly between 60 and 120cmbs in any of the units containing notching flakes, except for unit 7 (Figures 67-58).

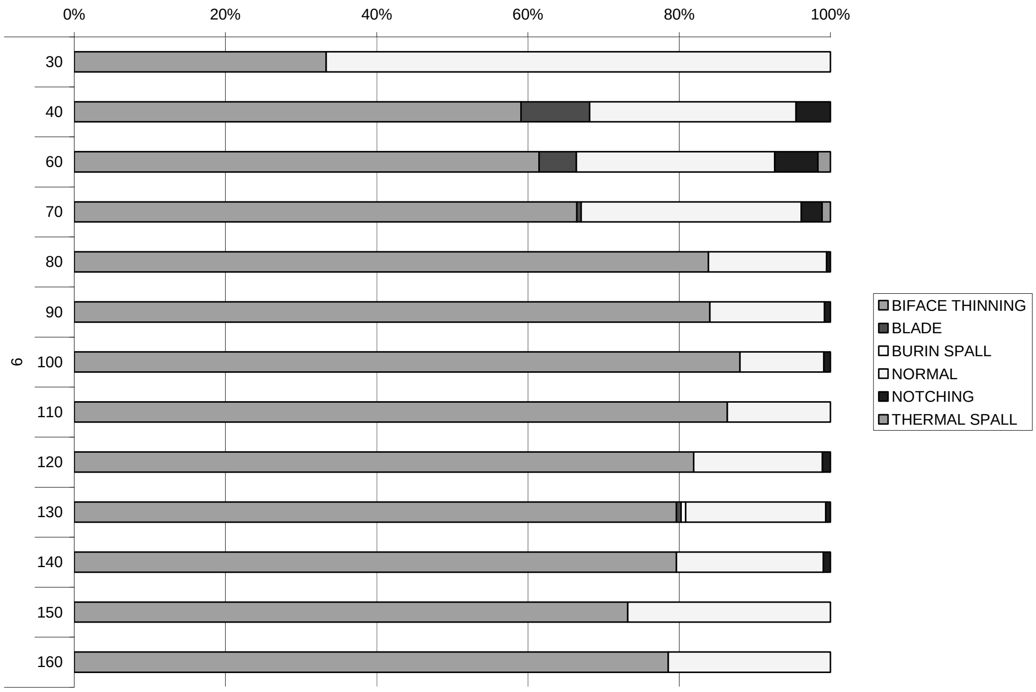

Figure 47. Percentage of flake types for Unit 6. Vertical axis is the percentage, and horizontal axis is the bottom depth of the 10cm level to which the percentages correspond. Color coded key for the flake types is to the right of the graph.

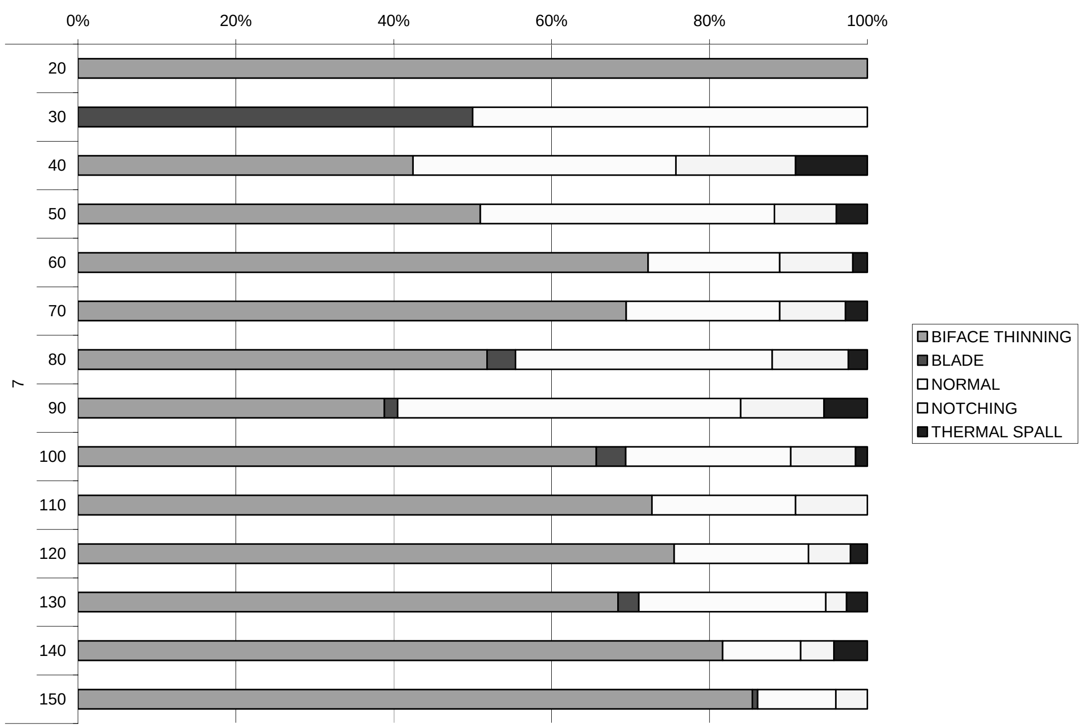

Figure 48. Percentage of flake types for Unit 7. Vertical axis is the percentage, and horizontal axis is the bottom depth of the 10cm level to which the percentages correspond. Color coded key for the flake types is to the right of the graph.

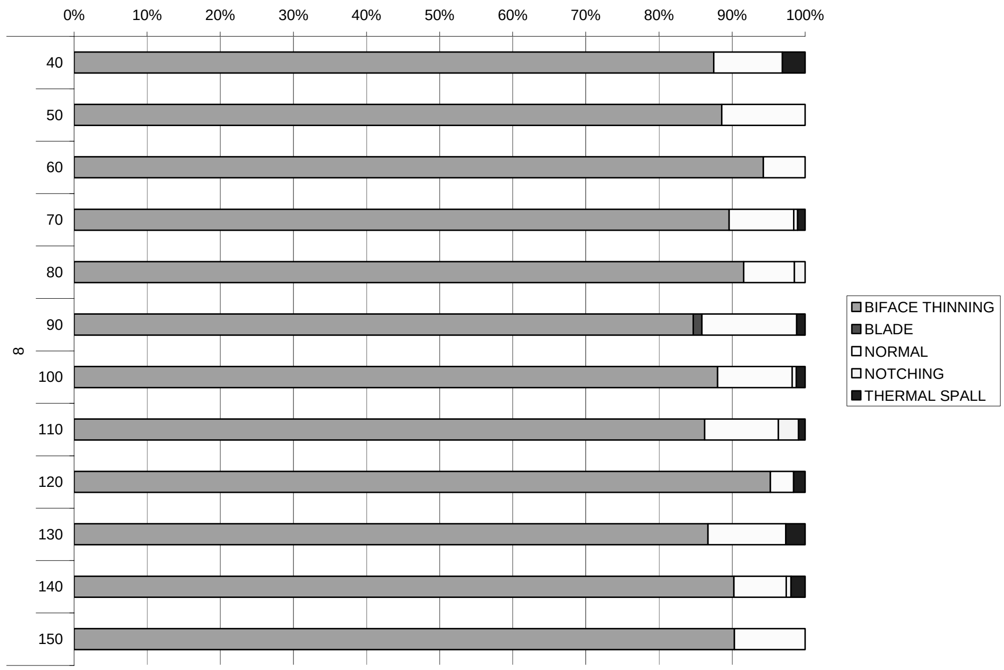

Figure 49. Percentage of flake types for Unit 8. Vertical axis is the percentage, and horizontal axis is the bottom depth of the 10cm level to which the percentages correspond. Color coded key for the flake types is to the right of the graph.

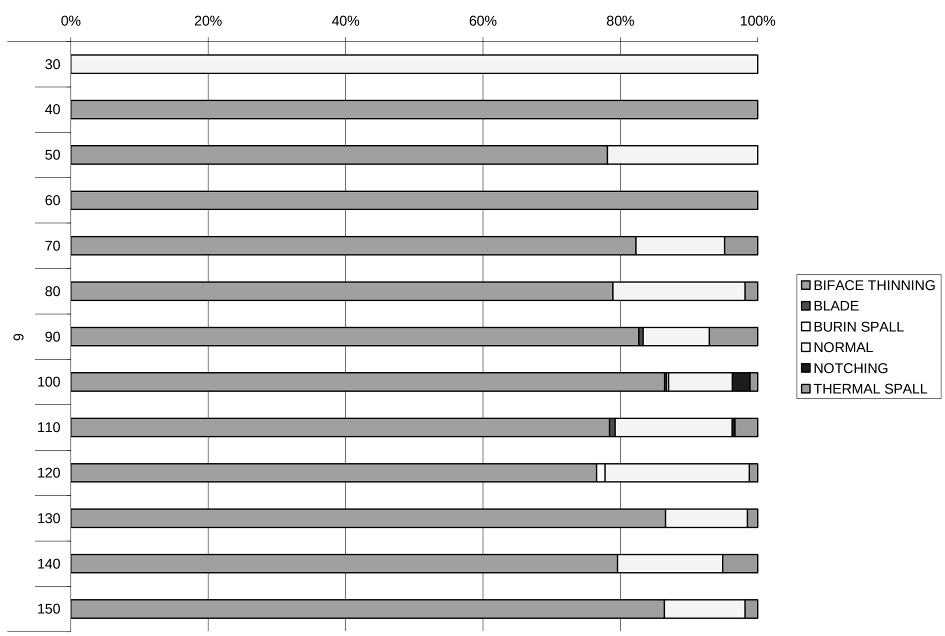

Figure 50. Percentage of flake types for Unit 9. Vertical axis is the percentage, and horizontal axis is the bottom depth of the 10cm level to which the percentages correspond. Color coded key for the flake types is to the right of the graph.

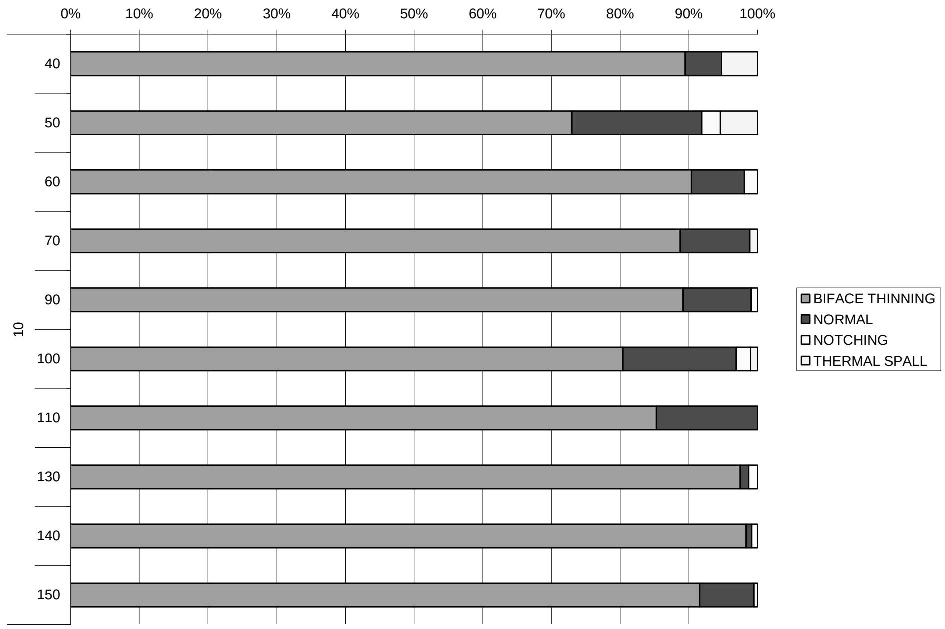

Figure 51. Percentage of flake types for Unit 10. Vertical axis is the percentage, and horizontal axis is the bottom depth of the 10cm level to which the percentages correspond. Color coded key for the flake types is to the right of the graph.

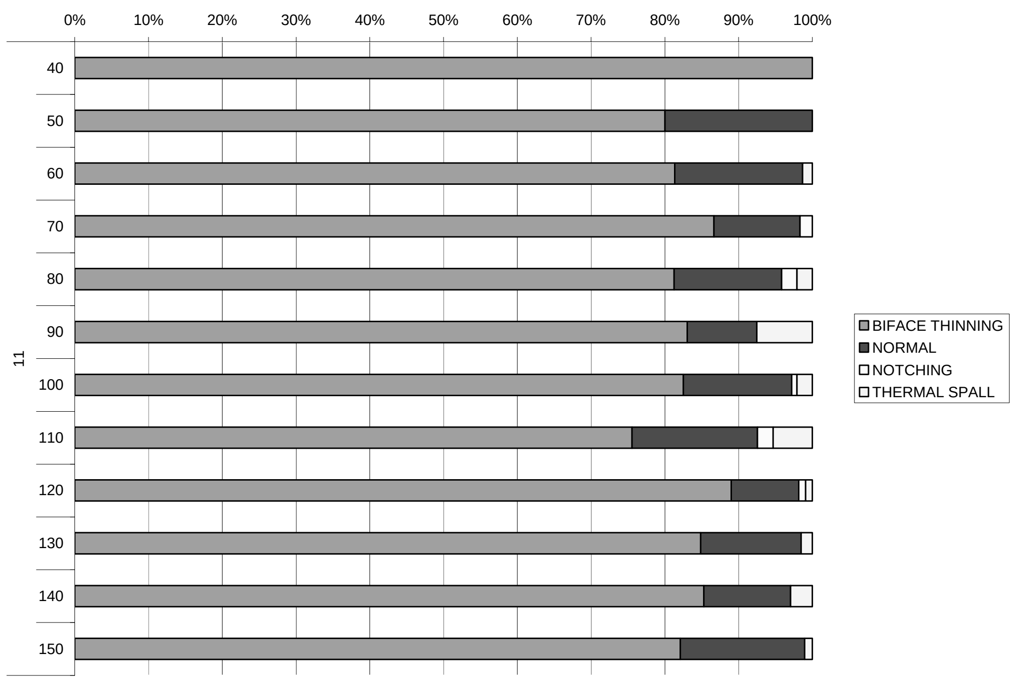

Figure 52. Percentage of flake types for Unit 11. Vertical axis is the percentage, and horizontal axis is the bottom depth of the 10cm level to which the percentages correspond. Color coded key for the flake types is to the right of the graph.

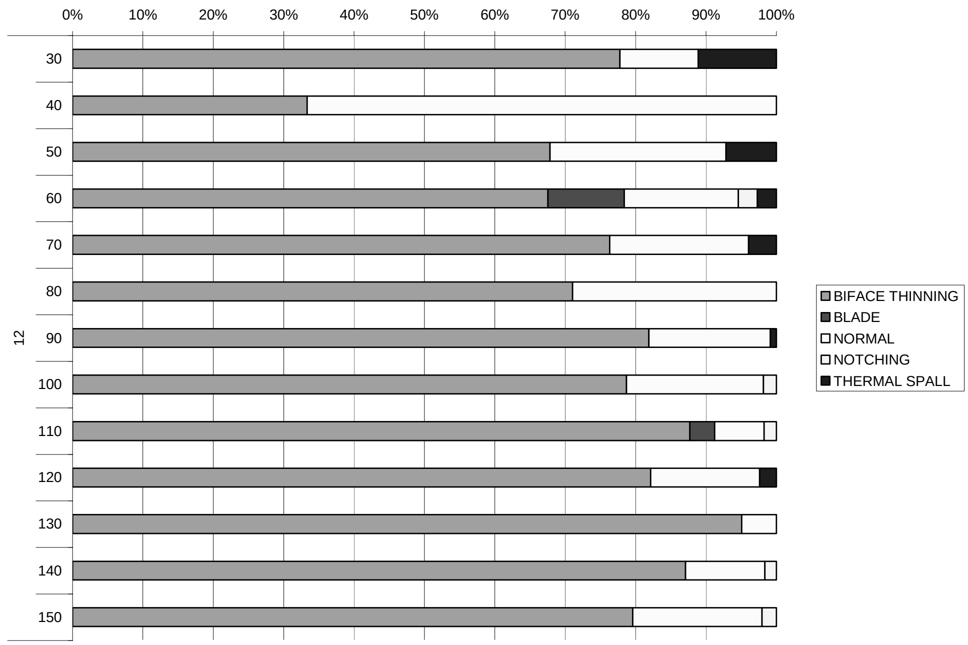

Figure 53. Percentage of flake types for Unit 12. Vertical axis is the percentage, and horizontal axis is the bottom depth of the 10cm level to which the percentages correspond. Color coded key for the flake types is to the right of the graph.

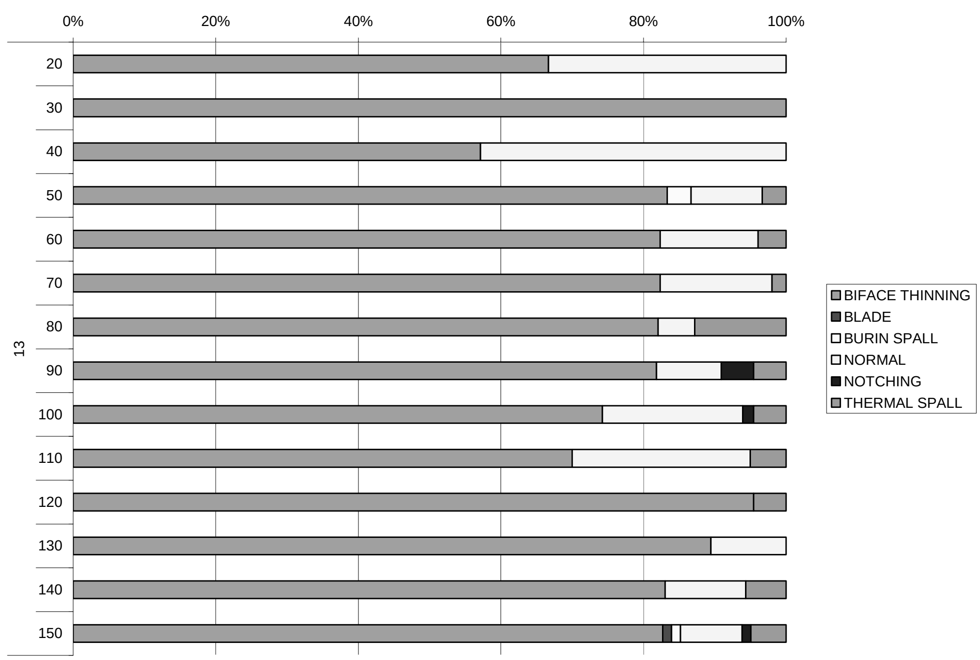

Figure 54. Percentage of flake types for Unit 13. Vertical axis is the percentage, and horizontal axis is the bottom depth of the 10cm level to which the percentages correspond. Color coded key for the flake types is to the right of the graph.

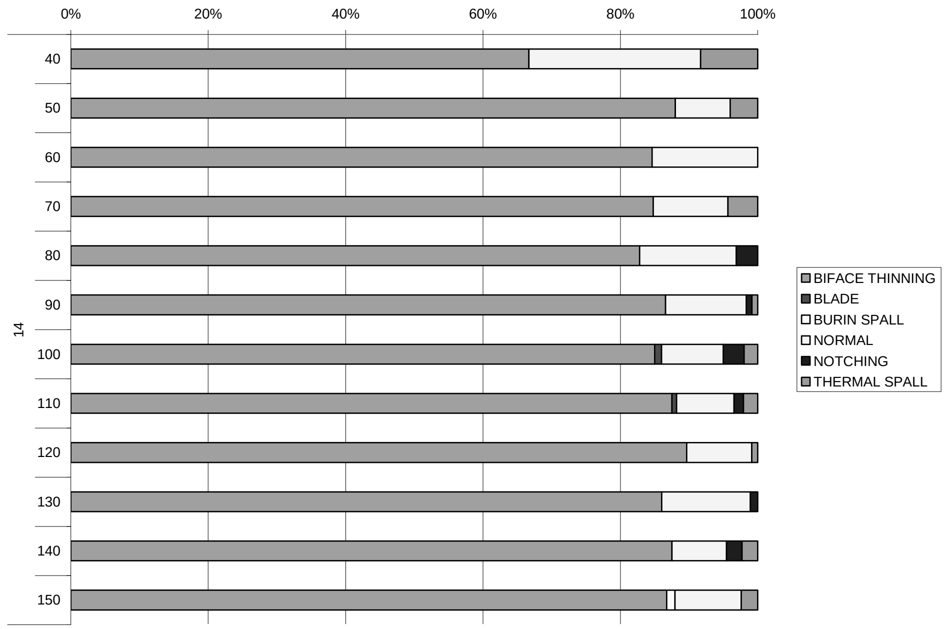

Figure 55. Percentage of flake types for Unit 14. Vertical axis is the percentage, and horizontal axis is the bottom depth of the 10cm level to which the percentages correspond. Color coded key for the flake types is to the right of the graph.

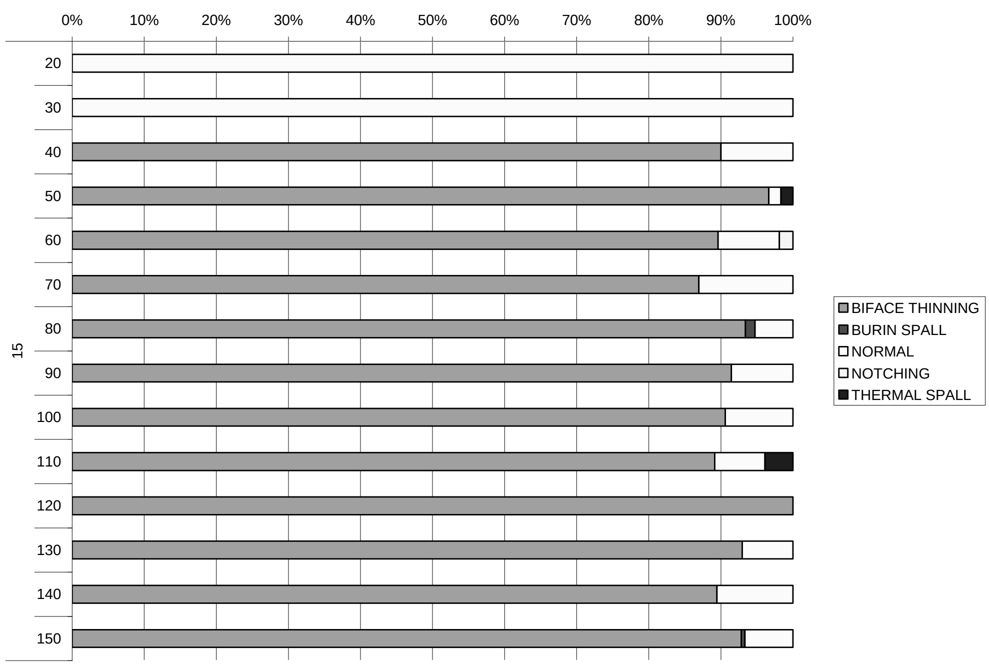

Figure 56. Percentage of flake types for Unit 15. Vertical axis is the percentage, and horizontal axis is the bottom depth of the 10cm level to which the percentages correspond. Color coded key for the flake types is to the right of the graph.

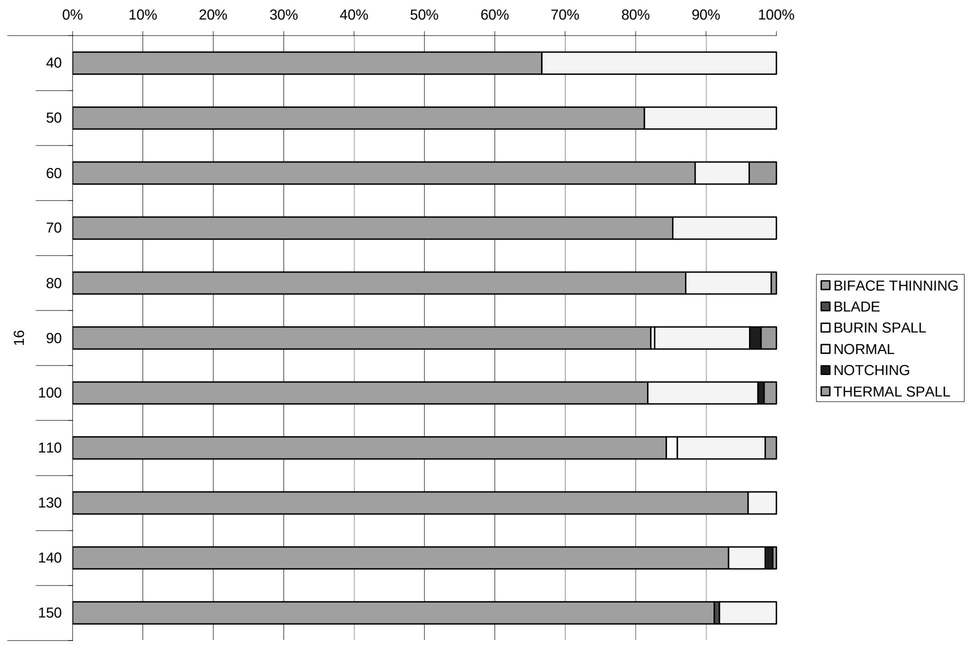

Figure 57. Percentage of flake types for Unit 16. Vertical axis is the percentage, and horizontal axis is the bottom depth of the 10cm level to which the percentages correspond. Color coded key for the flake types is to the right of the graph.

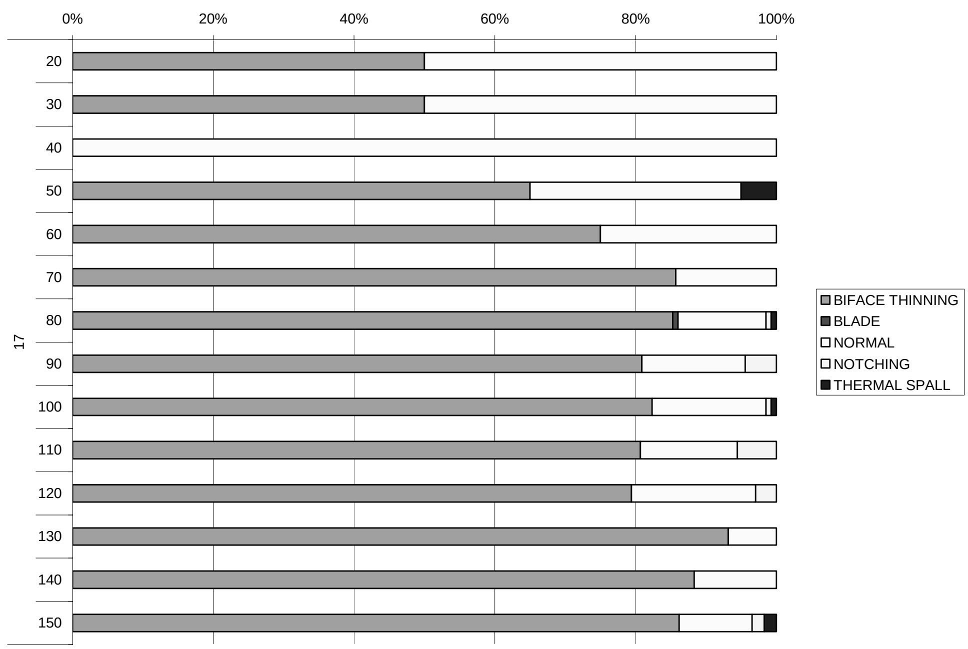

Figure 58. Percentage of flake types for Unit 18. Vertical axis is the percentage, and horizontal axis is the bottom depth of the 10cm level to which the percentages correspond. Color coded key for the flake types is to the right of the graph.

CHAPTER 9: INTERPRETATIONS OF RESULTS & THE ORGANIZATION OF LITHIC TECHNOLOGY AT SITE 41HY160

This chapter presents the interpretations of the data resulting from excavations at 41HY160 in 2001, 2002, 2003, and 2006. The results were presented in chapters seven and eight and in Appendices A-I. The data will first be used to develop a culture chronology represented in the site. The data will then be applied to the research questions from chapter five.

Chronology

The chronology presented here utilizes the accepted time periods for projectile point styles in Texas to determine years before present. There is only one radiocarbon date from the block, obtained in the 2001 Phase 1 investigations. It is a date of 3550±45 B.P. (SR-6101, calibrated age 3833 B.P.) from approximately 70-80cmbs and is associated with a Pedernales point in Unit 6. Unfortunately, the northern part of Unit 9, Unit 6, and Unit 7 were heavily disturbed historically with a trench dug for utility lines no longer in service, and may have damaged the context of this portion of the site. This trench is visible on a photograph of the northern profile of the block (Figure 59). In addition, the termination of excavations in 2006 not only occurred at the end of the field season, but coincided with the upper seepage of the water table.

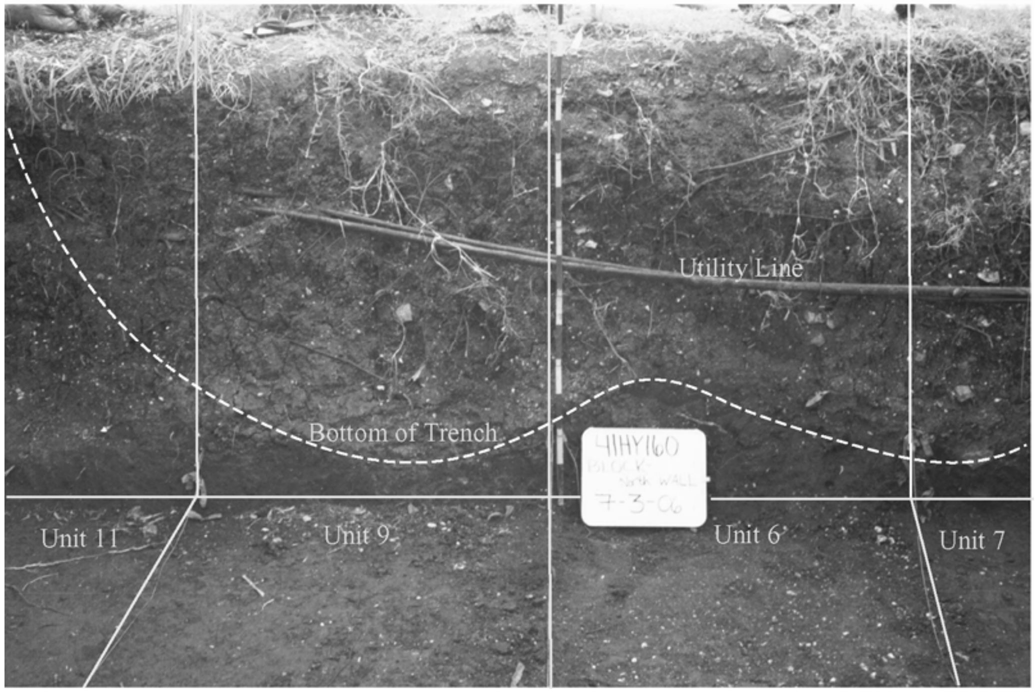

Figure 59. North Profile showing utility trench in dashed line. Vertical scale is in 10cm increments.

The following figures present collapsed views of the block in east to west lines of units, with features, lithic tools, diagnostic artifacts, and features represented. The diagnostic projectile points are used to estimate the potential age of the deposits (Figures 60, 61, 62).

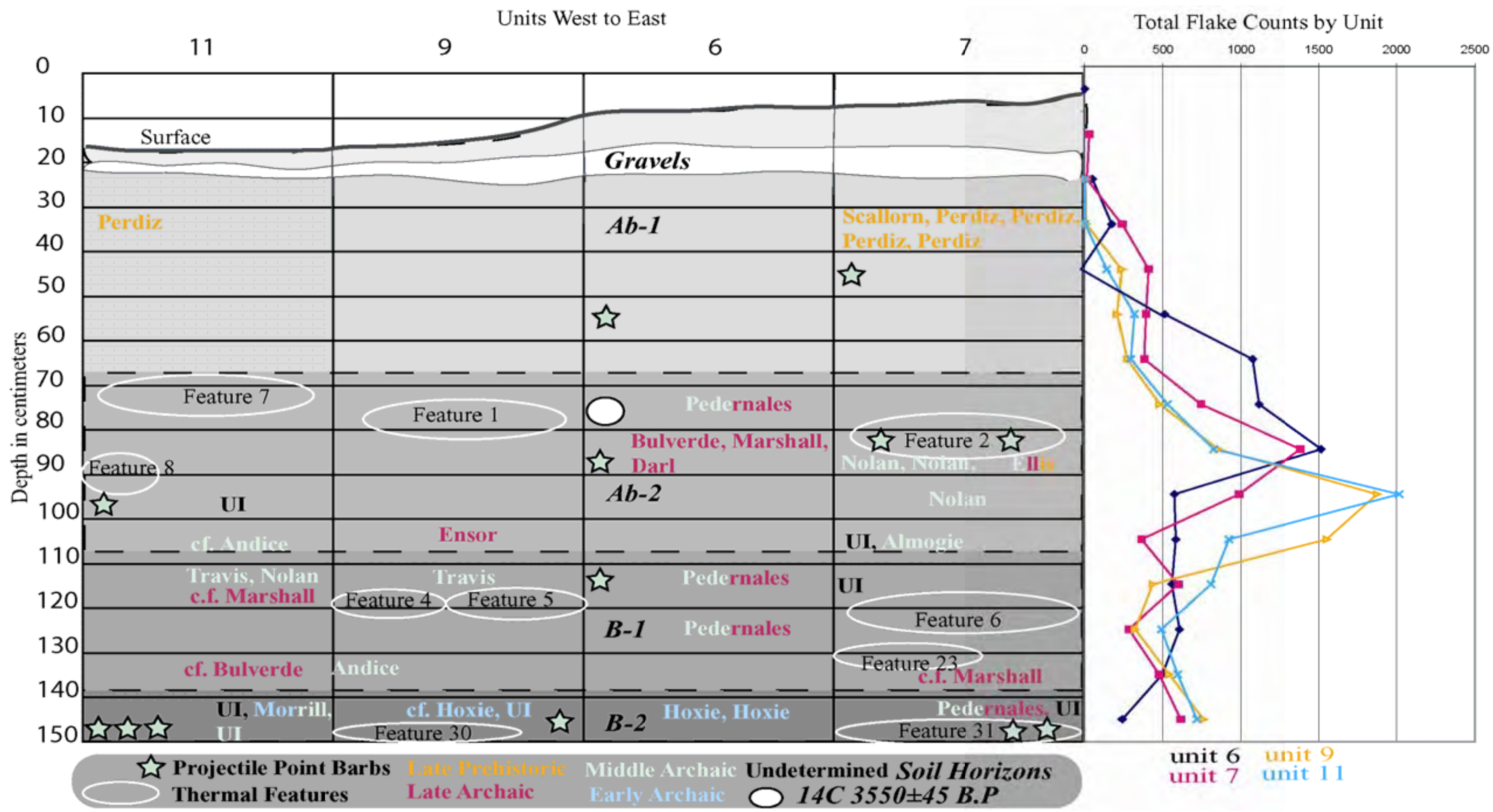

Figure 60. Soil horizons, culturally diagnostic materials, features, and flake counts by depth for Units 11, 9, 6, and 7. The designation c.f. indicates the point resembles the named projectile point, but does not have enough aspect of the point type for a confident determination.

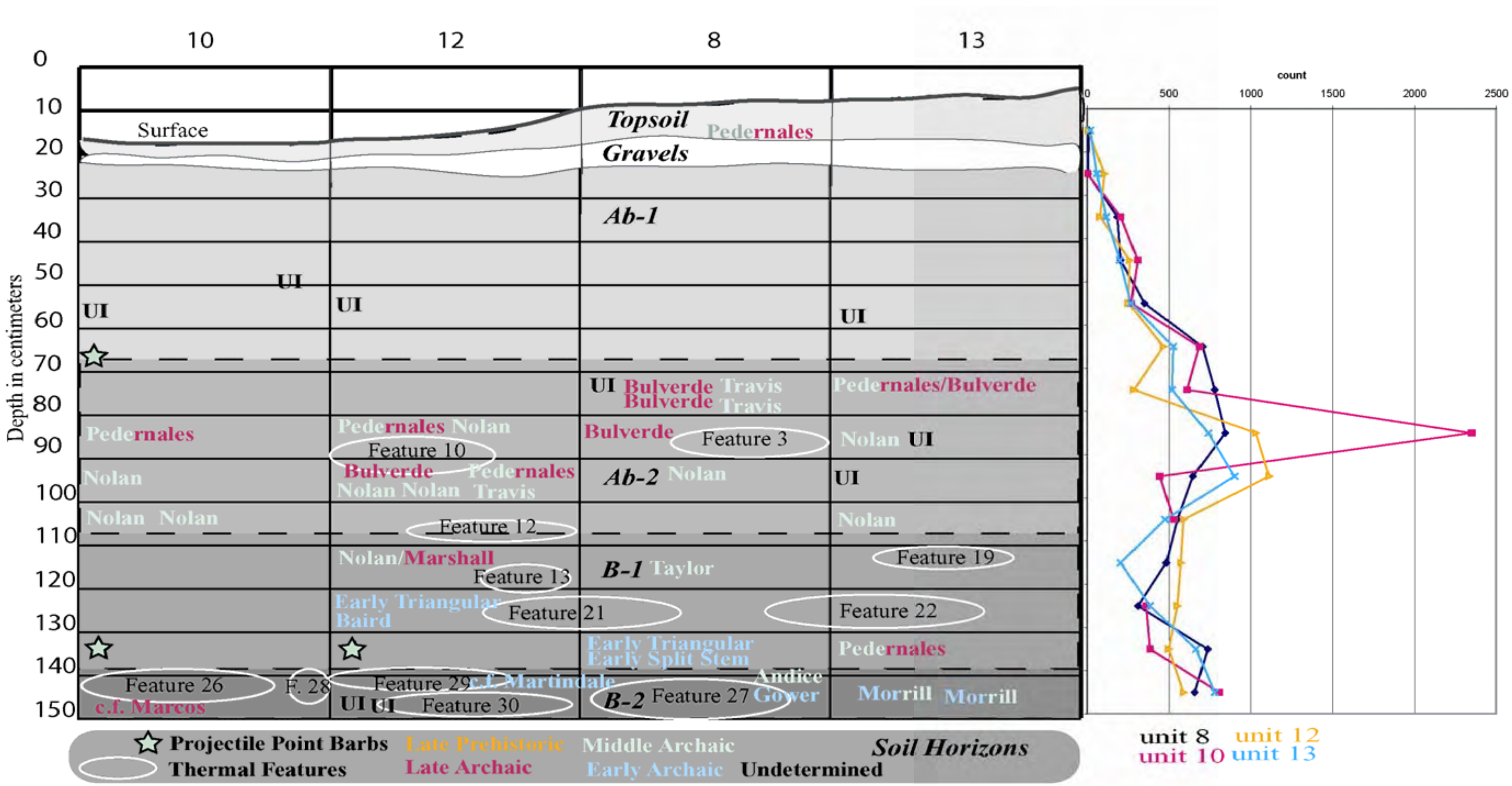

Figure 61. Soil horizons, culturally diagnostic materials, features, and flake counts by depth for Units 10, 12, 8, and 13. The designation c.f. indicates the point resembles the named projectile point, but does not have enough aspect of the point type for a confident determination.

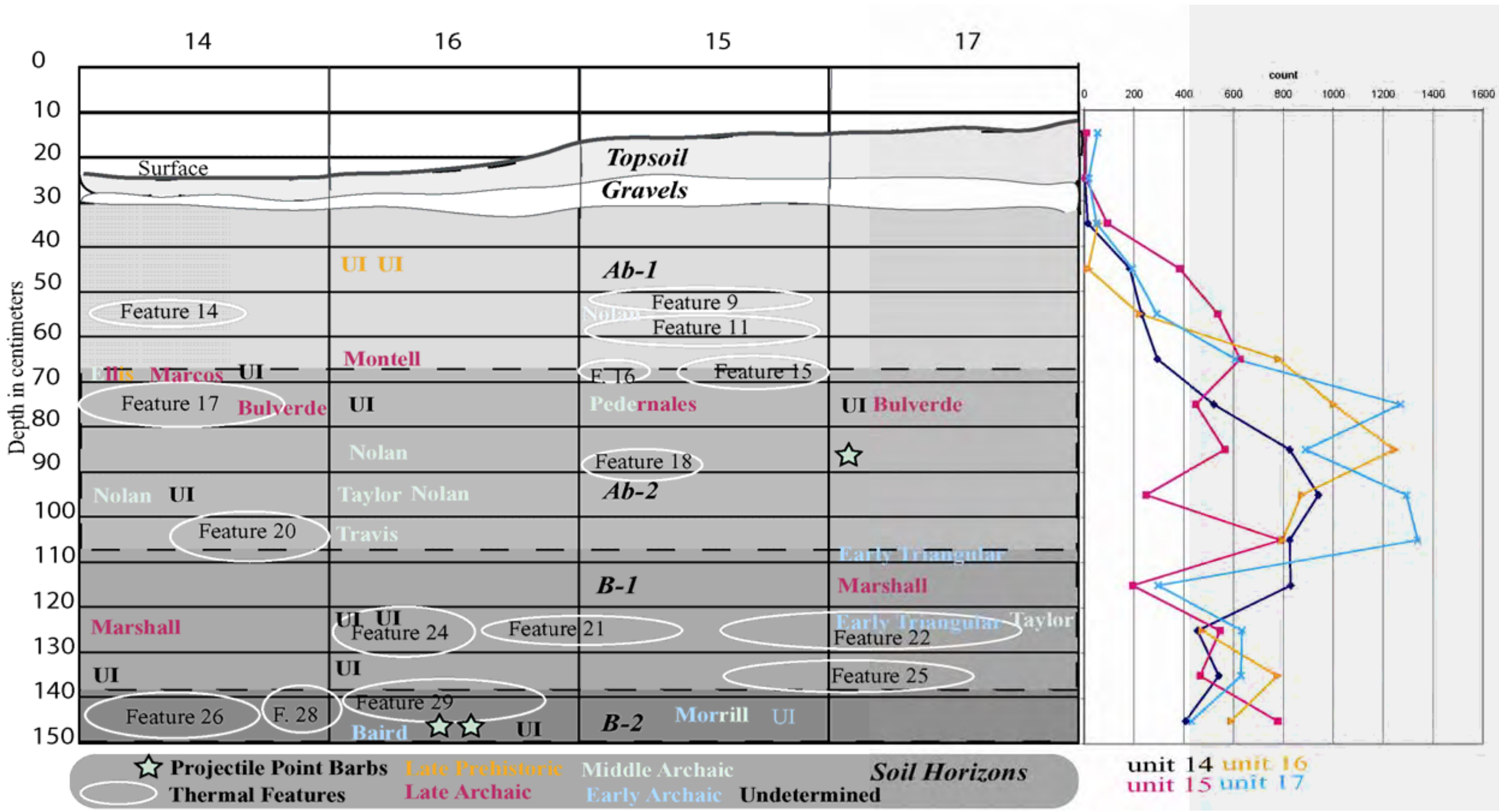

Figure 62. Soil horizons, culturally diagnostic materials, features, and flake counts by depth for Units 14, 16, 15, and 17. The designation c.f. indicates the point resembles the named projectile point, but does not have enough aspect of the point type for a confident determination.

Based on the distribution of culturally diagnostic materials, the following rough chronology can be constructed for this part of 41HY160. The earliest cultural period represented in the block is Early Archaic. This period appears to roughly correspond with the B-2 soil horizon and is found below 135-140cmbs. The depth of this cultural period is unknown because it is located below the termination of excavation. In addition, on an east to west axis, the Early Archaic deposits appear to form a “hump” in the center of the block..

The transition between the Early and Middle Archaic occurs between 120 and 140cmbs, and is generally situated around 130cmbs. The Middle Archaic is by far the best represented cultural period in the block, and the greatest concentration occurs between 70 and 130cmbs, though in some units this can be as shallow as 50cmbs. The geomorphology (Chapter 3) suggests that the end of the deposit should roughly correlate with the late Middle Archaic. A single radiocarbon date of 3550±45 B.P. (SR-6101, calibrated age 3833 B.P.), obtained from Unit 6 between 70 and 80, dates the upper portion of the Middle Archaic deposit the end of the Middle Archaic cultural period, around 4000 B.P.

The Late Archaic occurs primarily between 60 and 80cmbs. However, the Late Archaic cultural period is not as well represented as the Middle Archaic, and there is not a comfortable boundary between the end of Middle Archaic and the beginning of Late Archaic deposits. This may represent a fairly stable landform with compressed cultural deposits, a potential in this area as described in Chapter 3. In addition, the early Late Archaic materials appear to show a deposit that slopes down from east to west towards Spring Lake, at a slope of about 20cm down across the four meter wide excavation block.

Next, the northern four units show an absence of diagnostic tools between 40 and 70cmbs, the middle four units show no diagnostic tools above 70cmbs, and the southern four units show a very small absence of diagnostic tools between 50 and 60cmbs. Except for the southern four units, this absence of diagnostic tools is also accompanied by an absence of identified features. What this may represent is not immediately clear. Some possibilities include an alluvial deposition event, temporary reduction in use of the area, or it may simply be that the diagnostic tools and features are just outside the area of the excavation block.

The Late Prehistoric cultural period is not represented by diagnostic artifacts in the middle four units, but occurs between 30 and 40cmbs in the northern four units, and between 40 and 50cmbs in the southern four units. A Late Historic gravel parking lot, between 15 and 30cmbs depending on the location, caps the prehistoric deposits and marks the use of the area as a tourist destination. This gravel parking lot is covered by modern soils and detritus.

There are a few diagnostic projectile points that do not conform to this interpretation of the chronology. At least one of the Pedernales points was recovered from the bottom of the utility trench, so that is one obvious explanation. The other "out of place" points do not occur in such an easily explained context. They may represent animal or human turbation events, rootfall, argilliturbation, or landform disruption caused by the movement of the Sink Creek channel after the Middle Archaic. Additionally, some of the points may simply represent a variation in style. For example, there is a Late Archaic Marshall point in the Middle Archaic deposition, but there is also a point in this same deposit that is morphologically half-way between a Middle Archaic Nolan and a Late Archaic Marshall point.

Research Questions

The main research question from chapter five is, “Is there evidence of organization of technology at site 41HY160 during the Archaic period? If so, what is this evidence, does it change through time, and what may this mean about the lifeways of the people that deposited them?” To reiterate how this question will be answered, here are the questions that need to be asked to answer this question.

1. Are models based on extant evidence visible at site 41HY160?
2. Can lithic tools at site 41HY160 be designated as maintenance or extractive, and if so, how?
3. Can lithic tools at site 41HY160 be assigned measures of reliability, maintainability, and expediency, and if so, how?
4. What do the optimality models reveal about the mobility patterns discernable in the archaeological record at 41HY160?
5. Does the organization change through time? If so, when, and does it correlate with other changes visible in the archaeological record?
6. What aspects of environment, ecology, and geography evident in the archaeological record might account for these patterns?

Are models based on extant evidence visible at site 41HY160?

This is the broadest of the questions, and the proof for it is in the answers of the following five questions. These questions show that there is evidence to apply existing models to site 41HY160.

Can lithic tools at site 41HY160 be designated as maintenance or extractive, and if so, how?

To reiterate the designations of maintenance and extractive, extractive tools are those used to extract resources from the environment and maintenance tools are those used to make and maintain extractive tools. The answer to this question is yes, but not all of the tools are clearly one or the other. The projectile points, 134 in whole or in part, are extractive tools. Some of the other tools, like the adzes, may also be extractive tools, but only the projectile points represent extractive tools that can be applied to most of the aspects outlined in Chapter 5. As for maintenance tools, they are more difficult to determine, and may not have been preserved if they were deposited. The concave scrapers, the type that used to be called "spokeshaves," and the hammerstone can be designated maintenance tools. The quartzite hammerstone is an uncommon find for this area, as described in Chapter 2, and represents a different availability than the chert used for the chipped tools. The scrapers also have a very small sample size. The material is available, so that is not the issue. They may be in a different area of the site, the people may have had a tendency to use flakes as scrapers, or general scraping activities may simply not have occurred here. Alternatively, it was simply a manner of tradition; some of the bifaces and at least one of the recycled projectile points have unifacial trimming, so it is quite possible that bifaces were being used as scrapers.

The majority of the non-projectile point tools, the non-diagnostic bifaces, cannot easily be labeled as extractive or maintenance. In addition, they may represent a finished tool, a portable source for making new tools, or both. It is because of this difficulty that they are not being used for the detailed analysis.

Furthermore, it was determined that only chert tools would be used for this analysis of technological organization, due to its durability. Since maintenance tools for the identified extractive tools may not be lithics, the factor of maintenance tools can not successfully be used to apply models of technological organization to 41HY160. For this reason, the rest of the questions are answered in regards to extractive tools only.

Can extractive lithic tools at site 41HY160 be assigned measures of reliability, maintainability, and expediency, and if so, how?

In order to answer this question, only projectile points were used. This is because the projectile points, or mostly symmetrical chipped stone tools with a pointed end opposite a haft element, are easily recognized as a tool type and are the tool type on which most archaeological models of technological organization are based. To surmise the previously discussed measures from Chapter 5, reliability indicates the effectiveness of the tool, maintainability indicates how many times a tool can be repaired or resharpened before it is ineffective, and expediency indicates how quickly a tool can be manufactured (Bleed 1986; Torrence 1989; Bousman 1993; Bamforth and Bleed 1997).

Using the criteria outline in Chapter 5, measures of maintainability, in the form of degree of resharpening, was the measure that was determined to be the most visible and the measure with the most reproducible results.

Reliability. There was a great degree of variation in form, so degrees of measure of reliability were not examined. In addition, the majority of the styles represented can be resharpened multiple times before exhaustion, and are represented by numerous unbroken and broken specimens; the points, such as the Andice, that are more stylistically specialized and are represented by more broken specimens, are not represented by a large enough number to confidently analyze this aspect.

Expediency. No replication experiments were conducted to determine the time it takes to create the different forms, so measures of expediency were not applied to the projectile points. Although some expedient tools were recovered, in the form of utilized flakes and cores, their frequency was low enough that it was determined that their inclusion as a expedient to formal tool ratio would not add much to this study.

Maintainability. The degree of resharpening of projectile points was the most obvious variation that could be measured within the assemblage. Resharpening can be used as a measure of the maintenance performed on the tools (Bousman 1993), and it was used as such for the 41HY160 assemblage.

The degree of resharpening was labeled as none, little/none moderate, and extensive. None indicates that no resharpening is visible, and all of the flake scars that initially shaped the projectile point are intact. Little/none indicates there may be some retouch or a single episode of light retouch, in the form of minimal, small flake scars on the very edge of the blade, interrupting the regular nature of the flake scars that appear to have shaped the projectile point. Moderate indicates the likelihood of one or two episodes of retouch, in the form of obvious flake scars, largely on the edges of the blade, that interrupt the regular nature of the flake scars that shaped the projectile point as well as previous resharpening scar, as well as a few flake scars intruding into the inner surface of the blade. Extensive indicates multiple episodes of retouch that have dramatically altered the blade, indicated by numerous obvious flake scars that interrupt the regular flaking that shaped the projectile point, intrude over a large percentage of the blade surface, and may even reform the projectile point such that the style is not recognizable. If a tool has been obviously recycled, an aspect that may represent a more collector tendency in organization (Bleed 1986; Torrence 1989; Bousman 1993; Bamforth and Bleed 1997), an attempt was made to determine if the tool had been resharpened as a projectile point before being recycled.

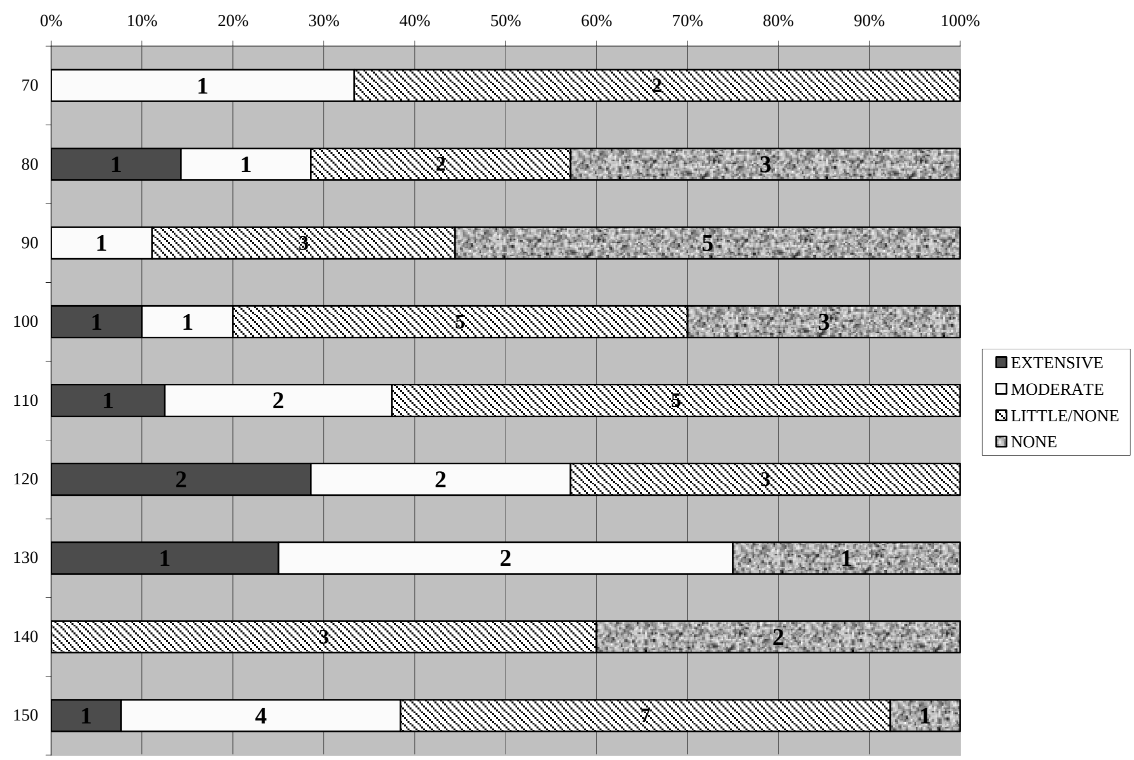

Figure 63. Percent of resharpening, divided into extensive, moderate, little/none, and none, by depth, all Units, all Levels. The vertical axis is the bottom depth of the 10cm level associated with the artifacts, the horizontal axis indicates percentage. The numbers within the colored bars represent the actual number of projectile points that bar represents.

As shown in Figure 63, there is great variability in resharpening as measured by depth. There are peaks in resharpening around 120-130cmbs, associated with the Early to Middle Archaic transition and the early Middle Archaic, and 80cmbs, likely associated with the late Middle Archaic and the Late Archaic. A marked decline in resharpening occurs in the 90-100cmbs level, likely associated with the late Middle Archaic. In addition, a clear trend appears, showing a transition through time of a decline in resharpening across the assemblage between 130 and 90cmbs, and perhaps the beginning of a second increase in resharpening after 90cmbs. 70cmbs represents the shallowest level with whole dart points, representing both the end of the clearly Archaic deposit and measurable sample validity.

The results from the resharpening determination were submitted to statistical analysis (Appendix H). In particular, chi-square, Goodman and Kruskal's Gamma analysis of ordinal variance, and Pearson's R were used.

Chi-Square. First of all, it is recognized that chi-square is not always used for ordinal data, and it is not considered very accurate if most of the cells contain number of five or less. However, this is one of the more common statistical methods used for determining the significance of change in degree of resharpening in organization of technology studies. For 41HY160, this data was run in two variations. One variation was to use the four presented categories; the other variation was to combine extensive and moderate, and to combine little/none and none. Using a chi-square analysis for the entire dataset, the dependent relationship between depth and degree of resharpening expressed in four categories was not significant, and the relationship using two categories only significant at $\alpha=0.30$. In an adjusted residual analysis of the cells in the two-category analysis, no cells were deemed significant assuming α=0.05 and z_c=2. However, the cells associated with 90cmbs, 120cmbs, 130cmbs, and 140cmbs contribute most to the significance, and are very close to being significant.

Goodman and Kruskal's Gamma Analysis of Ordinal Variance. The clear Middle Archaic sequence of decline in degree of resharpening, from 90 to 130cmbs, was also subjected to analysis, specifically analysis of ordinal variance using Goodman and Kruskal's Gamma. Like the chi-square analysis, two versions of the data were submitted, one using four categories and one using two. Both of these analysis indicated that this sequence is significant at α=0.05.

Pearson's R. The final method of analysis used was Pearson's R. The closer to 1.00 or -1.00 in Pearson's R, the more "perfect" the relationship. In order to perform this analysis, the two-category division of degree of resharpening for 90-130cmbs was converted to percentages. Then, the relationship between greater degree of resharpening and depth was calculated. This analysis showed that there was a 0.993 positive relationship between an increase in greater resharpening and increased depth. As this number is very close to 1.00, it indicates a strong relationship.

The percent of resharpening can also be broken down by point style (Figure 64) and by a combination of point style and depth (Figure 65).

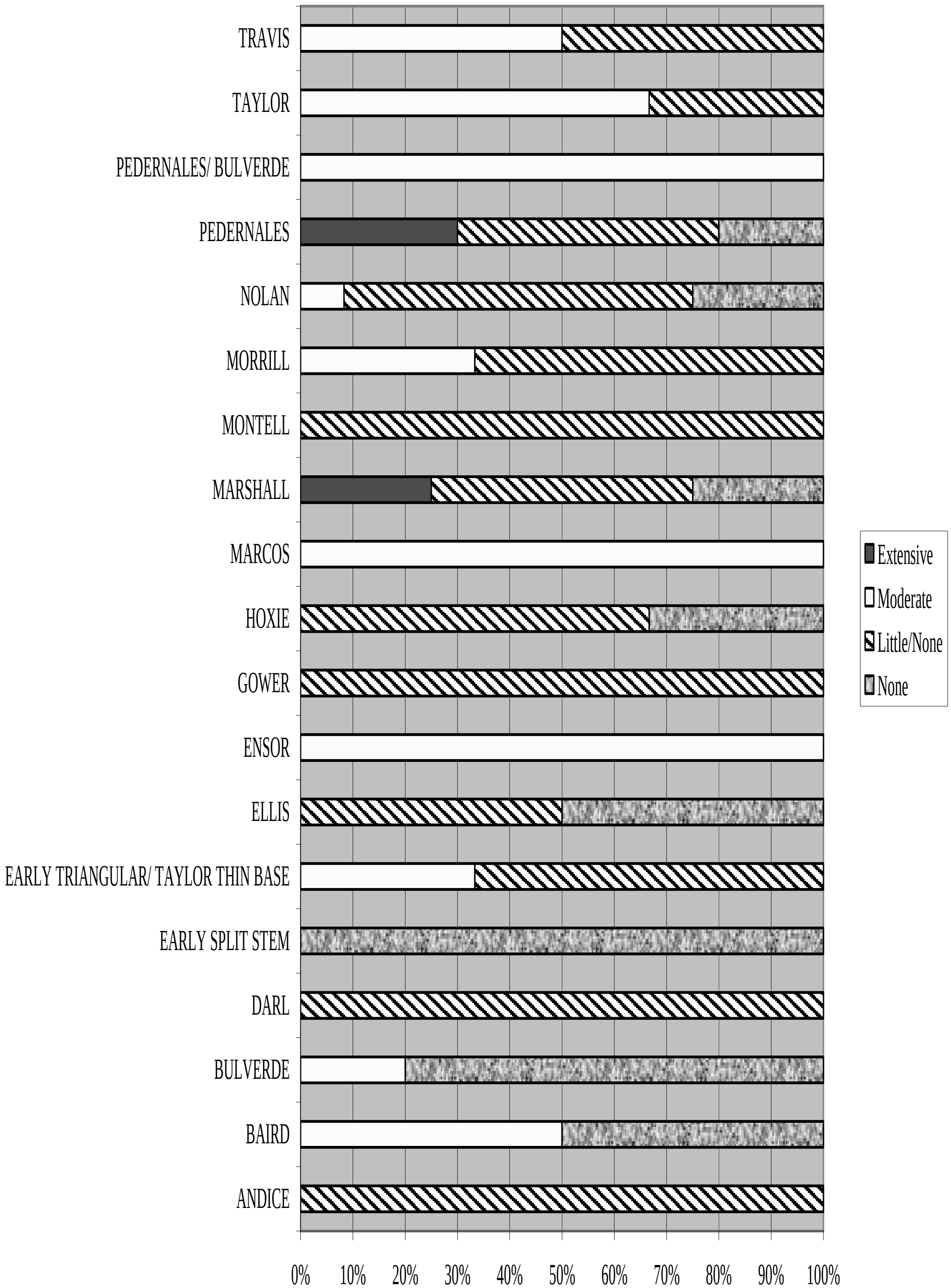

Figure 64. Percent of resharpening, divided into extensive, moderate, little/none, and none, by projectile point style type. The vertical axis is types, the horizontal axis indicates percentage.

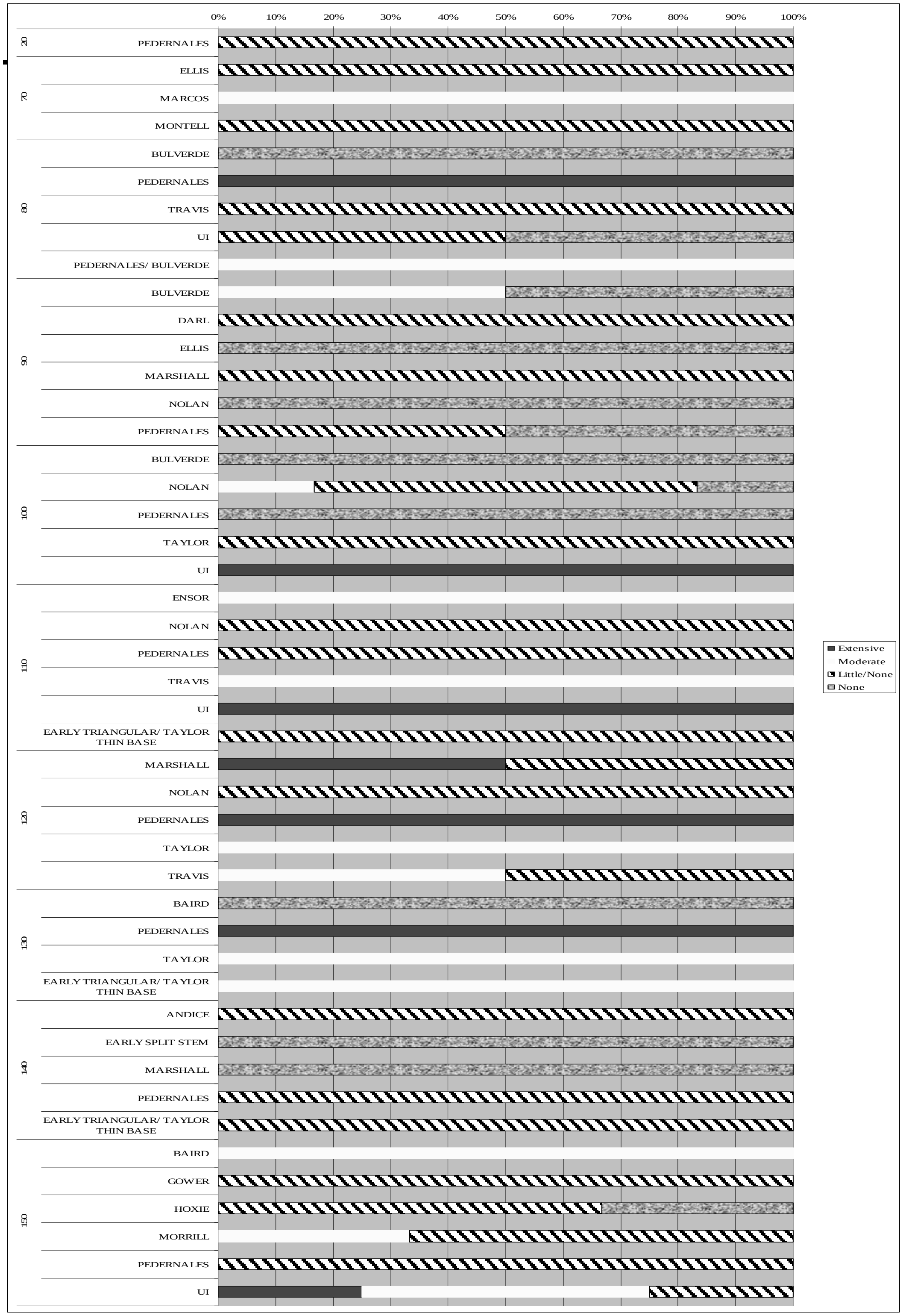

Figure 65. Percent of resharpening, divided into extensive, moderate, little/none, and none, by depth and type, all Units, all Levels. The vertical axis is the bottom depth of the 10cm level associated with the artifacts and the point style, the horizontal axis indicates percentage.

These figures (64 and 65) show that, among the identified types, Pedernales and Marshall points exhibit the most resharpening, and the Early Split Stem, Hoxie, Gower, Darl, Ellis, Montell and Andice exhibit the least amount of resharpening. When divided by depth, some of the point styles exhibit a change in the amount of resharpening through time. For example, the Nolan and Travis projectile points present a decrease in resharpening between 110 and 80cmbs.

In addition to four category division of degree of resharpening, the surface area of the point faces that bear resharpening scars was determined (Table 9). This was figured by calculating the flat surface area of the flat face of the projectile point, the flat surface area of the resharpening scars, and the flat surface area of the stem. The resharpened area was subtracted from the area of the face, and the flat surface area of the stem was subtracted from this number.

Table 9. Percent of face area bearing resharpening scars, and percent of face area minus the stem area bearing resharpening scars, separated by depth.

Average of % face resharpened on whole points		**Average of % face resharpened minus the stem on whole points**	
depth	**Total**	**depth**	**Total**
80	45.56%	80	68.45%
90	25.90%	90	33.96%
100	25.69%	100	36.32%
110	22.66%	110	31.94%
120	30.09%	120	39.99%
130	46.99%	130	65.94%
140	19.79%	140	24.46%
150	26.16%	150	35.12%
Grand Total	28.35%	Grand Total	38.83%

This computation was conducted to serve as a numeric source to compare to the analyst-determined categories already discussed. This numerical representation of resharpening shows peaks at 80 and 130cmbs, the same as the analyst-determined categories of resharpening. The numerical representation shows limited resharpening at 90, 110, and 140cmbs. The 90 and 140cmbs levels correspond with levels of reduction of resharpening in the visual observation, and the 110cmbs peak occurs along the visually observed continuum of resharpening reduction. However, the numeric analysis did not exhibit the same clear trend in increase in resharpening associated with increase in depth.

It should be noted that the numeric measure did not account for resharpening that was part of recycling the point into another tool type. For example, the only whole Andice appears to have been resharpened only once, if at all, before it was recycled into a scraper. Without artificially reconstructing the original margins, the numeric measure method used cannot accurately measure the pre-recycling degree of resharpening.

What do the optimality models reveal about the mobility patterns discernable in the archaeological record at 41HY160?

In utilizing the optimality models to analyze mobility patterns, the assumption is made that differences in organization indicate differences in mobility. However, without extensive regional site comparisons, the data only reveals the nature of organization. Using the criteria in Chapter 5, resharpening is the most readily apparent aspect of the physical manifestation of organization of technology visible in the archaeological record at 41HY160. Using this aspect, a more forager organization will exhibit relatively extensive resharpening, and a more collector organization will exhibit rapid tool replacement as reflected relatively little to no resharpening (Torrence 1989; Bousman 1993; Bamforth and Bleed 1997).

Referring back to table 9 and figure 63, there are changes in organization based on resharpening criteria. At the lowest excavated level, 150cmbs, there appears to be a more forager organization, a tendency towards a more collector organization at 140cmbs, and then a reversal of this tendency at 130cmbs. From this point, there appears to be a gradual progression to a more collector organization, which peaks at 90cmbs. At this point, there appears to be the beginning of a gradual progression back to forager organization. Of these changes, the gradual progression between 130 and 90cmbs was the only one determined to be significant.

There is no designated “switch” along the continuum between collector and forager organization; these designations of forager and collector organization are in relation to each other. However, when compared to ethnographic data the overall organization style represented by the assemblage would likely fall on the more forager end of the continuum. The observed changes, then, are movements contained within the forager side of the continuum.

Does organization change through time? If so, when, and does it correlate with other changes visible in the archaeological record?

The manner of organization does change through time. Using the geomorphology, site formation processes, and culture chronology outline in Chapters 2 and 3, as well as the results of excavations, summed in Figure 66, a few things can be assumed.

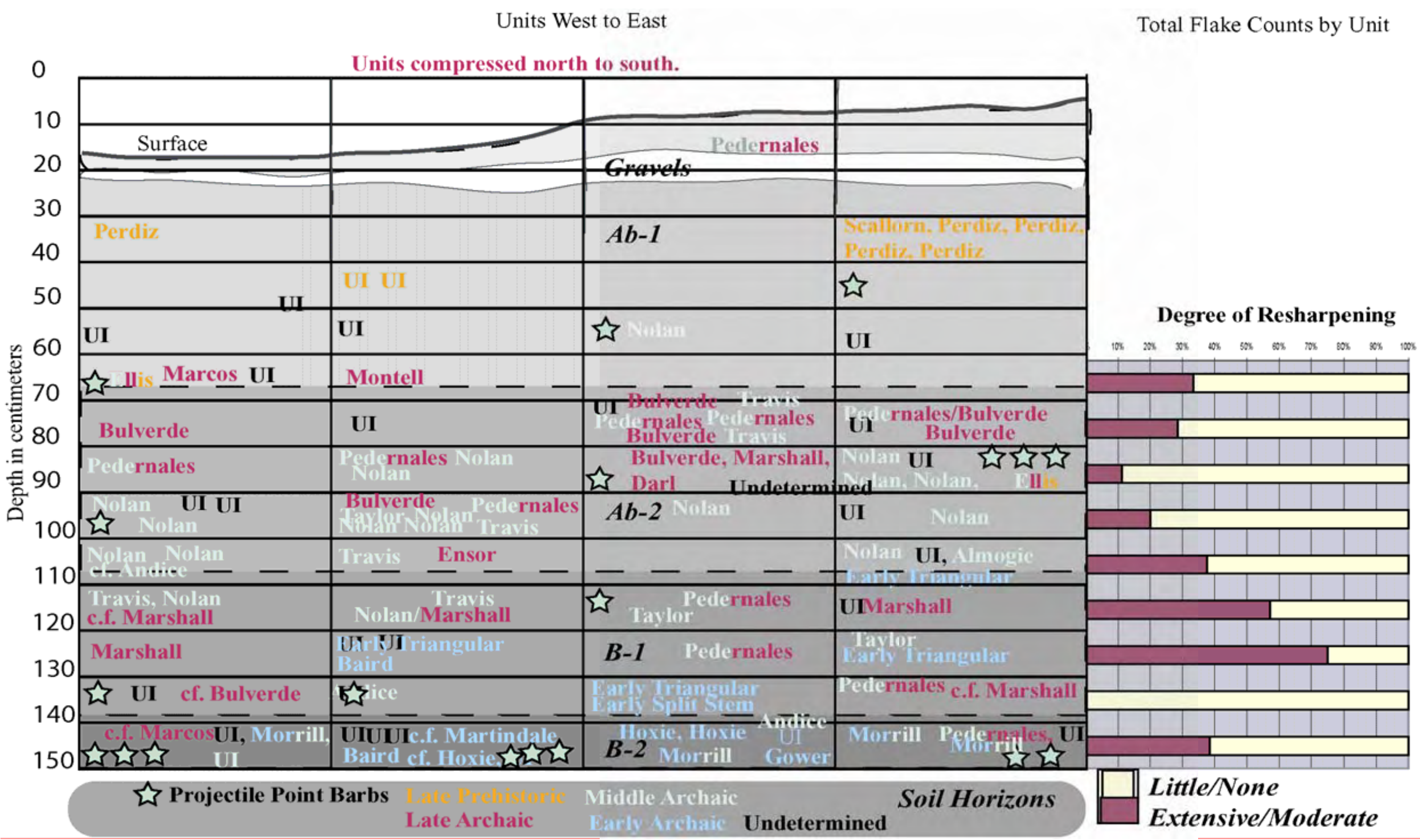

Figure 66. Representation of cultural time periods by diagnostic artifacts, north to south units compressed from chapter 8 table. Also, the degree of resharpening, in two categories, is provided to the side for a comparison of results.

First, the Early Archaic deposits should be from the Early Archaic but without further excavation to compare the block to older materials, a better determination cannot be made.

The Middle Archaic, on the other hand, appears to be well-represented. The depositional rates determined by the cores indicate the vertical distribution of Middle Archaic materials should be able to be viewed as representative of the Middle Archaic cultural time period. The Middle Archaic deposit likely represents depositional Unit D; the single radiocarbon date from the upper part of the Middle Archaic deposit corresponds to the end of the Middle Archaic time period, further strengthening the determination.

Finally, the Late Archaic mingles and sits atop the late Middle Archaic deposits, and probably is not well-stratified or represented. The changes between the Early and Middle Archaic are clearly visible, the Middle Archaic is well represented, and the mingling of Middle and Late Archaic deposits is clear.

With this correlation between deposition and cultural periods used to date the depositions, a rough correlation can be made between cultural changes and changes in the organization of technology. The late Early Archaic is correlated with the deepest recognized episode of forager organization in the excavation. Then, the transition between the Early and Middle Archaic is associated with a more collector organization. Shortly after the beginning of the Middle Archaic, there is a switch to a stronger forager organization, and a gradual progression through the Middle Archaic to a more collector organization. At the end of the Middle Archaic, and possibly into the Late Archaic, there is a switch in the gradual progression back towards forager organization.

What aspects of environment, ecology, and geography evident in the archaeological record might account for these patterns?

If the deposit represents the whole of the Middle Archaic as the geomorphology and cultural chronology appear to indicate (Nordt 2007), then the Middle Archaic deposit can be roughly correlated in time to the of the Altithermal evidenced across the Southern High Plains and Central Texas (refer to Chapter 3).

David Meltzer (1999) has noted that there are trends on the Southern High Plains, of which Central Texas is the southernmost section, that may indicate reduced residential mobility during the Altithermal. Meltzer (1999) uses regional climate and archaeological data for his analysis. It appears that areas without reliable water sources were practically abandoned during the course of the Middle Archaic, and the use of springs and the digging of wells increased. Meltzer (1999) used this trend during the Middle Archaic to postulate reduction in territory and residential mobility.

In Central Texas, regional climatic data indicates that the Altithermal definitely manifested in the region (see Chapter 2). This may be further supported by the geomorphology of 41HY160 by Nordt (2007) that indicates that the deposits associated with the Middle Archaic cultural material mark a dramatic change in fluvial geomorphology, and may show evidence of flooding across a parched landscape. These two aspects appear to associate the Middle Archaic deposits at 41HY160 was affected by the Altithermal.

In addition, NAME'S (2000) analysis of the source of chert at Wilson-Leonard also showed a relationship to the Althithermal. In the deposits associated with the

Altithermal, it was determined that the chert in the assemblage came from less varied and closer sources. This supports the idea that as the Altithermal progressed, people tended to utilize resources closer and closer to reliable sources of water. Utilizing a small territory of resources may represent a general trend towards a reduction in residential mobility.

Under this assumption, then the progression from a more forager to a more collector organization through the Middle Archaic also follows the inception of the Altithermal. Using Meltzer's (1999) determination that the Altithermal caused a reduction in residential mobility, and NAME'S analysis showing a reduction in the territory of exploited resources at Wilson-Leonard in Central Texas, it can be tentatively deduced that the progression from forager to collector organization may have followed a reduction in residential mobility. Such a change, that foragers can adopt aspects of more collector organization to cope with risk, in this case the Altithermal and all it entails, has been described by Bousman (1993).

Additional Interpretations

In addition to the chronology and research questions discussed above, other interpretations can be made regarding the data recovered at 41HY160. These most obvious of these is tool reduction sequence. The flakes recovered from 41HY160 are predominately biface reduction flakes and exhibit a very low amount of dorsal cortex. This would indicate that the initial testing and cortex removal likely occurred elsewhere. That elsewhere may be nearby, such as on the uplift just on the other side of the San Marcos Springs, possibly near 41HY37.

CHAPTER 10: CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Throughout history, most people have lived as hunter-gatherers. If this significant portion of human history is to be better understood, then a better understanding of the resource procurement strategies in prehistoric groups is needed to enhance the scant ethnographic record. One testable means of understanding these resource procurement strategies is by the theories of the organization of technology, physically visible remains of how humans have managed their risk. The creation of technological organization models utilizing lithic material is especially useful because of the enduring nature of lithics; even when all the organic artifacts are long decayed, the lithic artifacts may still survive. Such models were utilized in the analysis of the artifacts from 41HY160.

41HY160

Prehistoric people in Central Texas were hunter-gatherers. One of the sites these people utilized was the area around the San Marcos Springs, including 41HY160, from which the data for this thesis was obtained. The chronology of the site, as shown by diagnostic projectile points, geomorphology, and a single radiocarbon date, shows that the Middle Archaic is well represented at 41HY160. This was predicted by the geomorphology.

Chronology

In the excavation block, the lowest levels, just above the groundwater level, contained Early Archaic diagnostic artifacts. Just above these materials are diagnostic artifacts associated with the end of the Early Archaic and beginning of the Middle Archaic. Above these, the Middle Archaic represents the largest cultural component of the assemblage. With only a few problematic diagnostic artifacts, the upper portion of the Middle Archaic deposit is somewhat mingled with and mostly capped by early Late Archaic diagnostic artifacts. Whereas the Early Archaic deposits form a “hump” in the middle of the excavation block, the early Late Archaic diagnostic artifacts top a Middle Archaic deposit whose top is sloping towards Spring Lake.

Organization of Technology & Research Questions

The lithic tools from 41HY160 were examined to determine if they exhibited trends in organization of technology. Although the general nature of organization in the area is likely a more forager organization, it was evident that oscillations could occur within this designation and did occur at 41HY160 (Chapters 5, 9).

In the examination of the organization of technology, it was determined that the chert assemblage did not have a strong representation of maintenance tools, so only extractive tools were utilized in the analysis. It was further determined that projectile points would be the most reliable extractive tool to analyze because they have a definable state (Chapters 5, 9).

The projectile points were examined to see if they could be analyzed for measure of maintainability, reliability, and expediency; these are measures based on ethnographic models that can be used to determine the manner of organization of hunter-gatherers, on a continuum of collector to forager organization (Chapters 5, 9). It was determined that, given the nature of the assemblage, only maintainability could be measured (Chapter 9).

Maintainability was examined via resharpening. It was determined that there was a significant decrease in the degree of resharpening as the Middle Archaic progressed.

The progression of the Middle Archaic is also associated with the progression of the Altithermal, a severe warming and drying trend that strongly affected Central Texas. A study on the Southern High Plains suggests that people reduced mobility and concentrated around springs and wells as the Altithermal progressed; a study of chert sources represented at Wilson-Leonard showed that, as the Altithermal progressed, the source of lithic materials represented at the site became closer and less varied. Although there is not enough data present in this study to determine if trends in manner of organization at 41HY160 also represents a change in residential mobility, this data shows that the change in organization could very well have reflected some degree in change in residential mobility.

Recommendations

Site 41HY160 is a rich site containing evidence of the prehistoric and historic occupations of Central Texas (Chapter 2, Chapter 8, Chapter 9). The site has thus far produced abundant lithic resources and cultural features from the Late Prehistoric, Late Archaic, Middle Archaic, and Early Archaic cultural periods in Central Texas (Chapter 8, Chapter 9). Evidence from geoarchaeological coring indicates that this site may also contain more Early Archaic and Paleoindian artifacts below the water table (Chapter 2, Chapter 3).

In the Phase 1 investigations, several questions were answered. Two of these proved to be quite valuable to this thesis. First, the geoarchaeology of Sink Creek valley, in which 41HY160 is located, was described, and proved an invaluable resource in the discussion of the results for this thesis. Second, a combination of mean flake length and soil magnetic resistivity were show to be fairly reliable indicators of naturally versus culturally deposited layers; this measure showed that the area around the block excavated for this thesis was continually occupied, with few if any natural intrusions into the culturally deposited layers.

In the analysis of the materials recovered as part of data recovery at 41HY160 in 2001, 2002, 2003, and 2006, the question was asked, "Can organization of technology models be applied to the Archaic deposits at 41HY160 and, if so, what does it reveal about the organization of the people and cultures who occupied 41HY160 throughout the Archaic?" This question was answered, and is discussed in Chapter 9.

Future Research

There are still many other questions and lines of research that can be answered by 41HY160, both by the materials and manifestations still in the ground and by the materials already recovered and stored at CAS. Some of these potential questions are listed here, but it is by no means an exhaustive list.

One question that can be asked here regards the nature of deeper deposits. If the excavation could continue, via complex water removal methods, the cultural association with the deposition could continue to be developed, and the nature of the Paleoindian deposits can be better understood. In addition, such an investigation could continue the sequence presented in this thesis, and provide a view much deeper in time of the organization in technology at 41HY160.

Another question that could be asked is, “What is the reduction sequence apparent at 41HY160 through time, and does it change?” There were tens of thousands of flakes recovered, and a more complex analysis than that conducted for this thesis may reveal insight into this question. This is especially pertinent because of the very high percentage of flakes identified as biface thinning flakes, some of which are very large (Chapter 8, Appendix C).

In addition, the faunal remains could undergo a detailed analysis and dating, to show the fauna present at different time periods. Does it change? Is it similar to the faunal remains analyzed elsewhere on the site? How does it compare to regional faunal assemblages? What may it indicate about subsistence strategies? What may it indicate about climate?

In a similar vein, the float samples could be analyzed and possibly dated, showing the possible floral present at different time periods. The same questions asked for the faunal analysis could be asked here. The combination of faunal and floral analysis, in turn, could be combined with the present organization of technology study to give it more depth and provide a deeper understanding of the organization of the prehistoric occupants of 41HY160.

Finally, 41HY160 can be examined in a regional context in regards to culture and organization of lithic technology. In particular, if the site were to be compared to other stratified sites near springs in Central Texas and the Southern High Plains, and correlated with climatic and environmental changes, then it may be able to be incorporated into a larger regional pattern. This could be used as a means of better understanding how people adapted to the region and changes in the region.

In addition, 41HY160 meets the requirements for inclusion on the National Registry of Historic Places, under Criterion D.

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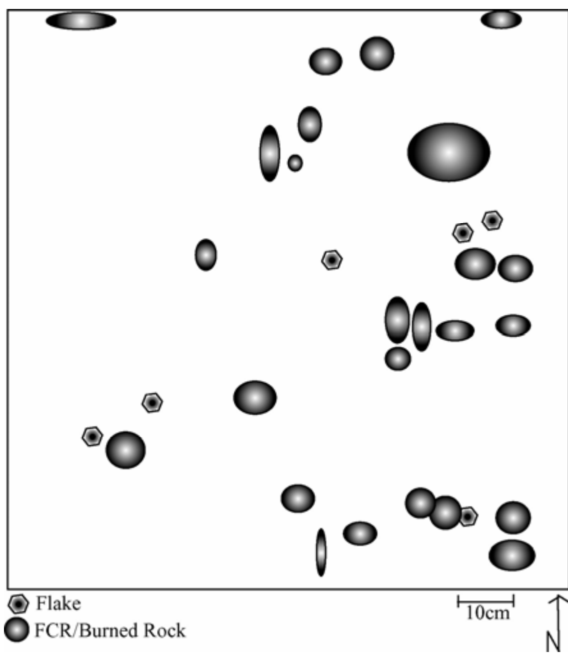
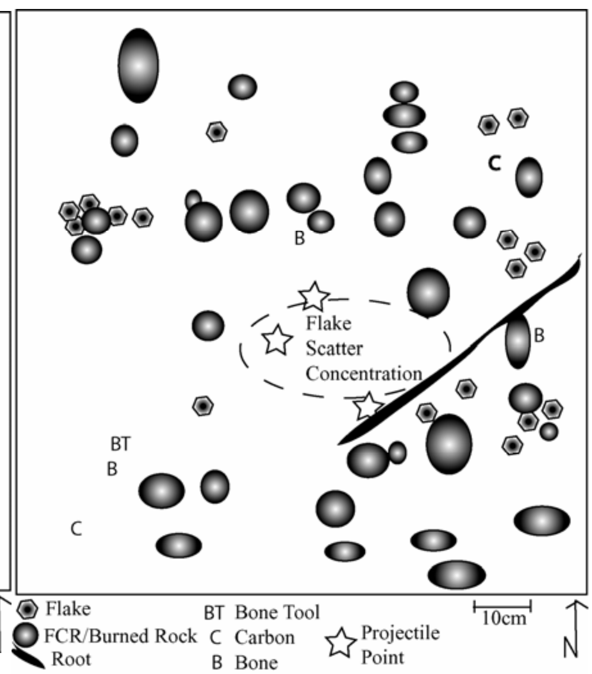
APPENDIX A: FEATURE MAPS

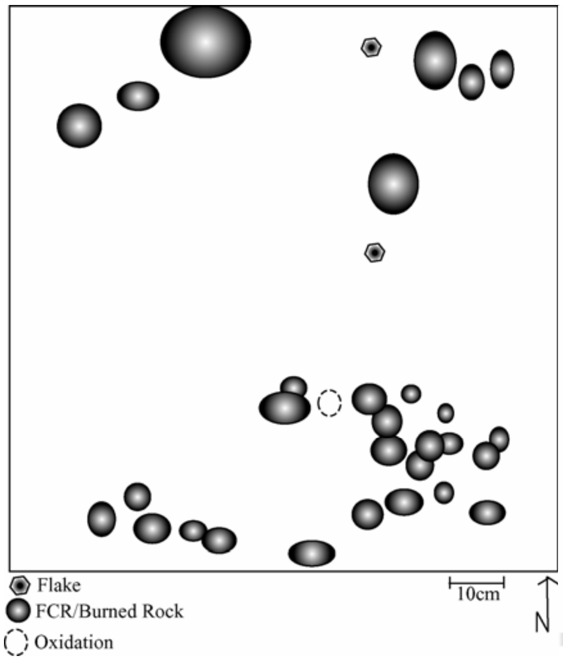
Feature 1, Unit 9



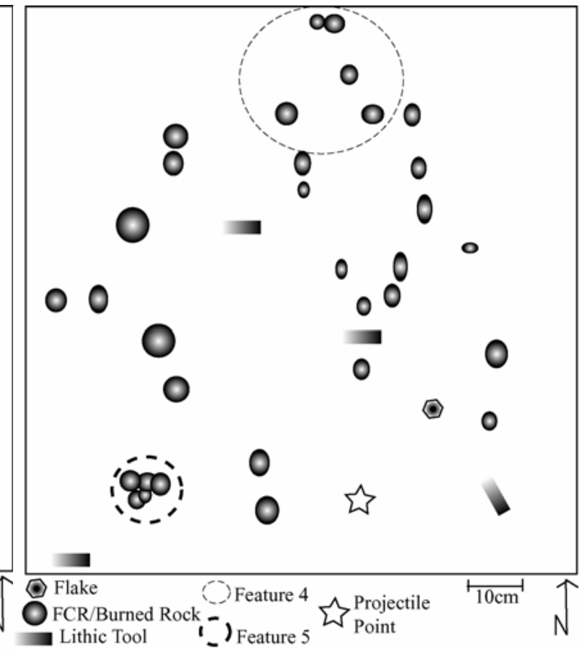
Feature 2, Unit 7



Feature 3, Unit 8



Features 4 and 5, Unit 9



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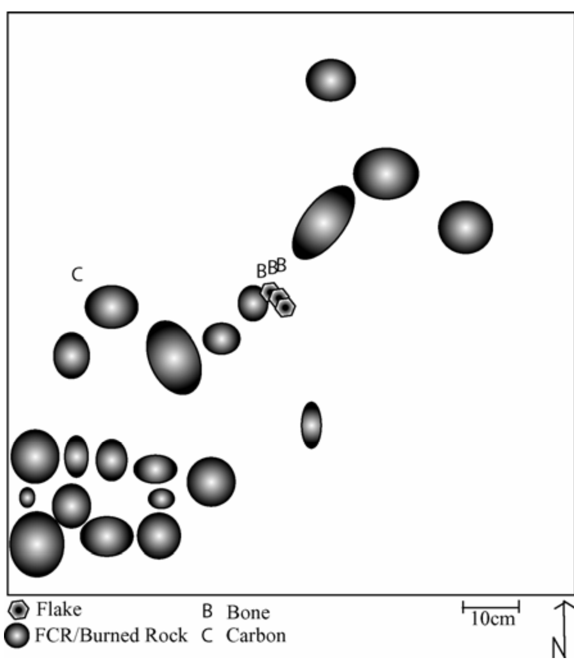
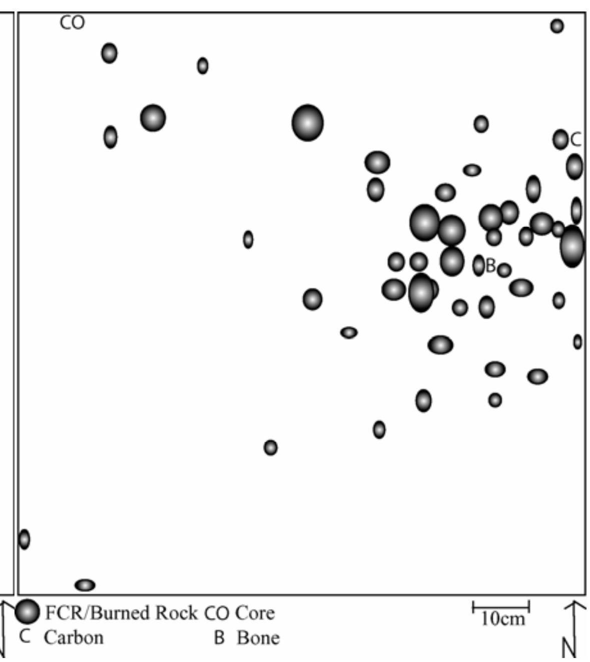


Feature 7, Unit 11



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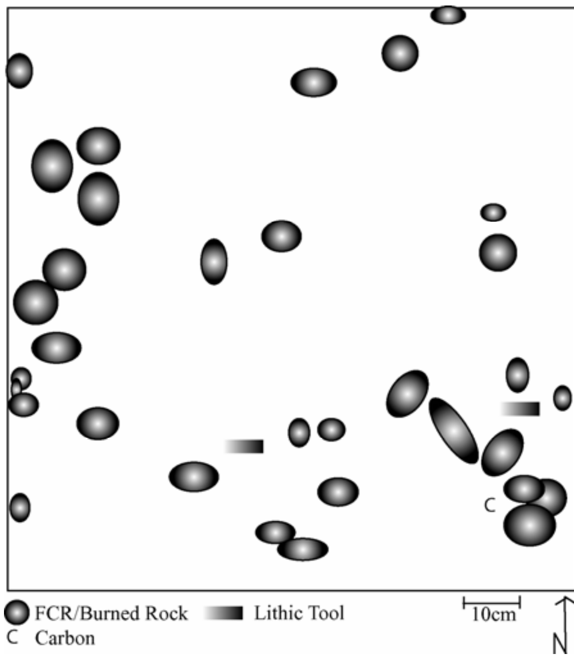
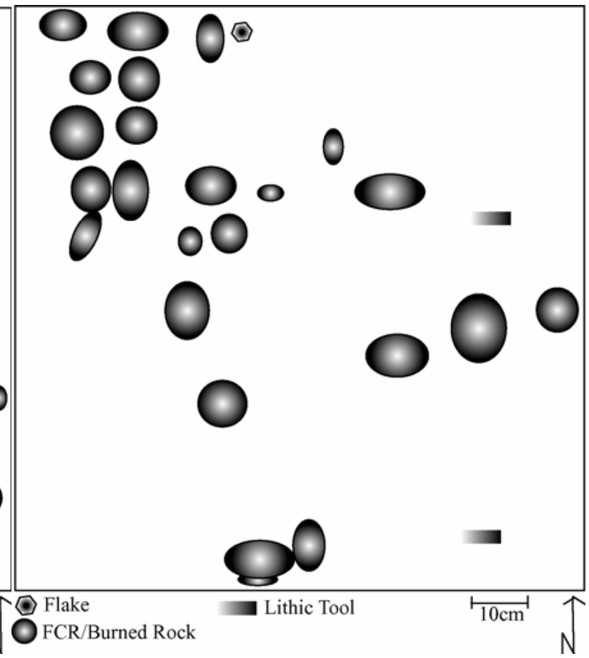


Feature 9, Unit 15



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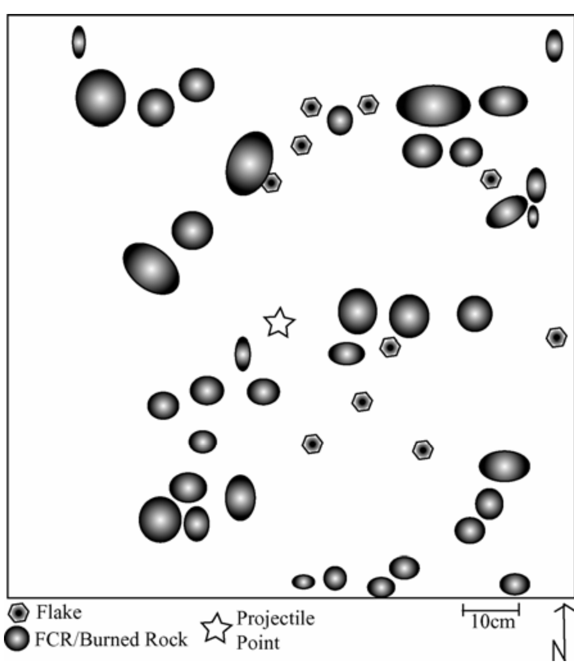
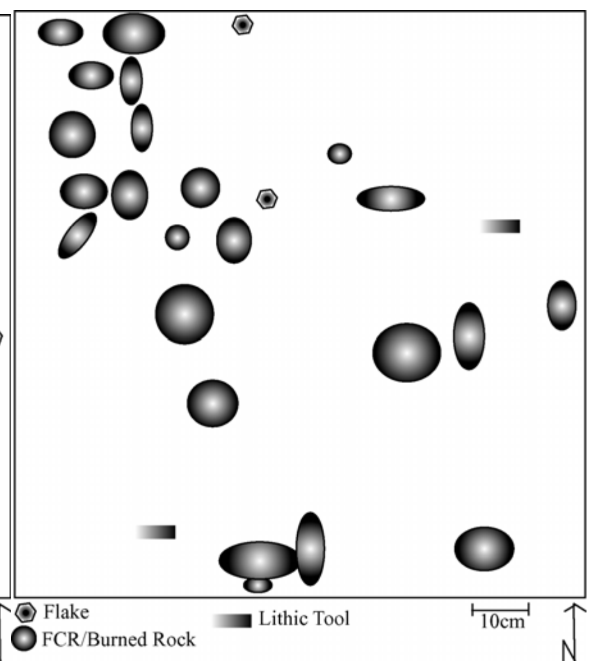
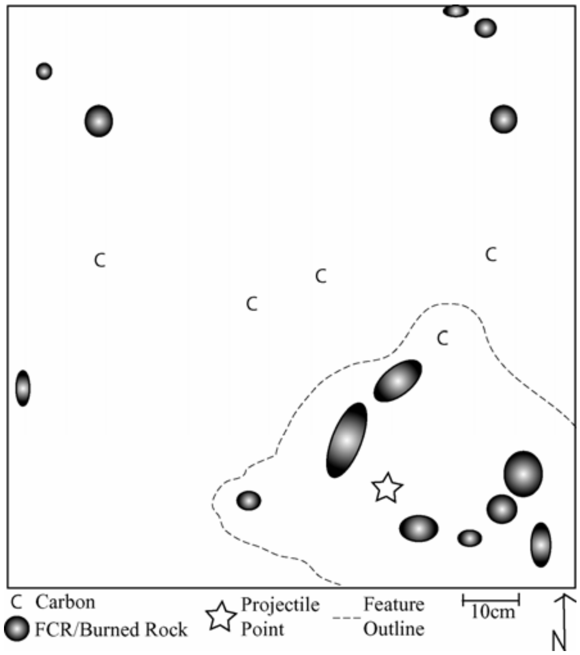


Feature 11, Unit 15



Feature 12, Unit 12



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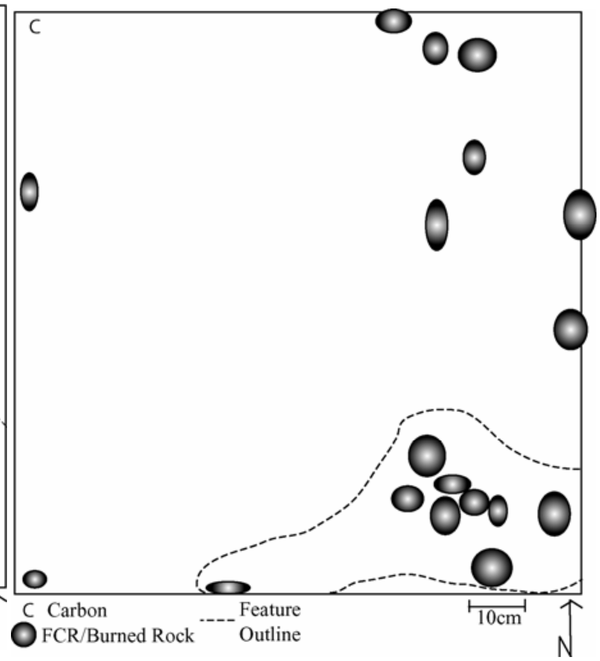

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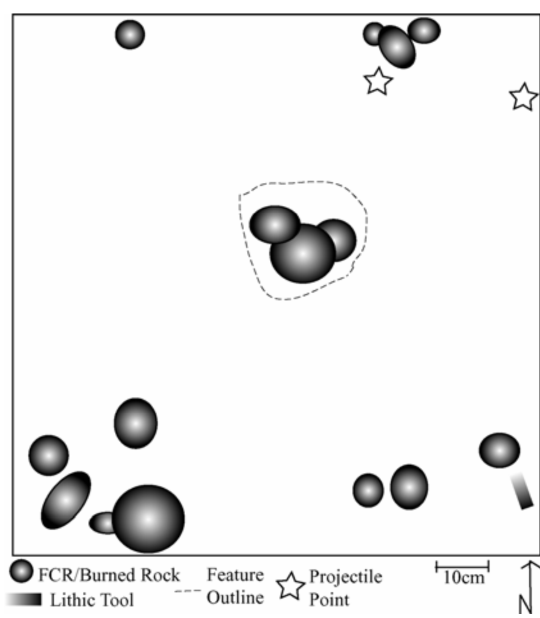
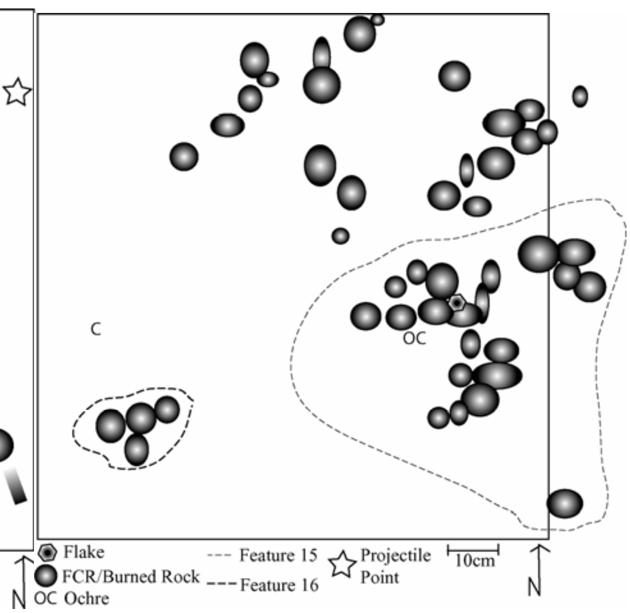


Features 15 and 16, Unit 15



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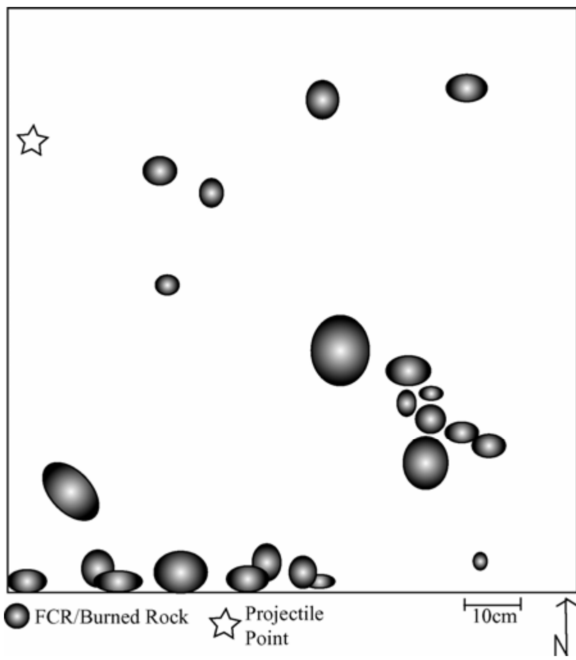

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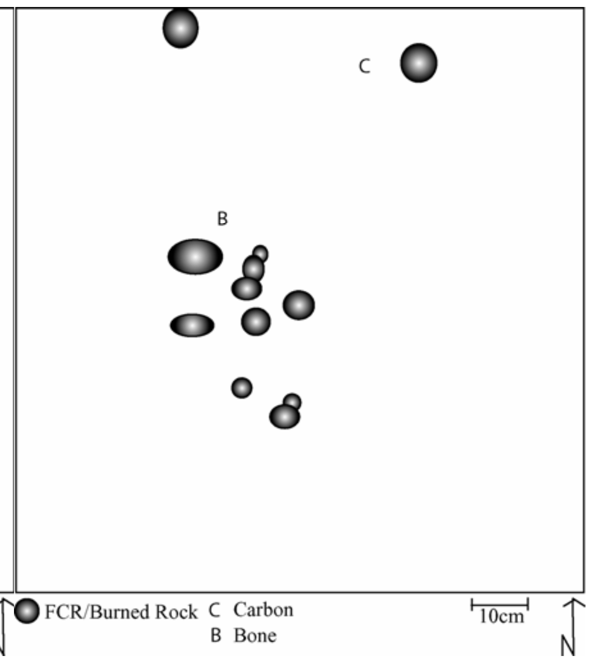

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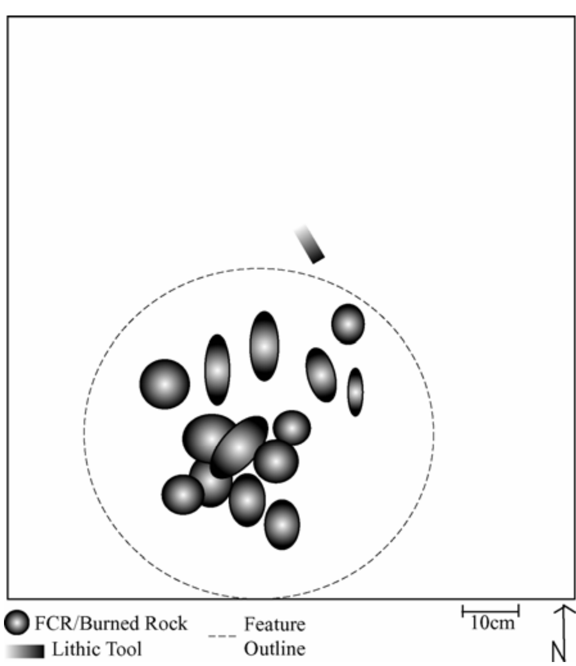

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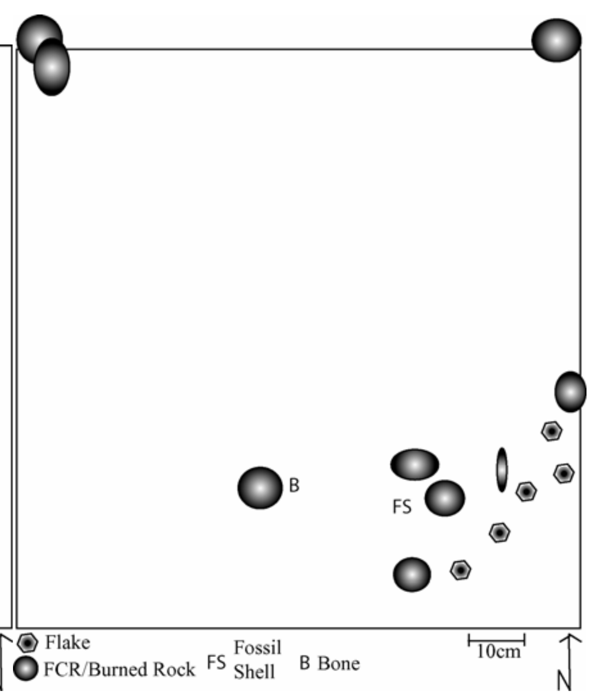
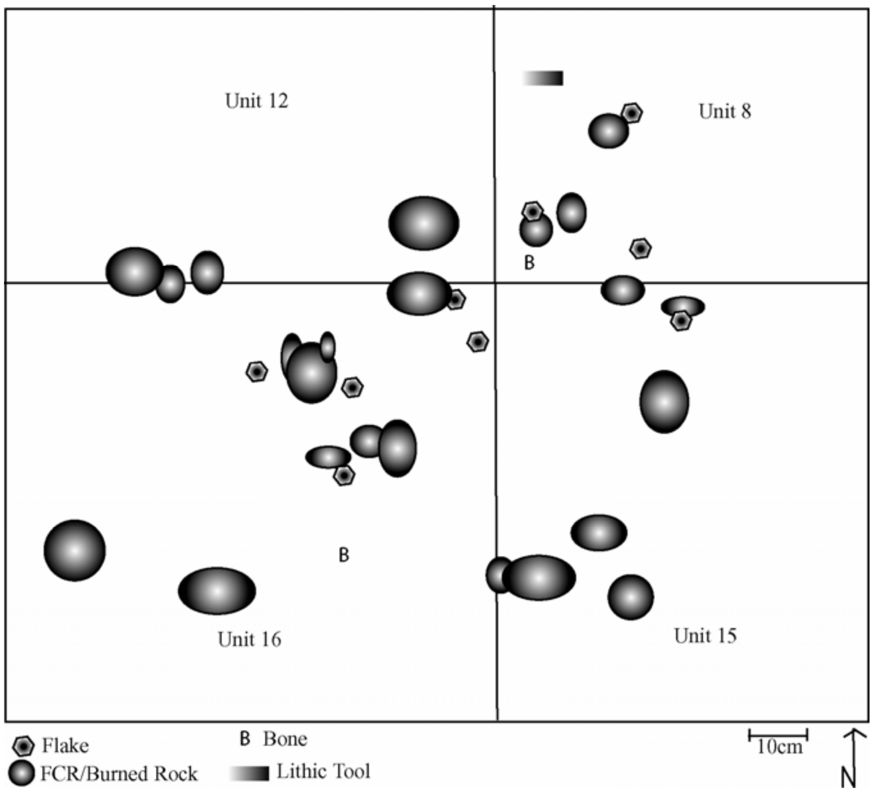
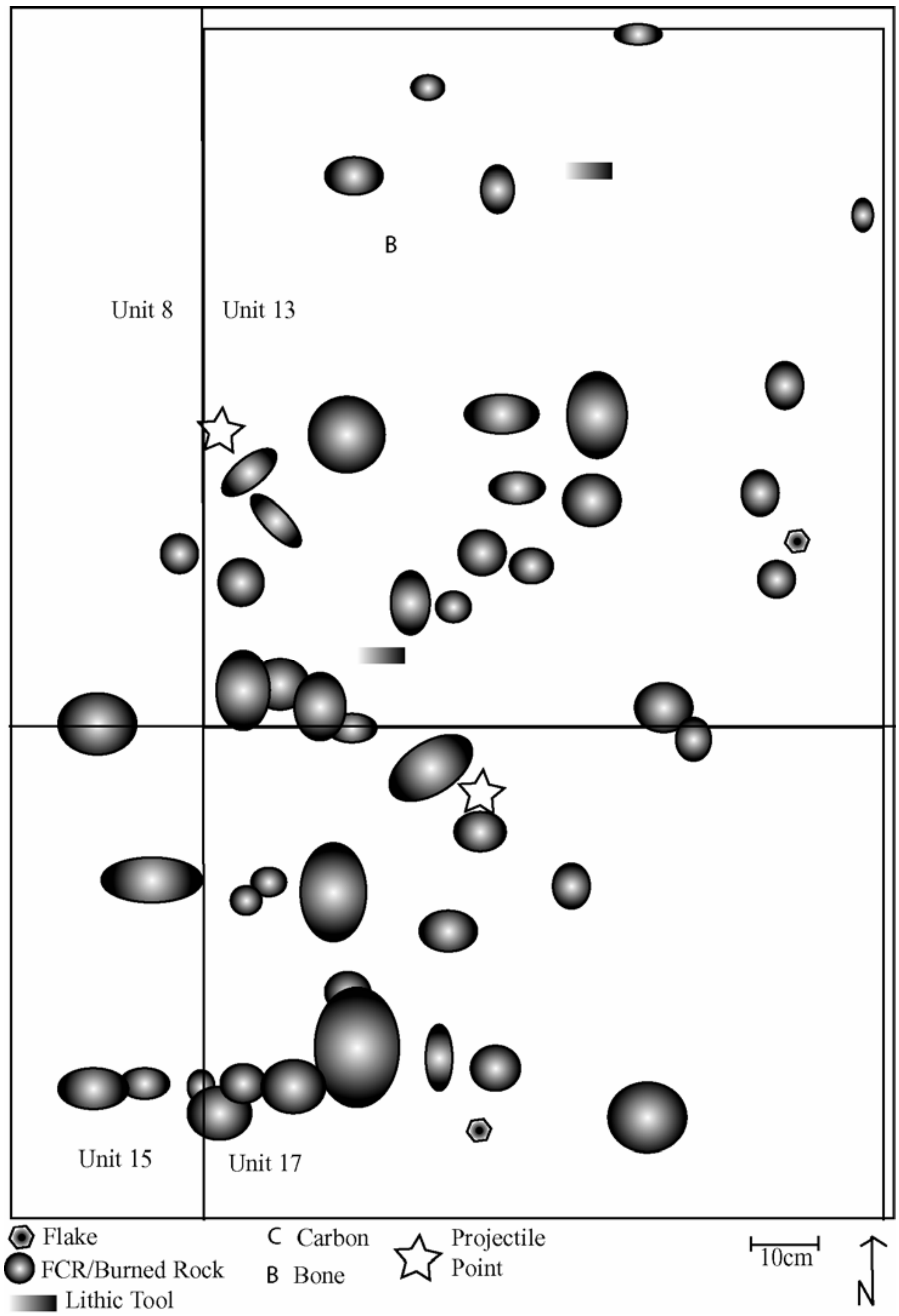


Feature 21, Units 12, 8, 16, 15



Feature 22, Units 13, 17, 15, 8



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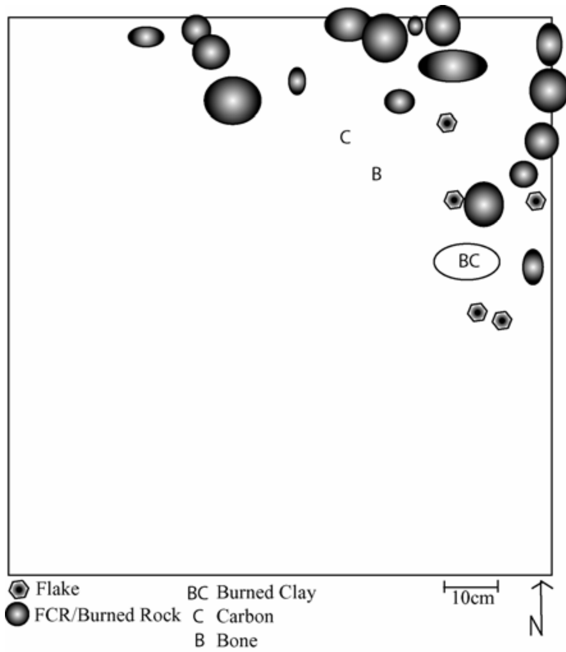

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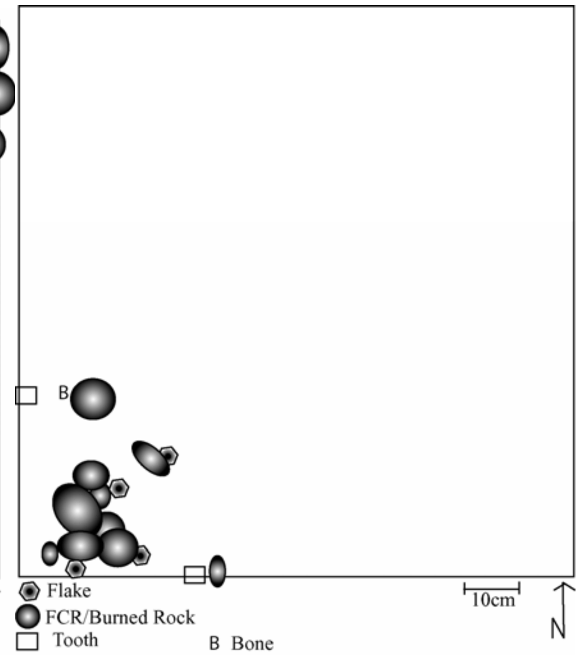
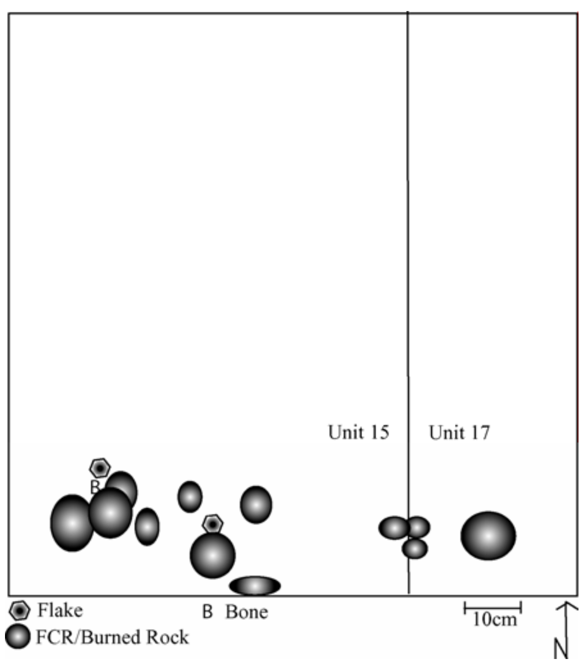


Feature 25, Units 15 and 17



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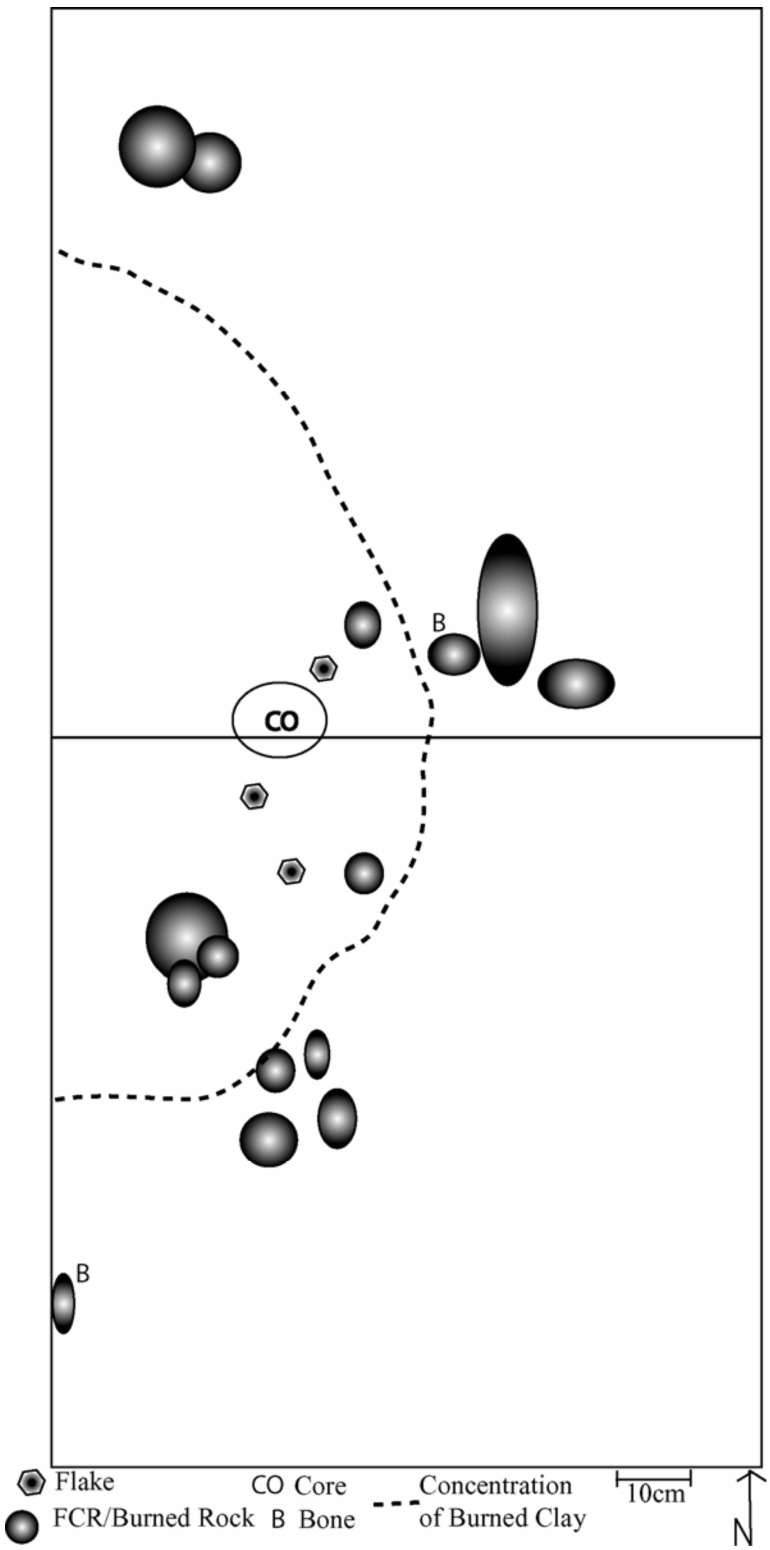

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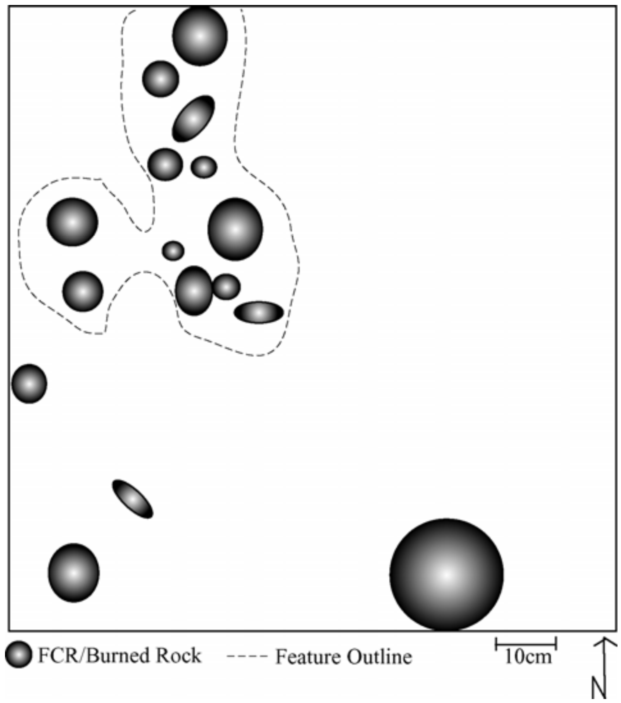
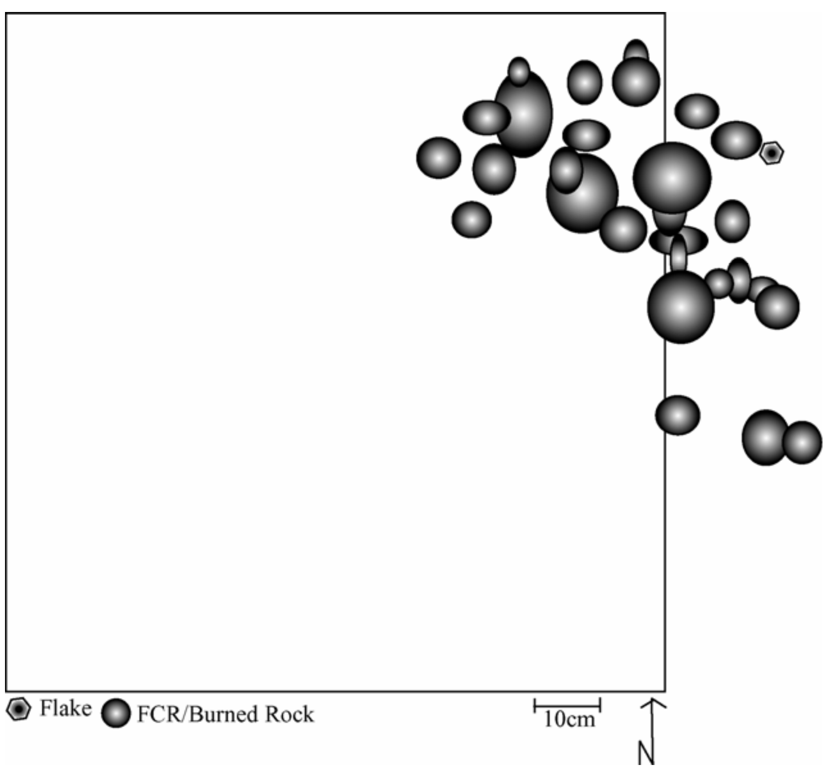
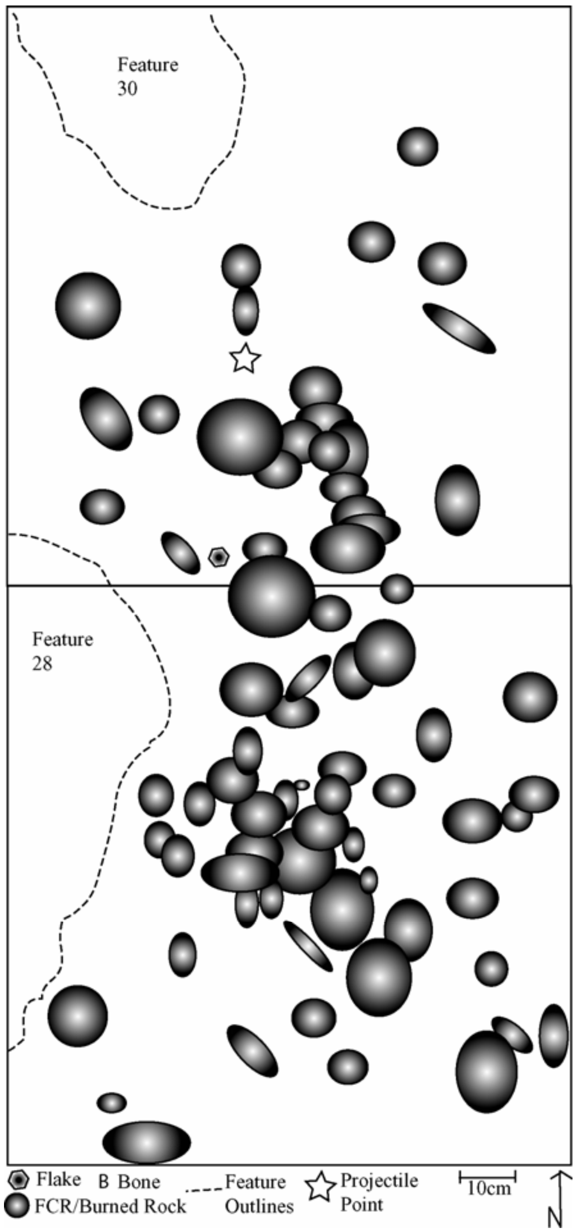


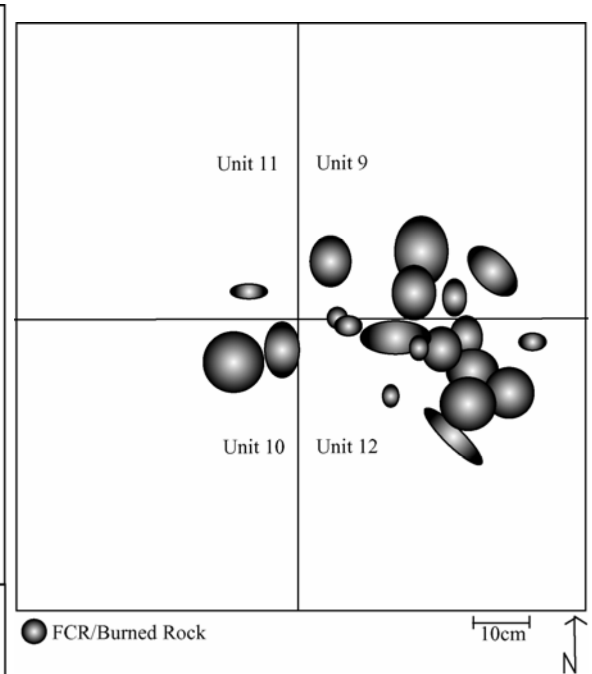
Feature 28, Units 16, 14, 10



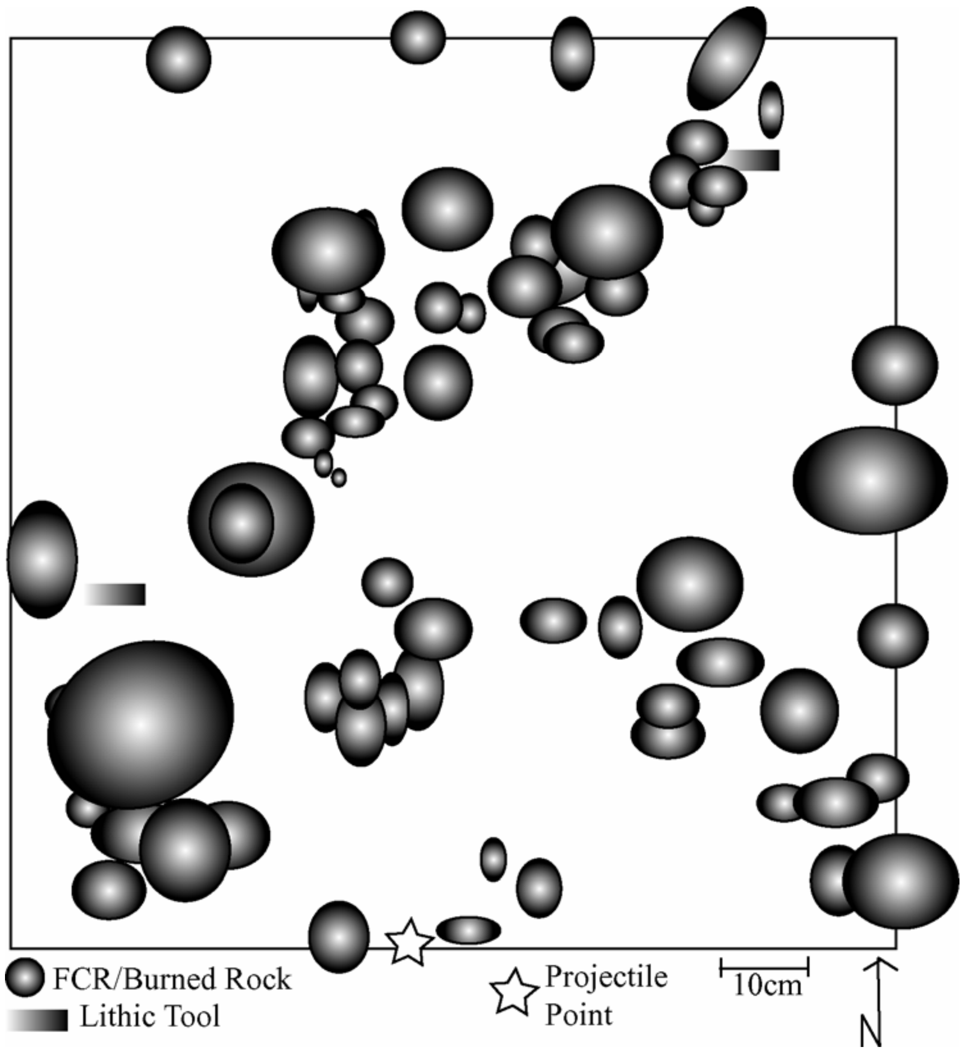
Feature 29, Units12 and 16



Feature 30, Units 9 and 12



Feature 31, Unit 7



APPENDIX B: NON-LITHIC ARTIFACTS

Historic

Glass

Unit	Level		Unidentifiable	Broken Bottle	Total
9	**1**			2	2
10	**1**		1		1
10	**2**		6		6
10	**3**		1		1
11	**1**		2		2
11	**2**		1		1
12	**1**		2		2
12	**3**		1		1
13	**1**		1		1
13	**3**		1		1
14	**4**		2		2
Grand Total			18	2	20

Metal

Unit	Level	Aluminum foil	Bottle Cap	Brass Boy Scout Button	Coin: 1973 Dime	Coin: 1992 Penny	Grommet	Gum Wrapper	Hex Bolt	Jack
7	**1**		1							
	2									
8	**1**								1	
9	**1**				1					
	2		1							
10	**1**		1				1	2		
	2									
	3									
11	**1**		4							
12	**1**									
13	**1**									
14	**1**									
	3		1							
15	**1**									
	3			1						
16	**1**	2								
17	**1**									
	2					1				
	3									1
Total		2	8	1	1	1	1	2	1	1

Unit	Level	Pull-Tabs	rusty nails	Shell Casing	Unfired 0.380 bullet	Unidentifiable	Washer	Wire	Total
7	**1**	7				1			9
	2							1	1
8	**1**	5			1	2		1	10
9	**1**	6						3	10
	2	1						1	3
10	**1**								4
	2	3							3
	3	3							3
11	**1**								4
12	**1**	8							6
13	**1**	10							10
14	**1**							1	1
	3	1				1	1		4
15	**1**					7			7
	3								1
16	**1**	2		1		4			9
17	**1**	8	2						10
	2								1
	3								1
Total		54	2	1	1	15	1	7	99

Historic: Other

Unit	Level	Carpet Fibers	Concrete	Drinking Straw	fiberglass	Hair Tie	Paper label	parking lot gravel	plastic bag clip	plastic button
7	1			4				2		
7	9							4		
8	1			2						
9	1							7		
9	2			2						
9	3									
9	10							8		
10	1					1				
10	2					1				
10	3									
10	9				1					
11	1							1		1
11	2							8		
11	3							11		
12	1				9			2		
12	2							56		
12	3							3		
13	1						1	7		
13	2							37		
13	8								1	
14	1	2	8	4						
14	3							9		
15	1							1		
15	2							47		
15	3							10		
16	1							1		
16	3									1
17	1							26		
17	2							14		
Grand Total		2	8	12	10	2	1	254	1	2

Historic Other, Continued

Unit	Level	Plastic Car Bits	plastic comb	Plastic Comb Tooth	Plastic Coin	Plastic Unidentifiable	rope	Rubber Strip	Rubber UI
7	**1**	6							
7	9								
8	**1**					1			
9	**1**				1	22			
9	**2**	1				8			
9	3			1					
9	10								
10	**1**					7			
10	**2**					9			
10	**3**					1			
10	9		1						
11	**1**					15			2
11	**2**					6			
11	3					1			
12	**1**	17							
12	2								
12	**3**								
13	**1**	10							
13	2								
13	8								
14	**1**					5			
14	**3**					5			
15	**1**					3		1	
15	2								
15	**3**								
16	**1**					7	1		
16	3								
17	**1**					10			
17	**2**								
Grand Total		34	1	1	1	100	1	1	2

Historic Other, Continued

Unit	Level	Seed Pod	Single Earring	string	Tar Paper	Total
7	**1**	1	1			14
7	9					4
8	**1**					3
9	**1**					30
9	**2**					11
9	3					1
9	10					8
10	**1**				1	9
10	**2**					10
10	**3**					1
10	9					2
11	**1**					19
11	**2**					14
11	3					12
12	**1**					28
12	2					56
12	**3**					3
13	**1**					18
13	2					37
13	8					1
14	**1**			1		20
14	**3**					14
15	**1**					6
15	2					47
15	**3**					10
16	**1**					9
16	3					1
17	**1**					36
17	**2**					14
Grand Total		1	1	1	1	437

Burned Clay

Unit	Level	Burned Clay
7	3	0.6
	4	2.6
	5	0.3
	6	3.3
	7	2
	8	1.8
	9	12.6
	10	5.9
	11	24.5
	13	0.1
	14	7.5
	15	4.7
7 Total		65.9
8	3	2.2
	4	4
	5	15.1
	6	2.5
	7	2.5
	8	14.7
	9	0.8
	10	11.9
	11	19.7
	12	0.5
	13	8.9
	14	13.3
	15	2.4
8 Total		98.5
9	4	4.2
	5	1.9
	6	1
	7	2
	8	21.6
	9	13.6
	10	4.4
	11	28.7
	12	13.9
	13	0.5
	14	2.2
	15	10.1
9 Total		104.1

10	**3**	0.5
	6	28.4
	7	38.6
	8	31
	9	9.2
	10	7.5
	11	6.1
	12	26.8
	13	296.8
	14	253
	4/5	9.7
10 Total		707.6
11	**2**	0.6
	3	8.9
	4	6.4
	5	16.1
	6	14.8
	7	3.3
	8	9.1
	9	20
	10	14.3
	11	34.6
	12	6.3
	13	13.8
	14	21.3
11 Total		169.5
12	2	0.4
	3	2.8
	4	16.6
	5	17.1
	6	19.7
	7	3.2
	8	11.3
	9	10.6
	10	17.3
	11	15.8
	12	3.4
	13	7.8
	14	6.5

Burned Clay, Continued

13	2	1.9
	3	3.3
	4	13.3
	5	3.7
	6	2.6
	7	6
	8	5.9
	9	29
	10	2.6
	11	3.8
	12	0.5
	13	4.2
	14	14.5
	15	21.2
13 Total		112.5
14	**3**	1
	4	17.9
	5	16.7
	6	15.5
	7	17.1
	8	9.9
	9	6
	10	10.4
	11	22.3
	12	12.3
	13	85.2
	14	13.6
14 Total		227.9
15	**3**	2.8
	4	3.7
	5	12.3
	6	5.1
	7	60
	8	4
	9	3.5
	10	0.8
	11	6.8
	12	1.2
	13	0.9
	14	11.4
	15	6.9
15 Total		119.4

16	3	3.1
	4	8.4
	5	9.7
	6	24.4
	7	23.6
	8	0
	10	6.2
	11	16.3
	12	2.5
	13	7.2
	14	5.7
16 Total		107.1
17	**3**	3.9
	4	0
	5	14.4
	6	13.8
	7	14.7
	8	7.7
	9	2.5
	10	36.7
	12	4.4
	13	16.2
	14	1.2
17 Total		115.5
Grand Total		1960.5

Bone

Unit	Level	Bone
7	**1**	11
	3	86
	4	124
	5	93
	6	70
	7	98
	8	54
	9	153
	10	66
	11	177
	12	13
	13	126
	14	216
	15	168
7 Total		1455
8	3	100
	4	105
	5	113
	6	148
	7	114
	8	102
	9	118
	10	156
	11	145
	12	36
	13	102
	14	152
	15	351
8 Total		1742
9	3	226
	4	102
	5	97
	6	143
	7	138
	8	192
	9	70
	10	123
	11	124
	12	129
	13	80
	15	334
9 Total		1758

10	**3**	121
	6	237
	7	219
	8	153
	9	163
	10	131
	11	122
	12	109
	13	183
	14	264
	4/5	262
10 Total		1964
11	**1**	0
	2	2
	3	120
	4	139
	5	145
	6	162
	7	233
	8	78
	9	142
	10	171
	11	188
	12	118
	13	268
	14	336
11 Total		2102
12	**1**	0
	2	0
	3	83
	4	200
	5	114
	6	260
	7	141
	8	221
	9	156
	10	113
	11	106
	12	158
	13	193
	14	208
12 Total		1953

Bone, Continued

13	**1**	5
	2	10
	3	125
	4	159
	5	222
	6	104
	7	90
	8	113
	9	141
	10	27
	11	53
	12	161
	14	171
	15	220
13 Total		1601
14	**1**	1
	2	2
	3	35
	4	148
	5	95
	6	171
	7	145
	8	113
	9	117
	10	170
	11	151
	12	91
	13	167
	14	162
14 Total		1568
15	**1**	1
	2	12
	3	109
	4	90
	5	113
	6	131
	7	157
	8	64
	9	116
	10	0
	11	138
	12	110
	13	155
	14	148
	15	302
15 Total		1646

16	**1**	9
	2	0
	3	30
	4	184
	5	141
	6	248
	7	239
	8	161
	9	55
	10	225
	11	83
	12	68
	13	248
	14	317
16 Total		2008
17	**1**	8
	2	3
	3	34
	4	131
	5	136
	6	173
	7	248
	8	166
	9	140
	10	205
	11	81
	12	184
	13	204
	14	133
	15	58
17 Total		1904
Grand Total		19701

Unit	Level	Quartzite
7	4	1
	5	1
	8	1
	15	1
7 Total		4
8	12	1
8 Total		1
9	6	1
	10	4
	15	1
9 Total		6
10	9	3
	12	2
	4/5	1
10 Total		6
12	5	1
	14	1
12 Total		2
13	4	1
	9	1
13 Total		2
14	6	1
14 Total		1
16	5	1
	7	1
	11	1
16 Total		3
Grand Total		25

Miscellaneous Rocks and Minerals

Unit	Level	Lidonite	Ochre	sandstone	Grand Total
7	7		1		1
7 Total			1		1
9	11			1	1
9 Total				1	1
11	9	2			2
	11		2		2
	14	2			2
11 Total		4	2		6
12	10	1			1
12 Total		1			1
13	4		2		2
13 Total			2		2
14	11		1		1
14 Total			1		1
Grand Total		5	6	1	12

Ceramics

Prov/Unit	Level/Depth	Ceramics
7	3	2
	11	1
7 Total		3
8	3	2
8 Total		2
10	4/5	1
10 Total		1
11	3	3
	4	1
11 Total		4
12	4	1
12 Total		1
13	**3**	1
13 Total		1
14	**3**	1
	4	3
	5	1
	6	1
14 Total		6
15	**3**	1
	4	1
15 Total		2
16	3	1
	4	4
	6	1
16 Total		6
17	4	2
	5	1
17 Total		3
Grand Total		29

Shell, not Snails

Prov/Unit	Level/Depth	Shell, not snail
7	8	3
	14	1
	15	2
7 Total		6
8	11	2
	15	5
8 Total		7
9	6	1
	11	4
	15	1
9 Total		6
10	**1**	3
	7	1
	10	1
	11	1
10 Total		6
11	8	1
	9	1
	10	2
	11	1
	13	1
	14	10
11 Total		16
12	6	1
	8	1
	12	3
	13	13
	14	1
12 Total		19

13	5	1
	8	8
	11	3
	14	7
	15	1
13 Total		20
14	6	1
	8	1
	10	2
	12	1
	14	6
14 Total		11
15	7	1
	9	1
	15	2
15 Total		4
16	7	1
	8	1
	11	4
	12	2
	13	1
16 Total		9
17	8	4
	9	1
	10	2
	13	1
	14	3
	15	6
17 Total		17
Grand Total		121

Charcoal

Unit	Level	Grand Total
7	4	1
	5	2
	8	1
	9	1
	11	1
	13	2
	14	1
	15	7
7 Total		16
8	4	1
	5	1
	7	2
	9	1
	13	1
8 Total		6
9	4	5
	5	1
	6	3
	8	1
	9	3
	13	1
9 Total		14
10	4	1
	5	1
	6	1
	7	1
	8	1
	9	3
	10	2
	11	1
10 Total		11

11	7	1
	8	3
	10	1
11 Total		5
12	4	1
	7	2
	9	3
	10	1
	11	1
	14	1
12 Total		9
14	5	1
	8	3
	9	1
	10	4
	11	1
	13	2
14 Total		12
15	6	2
	7	2
	8	1
	9	1
	11	3
15 Total		9
16	7	6
	9	1
	13	1
	14	2
16 Total		10
17	6	1
	9	2
	10	3
	11	1
	12	2
17 Total		9
Grand Total		101

Fossils

Unit	Level	Fossils
7	6	1
	9	1
	11	1
	13	1
7 Total		4
8	3	2
	6	1
	8	3
	13	1
8 Total		7
9	6	2
	10	1
	11	1
	12	2
9 Total		6
10	**3**	2
	7	1
	8	1
	9	3
	10	1
	14	1
	4/5	2
10 Total		11
11	**2**	2
	4	2
11 Total		4
12	2	4
	3	2
	4	1
	5	1
	8	2
	11	1
	13	1
12 Total		12

13	**1**	1
	2	2
	3	2
	8	2
	9	2
13 Total		9
14	**3**	1
	5	1
	7	1
	10	2
	13	1
	14	1
14 Total		7
15	**3**	3
	4	1
	5	1
	7	1
	11	1
15 Total		7
16	7	1
	10	1
16 Total		2
17	**2**	11
	6	1
	8	2
17 Total		14
Grand Total		83

APPENDIX C: FLAKE ANALYSIS

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
30	6	3	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
30	6	3	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
40	6	4	X	COMPLETE	BLADE	<25%	1-1.9cm	1
60	6	6	X	COMPLETE	BLADE	<25%	1-1.9cm	1
60	6	6	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
60	6	6	X	COMPLETE	NORMAL	<25%	2-3.9cm	3
60	6	6	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
60	6	6	X	COMPLETE	THERMAL SPALL	<25%	1-1.9cm	2
70	6	7	X	COMPLETE	BLADE	<25%	2-3.9cm	1
70	6	7	X	COMPLETE	NORMAL	<25%	0-.9cm	1
70	6	7	X	COMPLETE	NORMAL	<25%	1-1.9cm	7
70	6	7	X	COMPLETE	NORMAL	<25%	4+cm	1
70	6	7	X	COMPLETE	NOTCHING	<25%	1-1.9cm	1
70	6	7	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
70	6	7	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
70	6	7	X	COMPLETE	THERMAL SPALL	<25%	1-1.9cm	1
80	6	8	X	COMPLETE	NORMAL	<25%	1-1.9cm	4
80	6	8	X	COMPLETE	NORMAL	<25%	2-3.9cm	3
80	6	8	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	14
80	6	8	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	7
80	6	8	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
90	6	9	X	COMPLETE	NORMAL	<25%	1-1.9cm	7
90	6	9	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
90	6	9	X	COMPLETE	NORMAL	<25%	4+cm	2
90	6	9	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	16
90	6	9	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	4
90	6	9	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
100	6	10	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
100	6	10	X	COMPLETE	NORMAL	<25%	4+cm	2
100	6	10	X	COMPLETE	NOTCHING	<25%	0-.9cm	1
100	6	10	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	6
100	6	10	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
100	6	10	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
110	6	11	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
110	6	11	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
110	6	11	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
120	6	12	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
120	6	12	X	COMPLETE	NOTCHING	<25%	0-.9cm	1
120	6	12	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
120	6	12	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	4
120	6	12	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
130	6	13	X	COMPLETE	BLADE	<25%	2-3.9cm	1
130	6	13	X	COMPLETE	BURIN SPALL	<25%	2-3.9cm	1
130	6	13	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
130	6	13	X	COMPLETE	NORMAL	<25%	2-3.9cm	4
130	6	13	X	COMPLETE	BIFACE THINNING	<25%	0-.9cm	1
130	6	13	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	8
130	6	13	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	6

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
130	6	13	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
140	6	14	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
140	6	14	X	COMPLETE	NORMAL	<25%	2-3.9cm	3
140	6	14	X	COMPLETE	NORMAL	<25%	4+cm	1
140	6	14	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	5
140	6	14	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
150	6	15	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
150	6	15	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
150	6	15	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
150	6	15	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
20	7	1	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
40	7	3	X	COMPLETE	NORMAL	<25%	0-.9cm	2
40	7	3	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
40	7	3	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
40	7	3	X	COMPLETE	BIFACE THINNING	<25%	0-.9cm	1
40	7	3	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
40	7	3	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
50	7	4	X	COMPLETE	NORMAL	<25%	0-.9cm	2
50	7	4	X	COMPLETE	NORMAL	<25%	2-3.9cm	3
50	7	4	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	5
60	7	5	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
60	7	5	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
60	7	5	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
60	7	5	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
60	7	5	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
70	7	6	X	COMPLETE	NORMAL	<25%	2-3.9cm	3
70	7	6	X	COMPLETE	NORMAL	<25%	4+cm	1
70	7	6	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
70	7	6	X	COMPLETE	BIFACE	<25%	2-	3

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING		3.9cm	
80	7	7	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
80	7	7	X	COMPLETE	NORMAL	<25%	2-3.9cm	4
80	7	7	X	COMPLETE	NORMAL	<25%	4+cm	2
80	7	7	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
80	7	7	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	6
90	7	8	2	COMPLETE	NORMAL	<25%	0-.9cm	6
90	7	8	2	COMPLETE	NORMAL	<25%	1-1.9cm	18
90	7	8	2	COMPLETE	NORMAL	<25%	2-3.9cm	8
90	7	8	2	COMPLETE	NORMAL	<25%	4+cm	2
90	7	8	2	COMPLETE	NOTCHING	<25%	0-.9cm	4
90	7	8	2	COMPLETE	BIFACE THINNING	<25%	0-.9cm	2
90	7	8	2	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	6
90	7	8	2	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	6
90	7	8	2	COMPLETE	BIFACE THINNING	<25%	4+cm	1
90	7	8	2	COMPLETE	THERMAL SPALL	<25%	1-1.9cm	2
100	7	9	X	COMPLETE	NORMAL	<25%	2-3.9cm	5
100	7	9	X	COMPLETE	NORMAL	<25%	4+cm	1
100	7	9	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	7
100	7	9	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	5
100	7	9	X	COMPLETE	BIFACE THINNING	<25%	4+cm	3
110	7	10	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
110	7	10	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
110	7	10	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
120	7	11	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
120	7	11	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
120	7	11	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
120	7	12	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
130	7	13	X	COMPLETE	BLADE	<25%	1-1.9cm	1
130	7	13	X	COMPLETE	BIFACE	<25%	1-	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING		1.9cm	
130	7	13	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
130	7	13	X	COMPLETE	BIFACE THINNING	<25%	4+cm	3
140	7	14	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
140	7	14	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	3
140	7	14	X	COMPLETE	THERMAL SPALL	<25%	1-1.9cm	2
150	7	15	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
150	7	15	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
150	7	15	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	6
150	7	15	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
40	8	3	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
40	8	3	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
60	8	5	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
60	8	5	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
70	8	6	X	COMPLETE	NORMAL	<25%	1-1.9cm	4
70	8	6	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
70	8	6	X	COMPLETE	NORMAL	<25%	4+cm	1
70	8	6	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
80	8	7	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
80	8	7	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
80	8	7	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	5
90	8	8	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
90	8	8	X	COMPLETE	NORMAL	<25%	4+cm	1
90	8	8	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
90	8	8	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	6
90	8	8	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
100	8	9	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
100	8	9	X	COMPLETE	NORMAL	<25%	2-3.9cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
100	8	9	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	7
100	8	9	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
110	8	10	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
110	8	10	X	COMPLETE	NOTCHING	<25%	1-1.9cm	1
110	8	10	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	5
110	8	10	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
120	8	11	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
120	8	11	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
130	8	13	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
130	8	13	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
140	8	14	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
140	8	14	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	3
140	8	14	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
150	8	15	X	COMPLETE	NORMAL	<25%	2-3.9cm	5
150	8	15	X	COMPLETE	NORMAL	<25%	4+cm	1
150	8	15	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
150	8	15	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
150	8	15	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
30	9	1	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
50	9	3	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
50	9	3	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
60	9	4	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	3
70	9	5	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
70	9	5	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
70	9	5	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
80	9	6	X	COMPLETE	NORMAL	<25%	1-1.9cm	4
80	9	6	X	COMPLETE	NORMAL	<25%	2-3.9cm	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
80	9	6	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	5
80	9	6	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
80	9	6	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
90	9	7	X	COMPLETE	NORMAL	<25%	1-1.9cm	3
90	9	7	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	7
90	9	7	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
100	9	8	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
100	9	8	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
100	9	8	X	COMPLETE	NORMAL	<25%	4+cm	1
100	9	8	X	COMPLETE	NOTCHING	<25%	1-1.9cm	4
100	9	8	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	9
100	9	8	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	5
100	9	8	X	COMPLETE	BIFACE THINNING	<25%	4+cm	3
110	9	9	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
110	9	9	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
110	9	9	X	COMPLETE	NORMAL	<25%	4+cm	1
110	9	9	X	COMPLETE	BIFACE THINNING	<25%	0-.9cm	2
110	9	9	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	5
110	9	9	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
110	9	9	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
110	9	9	X	COMPLETE	THERMAL SPALL	<25%	0-.9cm	4
100	9	10	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
100	9	10	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
100	9	10	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	4
100	9	10	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
110	9	11	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
110	9	11	X	COMPLETE	NORMAL	<25%	2-3.9cm	3
110	9	11	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	3

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
110	9	11	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
120	9	12	X	COMPLETE	NORMAL	<25%	2-3.9cm	5
120	9	12	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
120	9	12	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	7
130	9	13	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
130	9	13	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
130	9	13	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	5
130	9	13	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	5
140	9	14	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
140	9	14	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
140	9	14	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
150	9	15	X	COMPLETE	NORMAL	<25%	1-1.9cm	4
150	9	15	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	10
150	9	15	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	9
150	9	15	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
60	10	5	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
60	10	5	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
70	10	6	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
70	10	6	X	COMPLETE	NORMAL	<25%	4+cm	1
70	10	6	1	COMPLETE	NORMAL	<25%	4+cm	1
70	10	6	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
70	10	6	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
70	10	6	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
70	10	6	1	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	7
90	10	8	X	COMPLETE	NORMAL	<25%	2-3.9cm	6
90	10	8	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	6
90	10	8	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	4
90	10	8	X	COMPLETE	BIFACE	<25%	4+cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING			
90	10	9	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
90	10	9	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
90	10	9	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
100	10	10	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
110	10	11	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	5
110	10	11	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
130	10	12	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
130	10	12	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
140	10	13	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	5
140	10	13	X	COMPLETE	BIFACE THINNING	<25%	4+cm	3
150	10	14	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	6
150	10	14	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	4
150	10	14	28	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
50	11	3	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
50	11	3	X	COMPLETE	NORMAL	<25%	4+cm	1
60	11	4	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
60	11	4	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
60	11	5	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
60	11	5	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
70	11	6	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
70	11	6	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
70	11	6	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
70	11	6	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
90	11	8	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
90	11	8	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
90	11	8	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
90	11	8	X	COMPLETE	BIFACE	<25%	2-	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING		3.9cm	
90	11	8	X	COMPLETE	BIFACE THINNING	<25%	4+cm	4
100	11	9	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
100	11	9	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
100	11	9	X	COMPLETE	NORMAL	<25%	4+cm	1
100	11	9	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	6
100	11	9	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	9
100	11	9	X	COMPLETE	BIFACE THINNING	<25%	4+cm	8
110	11	10	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
110	11	10	X	COMPLETE	NORMAL	<25%	4+cm	1
110	11	10	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	5
120	11	11	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	5
120	11	11	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	6
120	11	11	X	COMPLETE	BIFACE THINNING	<25%	4+cm	3
130	11	12	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
130	11	12	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	3
130	11	12	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
140	11	13	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
140	11	13	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
140	11	13	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
140	11	13	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
150	11	14	X	COMPLETE	NORMAL	<25%	2-3.9cm	3
150	11	14	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
50	12	4	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	3
50	12	4	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
60	12	5	X	COMPLETE	BLADE	<25%	2-3.9cm	1
60	12	5	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
60	12	5	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
70	12	6	X	COMPLETE	NORMAL	<25%	4+cm	2
70	12	6	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
70	12	6	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
80	12	7	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
80	12	7	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
80	12	7	X	COMPLETE	NORMAL	<25%	4+cm	1
80	12	7	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
90	12	8	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
90	12	8	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
90	12	8	X	COMPLETE	NORMAL	<25%	4+cm	2
90	12	8	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
90	12	8	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	4
90	12	8	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
100	12	9	X	COMPLETE	NORMAL	<25%	1-1.9cm	4
100	12	9	X	COMPLETE	NORMAL	<25%	2-3.9cm	4
100	12	9	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	6
100	12	9	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	4
110	12	10	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
110	12	10	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
110	12	10	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
120	12	11	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
120	12	11	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	5
120	12	11	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
130	12	12	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
130	12	12	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	3
140	12	13	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
140	12	13	X	COMPLETE	NORMAL	<25%	4+cm	2
140	12	13	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	4
140	12	13	X	COMPLETE	BIFACE	<25%	2-	3

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING		3.9cm	
50	13	4	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
50	13	4	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
50	13	4	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
50	13	4	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
60	13	5	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
60	13	5	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
60	13	5	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
70	13	6	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
70	13	6	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
80	13	7	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
90	13	8	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
90	13	8	X	COMPLETE	NORMAL	<25%	4+cm	1
90	13	8	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
100	13	9	X	COMPLETE	NORMAL	<25%	1-1.9cm	4
100	13	9	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
100	13	9	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
100	13	9	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
110	13	10	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
120	13	11	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
120	13	11	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
130	13	13	22	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
140	13	14	X	COMPLETE	NORMAL	<25%	2-3.9cm	3
140	13	14	X	COMPLETE	NORMAL	<25%	4+cm	2
140	13	14	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	4
140	13	14	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
150	13	15	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
150	13	15	X	COMPLETE	NORMAL	<25%	2-3.9cm	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
150	13	15	X	COMPLETE	NORMAL	<25%	4+cm	2
150	13	15	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
150	13	15	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
150	13	15	X	COMPLETE	BIFACE THINNING	<25%	4+cm	3
60	14	5	X	COMPLETE	NORMAL	<25%	4+cm	1
60	14	5	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
70	14	6	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
70	14	6	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
70	14	6	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
80	14	7	X	COMPLETE	NORMAL	<25%	4+cm	2
80	14	7	X	COMPLETE	NOTCHING	<25%	1-1.9cm	2
80	14	7	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
90	14	8	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
90	14	8	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
90	14	8	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
100	14	9	X	COMPLETE	NORMAL	<25%	4+cm	1
100	14	9	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
110	14	10	X	COMPLETE	BLADE	<25%	2-3.9cm	1
110	14	10	X	COMPLETE	NORMAL	<25%	4+cm	1
110	14	10	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
120	14	11	X	COMPLETE	NORMAL	<25%	4+cm	1
120	14	11	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	49
120	14	11	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	5
130	14	12	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
130	14	12	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
140	14	13	X	COMPLETE	NORMAL	<25%	2-3.9cm	2
140	14	13	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
150	14	14	X	COMPLETE	NORMAL	<25%	0-.9cm	1
20	15	1	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
50	15	5	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
50	15	5	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
50	15	5	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
60	15	6	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
60	15	6	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
60	15	6	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
60	15	6	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
70	15	7	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
70	15	7	X	COMPLETE	BIFACE THINNING	<25%	4+cm	3
70	15	7	15	COMPLETE	BIFACE THINNING	<25%	4+cm	1
80	15	8	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
90	15	9	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	6
90	15	9	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
110	15	11	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	5
110	15	11	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
130	15	13	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
140	15	14	X	COMPLETE	NORMAL	<25%	2-3.9cm	3
140	15	14	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	5
140	15	14	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
150	15	15	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
150	15	15	X	COMPLETE	NORMAL	<25%	4+cm	1
150	15	15	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
150	15	15	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
40	16	3	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
50	16	4	X	COMPLETE	NORMAL	<25%	4+cm	1
60	16	5	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
60	16	5	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
70	16	6	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
70	16	6	X	COMPLETE	NORMAL	<25%	4+cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
70	16	6	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	3
80	16	7	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	3
80	16	7	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	10
80	16	7	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
90	16	8	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	9
110	16	11	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
110	16	11	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
110	16	11	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	5
110	16	11	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
130	16	12	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	5
130	16	12	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
140	16	13	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
140	16	13	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	8
140	16	13	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	4
140	16	13	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
150	16	14	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
30	17	2	X	COMPLETE	BIFACE THINNING	<25%	4+cm	1
50	17	4	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
50	17	4	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
60	17	5	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
70	17	6	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	6
70	17	6	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
80	17	7	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
80	17	7	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
80	17	7	X	COMPLETE	NORMAL	<25%	4+cm	1
80	17	7	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	9
80	17	7	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	5

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
80	17	7	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
80	17	7	X	COMPLETE	THERMAL SPALL	<25%	0-.9cm	1
90	17	8	X	COMPLETE	NORMAL	<25%	1-1.9cm	2
90	17	8	X	COMPLETE	NORMAL	<25%	2-3.9cm	1
90	17	8	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
100	17	9	X	COMPLETE	NORMAL	<25%	1-1.9cm	3
100	17	9	X	COMPLETE	NORMAL	<25%	2-3.9cm	4
100	17	9	X	COMPLETE	NORMAL	<25%	4+cm	1
100	17	9	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	3
100	17	9	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	4
110	17	10	X	COMPLETE	NORMAL	<25%	1-1.9cm	3
110	17	10	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	3
120	17	11	X	COMPLETE	NORMAL	<25%	4+cm	1
120	17	11	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
130	17	12	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	1
130	17	12	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
140	17	13	X	COMPLETE	NORMAL	<25%	1-1.9cm	1
140	17	13	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	1
150	17	14	X	COMPLETE	BIFACE THINNING	<25%	1-1.9cm	2
150	17	14	X	COMPLETE	BIFACE THINNING	<25%	2-3.9cm	2
150	17	14	X	COMPLETE	BIFACE THINNING	<25%	4+cm	2
40	7	3	X	COMPLETE	NOTCHING	<25%	0-.9cm	2
30	6	3	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
40	6	4	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
40	6	4	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
40	6	4	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	2
60	6	6	X	COMPLETE	NORMAL	>25%	0-.9cm	5
60	6	6	X	COMPLETE	NORMAL	>25%	1-1.9cm	10
60	6	6	X	COMPLETE	NORMAL	>25%	2-3.9cm	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
60	6	6	X	COMPLETE	NOTCHING	>25%	0-.9cm	1
60	6	6	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	3
60	6	6	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	7
60	6	6	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
70	6	7	X	COMPLETE	NORMAL	>25%	0-.9cm	2
70	6	7	X	COMPLETE	NORMAL	>25%	1-1.9cm	12
70	6	7	X	COMPLETE	NORMAL	>25%	2-3.9cm	11
70	6	7	X	COMPLETE	NORMAL	>25%	4+cm	1
70	6	7	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	7
70	6	7	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	9
70	6	7	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
70	6	7	X	COMPLETE	THERMAL SPALL	>25%	4+cm	1
80	6	8	X	COMPLETE	NORMAL	>25%	0-.9cm	2
80	6	8	X	COMPLETE	NORMAL	>25%	1-1.9cm	9
80	6	8	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
80	6	8	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	2
80	6	8	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	20
80	6	8	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
90	6	9	X	COMPLETE	NORMAL	>25%	0-.9cm	2
90	6	9	X	COMPLETE	NORMAL	>25%	1-1.9cm	12
90	6	9	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
90	6	9	X	COMPLETE	NORMAL	>25%	4+cm	3
90	6	9	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	2
90	6	9	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	21
90	6	9	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	7
90	6	9	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
100	6	10	X	COMPLETE	NORMAL	>25%	0-.9cm	1
100	6	10	X	COMPLETE	NORMAL	>25%	1-1.9cm	4
100	6	10	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
100	6	10	X	COMPLETE	NORMAL	>25%	4+cm	1
100	6	10	X	COMPLETE	BIFACE	>25%	1-	8

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING		1.9cm	
110	6	11	X	COMPLETE	NORMAL	>25%	0-.9cm	1
110	6	11	X	COMPLETE	NORMAL	>25%	1-1.9cm	5
110	6	11	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
110	6	11	X	COMPLETE	NORMAL	>25%	4+cm	1
110	6	11	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	14
110	6	11	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
110	6	11	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
120	6	12	X	COMPLETE	NORMAL	>25%	0-.9cm	1
120	6	12	X	COMPLETE	NORMAL	>25%	1-1.9cm	5
120	6	12	X	COMPLETE	NORMAL	>25%	2-3.9cm	7
120	6	12	X	COMPLETE	NORMAL	>25%	4+cm	1
120	6	12	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	9
120	6	12	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
130	6	13	X	COMPLETE	NORMAL	>25%	0-.9cm	1
130	6	13	X	COMPLETE	NORMAL	>25%	1-1.9cm	4
130	6	13	X	COMPLETE	NORMAL	>25%	2-3.9cm	12
130	6	13	X	COMPLETE	NORMAL	>25%	4+cm	2
130	6	13	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	12
130	6	13	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
140	6	14	X	COMPLETE	NORMAL	>25%	1-1.9cm	6
140	6	14	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
140	6	14	X	COMPLETE	NORMAL	>25%	4+cm	1
140	6	14	X	COMPLETE	NOTCHING	>25%	1-1.9cm	1
140	6	14	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	6
140	6	14	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
150	6	15	X	COMPLETE	NORMAL	>25%	1-1.9cm	7
150	6	15	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
150	6	15	X	COMPLETE	NORMAL	>25%	4+cm	1
150	6	15	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
150	6	15	X	COMPLETE	BIFACE	>25%	2-	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING		3.9cm	
160	6	16	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
160	6	16	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
30	7	2	X	COMPLETE	BLADE	>25%	4+cm	1
40	7	3	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
40	7	3	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	1
40	7	3	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
50	7	4	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
50	7	4	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
50	7	4	X	COMPLETE	NORMAL	>25%	4+cm	1
50	7	4	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	1
50	7	4	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
60	7	5	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
60	7	5	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
60	7	5	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	10
60	7	5	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
60	7	5	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
60	7	5	X	COMPLETE	THERMAL SPALL	>25%	0-.9cm	1
70	7	6	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
70	7	6	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
70	7	6	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	1
70	7	6	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
70	7	6	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
70	7	6	X	COMPLETE	BIFACE THINNING	>25%	4+cm	3
80	7	7	X	COMPLETE	BLADE	>25%	1-1.9cm	1
80	7	7	X	COMPLETE	BLADE	>25%	2-3.9cm	1
80	7	7	X	COMPLETE	BLADE	>25%	4+cm	1
80	7	7	X	COMPLETE	NORMAL	>25%	0-.9cm	1
80	7	7	X	COMPLETE	NORMAL	>25%	1-1.9cm	8
80	7	7	X	COMPLETE	NORMAL	>25%	2-	7

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
							3.9cm	
80	7	7	X	COMPLETE	NORMAL	>25%	4+cm	1
80	7	7	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
80	7	7	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	4
80	7	7	X	COMPLETE	BIFACE THINNING	>25%	4+cm	3
90	7	8	2	COMPLETE	NORMAL	>25%	0-.9cm	4
90	7	8	2	COMPLETE	NORMAL	>25%	1-1.9cm	4
90	7	8	2	COMPLETE	NORMAL	>25%	2-3.9cm	4
90	7	8	2	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	3
90	7	8	2	COMPLETE	BIFACE THINNING	>25%	4+cm	1
100	7	9	X	COMPLETE	NORMAL	>25%	0-.9cm	1
100	7	9	X	COMPLETE	NORMAL	>25%	1-1.9cm	5
100	7	9	X	COMPLETE	NORMAL	>25%	2-3.9cm	6
100	7	9	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	6
100	7	9	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
100	7	9	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
110	7	10	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
110	7	10	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
110	7	10	X	COMPLETE	NORMAL	>25%	4+cm	1
110	7	10	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	1
110	7	10	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
120	7	11	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
120	7	11	X	COMPLETE	NORMAL	>25%	4+cm	4
120	7	11	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
120	7	11	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	7
120	7	12	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
120	7	12	X	COMPLETE	NORMAL	>25%	4+cm	3
120	7	12	X	COMPLETE	NOTCHING	>25%	0-.9cm	1
120	7	12	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	1
130	7	13	X	COMPLETE	NORMAL	>25%	1-1.9cm	3

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
130	7	13	X	COMPLETE	NORMAL	>25%	4+cm	2
130	7	13	23	COMPLETE	NORMAL	>25%	4+cm	1
130	7	13	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
130	7	13	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
130	7	13	23	COMPLETE	BIFACE THINNING	>25%	4+cm	1
140	7	14	X	COMPLETE	NORMAL	>25%	0-.9cm	1
140	7	14	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
140	7	14	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
140	7	14	X	COMPLETE	NORMAL	>25%	4+cm	1
140	7	14	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
150	7	15	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
150	7	15	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
150	7	15	X	COMPLETE	NORMAL	>25%	4+cm	2
150	7	15	31	COMPLETE	NORMAL	>25%	2-3.9cm	2
150	7	15	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	12
150	7	15	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	4
150	7	15	31	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
40	8	3	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
40	8	3	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
50	8	4	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
50	8	4	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
50	8	4	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
60	8	5	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
60	8	5	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
60	8	5	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	10
60	8	5	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	5
60	8	5	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
70	8	6	X	COMPLETE	NORMAL	>25%	1-1.9cm	7
70	8	6	X	COMPLETE	NORMAL	>25%	2-3.9cm	3

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
70	8	6	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	21
70	8	6	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	7
70	8	6	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
80	8	7	X	COMPLETE	NORMAL	>25%	1-1.9cm	6
80	8	7	X	COMPLETE	NORMAL	>25%	2-3.9cm	4
80	8	7	X	COMPLETE	NORMAL	>25%	4+cm	2
80	8	7	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	24
80	8	7	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	8
80	8	7	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
90	8	8	X	COMPLETE	BLADE	>25%	4+cm	1
90	8	8	X	COMPLETE	NORMAL	>25%	1-1.9cm	6
90	8	8	X	COMPLETE	NORMAL	>25%	2-3.9cm	6
90	8	8	X	COMPLETE	NORMAL	>25%	4+cm	5
90	8	8	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	2
90	8	8	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	16
90	8	8	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
90	8	8	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
100	8	9	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
100	8	9	X	COMPLETE	NORMAL	>25%	2-3.9cm	4
100	8	9	X	COMPLETE	NORMAL	>25%	4+cm	4
100	8	9	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	4
100	8	9	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	24
100	8	9	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	7
100	8	9	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
110	8	10	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
110	8	10	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
110	8	10	X	COMPLETE	NORMAL	>25%	4+cm	3
110	8	10	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	7
110	8	10	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
120	8	11	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
120	8	11	X	COMPLETE	NORMAL	>25%	4+cm	1
120	8	11	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	16
120	8	11	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
120	8	11	X	COMPLETE	BIFACE THINNING	>25%	4+cm	3
120	8	11	X	COMPLETE	THERMAL SPALL	>25%	1-1.9cm	1
120	8	12	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
120	8	12	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
130	8	13	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
130	8	13	X	COMPLETE	NORMAL	>25%	2-3.9cm	6
130	8	13	X	COMPLETE	NORMAL	>25%	4+cm	2
130	8	13	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	11
130	8	13	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	10
130	8	13	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
140	8	14	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
140	8	14	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
140	8	14	X	COMPLETE	NORMAL	>25%	4+cm	2
140	8	14	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	14
140	8	14	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	8
140	8	14	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
140	8	14	X	COMPLETE	THERMAL SPALL	>25%	1-1.9cm	1
150	8	15	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
150	8	15	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
150	8	15	X	COMPLETE	NORMAL	>25%	4+cm	2
150	8	15	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	9
150	8	15	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	9
150	8	15	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
50	9	3	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
50	9	3	X	COMPLETE	NORMAL	>25%	2-	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
							3.9cm	
50	9	3	X	COMPLETE	NORMAL	>25%	4+cm	1
50	9	3	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	8
60	9	4	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	10
60	9	4	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
70	9	5	X	COMPLETE	NORMAL	>25%	1-1.9cm	4
70	9	5	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
70	9	5	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	2
70	9	5	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	6
70	9	5	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
80	9	6	X	COMPLETE	NORMAL	>25%	1-1.9cm	4
80	9	6	X	COMPLETE	NORMAL	>25%	2-3.9cm	8
80	9	6	X	COMPLETE	NORMAL	>25%	4+cm	3
80	9	6	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	3
80	9	6	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	6
80	9	6	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
90	9	7	X	COMPLETE	BLADE	>25%	2-3.9cm	1
90	9	7	X	COMPLETE	NORMAL	>25%	1-1.9cm	6
90	9	7	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
90	9	7	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	5
90	9	7	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	17
90	9	7	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
90	9	7	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
100	9	8	X	COMPLETE	BURIN SPALL	>25%	1-1.9cm	1
100	9	8	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
100	9	8	X	COMPLETE	NORMAL	>25%	2-3.9cm	6
100	9	8	X	COMPLETE	NORMAL	>25%	4+cm	1
100	9	8	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	27
100	9	8	X	COMPLETE	BIFACE	>25%	2-	13

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING		3.9cm	
100	9	8	X	COMPLETE	BIFACE THINNING	>25%	4+cm	3
110	9	9	X	COMPLETE	NORMAL	>25%	1-1.9cm	13
110	9	9	X	COMPLETE	NORMAL	>25%	2-3.9cm	8
110	9	9	X	COMPLETE	NORMAL	>25%	4+cm	2
110	9	9	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	11
110	9	9	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	10
110	9	9	X	COMPLETE	BIFACE THINNING	>25%	4+cm	4
100	9	10	X	COMPLETE	NORMAL	>25%	1-1.9cm	5
100	9	10	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
100	9	10	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	5
100	9	10	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
100	9	10	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
110	9	11	X	COMPLETE	BLADE	>25%	2-3.9cm	2
110	9	11	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
110	9	11	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
110	9	11	X	COMPLETE	NORMAL	>25%	4+cm	1
110	9	11	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	9
110	9	11	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
110	9	11	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
120	9	12	X	COMPLETE	BURIN SPALL	>25%	4+cm	1
120	9	12	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
120	9	12	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
120	9	12	X	COMPLETE	NORMAL	>25%	4+cm	2
120	9	12	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	2
120	9	12	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	7
120	9	12	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
120	9	12	X	COMPLETE	BIFACE THINNING	>25%	4+cm	4
130	9	13	X	COMPLETE	NORMAL	>25%	1-1.9cm	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
130	9	13	X	COMPLETE	NORMAL	>25%	4+cm	2
130	9	13	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	5
130	9	13	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	5
130	9	13	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
130	9	13	X	COMPLETE	THERMAL SPALL	>25%	1-1.9cm	1
140	9	14	X	COMPLETE	NORMAL	>25%	1-1.9cm	5
140	9	14	X	COMPLETE	NORMAL	>25%	2-3.9cm	4
140	9	14	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	6
140	9	14	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	4
140	9	14	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
140	9	14	X	COMPLETE	THERMAL SPALL	>25%	1-1.9cm	2
150	9	15	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
150	9	15	X	COMPLETE	NORMAL	>25%	2-3.9cm	8
150	9	15	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	7
150	9	15	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	8
150	9	15	X	COMPLETE	THERMAL SPALL	>25%	1-1.9cm	1
40	10	3	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
40	10	3	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
50	10	4	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
50	10	4	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
50	10	4	X	COMPLETE	NORMAL	>25%	4+cm	3
50	10	4	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
50	10	4	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	4
60	10	5	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
60	10	5	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
60	10	5	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
60	10	5	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
60	10	5	X	COMPLETE	BIFACE	>25%	4+cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING			
70	10	6	X	COMPLETE	NORMAL	>25%	1-1.9cm	4
70	10	6	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
70	10	6	X	COMPLETE	NORMAL	>25%	4+cm	4
70	10	6	1	COMPLETE	NORMAL	>25%	1-1.9cm	5
70	10	6	1	COMPLETE	NORMAL	>25%	2-3.9cm	2
70	10	6	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
70	10	6	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	8
70	10	6	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
70	10	6	1	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	13
70	10	6	1	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	8
70	10	6	1	COMPLETE	BIFACE THINNING	>25%	4+cm	1
70	10	6	X	COMPLETE	THERMAL SPALL	>25%	0-.9cm	1
90	10	8	X	COMPLETE	NORMAL	>25%	2-3.9cm	11
90	10	8	X	COMPLETE	NORMAL	>25%	4+cm	3
90	10	8	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	6
90	10	8	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
90	10	8	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
90	10	9	X	COMPLETE	NORMAL	>25%	1-1.9cm	7
90	10	9	X	COMPLETE	NORMAL	>25%	2-3.9cm	9
90	10	9	X	COMPLETE	NORMAL	>25%	4+cm	2
90	10	9	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	13
90	10	9	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	21
90	10	9	X	COMPLETE	BIFACE THINNING	>25%	4+cm	4
100	10	10	X	COMPLETE	NORMAL	>25%	1-1.9cm	5
100	10	10	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
100	10	10	X	COMPLETE	NORMAL	>25%	4+cm	3
100	10	10	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
100	10	10	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	7
100	10	10	X	COMPLETE	BIFACE	>25%	4+cm	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING			
110	10	11	X	COMPLETE	NORMAL	>25%	1-1.9cm	7
110	10	11	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
110	10	11	X	COMPLETE	NORMAL	>25%	4+cm	2
110	10	11	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	7
110	10	11	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	9
140	10	12	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
130	10	12	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	9
130	10	12	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	5
130	10	12	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
140	10	13	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	5
140	10	13	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
140	10	13	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
150	10	14	X	COMPLETE	NORMAL	>25%	2-3.9cm	6
150	10	14	X	COMPLETE	NORMAL	>25%	4+cm	4
150	10	14	26	COMPLETE	NORMAL	>25%	2-3.9cm	4
150	10	14	26	COMPLETE	NORMAL	>25%	4+cm	1
150	10	14	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
150	10	14	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	7
150	10	14	X	COMPLETE	BIFACE THINNING	>25%	4+cm	4
150	10	14	26	COMPLETE	BIFACE THINNING	>25%	4+cm	1
50	11	3	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
50	11	3	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
50	11	3	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
60	11	4	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
60	11	4	X	COMPLETE	NORMAL	>25%	4+cm	1
60	11	4	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	5
60	11	4	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
60	11	5	X	COMPLETE	NORMAL	>25%	1-1.9cm	3

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
60	11	5	X	COMPLETE	NORMAL	>25%	4+cm	2
60	11	5	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	5
60	11	5	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
60	11	5	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
70	11	6	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
70	11	6	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
70	11	6	X	COMPLETE	NORMAL	>25%	4+cm	1
70	11	6	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
70	11	6	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	7
70	11	6	X	COMPLETE	BIFACE THINNING	>25%	4+cm	3
80	11	7	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
80	11	7	X	COMPLETE	NORMAL	>25%	2-3.9cm	4
80	11	7	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	5
80	11	7	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
80	11	7	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
90	11	8	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
90	11	8	X	COMPLETE	NORMAL	>25%	4+cm	1
90	11	8	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
90	11	8	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	4
90	11	8	X	COMPLETE	BIFACE THINNING	>25%	4+cm	5
100	11	9	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
100	11	9	X	COMPLETE	NORMAL	>25%	2-3.9cm	11
100	11	9	X	COMPLETE	NORMAL	>25%	4+cm	1
100	11	9	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
100	11	9	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	7
100	11	9	X	COMPLETE	BIFACE THINNING	>25%	4+cm	6
110	11	10	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
110	11	10	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
110	11	10	X	COMPLETE	NORMAL	>25%	4+cm	5

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
110	11	10	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
110	11	10	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	15
110	11	10	X	COMPLETE	BIFACE THINNING	>25%	4+cm	5
120	11	11	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
120	11	11	X	COMPLETE	NORMAL	>25%	2-3.9cm	4
120	11	11	X	COMPLETE	NORMAL	>25%	4+cm	3
120	11	11	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	2
120	11	11	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
120	11	11	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	7
120	11	11	X	COMPLETE	BIFACE THINNING	>25%	4+cm	6
130	11	12	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
130	11	12	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
130	11	12	X	COMPLETE	NORMAL	>25%	4+cm	2
130	11	12	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	6
130	11	12	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	4
140	11	13	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
140	11	13	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
140	11	13	X	COMPLETE	NORMAL	>25%	4+cm	1
140	11	13	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
140	11	13	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
150	11	14	X	COMPLETE	NORMAL	>25%	0-.9cm	1
150	11	14	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
150	11	14	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
150	11	14	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
150	11	14	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	7
40	12	3	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
50	12	4	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
50	12	4	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
50	12	4	X	COMPLETE	NORMAL	>25%	4+cm	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
50	12	4	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	3
60	12	5	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
60	12	5	X	COMPLETE	NORMAL	>25%	4+cm	1
60	12	5	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
60	12	5	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
70	12	6	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
70	12	6	X	COMPLETE	NORMAL	>25%	2-3.9cm	7
70	12	6	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	1
70	12	6	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
70	12	6	X	COMPLETE	THERMAL SPALL	>25%	1-1.9cm	2
80	12	7	X	COMPLETE	NORMAL	>25%	2-3.9cm	4
80	12	7	X	COMPLETE	NORMAL	>25%	4+cm	3
80	12	7	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
80	12	7	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
90	12	8	X	COMPLETE	NORMAL	>25%	0-.9cm	1
90	12	8	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
90	12	8	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
90	12	8	X	COMPLETE	NORMAL	>25%	4+cm	5
90	12	8	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
90	12	8	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
90	12	8	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
100	12	9	X	COMPLETE	NORMAL	>25%	1-1.9cm	5
100	12	9	X	COMPLETE	NORMAL	>25%	2-3.9cm	6
100	12	9	X	COMPLETE	NORMAL	>25%	4+cm	2
100	12	9	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	3
100	12	9	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
100	12	9	X	COMPLETE	BIFACE THINNING	>25%	4+cm	5
110	12	10	X	COMPLETE	BLADE	>25%	2-3.9cm	2
110	12	10	X	COMPLETE	NORMAL	>25%	1-1.9cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
110	12	10	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
110	12	10	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	5
120	12	11	X	COMPLETE	NORMAL	>25%	1-1.9cm	5
120	12	11	X	COMPLETE	NORMAL	>25%	2-3.9cm	7
120	12	11	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	6
120	12	11	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
120	12	11	X	COMPLETE	THERMAL SPALL	>25%	1-1.9cm	2
130	12	12	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
140	12	13	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
140	12	13	X	COMPLETE	NORMAL	>25%	4+cm	1
140	12	13	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	1
150	12	14	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
150	12	14	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
150	12	14	X	COMPLETE	NORMAL	>25%	4+cm	1
150	12	14	30	COMPLETE	NORMAL	>25%	4+cm	1
150	12	14	29	COMPLETE	NORMAL	>25%	2-3.9cm	2
150	12	14	29	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	1
20	13	1	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
40	13	3	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
40	13	3	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
50	13	4	X	COMPLETE	BURIN SPALL	>25%	2-3.9cm	1
50	13	4	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
50	13	4	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
60	13	5	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
60	13	5	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
60	13	5	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	7
60	13	5	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	7
60	13	5	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
70	13	6	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
70	13	6	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
70	13	6	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	1
70	13	6	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	6
70	13	6	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
70	13	6	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
80	13	7	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
80	13	7	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	3
80	13	7	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
90	13	8	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
90	13	8	X	COMPLETE	NORMAL	>25%	4+cm	1
90	13	8	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
90	13	8	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
100	13	9	X	COMPLETE	NORMAL	>25%	1-1.9cm	6
100	13	9	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
100	13	9	X	COMPLETE	NORMAL	>25%	4+cm	1
100	13	9	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
100	13	9	X	COMPLETE	BIFACE THINNING	>25%	4+cm	4
110	13	10	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
110	13	10	X	COMPLETE	NORMAL	>25%	4+cm	2
110	13	10	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	2
110	13	10	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
120	13	11	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
120	13	11	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
120	13	12	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
130	13	13	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
130	13	13	X	COMPLETE	NORMAL	>25%	4+cm	1
130	13	13	22	COMPLETE	NORMAL	>25%	4+cm	2
130	13	13	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
130	13	13	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
130	13	13	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
130	13	13	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
140	13	14	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
140	13	14	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	1
140	13	14	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	1
140	13	14	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
150	13	15	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
150	13	15	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
150	13	15	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
150	13	15	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
150	13	15	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
40	14	3	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
40	14	3	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	3
50	14	4	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
50	14	4	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
50	14	4	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
60	14	5	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
60	14	5	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
60	14	5	X	COMPLETE	NORMAL	>25%	4+cm	1
60	14	5	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	4
60	14	5	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
70	14	6	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
70	14	6	X	COMPLETE	NORMAL	>25%	4+cm	1
70	14	6	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	2
70	14	6	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	3
70	14	6	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
70	14	6	X	COMPLETE	BIFACE	>25%	4+cm	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING			
80	14	7	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
80	14	7	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
80	14	7	X	COMPLETE	NORMAL	>25%	4+cm	2
80	14	7	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	9
80	14	7	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
90	14	8	X	COMPLETE	NORMAL	>25%	1-1.9cm	7
90	14	8	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
90	14	8	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	12
90	14	8	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	10
100	14	9	X	COMPLETE	BLADE	>25%	4+cm	1
100	14	9	X	COMPLETE	NORMAL	>25%	1-1.9cm	6
100	14	9	X	COMPLETE	NORMAL	>25%	4+cm	2
100	14	9	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	9
100	14	9	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
100	14	9	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
110	14	10	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
110	14	10	X	COMPLETE	NORMAL	>25%	4+cm	5
110	14	10	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	4
110	14	10	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	12
110	14	10	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
110	14	10	X	COMPLETE	BIFACE THINNING	>25%	4+cm	4
120	14	11	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
120	14	11	X	COMPLETE	NORMAL	>25%	2-3.9cm	6
120	14	11	X	COMPLETE	NORMAL	>25%	4+cm	2
120	14	11	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	11
120	14	11	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	8
120	14	11	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
130	14	12	X	COMPLETE	NORMAL	>25%	2-3.9cm	7
130	14	12	X	COMPLETE	BIFACE	>25%	1-	5

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING		1.9cm	
130	14	12	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	10
140	14	13	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
140	14	13	X	COMPLETE	NORMAL	>25%	4+cm	2
140	14	13	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	3
140	14	13	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
140	14	13	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
140	14	13	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
150	14	14	X	COMPLETE	BURIN SPALL	>25%	4+cm	1
150	14	14	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
150	14	14	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
150	14	14	X	COMPLETE	NORMAL	>25%	4+cm	1
150	14	14	X	COMPLETE	BIFACE THINNING	>25%	0-.9cm	1
150	14	14	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	6
150	14	14	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
30	15	2	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
40	15	3	X	COMPLETE	NORMAL	>25%	4+cm	2
40	15	3	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
40	15	3	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
50	15	4	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	5
50	15	5	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
50	15	5	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	1
50	15	5	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
60	15	6	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
60	15	6	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
60	15	6	X	COMPLETE	NORMAL	>25%	4+cm	4
60	15	6	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	13
60	15	6	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	8
60	15	6	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
70	15	7	X	COMPLETE	NORMAL	>25%	1-	3

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
							1.9cm	
70	15	7	X	COMPLETE	NORMAL	>25%	2-3.9cm	7
70	15	7	X	COMPLETE	NORMAL	>25%	4+cm	2
70	15	7	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	8
70	15	7	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	5
70	15	7	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
80	15	8	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
80	15	8	X	COMPLETE	NORMAL	>25%	4+cm	1
80	15	8	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	5
80	15	8	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	4
90	15	9	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
90	15	9	X	COMPLETE	NORMAL	>25%	2-3.9cm	6
90	15	9	X	COMPLETE	NORMAL	>25%	4+cm	1
100	15	9	18	COMPLETE	NORMAL	>25%	4+cm	1
90	15	9	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	11
90	15	9	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	4
100	15	10	X	COMPLETE	NORMAL	>25%	4+cm	1
100	15	10	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	7
110	15	11	X	COMPLETE	NORMAL	>25%	0-.9cm	2
110	15	11	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
110	15	11	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
110	15	11	X	COMPLETE	NORMAL	>25%	4+cm	3
110	15	11	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	13
110	15	11	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	4
120	15	12	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
120	15	12	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
130	15	13	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
130	15	13	21	COMPLETE	NORMAL	>25%	4+cm	3
130	15	13	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	7
130	15	13	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
130	15	13	21	COMPLETE	BIFACE	>25%	4+cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING			
140	15	14	X	COMPLETE	NORMAL	>25%	1-1.9cm	4
140	15	14	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
140	15	14	X	COMPLETE	NORMAL	>25%	4+cm	2
140	15	14	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	10
140	15	14	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	7
150	15	15	X	COMPLETE	NORMAL	>25%	1-1.9cm	4
150	15	15	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
150	15	15	X	COMPLETE	NORMAL	>25%	4+cm	2
150	15	15	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	11
150	15	15	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
150	15	15	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
40	16	3	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
40	16	3	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	1
50	16	4	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
50	16	4	X	COMPLETE	NORMAL	>25%	4+cm	1
50	16	4	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
60	16	5	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
60	16	5	X	COMPLETE	NORMAL	>25%	4+cm	1
60	16	5	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	3
60	16	5	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	2
60	16	5	X	COMPLETE	BIFACE THINNING	>25%	4+cm	2
70	16	6	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
70	16	6	X	COMPLETE	NORMAL	>25%	4+cm	2
70	16	6	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	8
70	16	6	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	5
80	16	7	X	COMPLETE	NORMAL	>25%	1-1.9cm	9
80	16	7	X	COMPLETE	NORMAL	>25%	2-3.9cm	4
80	16	7	X	COMPLETE	NORMAL	>25%	4+cm	4
80	16	7	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	12

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
80	16	7	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	8
90	16	8	X	COMPLETE	NORMAL	>25%	1-1.9cm	4
90	16	8	X	COMPLETE	NORMAL	>25%	2-3.9cm	11
90	16	8	X	COMPLETE	NORMAL	>25%	4+cm	3
90	16	8	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
90	16	8	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
90	16	8	X	COMPLETE	BIFACE THINNING	>25%	4+cm	3
90	16	9	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
90	16	9	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
90	16	9	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
100	16	10	X	COMPLETE	NORMAL	>25%	1-1.9cm	5
100	16	10	X	COMPLETE	NORMAL	>25%	2-3.9cm	10
100	16	10	X	COMPLETE	NORMAL	>25%	4+cm	3
100	16	10	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	9
100	16	10	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	8
100	16	10	X	COMPLETE	BIFACE THINNING	>25%	4+cm	3
110	16	11	X	COMPLETE	NORMAL	>25%	1-1.9cm	10
110	16	11	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
110	16	11	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	9
110	16	11	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	6
110	16	11	X	COMPLETE	BIFACE THINNING	>25%	4+cm	4
130	16	12	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
130	16	12	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
130	16	12	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	5
130	16	12	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	10
130	16	12	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
140	16	13	X	COMPLETE	NORMAL	>25%	1-1.9cm	6
140	16	13	X	COMPLETE	NORMAL	>25%	2-	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
							3.9cm	
140	16	13	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	6
140	16	13	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	5
140	16	13	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
150	16	14	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
150	16	14	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
150	16	14	X	COMPLETE	NORMAL	>25%	4+cm	2
150	16	14	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	8
150	16	14	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	4
20	17	1	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
20	17	1	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	1
30	17	2	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
30	17	2	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
40	17	3	X	COMPLETE	NORMAL	>25%	1-1.9cm	2
40	17	3	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
40	17	3	X	COMPLETE	NORMAL	>25%	4+cm	2
50	17	4	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
50	17	4	X	COMPLETE	NORMAL	>25%	4+cm	1
60	17	5	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
60	17	5	X	COMPLETE	NORMAL	>25%	2-3.9cm	3
60	17	5	X	COMPLETE	NORMAL	>25%	4+cm	4
60	17	5	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
70	17	6	X	COMPLETE	NORMAL	>25%	1-1.9cm	9
70	17	6	X	COMPLETE	NORMAL	>25%	4+cm	1
70	17	6	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	2
70	17	6	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	5
80	17	7	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
80	17	7	X	COMPLETE	NORMAL	>25%	2-3.9cm	7
80	17	7	X	COMPLETE	NORMAL	>25%	4+cm	4
80	17	7	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	8

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
80	17	7	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	5
80	17	7	X	COMPLETE	BIFACE THINNING	>25%	4+cm	3
90	17	8	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
90	17	8	X	COMPLETE	NORMAL	>25%	2-3.9cm	1
90	17	8	X	COMPLETE	NORMAL	>25%	4+cm	4
90	17	8	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	10
90	17	8	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
90	17	8	X	COMPLETE	BIFACE THINNING	>25%	4+cm	3
100	17	9	X	COMPLETE	NORMAL	>25%	1-1.9cm	5
100	17	9	X	COMPLETE	NORMAL	>25%	2-3.9cm	5
100	17	9	X	COMPLETE	NORMAL	>25%	4+cm	2
100	17	9	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	11
100	17	9	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	8
100	17	9	X	COMPLETE	BIFACE THINNING	>25%	4+cm	4
100	17	9	X	COMPLETE	THERMAL SPALL	>25%	1-1.9cm	1
110	17	10	X	COMPLETE	NORMAL	>25%	1-1.9cm	6
110	17	10	X	COMPLETE	NORMAL	>25%	2-3.9cm	8
110	17	10	X	COMPLETE	NORMAL	>25%	4+cm	3
110	17	10	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	10
110	17	10	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	9
120	17	11	X	COMPLETE	NORMAL	>25%	1-1.9cm	3
120	17	11	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
130	17	12	X	COMPLETE	NORMAL	>25%	2-3.9cm	2
130	17	12	X	COMPLETE	NORMAL	>25%	4+cm	1
130	17	12	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	1
130	17	12	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	3
130	17	12	X	COMPLETE	BIFACE THINNING	>25%	4+cm	3
140	17	13	X	COMPLETE	NORMAL	>25%	2-3.9cm	4
140	17	13	X	COMPLETE	NORMAL	>25%	4+cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
140	17	13	X	COMPLETE	BIFACE THINNING	>25%	1-1.9cm	4
140	17	13	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	4
140	17	13	X	COMPLETE	BIFACE THINNING	>25%	4+cm	1
150	17	14	X	COMPLETE	NORMAL	>25%	1-1.9cm	1
150	17	14	X	COMPLETE	NORMAL	>25%	2-3.9cm	4
150	17	14	X	COMPLETE	NORMAL	>25%	4+cm	1
150	17	14	X	COMPLETE	BIFACE THINNING	>25%	2-3.9cm	1
150	17	14	X	COMPLETE	THERMAL SPALL	>25%	0-.9cm	1
30	6	3	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
30	6	3	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
40	6	4	X	COMPLETE	BLADE	NONE	1-1.9cm	1
40	6	4	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
40	6	4	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	7
40	6	4	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	3
40	6	4	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	1
60	6	6	X	COMPLETE	BLADE	NONE	1-1.9cm	5
60	6	6	X	COMPLETE	NORMAL	NONE	1-1.9cm	8
60	6	6	X	COMPLETE	NORMAL	NONE	2-3.9cm	3
60	6	6	X	COMPLETE	NOTCHING	NONE	0-.9cm	3
60	6	6	X	COMPLETE	NOTCHING	NONE	0-.9cm	3
60	6	6	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	19
60	6	6	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	27
60	6	6	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	13
60	6	6	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
70	6	7	X	COMPLETE	NORMAL	NONE	0-.9cm	2
70	6	7	X	COMPLETE	NORMAL	NONE	1-1.9cm	12
70	6	7	X	COMPLETE	NORMAL	NONE	2-3.9cm	3
70	6	7	X	COMPLETE	NORMAL	NONE	4+cm	1
70	6	7	X	COMPLETE	NOTCHING	NONE	0-.9cm	4
70	6	7	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	20

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
70	6	7	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	59
70	6	7	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	16
70	6	7	X	COMPLETE	BIFACE THINNING	NONE	4+cm	4
80	6	8	X	COMPLETE	NORMAL	NONE	0-.9cm	1
80	6	8	X	COMPLETE	NORMAL	NONE	1-1.9cm	5
80	6	8	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
80	6	8	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
80	6	8	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	16
80	6	8	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	83
80	6	8	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	15
90	6	9	X	COMPLETE	NORMAL	NONE	1-1.9cm	4
90	6	9	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
90	6	9	X	COMPLETE	NORMAL	NONE	4+cm	1
90	6	9	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
90	6	9	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
90	6	9	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	12
90	6	9	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	130
90	6	9	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	13
90	6	9	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
100	6	10	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
100	6	10	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	8
100	6	10	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	72
100	6	10	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	4
100	6	10	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
110	6	11	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
110	6	11	X	COMPLETE	NORMAL	NONE	2-3.9cm	2
110	6	11	X	COMPLETE	NORMAL	NONE	4+cm	1
110	6	11	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	9
110	6	11	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	49

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
110	6	11	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	14
110	6	11	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
120	6	12	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
120	6	12	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	
120	6	12	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	50
120	6	12	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	8
120	6	12	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
130	6	13	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
130	6	13	X	COMPLETE	NORMAL	NONE	2-3.9cm	5
130	6	13	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
130	6	13	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	6
130	6	13	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	82
130	6	13	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	9
130	6	13	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
140	6	14	X	COMPLETE	NORMAL	NONE	1-1.9cm	4
140	6	14	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
140	6	14	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	8
140	6	14	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	57
140	6	14	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	5
140	6	14	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
150	6	15	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
150	6	15	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
150	6	15	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
150	6	15	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	26
150	6	15	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	5
160	6	16	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
160	6	16	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	9

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
30	7	2	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
40	7	3	X	COMPLETE	NORMAL	NONE	0-.9cm	3
40	7	3	X	COMPLETE	NORMAL	NONE	4+cm	2
40	7	3	X	COMPLETE	NOTCHING	NONE	1-1.9cm	3
40	7	3	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	5
40	7	3	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	4
40	7	3	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	3
50	7	4	X	COMPLETE	NORMAL	NONE	1-1.9cm	2
50	7	4	X	COMPLETE	NORMAL	NONE	2-3.9cm	4
50	7	4	X	COMPLETE	NORMAL	NONE	4+cm	1
50	7	4	X	COMPLETE	NOTCHING	NONE	0-.9cm	4
50	7	4	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
50	7	4	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	9
50	7	4	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	4
50	7	4	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
50	7	4	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
50	7	4	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
60	7	5	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
60	7	5	X	COMPLETE	NOTCHING	NONE	0-.9cm	5
60	7	5	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
60	7	5	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	15
60	7	5	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	3
70	7	6	X	COMPLETE	NOTCHING	NONE	0-.9cm	2
70	7	6	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
70	7	6	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
70	7	6	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	7
70	7	6	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
70	7	6	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
70	7	6	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
80	7	7	X	COMPLETE	NORMAL	NONE	2-3.9cm	3

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
80	7	7	X	COMPLETE	NOTCHING	NONE	0-.9cm	6
80	7	7	X	COMPLETE	NOTCHING	NONE	1-1.9cm	2
80	7	7	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
80	7	7	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	10
80	7	7	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	8
80	7	7	X	COMPLETE	BIFACE THINNING	NONE	4+cm	5
80	7	7	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	2
90	7	8	2	COMPLETE	BLADE	NONE	0-.9cm	2
90	7	8	2	COMPLETE	BLADE	NONE	1-1.9cm	1
90	7	8	2	COMPLETE	BLADE	NONE	2-3.9cm	1
90	7	8	2	COMPLETE	NORMAL	NONE	0-.9cm	13
90	7	8	2	COMPLETE	NORMAL	NONE	1-1.9cm	25
90	7	8	2	COMPLETE	NORMAL	NONE	2-3.9cm	17
90	7	8	2	COMPLETE	NORMAL	NONE	4+cm	2
90	7	8	2	COMPLETE	NOTCHING	NONE	0-.9cm	12
90	7	8	2	COMPLETE	NOTCHING	NONE	1-1.9cm	9
90	7	8	2	COMPLETE	BIFACE THINNING	NONE	0-.9cm	20
90	7	8	2	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	32
90	7	8	2	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	18
90	7	8	2	COMPLETE	BIFACE THINNING	NONE	4+cm	3
90	7	8	2	COMPLETE	THERMAL SPALL	NONE	0-.9cm	7
90	7	8	2	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	4
100	7	9	X	COMPLETE	BLADE	NONE	1-1.9cm	5
100	7	9	X	COMPLETE	NORMAL	NONE	0-.9cm	1
100	7	9	X	COMPLETE	NORMAL	NONE	1-1.9cm	8
100	7	9	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
100	7	9	X	COMPLETE	NOTCHING	NONE	0-.9cm	8
100	7	9	X	COMPLETE	NOTCHING	NONE	1-1.9cm	3
100	7	9	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	8
100	7	9	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	38
100	7	9	X	COMPLETE	BIFACE	NONE	2-	12

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING		3.9cm	
100	7	9	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
100	7	9	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
110	7	10	X	COMPLETE	NORMAL	NONE	1-1.9cm	3
110	7	10	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
110	7	10	X	COMPLETE	NOTCHING	NONE	0-.9cm	3
110	7	10	X	COMPLETE	NOTCHING	NONE	1-1.9cm	2
110	7	10	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
110	7	10	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	15
110	7	10	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	10
110	7	10	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
120	7	11	X	COMPLETE	NORMAL	NONE	1-1.9cm	3
120	7	11	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
120	7	11	X	COMPLETE	NOTCHING	NONE	0-.9cm	2
120	7	11	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	7
120	7	11	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	27
120	7	11	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	12
120	7	11	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
120	7	11	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	2
120	7	12	X	COMPLETE	NOTCHING	NONE	0-.9cm	2
120	7	12	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	3
120	7	12	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	4
130	7	13	X	COMPLETE	NORMAL	NONE	1-1.9cm	3
130	7	13	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
130	7	13	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	8
130	7	13	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	3
130	7	13	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
130	7	13	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
140	7	14	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
140	7	14	X	COMPLETE	NOTCHING	NONE	0-.9cm	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
140	7	14	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
140	7	14	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	8
140	7	14	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	35
140	7	14	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	9
140	7	14	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
150	7	15	X	COMPLETE	BLADE	NONE	2-3.9cm	1
150	7	15	X	COMPLETE	NORMAL	NONE	0-.9cm	1
150	7	15	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
150	7	15	X	COMPLETE	NORMAL	NONE	2-3.9cm	2
150	7	15	X	COMPLETE	NOTCHING	NONE	0-.9cm	5
150	7	15	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
150	7	15	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	7
150	7	15	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	83
150	7	15	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	12
150	7	15	31	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	1
40	8	3	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
40	8	3	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	15
40	8	3	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
40	8	3	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
50	8	4	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
50	8	4	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
50	8	4	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	23
50	8	4	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	1
60	8	5	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	5
60	8	5	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	39
60	8	5	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	5
70	8	6	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
70	8	6	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
70	8	6	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	13

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
70	8	6	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	113
70	8	6	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	13
70	8	6	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
70	8	6	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	2
80	8	7	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
80	8	7	X	COMPLETE	NOTCHING	NONE	1-1.9cm	3
80	8	7	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	11
80	8	7	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	115
80	8	7	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	12
80	8	7	X	COMPLETE	BIFACE THINNING	NONE	4+cm	5
90	8	8	X	COMPLETE	BLADE	NONE	2-3.9cm	1
90	8	8	X	COMPLETE	NORMAL	NONE	1-1.9cm	3
90	8	8	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	10
90	8	8	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	78
90	8	8	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	20
90	8	8	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
90	8	8	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	2
100	8	9	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
100	8	9	X	COMPLETE	NORMAL	NONE	2-3.9cm	3
100	8	9	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
100	8	9	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	11
100	8	9	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	72
100	8	9	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	18
100	8	9	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
100	8	9	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
110	8	10	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
110	8	10	X	COMPLETE	NOTCHING	NONE	0-.9cm	2
110	8	10	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
110	8	10	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	57
110	8	10	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	13
110	8	10	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
110	8	10	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
120	8	11	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
120	8	11	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	57
120	8	11	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	16
120	8	11	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
120	8	11	X	COMPLETE	THERMAL SPALL	NONE	2-3.9cm	1
120	8	12	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
120	8	12	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
120	8	12	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	6
120	8	12	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	1
130	8	13	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
130	8	13	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
130	8	13	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
130	8	13	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	64
130	8	13	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	10
130	8	13	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	3
140	8	14	X	COMPLETE	NORMAL	NONE	1-1.9cm	2
140	8	14	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
140	8	14	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
140	8	14	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	6
140	8	14	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	77
140	8	14	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	25
140	8	14	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
140	8	14	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
150	8	15	X	COMPLETE	BIFACE	NONE	0-.9cm	6

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING			
150	8	15	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	63
150	8	15	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	17
150	8	15	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
40	9	2	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	1
40	9	2	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
50	9	3	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
50	9	3	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	12
50	9	3	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
60	9	4	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
60	9	4	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	15
60	9	4	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	4
70	9	5	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
70	9	5	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	6
70	9	5	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	23
70	9	5	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	4
70	9	5	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	2
70	9	5	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
80	9	6	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	12
80	9	6	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	47
80	9	6	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	8
80	9	6	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
80	9	6	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
80	9	6	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
90	9	7	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
90	9	7	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	7
90	9	7	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	59
90	9	7	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	21

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
90	9	7	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
90	9	7	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	7
90	9	7	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	4
100	9	8	X	COMPLETE	BLADE	NONE	2-3.9cm	1
100	9	8	X	COMPLETE	NORMAL	NONE	1-1.9cm	4
100	9	8	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
100	9	8	X	COMPLETE	NORMAL	NONE	4+cm	1
100	9	8	X	COMPLETE	NOTCHING	NONE	0-.9cm	4
100	9	8	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	20
100	9	8	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	136
100	9	8	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	25
100	9	8	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
100	9	8	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	3
110	9	9	X	COMPLETE	NORMAL	NONE	1-1.9cm	3
110	9	9	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
110	9	9	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
110	9	9	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	9
110	9	9	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	64
110	9	9	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	13
110	9	9	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
100	9	10	X	COMPLETE	NORMAL	NONE	1-1.9cm	2
100	9	10	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
100	9	10	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
100	9	10	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	31
100	9	10	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	13
100	9	10	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
100	9	10	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
110	9	11	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
110	9	11	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	30

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
110	9	11	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	10
110	9	11	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
110	9	11	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	4
120	9	12	X	COMPLETE	NORMAL	NONE	1-1.9cm	3
120	9	12	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
120	9	12	X	COMPLETE	NORMAL	NONE	4+cm	1
120	9	12	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
120	9	12	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	20
120	9	12	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	6
120	9	12	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
120	9	12	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
130	9	13	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
130	9	13	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
130	9	13	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	28
130	9	13	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	7
130	9	13	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
140	9	14	X	COMPLETE	NORMAL	NONE	1-1.9cm	2
140	9	14	X	COMPLETE	NORMAL	NONE	2-3.9cm	2
140	9	14	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	43
140	9	14	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	17
140	9	14	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
140	9	14	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	3
150	9	15	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
150	9	15	X	COMPLETE	NORMAL	NONE	2-3.9cm	3
150	9	15	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	7
150	9	15	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	69
150	9	15	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	27
150	9	15	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
150	9	15	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	2
40	10	3	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	5
40	10	3	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	8
40	10	3	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
40	10	3	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
50	10	4	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
50	10	4	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
50	10	4	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	17
50	10	4	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
50	10	4	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
60	10	5	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
60	10	5	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
60	10	5	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	30
60	10	5	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	4
60	10	5	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
70	10	6	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
70	10	6	X	COMPLETE	NORMAL	NONE	4+cm	2
70	10	6	1	COMPLETE	NORMAL	NONE	2-3.9cm	1
70	10	6	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
70	10	6	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	88
70	10	6	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	9
70	10	6	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
70	10	6	1	COMPLETE	BIFACE THINNING	NONE	0-.9cm	13
70	10	6	1	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	55
70	10	6	1	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	16
70	10	6	1	COMPLETE	BIFACE THINNING	NONE	4+cm	2
70	10	6	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
90	10	8	X	COMPLETE	NORMAL	NONE	4+cm	1
90	10	8	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	9

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
90	10	8	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	109
90	10	8	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	20
90	10	8	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
90	10	9	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
90	10	9	X	COMPLETE	NOTCHING	NONE	1-1.9cm	4
90	10	9	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	8
90	10	9	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	132
90	10	9	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	30
90	10	9	X	COMPLETE	BIFACE THINNING	NONE	4+cm	5
100	10	10	X	COMPLETE	NORMAL	NONE	2-3.9cm	2
100	10	10	X	COMPLETE	NORMAL	NONE	4+cm	1
100	10	10	X	COMPLETE	NOTCHING	NONE	1-1.9cm	2
100	10	10	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
100	10	10	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	44
100	10	10	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	12
100	10	10	X	COMPLETE	BIFACE THINNING	NONE	4+cm	5
100	10	10	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
110	10	11	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
110	10	11	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	36
110	10	11	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	12
110	10	11	X	COMPLETE	BIFACE THINNING	NONE	4+cm	6
130	10	12	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
130	10	12	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
130	10	12	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	41
130	10	12	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	14
130	10	12	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
140	10	13	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
140	10	13	X	COMPLETE	BIFACE	NONE	0-.9cm	5

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING			
140	10	13	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	76
140	10	13	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	18
140	10	13	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
150	10	14	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
150	10	14	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	95
150	10	14	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	38
150	10	14	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
150	10	14	26	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
150	10	14	26	COMPLETE	BIFACE THINNING	NONE	4+cm	1
150	10	14	28	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	3
150	10	14	28	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
150	10	14	28	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
40	11	2	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	2
50	11	3	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	9
50	11	3	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	6
60	11	4	X	COMPLETE	NORMAL	NONE	1-1.9cm	3
60	11	4	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	11
60	11	4	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
60	11	4	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
60	11	5	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
60	11	5	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
60	11	5	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	18
60	11	5	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	5
60	11	5	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
70	11	6	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
70	11	6	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
70	11	6	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
70	11	6	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	26
70	11	6	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	6
70	11	6	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
80	11	7	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
80	11	7	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
80	11	7	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
80	11	7	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	23
80	11	7	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	5
80	11	7	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
80	11	7	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
90	11	8	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
90	11	8	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
90	11	8	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	13
90	11	8	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	4
90	11	8	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
90	11	8	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	4
100	11	9	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
100	11	9	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
100	11	9	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	5
100	11	9	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	53
100	11	9	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	19
100	11	9	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
100	11	9	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
100	11	9	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
110	11	10	X	COMPLETE	NORMAL	NONE	1-1.9cm	2
110	11	10	X	COMPLETE	NOTCHING	NONE	1-1.9cm	2
110	11	10	X	COMPLETE	BIFACE	NONE	0-.9cm	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING			
110	11	10	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	23
110	11	10	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	15
110	11	10	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
110	11	10	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	4
110	11	10	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
120	11	11	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
120	11	11	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	5
120	11	11	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	40
120	11	11	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	19
120	11	11	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
130	11	12	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
130	11	12	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	25
130	11	12	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	11
130	11	12	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
140	11	13	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
140	11	13	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	30
140	11	13	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	10
140	11	13	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
140	11	13	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	2
150	11	14	X	COMPLETE	NORMAL	NONE	0-.9cm	1
150	11	14	X	COMPLETE	NORMAL	NONE	1-1.9cm	3
150	11	14	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	8
150	11	14	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	36
150	11	14	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	20
150	11	14	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
150	11	14	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
30	12	2	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
30	12	2	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
30	12	2	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	5
30	12	2	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	1
30	12	2	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
40	12	3	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
40	12	3	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	1
50	12	4	X	COMPLETE	NORMAL	NONE	2-3.9cm	2
50	12	4	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	10
50	12	4	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
50	12	4	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
60	12	5	X	COMPLETE	BLADE	NONE	1-1.9cm	1
60	12	5	X	COMPLETE	BLADE	NONE	2-3.9cm	2
60	12	5	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
60	12	5	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
60	12	5	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
60	12	5	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	12
60	12	5	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	4
60	12	5	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
60	12	5	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
70	12	6	X	COMPLETE	NORMAL	NONE	1-1.9cm	3
70	12	6	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
70	12	6	X	COMPLETE	NORMAL	NONE	4+cm	1
70	12	6	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
70	12	6	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	37
70	12	6	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	9
70	12	6	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
70	12	6	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
80	12	7	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
80	12	7	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	11

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
80	12	7	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	7
80	12	7	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
90	12	8	X	COMPLETE	NORMAL	NONE	2-3.9cm	6
90	12	8	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	7
90	12	8	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	49
90	12	8	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	15
90	12	8	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
90	12	8	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
100	12	9	X	COMPLETE	NOTCHING	NONE	1-1.9cm	2
100	12	9	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	7
100	12	9	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	47
100	12	9	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	9
100	12	9	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
110	12	10	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
110	12	10	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	6
110	12	10	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	31
110	12	10	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
110	12	10	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
120	12	11	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	7
120	12	11	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	37
120	12	11	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	6
130	12	12	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
130	12	12	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
130	12	12	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	37
130	12	12	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	9
130	12	12	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
140	12	13	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
140	12	13	X	COMPLETE	NOTCHING	NONE	0-.9cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
140	12	13	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	6
140	12	13	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	34
140	12	13	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	6
150	12	14	29	COMPLETE	NORMAL	NONE	1-1.9cm	1
150	12	14	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
150	12	14	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
150	12	14	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	24
150	12	14	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	6
150	12	14	29	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	4
150	12	14	29	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
20	13	1	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	1
20	13	1	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	1
30	13	2	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	3
30	13	2	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	1
40	13	3	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
40	13	3	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2
50	13	4	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
50	13	4	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	10
50	13	4	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	4
50	13	4	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
60	13	5	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
60	13	5	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	14
60	13	5	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	8
60	13	5	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
60	13	5	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
70	13	6	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
70	13	6	X	COMPLETE	BIFACE	NONE	1-	19

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING		1.9cm	
70	13	6	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	5
70	13	6	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
80	13	7	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
80	13	7	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	13
80	13	7	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	8
80	13	7	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
80	13	7	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	3
80	13	7	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
90	13	8	X	COMPLETE	NOTCHING	NONE	1-1.9cm	2
90	13	8	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
90	13	8	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	19
90	13	8	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	6
90	13	8	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
90	13	8	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
100	13	9	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
100	13	9	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
100	13	9	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	21
100	13	9	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	8
100	13	9	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
100	13	9	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	3
110	13	10	X	COMPLETE	NORMAL	NONE	1-1.9cm	2
110	13	10	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
110	13	10	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	4
110	13	10	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	3
110	13	10	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
120	13	11	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
120	13	11	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	13

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
120	13	11	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	6
120	13	11	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
120	13	11	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	2
120	13	12	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	6
120	13	12	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	3
130	13	13	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
130	13	13	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	14
130	13	13	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	4
130	13	13	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
130	13	13	22	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	4
140	13	14	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
140	13	14	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	20
140	13	14	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	12
140	13	14	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	3
150	13	15	X	COMPLETE	BLADE	NONE	2-3.9cm	1
150	13	15	X	COMPLETE	BURIN SPALL	NONE	2-3.9cm	1
150	13	15	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
150	13	15	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
150	13	15	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	32
150	13	15	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	17
150	13	15	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
150	13	15	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	2
150	13	15	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
40	14	3	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	5
40	14	3	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
50	14	4	X	COMPLETE	NORMAL	NONE	4+cm	1
50	14	4	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
50	14	4	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	16
50	14	4	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	2

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
50	14	4	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
60	14	5	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
60	14	5	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
60	14	5	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	16
60	14	5	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	8
60	14	5	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
70	14	6	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
70	14	6	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	14
70	14	6	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	5
70	14	6	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
70	14	6	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
80	14	7	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
80	14	7	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
80	14	7	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
80	14	7	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	29
80	14	7	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	7
80	14	7	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
90	14	8	X	COMPLETE	NORMAL	NONE	1-1.9cm	3
90	14	8	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
90	14	8	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	7
90	14	8	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	56
90	14	8	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	10
90	14	8	X	COMPLETE	BIFACE THINNING	NONE	4+cm	5
90	14	8	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
100	14	9	X	COMPLETE	NOTCHING	NONE	1-1.9cm	3
100	14	9	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	8
100	14	9	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	51
100	14	9	X	COMPLETE	BIFACE	NONE	2-	4

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING		3.9cm	
100	14	9	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
100	14	9	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	2
110	14	10	X	COMPLETE	NOTCHING	NONE	1-1.9cm	2
110	14	10	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	13
110	14	10	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	77
110	14	10	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	9
110	14	10	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
110	14	10	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	3
110	14	11	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
120	14	11	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	13
120	14	11	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	14
120	14	11	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
120	14	11	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
130	14	12	X	COMPLETE	NORMAL	NONE	2-3.9cm	3
130	14	12	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
130	14	12	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	6
130	14	12	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	42
130	14	12	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	11
130	14	12	X	COMPLETE	BIFACE THINNING	NONE	4+cm	4
140	14	13	X	COMPLETE	NOTCHING	NONE	1-1.9cm	2
140	14	13	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	5
140	14	13	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	50
140	14	13	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	10
140	14	13	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
140	14	13	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
150	14	14	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
150	14	14	X	COMPLETE	NORMAL	NONE	4+cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
150	14	14	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	6
150	14	14	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	43
150	14	14	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	9
150	14	14	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
150	14	14	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
150	14	14	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
30	15	2	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
40	15	3	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	15
50	15	4	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	6
50	15	4	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	1
50	15	5	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
50	15	5	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	30
50	15	5	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	5
50	15	5	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
50	15	5	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
60	15	6	X	COMPLETE	NOTCHING	NONE	1-1.9cm	2
60	15	6	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
60	15	6	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	37
60	15	6	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	28
60	15	6	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
70	15	7	X	COMPLETE	NORMAL	NONE	2-3.9cm	2
70	15	7	X	COMPLETE	NORMAL	NONE	4+cm	1
70	15	7	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	7
70	15	7	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	49
70	15	7	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	19
70	15	7	X	COMPLETE	BIFACE THINNING	NONE	4+cm	4
80	15	8	X	COMPLETE	BURIN SPALL	NONE	2-3.9cm	1
80	15	8	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
80	15	8	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	46
80	15	8	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	10
80	15	8	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
90	15	9	X	COMPLETE	NORMAL	NONE	1-1.9cm	2
90	15	9	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
90	15	9	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	59
90	15	9	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	22
90	15	9	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
100	15	10	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
100	15	10	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
100	15	10	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	15
100	15	10	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	6
110	15	11	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	7
110	15	11	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	62
110	15	11	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	20
110	15	11	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
110	15	11	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	5
120	15	12	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	5
120	15	12	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	10
120	15	12	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	5
130	15	13	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	9
130	15	13	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	56
130	15	13	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	24
130	15	13	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
130	15	13	21	COMPLETE	BIFACE THINNING	NONE	4+cm	1
140	15	14	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
140	15	14	X	COMPLETE	BIFACE	NONE	1-	63

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING		1.9cm	
140	15	14	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	12
150	15	15	X	COMPLETE	BURIN SPALL	NONE	2-3.9cm	1
150	15	15	X	COMPLETE	NORMAL	NONE	2-3.9cm	2
150	15	15	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	14
150	15	15	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	113
150	15	15	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	31
40	16	3	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	2
50	16	4	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	8
50	16	4	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	1
60	16	5	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
60	16	5	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	8
60	16	5	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	5
60	16	5	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
70	16	6	X	COMPLETE	NORMAL	NONE	4+cm	1
70	16	6	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
70	16	6	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	28
70	16	6	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	7
70	16	6	X	COMPLETE	BIFACE THINNING	NONE	4+cm	4
80	16	7	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	4
80	16	7	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	63
80	16	7	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	17
80	16	7	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
80	16	7	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	1
90	16	8	X	COMPLETE	BURIN SPALL	NONE	2-3.9cm	1
90	16	8	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
90	16	8	X	COMPLETE	NOTCHING	NONE	0-.9cm	2
90	16	8	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
90	16	8	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	17
90	16	8	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	76
90	16	8	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	12
90	16	8	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
90	16	8	X	COMPLETE	THERMAL SPALL	NONE	1-1.9cm	4
90	16	9	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
90	16	9	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
90	16	9	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	17
90	16	9	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	3
100	16	10	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
100	16	10	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	6
100	16	10	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	45
100	16	10	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	21
100	16	10	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
100	16	10	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	2
110	16	11	X	COMPLETE	BURIN SPALL	NONE	2-3.9cm	2
110	16	11	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
110	16	11	X	COMPLETE	NORMAL	NONE	4+cm	1
110	16	11	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	8
110	16	11	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	57
110	16	11	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	13
110	16	11	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
110	16	11	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	2
130	16	12	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
130	16	12	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	49
130	16	12	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	22
130	16	12	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
140	16	13	X	COMPLETE	NOTCHING	NONE	1-1.9cm	2
140	16	13	X	COMPLETE	BIFACE	NONE	0-.9cm	11

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
					THINNING			
140	16	13	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	119
140	16	13	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	21
140	16	13	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
140	16	13	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
150	16	14	X	COMPLETE	BLADE	NONE	4+cm	1
150	16	14	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
150	16	14	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	6
150	16	14	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	78
150	16	14	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	25
150	16	14	28	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	1
20	17	1	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	1
20	17	1	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	1
30	17	2	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	1
50	17	4	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
50	17	4	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
50	17	4	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	6
50	17	4	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	4
50	17	4	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
50	17	4	X	COMPLETE	THERMAL SPALL	NONE	0-.9cm	1
60	17	5	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	14
60	17	5	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	6
70	17	6	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	35
70	17	6	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	8
70	17	6	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
80	17	7	X	COMPLETE	BLADE	NONE	4+cm	1
80	17	7	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
80	17	7	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
80	17	7	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	65

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
80	17	7	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	15
80	17	7	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
90	17	8	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
90	17	8	X	COMPLETE	NOTCHING	NONE	0-.9cm	2
90	17	8	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
90	17	8	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
90	17	8	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	29
90	17	8	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	6
100	17	9	X	COMPLETE	NORMAL	NONE	1-1.9cm	1
100	17	9	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
100	17	9	X	COMPLETE	NOTCHING	NONE	1-1.9cm	1
100	17	9	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	9
100	17	9	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	58
100	17	9	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	14
100	17	9	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
110	17	10	X	COMPLETE	NOTCHING	NONE	0-.9cm	6
110	17	10	X	COMPLETE	NOTCHING	NONE	1-1.9cm	2
110	17	10	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	5
110	17	10	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	69
110	17	10	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	19
110	17	10	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
120	17	11	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
120	17	11	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	2
120	17	11	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	15
120	17	11	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	7
120	17	11	X	COMPLETE	BIFACE THINNING	NONE	4+cm	2
130	17	12	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	25
130	17	12	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	6

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
130	17	12	X	COMPLETE	BIFACE THINNING	NONE	4+cm	1
140	17	13	X	COMPLETE	NORMAL	NONE	2-3.9cm	1
140	17	13	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	1
140	17	13	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	32
140	17	13	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	7
140	17	13	X	COMPLETE	BIFACE THINNING	NONE	4+cm	3
150	17	14	X	COMPLETE	NOTCHING	NONE	0-.9cm	1
150	17	14	X	COMPLETE	BIFACE THINNING	NONE	0-.9cm	3
150	17	14	X	COMPLETE	BIFACE THINNING	NONE	1-1.9cm	33
150	17	14	X	COMPLETE	BIFACE THINNING	NONE	2-3.9cm	7
10	6	1	X	INCOMPLETE	X	X	X	2
30	6	3	X	INCOMPLETE	X	X	X	46
40	6	4	X	INCOMPLETE	X	X	X	153
60	6	6	X	INCOMPLETE	X	X	X	388
70	6	7	1	INCOMPLETE	X	X	X	893
80	6	8	1	INCOMPLETE	X	X	X	924
90	6	9	1	INCOMPLETE	X	X	X	1266
100	6	10	1	INCOMPLETE	X	X	X	456
110	6	11	X	INCOMPLETE	X	X	X	472
120	6	12	X	INCOMPLETE	X	X	X	463
130	6	13	X	INCOMPLETE	X	X	X	444
140	6	14	X	INCOMPLETE	X	X	X	388
150	6	15	X	INCOMPLETE	X	X	X	184
160	6	16	X	INCOMPLETE	X	X	X	38
20	7	1	X	SHATTER	X	X	X	5
20	7	1	X	INCOMPLETE	X	X	X	25
30	7	2	X	INCOMPLETE	X	X	X	14
40	7	3	X	SHATTER	X	X	X	6
40	7	3	X	INCOMPLETE	X	X	X	200
50	7	4	X	SHATTER	X	X	X	2
50	7	4	X	INCOMPLETE	X	X	X	355
60	7	5	X	SHATTER	X	X	X	2
60	7	5	X	INCOMPLETE	X	X	X	335
70	7	6	X	SHATTER	X	X	X	2
70	7	6	X	INCOMPLETE	X	X	X	342
80	7	7	X	SHATTER	X	X	X	7
80	7	7	X	INCOMPLETE	X	X	X	653
90	7	8	2	SHATTER	X	X	X	3
90	7	8	X	INCOMPLETE	X	X	X	1142
100	7	9	X	SHATTER	X	X	X	6

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
100	7	9	X	INCOMPLETE	X	X	X	847
110	7	10	X	SHATTER	X	X	X	2
110	7	10	X	INCOMPLETE	X	X	X	305
120	7	11	X	SHATTER	X	X	X	10
120	7	11	X	INCOMPLETE	X	X	X	437
120	7	12	X	INCOMPLETE	X	X	X	58
130	7	13	X	SHATTER	X	X	X	6
130	7	13	X	INCOMPLETE	X	X	X	235
130	7	13	23	INCOMPLETE	X	X	X	3
140	7	14	X	SHATTER	X	X	X	10
140	7	14	X	INCOMPLETE	X	X	X	394
150	7	15	X	SHATTER	X	X	X	15
150	7	15	X	INCOMPLETE	X	X	X	435
150	7	15	31	INCOMPLETE	X	X	X	13
20	8	1	X	INCOMPLETE	X	X	X	10
30	8	2	X	INCOMPLETE	X	X	X	3
40	8	3	X	SHATTER	X	X	X	9
40	8	3	X	INCOMPLETE	X	X	X	142
50	8	4	X	SHATTER	X	X	X	6
50	8	4	X	INCOMPLETE	X	X	X	163
60	8	5	X	SHATTER	X	X	X	8
60	8	5	X	INCOMPLETE	X	X	X	271
70	8	6	X	SHATTER	X	X	X	2
70	8	6	X	INCOMPLETE	X	X	X	510
80	8	7	X	SHATTER	X	X	X	15
80	8	7	X	INCOMPLETE	X	X	X	562
90	8	8	X	SHATTER	X	X	X	6
90	8	8	X	INCOMPLETE	X	X	X	668
100	8	9	X	SHATTER	X	X	X	11
100	8	9	X	INCOMPLETE	X	X	X	468
110	8	10	X	SHATTER	X	X	X	13
110	8	10	X	INCOMPLETE	X	X	X	428
120	8	11	X	SHATTER	X	X	X	14
120	8	11	X	INCOMPLETE	X	X	X	286
120	8	12	X	SHATTER	X	X	X	3
120	8	12	X	INCOMPLETE	X	X	X	54
130	8	13	X	SHATTER	X	X	X	11
130	8	13	X	INCOMPLETE	X	X	X	185
140	8	14	X	SHATTER	X	X	X	10
140	8	14	X	INCOMPLETE	X	X	X	572
150	8	15	X	SHATTER	X	X	X	23
150	8	15	X	INCOMPLETE	X	X	X	510
30	9	1	X	INCOMPLETE	X	X	X	5
40	9	2	X	INCOMPLETE	X	X	X	9
50	9	3	X	INCOMPLETE	X	X	X	205
60	9	4	X	SHATTER	X	X	X	3
60	9	4	X	INCOMPLETE	X	X	X	170

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
70	9	5	X	SHATTER	X	X	X	2
70	9	5	X	INCOMPLETE	X	X	X	207
80	9	6	X	SHATTER	X	X	X	4
80	9	6	X	INCOMPLETE	X	X	X	367
90	9	7	X	SHATTER	X	X	X	1
90	9	7	1	INCOMPLETE	X	X	X	697
100	9	8	X	SHATTER	X	X	X	3
100	9	8	X	INCOMPLETE	X	X	X	1072
110	9	9	X	SHATTER	X	X	X	5
110	9	9	X	INCOMPLETE	X	X	X	868
100	9	10	X	SHATTER	X	X	X	1
100	9	10	X	INCOMPLETE	X	X	X	445
110	9	11	X	SHATTER	X	X	X	12
110	9	11	X	INCOMPLETE	X	X	X	426
120	9	12	X	SHATTER	X	X	X	8
120	9	12	X	INCOMPLETE	X	X	X	345
130	9	13	X	INCOMPLETE	X	X	X	255
140	9	14	X	SHATTER	X	X	X	13
140	9	14	X	INCOMPLETE	X	X	X	429
150	9	15	X	SHATTER	X	X	X	22
150	9	15	X	INCOMPLETE	X	X	X	575
30	10	2	X	INCOMPLETE	X	X	X	1
40	10	3	X	SHATTER	X	X	X	5
40	10	3	X	INCOMPLETE	X	X	X	180
50	10	4	X	SHATTER	X	X	X	9
50	10	4	X	INCOMPLETE	X	X	X	262
60	10	5	X	INCOMPLETE	X	X	X	215
70	10	6	X	SHATTER	X	X	X	8
70	10	6	1	INCOMPLETE	X	X	X	397
70	10	7	X	SHATTER	X	X	X	13
80	10	7	X	INCOMPLETE	X	X	X	610
90	10	8	X	SHATTER	X	X	X	14
90	10	8	X	INCOMPLETE	X	X	X	785
90	10	9	X	SHATTER	X	X	X	17
90	10	9	X	INCOMPLETE	X	X	X	1108
100	10	10	X	SHATTER	X	X	X	9
100	10	10	X	INCOMPLETE	X	X	X	338
110	10	11	X	SHATTER	X	X	X	11
110	10	11	X	INCOMPLETE	X	X	X	421
130	10	12	X	SHATTER	X	X	X	9
130	10	12	X	INCOMPLETE	X	X	X	271
140	10	13	X	INCOMPLETE	X	X	X	264
150	10	14	X	SHATTER	X	X	X	9
150	10	14	28	INCOMPLETE	X	X	X	19
150	10	14	26	INCOMPLETE	X	X	X	23
150	10	14	X	INCOMPLETE	X	X	X	566
30	11	1	X	INCOMPLETE	X	X	X	4

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
40	11	2	X	INCOMPLETE	X	X	X	3
50	11	3	X	SHATTER	X	X	X	7
50	11	3	X	INCOMPLETE	X	X	X	111
60	11	4	X	SHATTER	X	X	X	1
60	11	4	X	INCOMPLETE	X	X	X	123
60	11	5	X	SHATTER	X	X	X	1
60	11	5	X	INCOMPLETE	X	X	X	117
70	11	6	X	SHATTER	X	X	X	6
70	11	6	X	INCOMPLETE	X	X	X	228
80	11	7	X	INCOMPLETE	X	X	X	481
90	11	8	X	SHATTER	X	X	X	2
90	11	8	X	INCOMPLETE	X	X	X	771
100	11	9	X	SHATTER	X	X	X	3
100	11	9	X	INCOMPLETE	X	X	X	1871
110	11	10	X	SHATTER	X	X	X	7
110	11	10	X	INCOMPLETE	X	X	X	822
120	11	11	X	INCOMPLETE	X	X	X	699
130	11	12	X	INCOMPLETE	X	X	X	424
140	11	13	X	INCOMPLETE	X	X	X	526
150	11	14	X	SHATTER	X	X	X	3
150	11	14	X	INCOMPLETE	X	X	X	619
20	12	1	X	INCOMPLETE	X	X	X	6
30	12	2	X	INCOMPLETE	X	X	X	93
40	12	3	X	SHATTER	X	X	X	2
40	12	3	X	INCOMPLETE	X	X	X	71
50	12	4	X	INCOMPLETE	X	X	X	232
60	12	5	X	INCOMPLETE	X	X	X	214
70	12	6	X	INCOMPLETE	X	X	X	390
80	12	7	X	INCOMPLETE	X	X	X	246
90	12	8	X	SHATTER	X	X	X	12
90	12	8	X	INCOMPLETE	X	X	X	903
100	12	9	X	INCOMPLETE	X	X	X	1004
110	12	10	X	INCOMPLETE	X	X	X	531
120	12	11	X	SHATTER	X	X	X	5
120	12	11	X	INCOMPLETE	X	X	X	482
130	12	12	X	SHATTER	X	X	X	5
130	12	12	X	INCOMPLETE	X	X	X	484
140	12	13	X	SHATTER	X	X	X	4
140	12	13	X	INCOMPLETE	X	X	X	431
150	12	14	X	SHATTER	X	X	X	4
150	12	14	X	INCOMPLETE	X	X	X	517
150	12	14	29	INCOMPLETE	X	X	X	17
150	12	14	30	INCOMPLETE	X	X	X	1
20	13	1	X	INCOMPLETE	X	X	X	15
30	13	2	X	INCOMPLETE	X	X	X	54
40	13	3	X	INCOMPLETE	X	X	X	107
50	13	4	X	INCOMPLETE	X	X	X	168

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
60	13	5	X	SHATTER	X	X	X	2
60	13	5	X	INCOMPLETE	X	X	X	214
70	13	6	X	SHATTER	X	X	X	1
70	13	6	X	INCOMPLETE	X	X	X	473
80	13	7	X	SHATTER	X	X	X	1
80	13	7	X	INCOMPLETE	X	X	X	477
90	13	8	X	SHATTER	X	X	X	5
90	13	8	X	INCOMPLETE	X	X	X	691
100	13	9	X	SHATTER	X	X	X	6
100	13	9	X	INCOMPLETE	X	X	X	828
110	13	10	X	INCOMPLETE	X	X	X	138
110	13	11	X	INCOMPLETE	X	X	X	318
120	13	12	X	INCOMPLETE	X	X	X	159
130	13	13	X	INCOMPLETE	X	X	X	324
130	13	13	22	INCOMPLETE	X	X	X	21
140	13	14	X	SHATTER	X	X	X	4
140	13	14	X	INCOMPLETE	X	X	X	608
150	13	15	X	SHATTER	X	X	X	12
150	13	15	X	INCOMPLETE	X	X	X	686
30	14	1	X	INCOMPLETE	X	X	X	3
40	14	2	X	INCOMPLETE	X	X	X	3
50	14	4	X	INCOMPLETE	X	X	X	158
60	14	5	X	INCOMPLETE	X	X	X	191
70	14	6	X	INCOMPLETE	X	X	X	248
80	14	7	X	SHATTER	X	X	X	1
80	14	7	X	SHATTER	X	X	X	7
80	14	7	X	INCOMPLETE	X	X	X	449
90	14	8	X	SHATTER	X	X	X	3
90	14	8	X	INCOMPLETE	X	X	X	703
100	14	9	X	INCOMPLETE	X	X	X	841
110	14	10	X	SHATTER	X	X	X	8
110	14	10	X	INCOMPLETE	X	X	X	673
120	14	11	X	INCOMPLETE	X	X	X	713
130	14	12	X	INCOMPLETE	X	X	X	363
140	14	13	X	INCOMPLETE	X	X	X	453
150	14	14	X	INCOMPLETE	X	X	X	324
20	15	1	X	INCOMPLETE	X	X	X	7
30	15	2	X	INCOMPLETE	X	X	X	3
40	15	3	X	SHATTER	X	X	X	2
40	15	3	X	INCOMPLETE	X	X	X	71
50	15	4	X	INCOMPLETE	X	X	X	59
50	15	5	X	SHATTER	X	X	X	8
50	15	5	X	INCOMPLETE	X	X	X	256
60	15	6	X	SHATTER	X	X	X	5
60	15	6	X	INCOMPLETE	X	X	X	426
70	15	7	X	SHATTER	X	X	X	4
70	15	7	X	INCOMPLETE	X	X	X	508

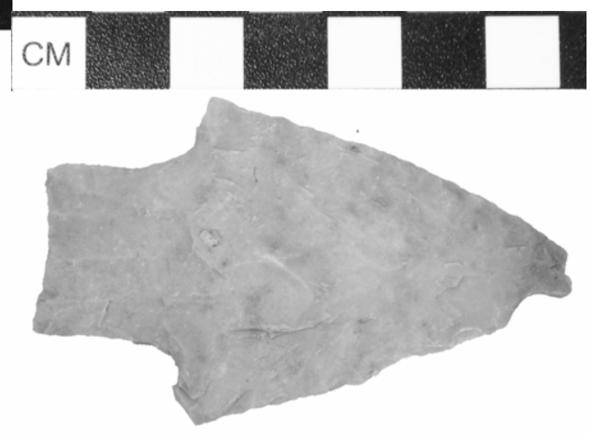
Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
80	15	8	X	INCOMPLETE	X	X	X	373
90	15	9	X	SHATTER	X	X	X	4
90	15	9	X	INCOMPLETE	X	X	X	444
100	15	10	X	SHATTER	X	X	X	4
100	15	10	X	INCOMPLETE	X	X	X	212
110	15	11	X	SHATTER	X	X	X	6
110	15	11	X	INCOMPLETE	X	X	X	654
120	15	12	X	SHATTER	X	X	X	5
120	15	12	X	INCOMPLETE	X	X	X	163
130	15	13	X	INCOMPLETE	X	X	X	427
130	15	13	21	INCOMPLETE	X	X	X	5
140	15	14	X	SHATTER	X	X	X	13
140	15	14	X	INCOMPLETE	X	X	X	339
150	15	15	X	SHATTER	X	X	X	16
150	15	15	X	INCOMPLETE	X	X	X	566
40	16	3	X	SHATTER	X	X	X	5
40	16	3	X	INCOMPLETE	X	X	X	45
70	16	4	X	INCOMPLETE	X	X	X	166
60	16	5	X	INCOMPLETE	X	X	X	195
70	16	6	X	SHATTER	X	X	X	4
70	16	6	X	INCOMPLETE	X	X	X	542
80	16	7	X	SHATTER	X	X	X	6
80	16	7	X	INCOMPLETE	X	X	X	854
90	16	8	X	SHATTER	X	X	X	15
90	16	8	X	INCOMPLETE	X	X	X	948
90	16	9	X	INCOMPLETE	X	X	X	97
100	16	10	X	SHATTER	X	X	X	5
100	16	10	X	INCOMPLETE	X	X	X	752
110	16	11	X	SHATTER	X	X	X	6
110	16	11	X	INCOMPLETE	X	X	X	662
130	16	12	X	SHATTER	X	X	X	5
130	16	12	X	INCOMPLETE	X	X	X	367
130	16	12	24	INCOMPLETE	X	X	X	2
140	16	13	X	INCOMPLETE	X	X	X	583
150	16	14	X	SHATTER	X	X	X	4
150	16	14	X	INCOMPLETE	X	X	X	450
20	17	1	X	INCOMPLETE	X	X	X	48
30	17	2	X	INCOMPLETE	X	X	X	14
40	17	3	X	INCOMPLETE	X	X	X	45
50	17	4	X	INCOMPLETE	X	X	X	173
60	17	5	X	SHATTER	X	X	X	4
60	17	5	X	INCOMPLETE	X	X	X	255
70	17	6	X	SHATTER	X	X	X	11
70	17	6	X	INCOMPLETE	X	X	X	527
80	17	7	X	SHATTER	X	X	X	4
80	17	7	X	INCOMPLETE	X	X	X	1130
90	17	8	X	INCOMPLETE	X	X	X	821

Depth	Unit	Level	Feature	Complete	Type	Cortex	Length	Count
100	17	9	X	SHATTER	X	X	X	10
100	17	9	X	INCOMPLETE	X	X	X	1147
110	17	10	X	SHATTER	X	X	X	11
110	17	10	X	INCOMPLETE	X	X	X	1183
120	17	11	X	SHATTER	X	X	X	3
120	17	11	X	INCOMPLETE	X	X	X	260
130	17	12	X	SHATTER	X	X	X	1
130	17	12	X	INCOMPLETE	X	X	X	587
130	17	12	25	INCOMPLETE	X	X	X	2
140	17	13	X	INCOMPLETE	X	X	X	570
150	17	14	X	INCOMPLETE	X	X	X	373

APPENDIX D: PHOTOGRAPHS OF PROJECTILE POINTS

Unit 6, 90cmbs, Bulverde

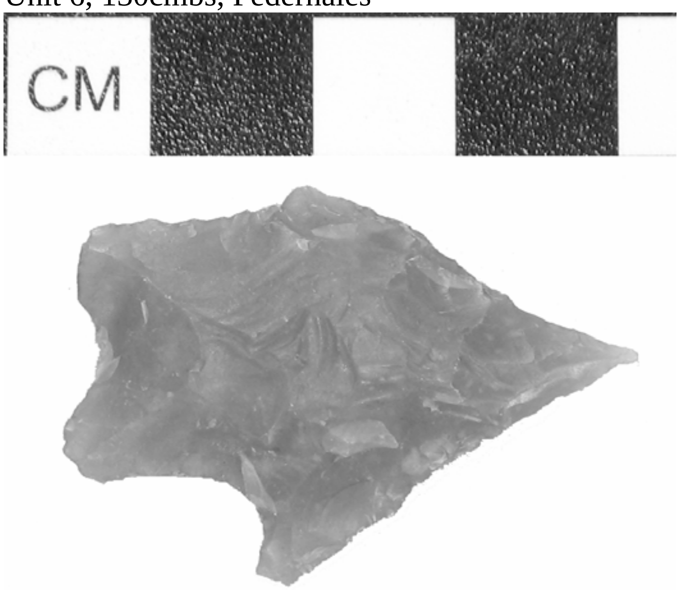
Unit 6, 90cmbs, Marshall



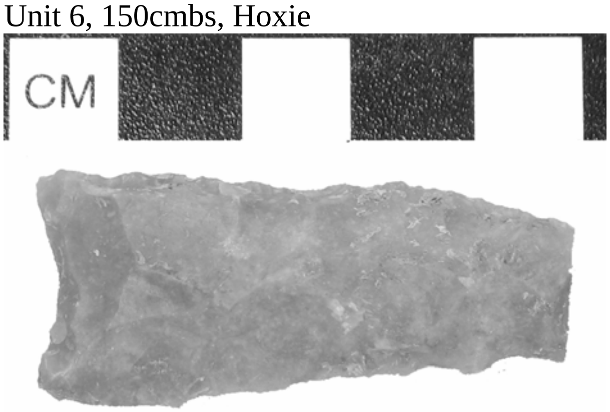
Unit 6, 90cmbs, Darl

Unit 6, 120cmbs, Pedernales

Unit 6, 130cmbs, Pedernales

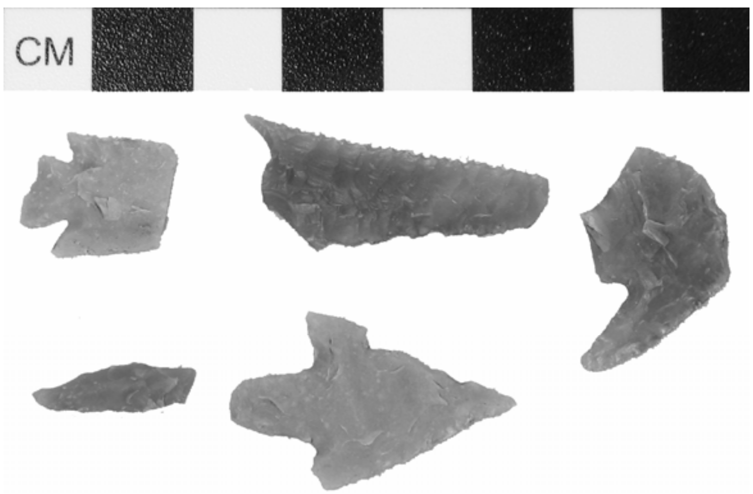


Unit 6, 150cmbs, Hoxie

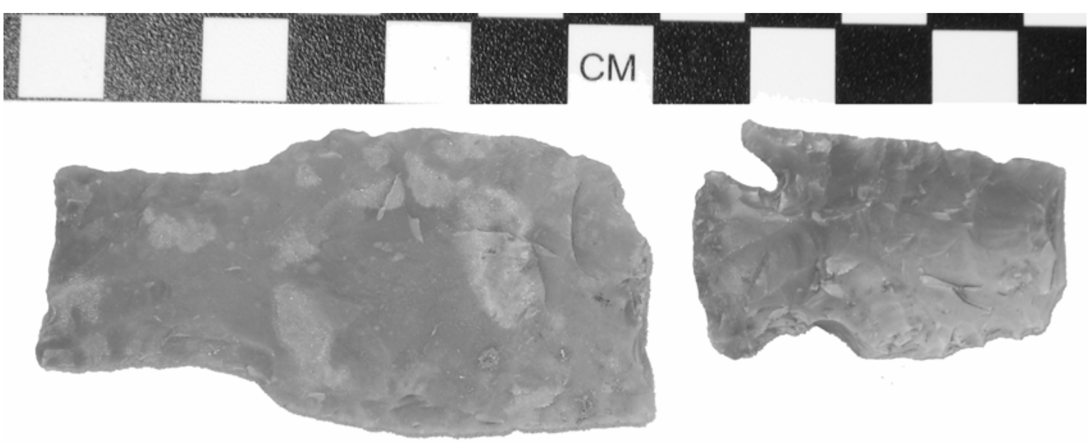


Unit 6, 150cmbs, Hoxie

Unit 7, 40cmbs, Scallorn, Perdiz, Perdiz, Perdiz, Perdiz



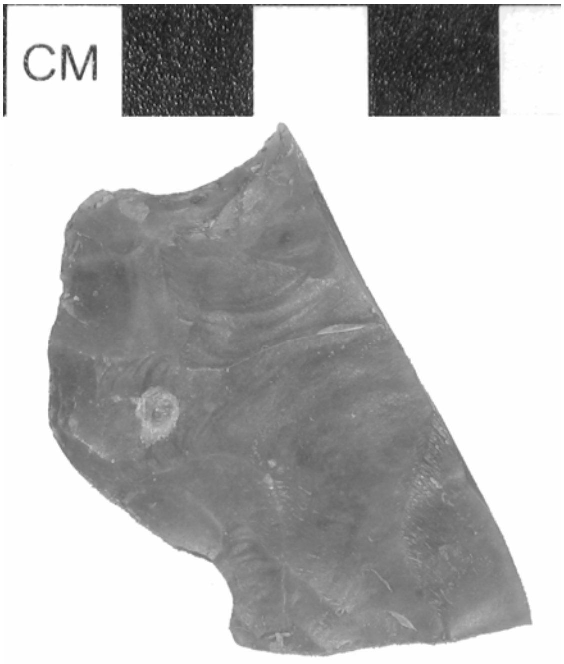
Unit 7, 90cmbs, Nolan, Ellis



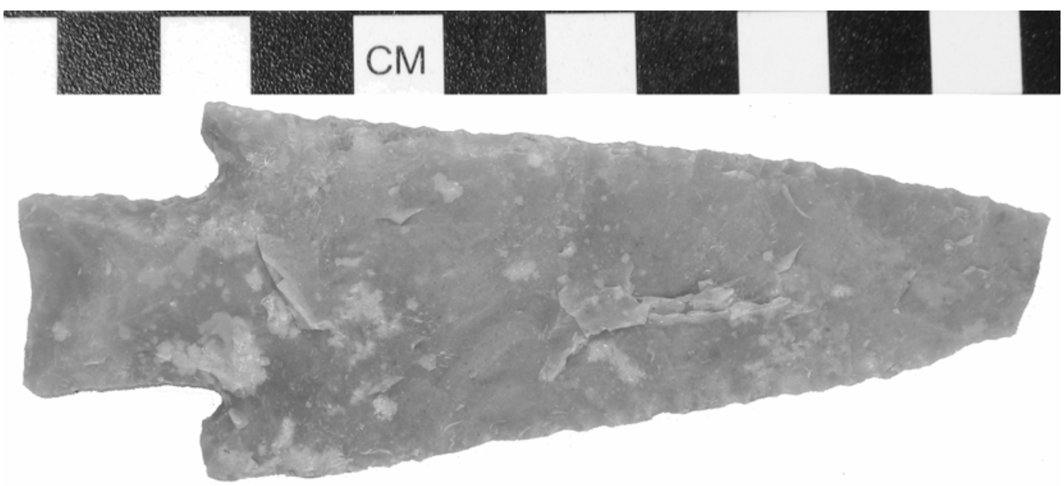
Unit 7, 100cmbs, Nolan

Unit 7, 110cmbs, Unidentified

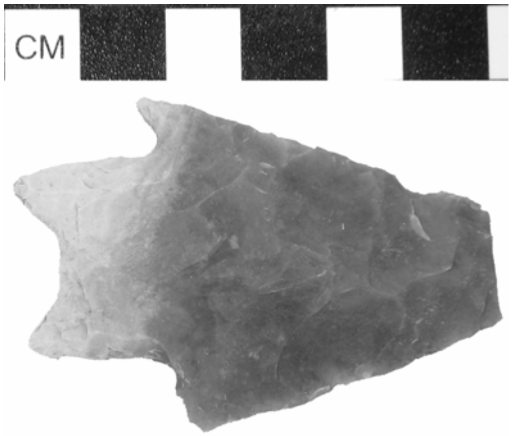
Unit 7, 110cmbs, Almogie



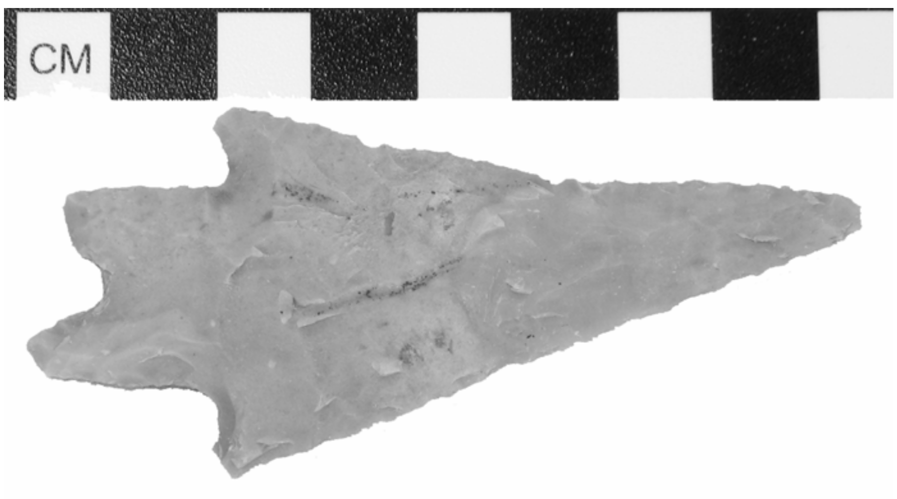
Unit 7, 140cmbs, Marshall



Unit 7, 150cmbs, Pedernales



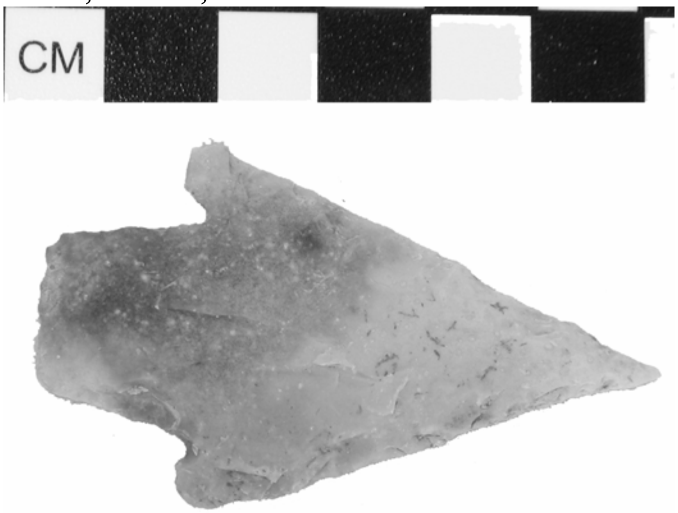
Unit 8, 20cmbs, Pedernales



Unit 8, 80cmbs, Unidentified, Bulverde

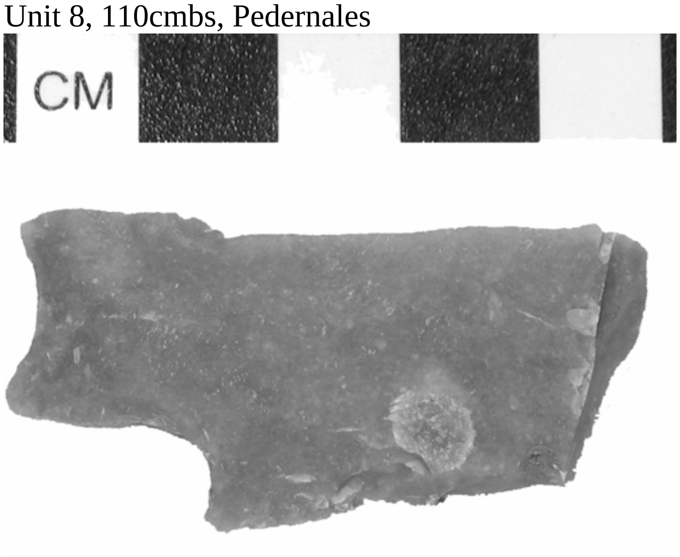
Unit 8, 80, Travis, Travis

Unit 8, 90cmbs, Bulverde

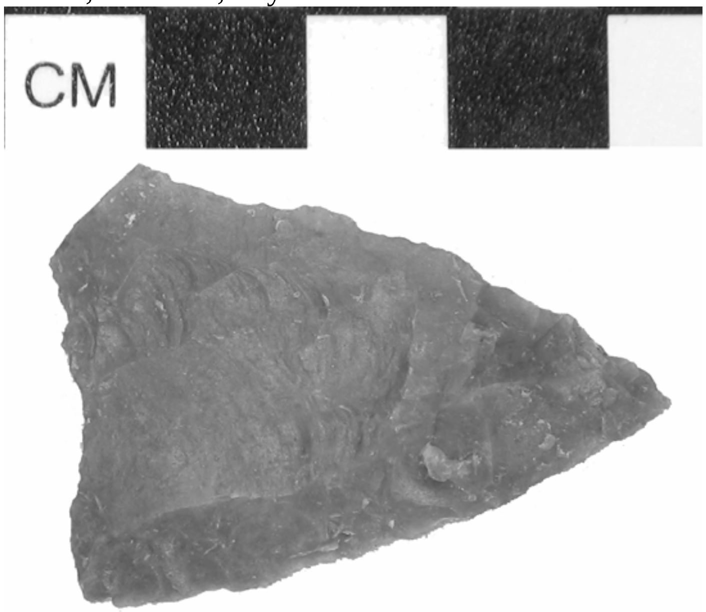


Unit 8, 100cmbs, Nolan

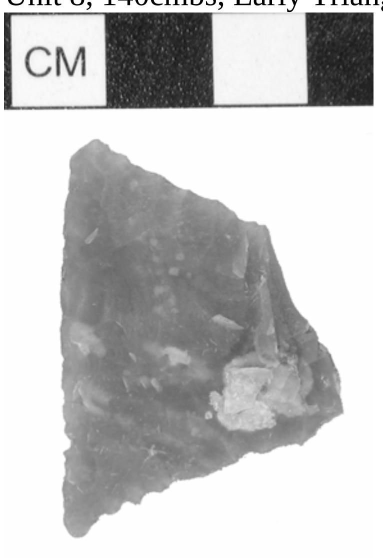
Unit 8, 110cmbs, Pedernales



Unit 8, 120cmbs, Taylor

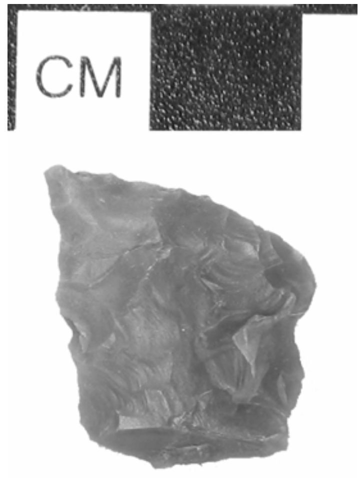


Unit 8, 140cmbs, Early Triangular/Taylor Thin Based

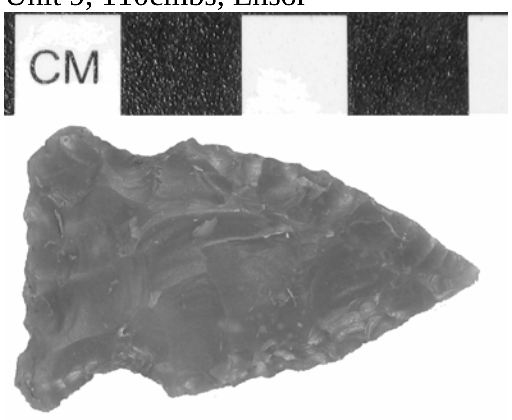


Unit 8, 140cmbs, Early Split Stem

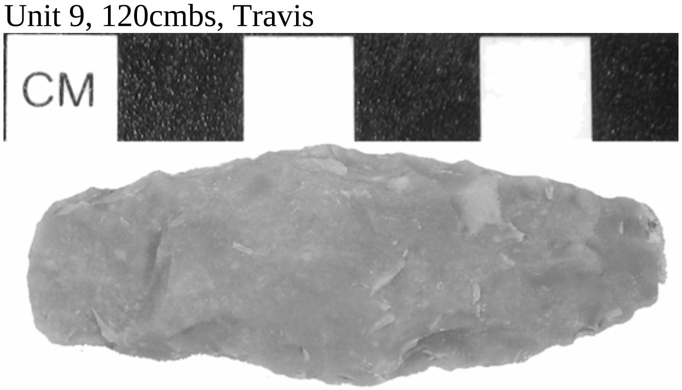
Unit 8, 150cmbs, Gower



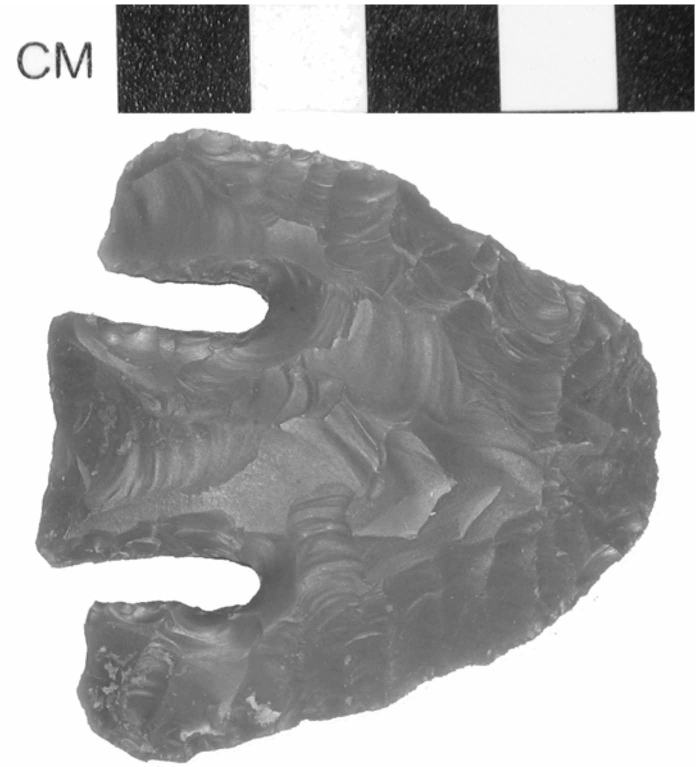
Unit 9, 110cmbs, Ensor



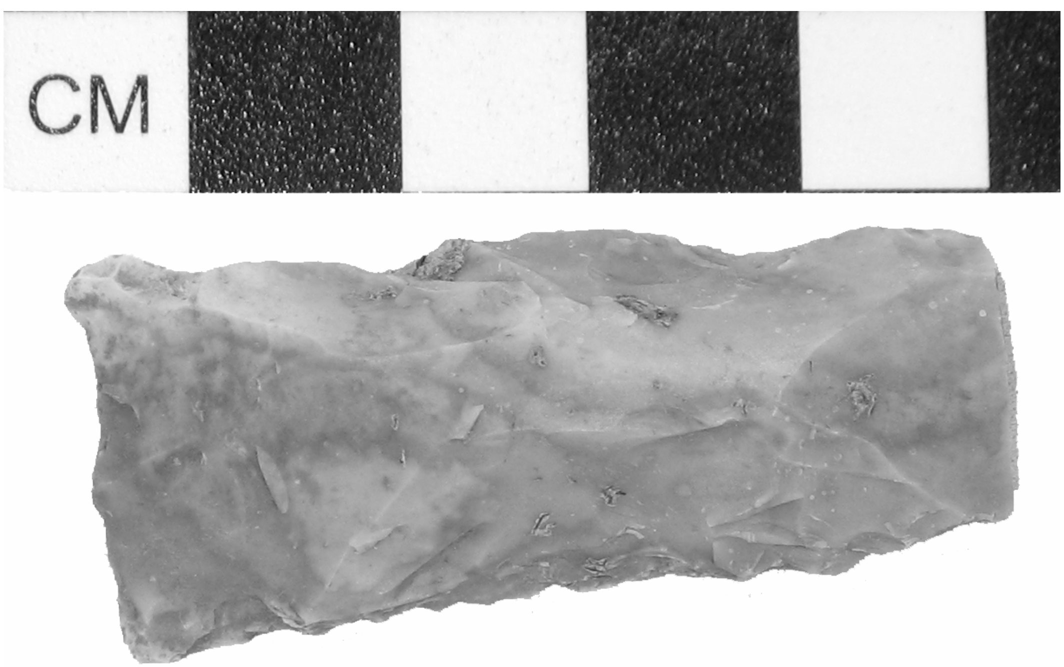
Unit 9, 120cmbs, Travis



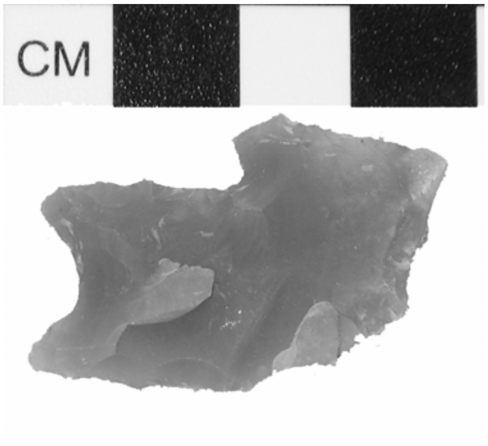
Unit 9, 140cmbs, Andice (resharpened into scraper)



Unit 9, 150cmbs, Hoxie

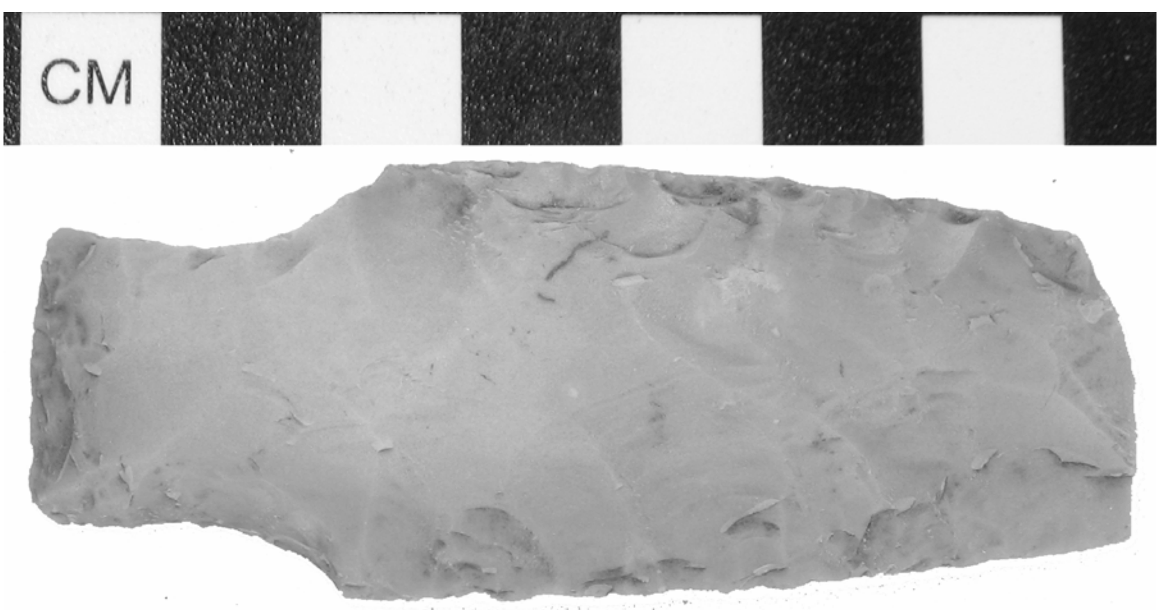


Unit 10, 90cmbs, Pedernales



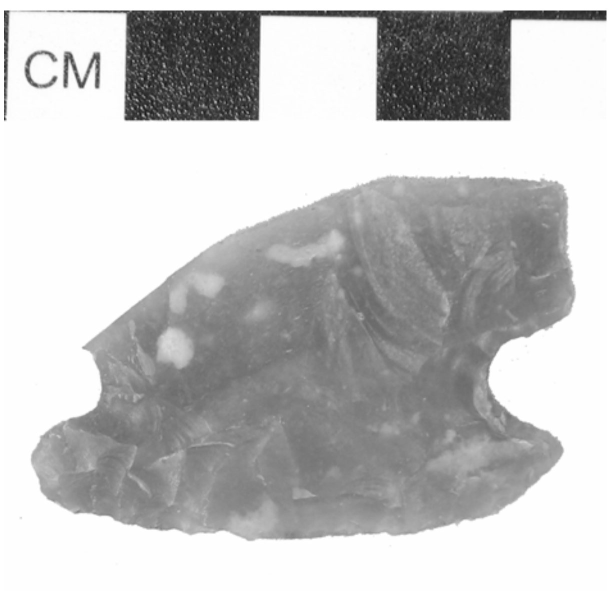
Unit 10, 100cmbs, Nolan

Unit 10, 110cmbs, Nolan

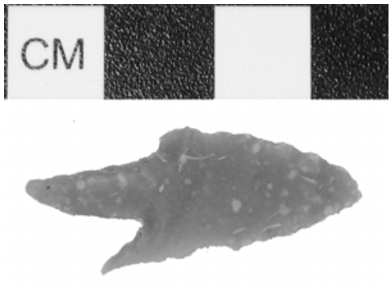


Unit 10, 110cmbs, Nolan

Unit 10, 150cmbs, Marcos

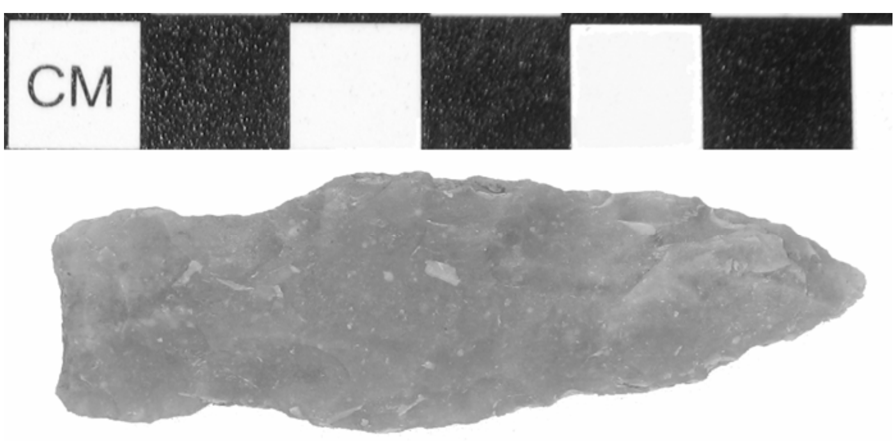


Unit 11, 40cmbs, Perdiz



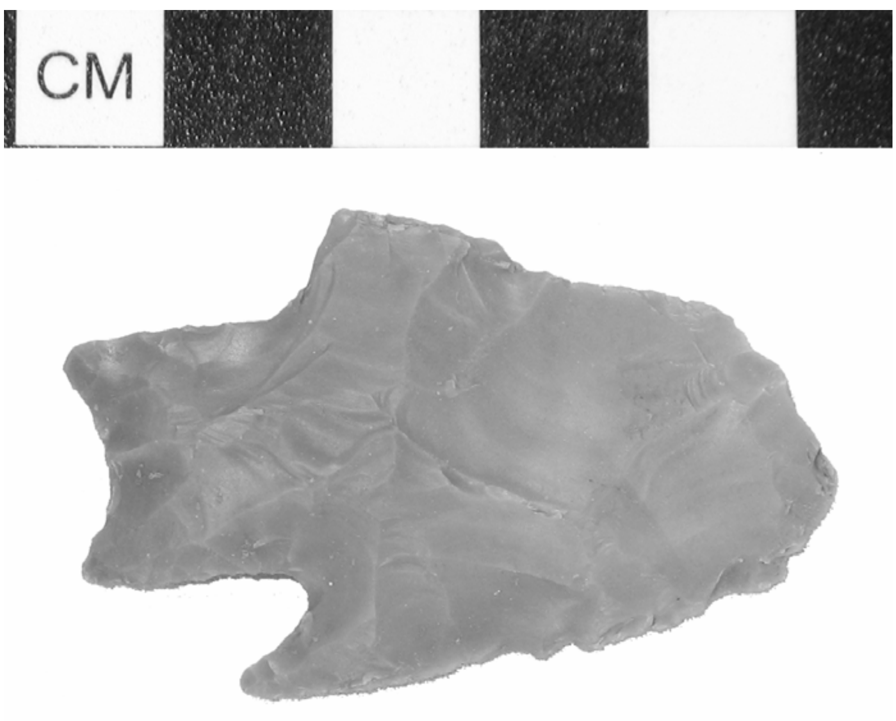
Unit 11, 110cmbs, Nolan

Unit 11, 120cmbs, Travis



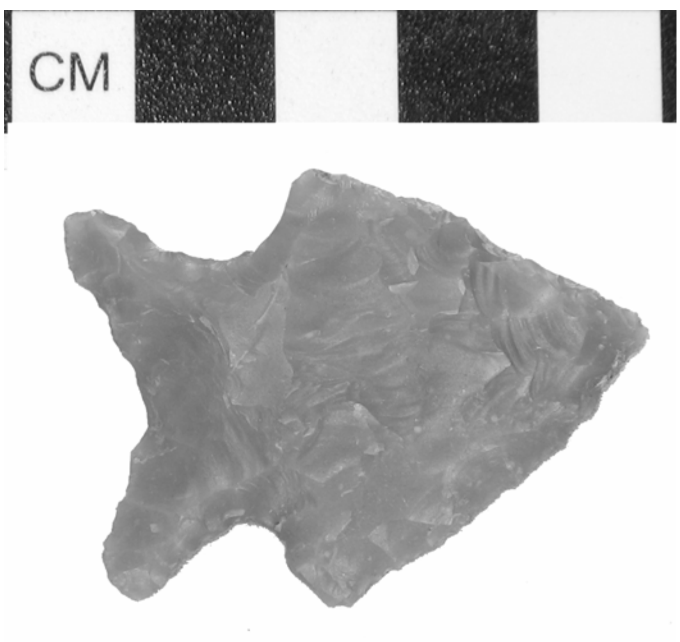
Unit 11, 120cmbs, Nolan

Unit 11, 120cmbs, Marshall



Unit 11, 150cmbs, Unidentified, c.f. Morrill

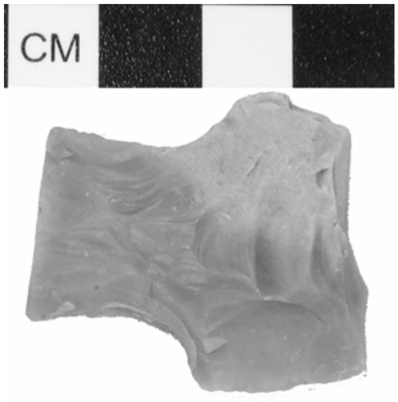
Unit 11, 150cmbs, Morrill



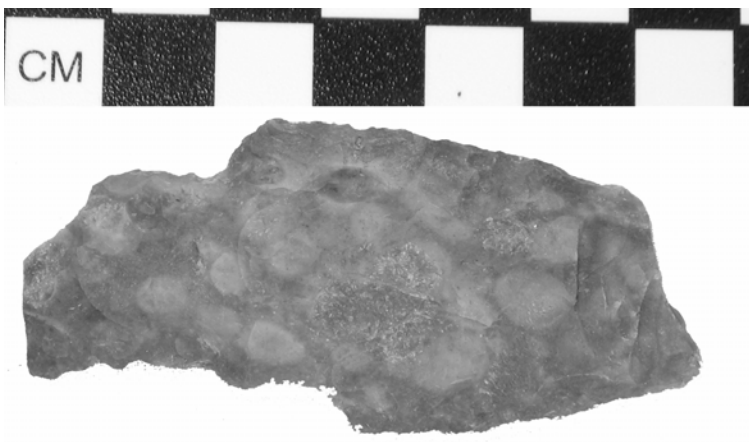
Unit 12, 60cmbs, Unidentified

Unit 12, 90cmbs, Pedernales

Unit 12, 90cmbs, Nolan



Unit 12, 100cmbs, Nolan



Unit 12, 100cmbs, Nolan

Unit 12, 100cmbs, Bulverde

Unit 12, 100cmbs, Pedernales

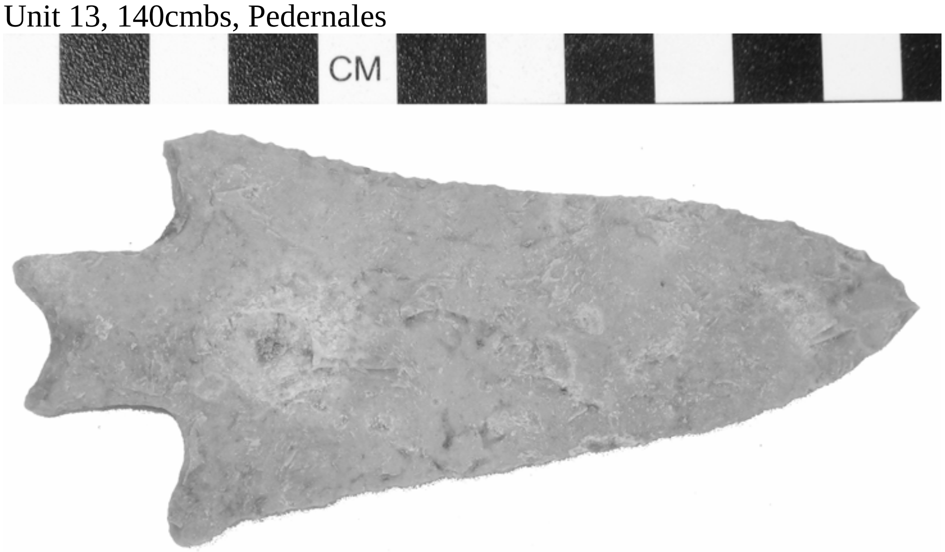
Unit 12, 130cmbs, Early Triangular/
Taylor Thin Based

Unit 12, 130cmbs, Baird

Unit 13, 80cmbs, Pedernales/Bulverde

Unit 13, 100cmbs, Unidentifiable

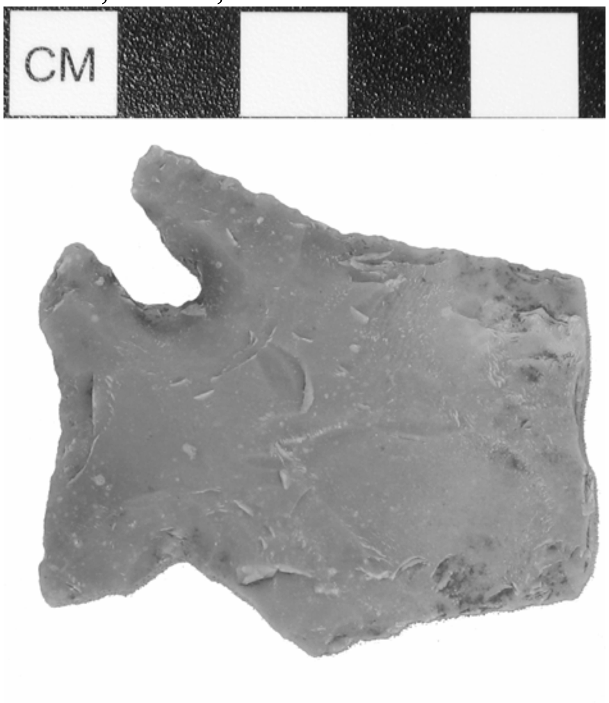
Unit 13, 140cmbs, Pedernales



Unit 13, 150cmbs, Morrill

Unit 14, 70cmbs, Ellis

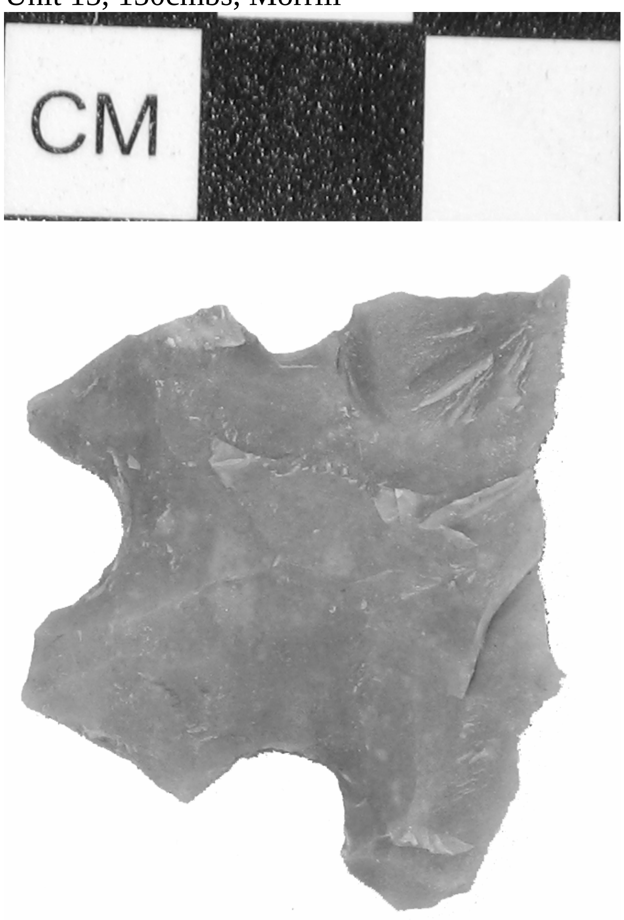
Unit 14, 70cmbs, Marcos



Unit 14, 80cmbs, Bulverde

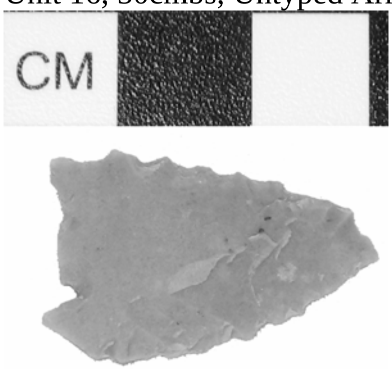
Unit 14, 100cmbs, Nolan

Unit 15, 150cmbs, Morrill

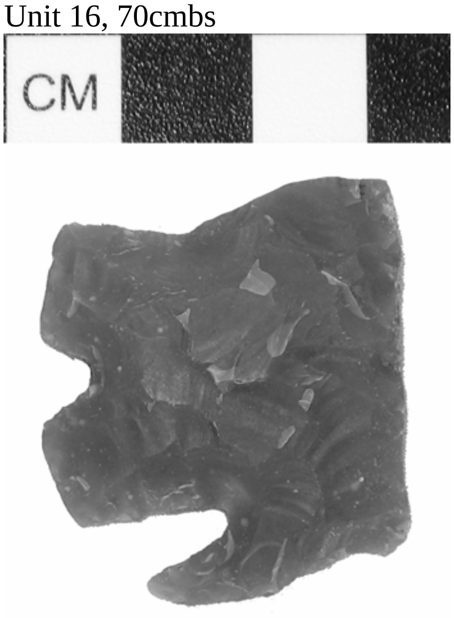


Unit 15, 150cmbs, Untyped Early Archaic

Unit 16, 50cmbs, Untyped Arrow



Unit 16, 70cmbs

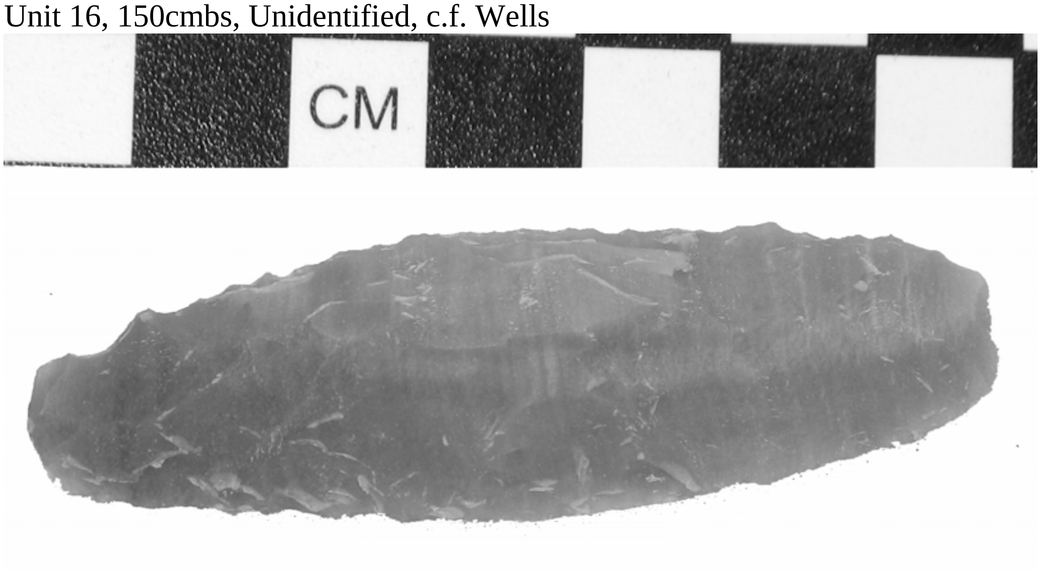


Unit 16, 80cmbs, Untyped

Unit 16, 100cmbs, Taylor

Unit 16, 110cmbs, Travis

Unit 16, 150cmbs, Unidentified, c.f. Wells



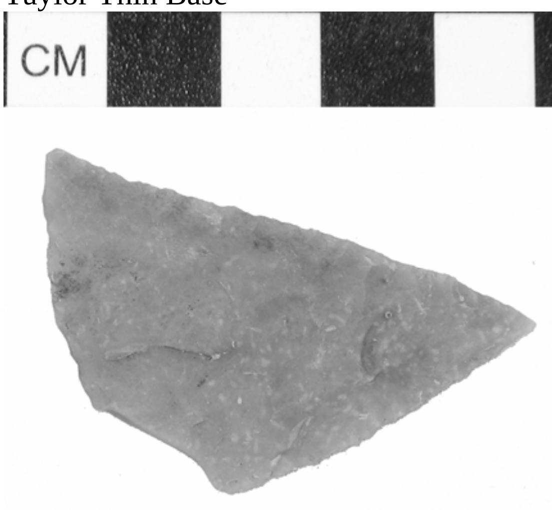
Unit 16, 150cmbs, Baird

Unit 17, 80cmbs, Unidentified

Unit 17, 110cmbs, Early Triangular/
Taylor Thin Base

Unit 17, 120cmbs, Marshall

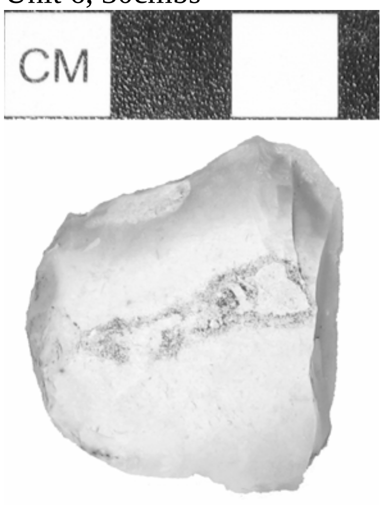
Unit 17, 130cmbs, Early Triangular/
Taylor Thin Base



Unit 17, 130cmbs, Taylor

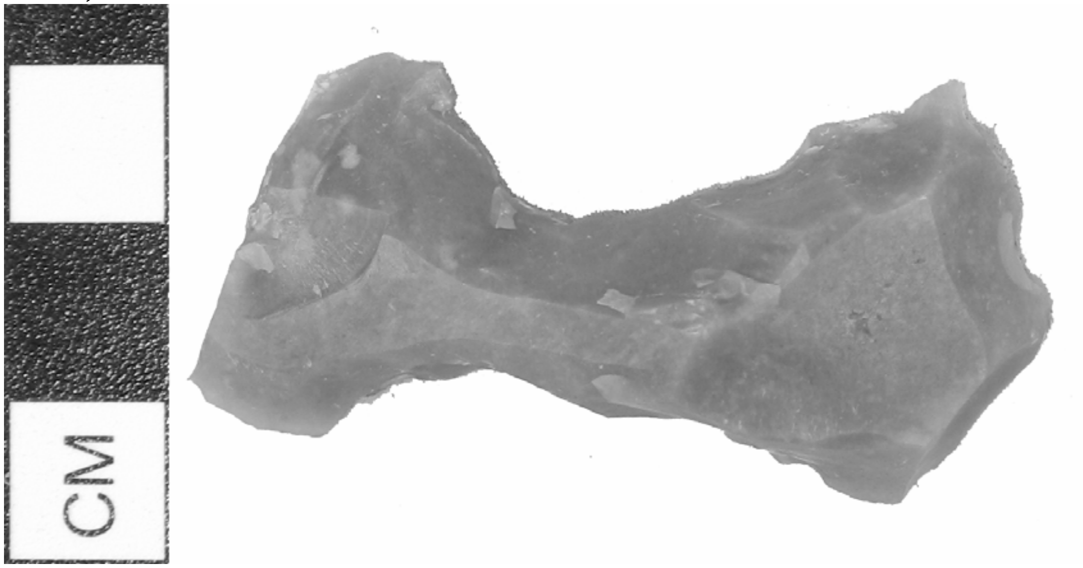
APPENDIX E: PHOTOGRAPHS OF UNIFACES

Unit 6, 30cmbs

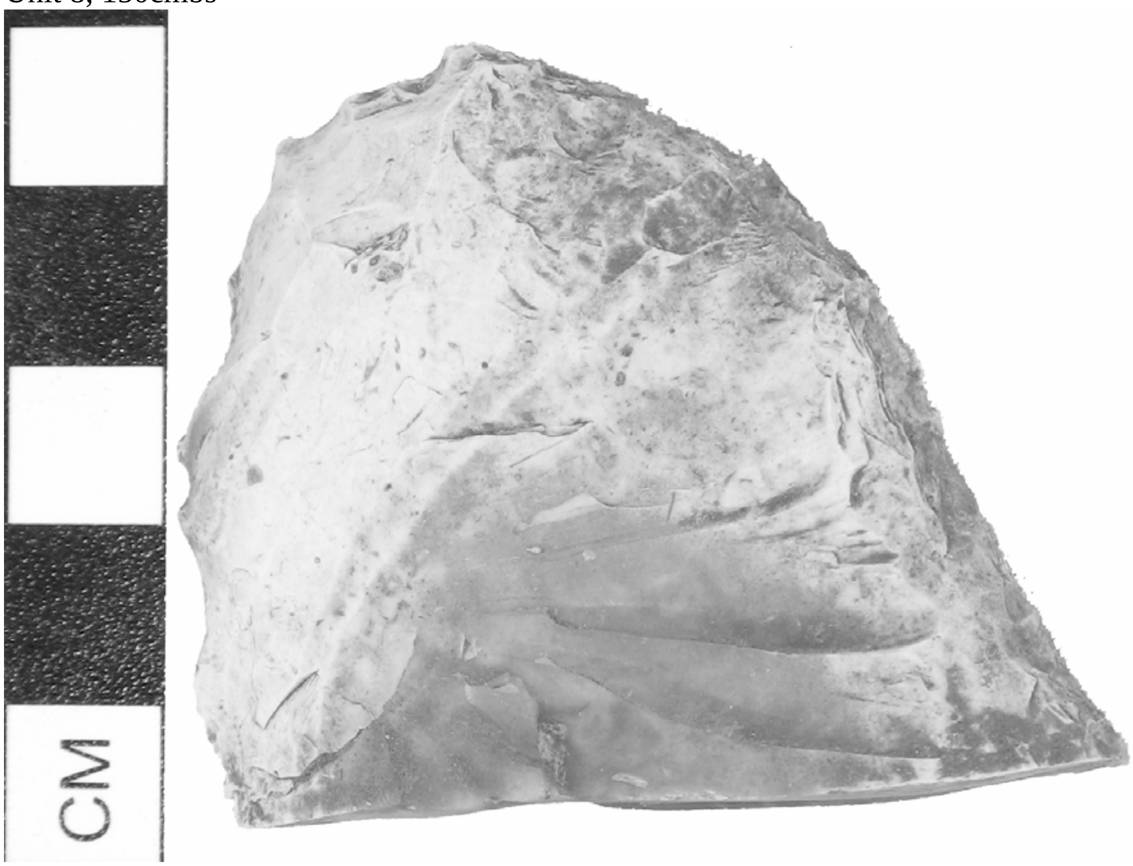


Unit 6, 120cmbs

Unit 6, 130cmbs

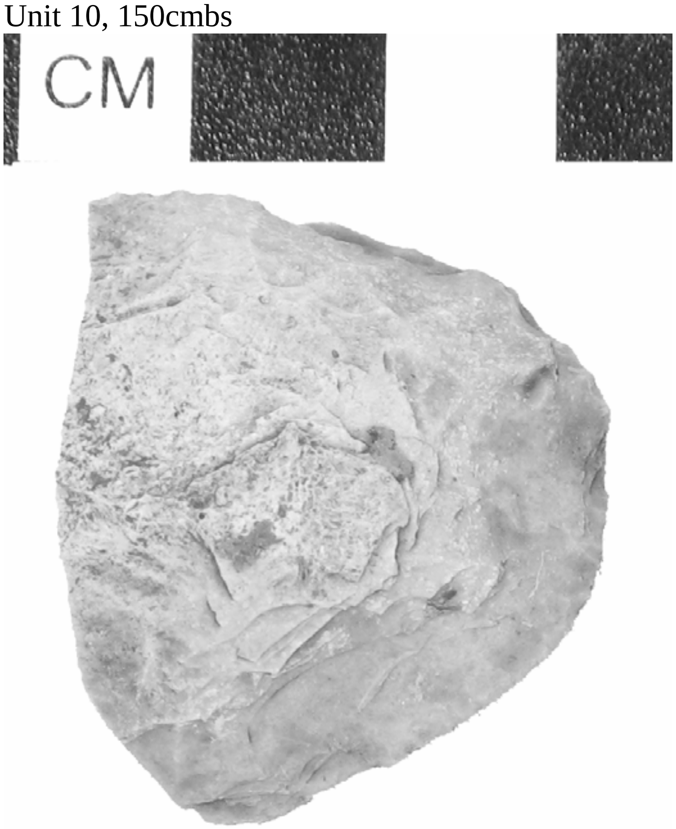


Unit 8, 150cmbs

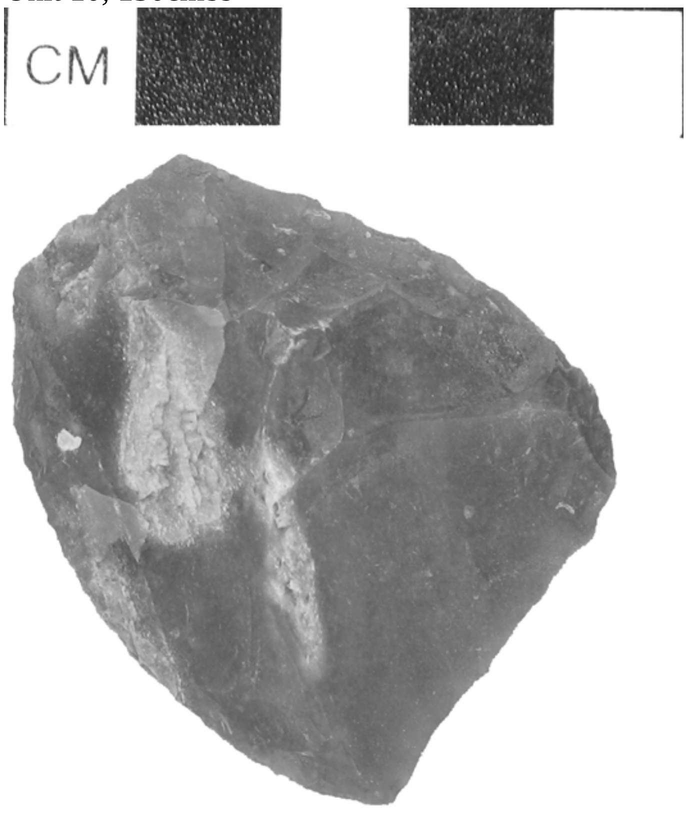


Unit 10, 70cmbs

Unit 10, 150cmbs

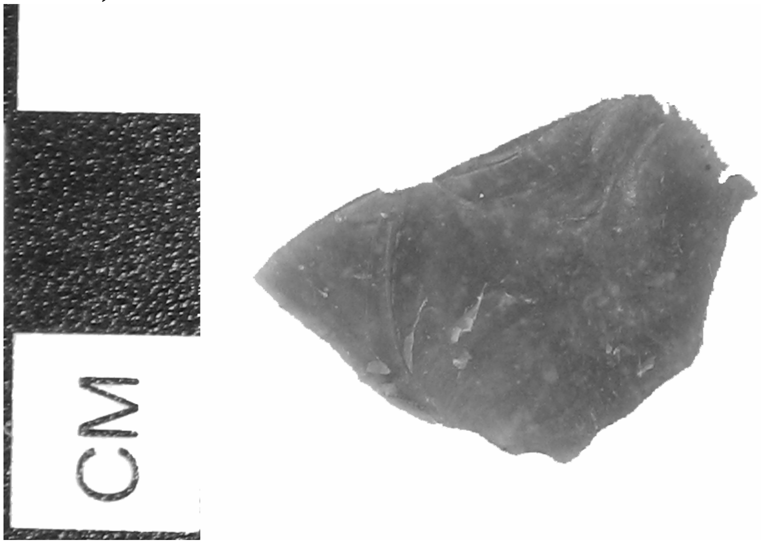


Unit 10, 150cmbs



Unit 12, 150cmbs

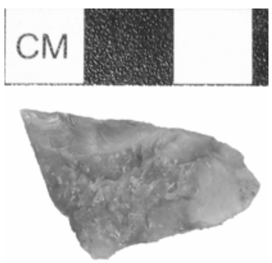
Unit 14, 130cmbs



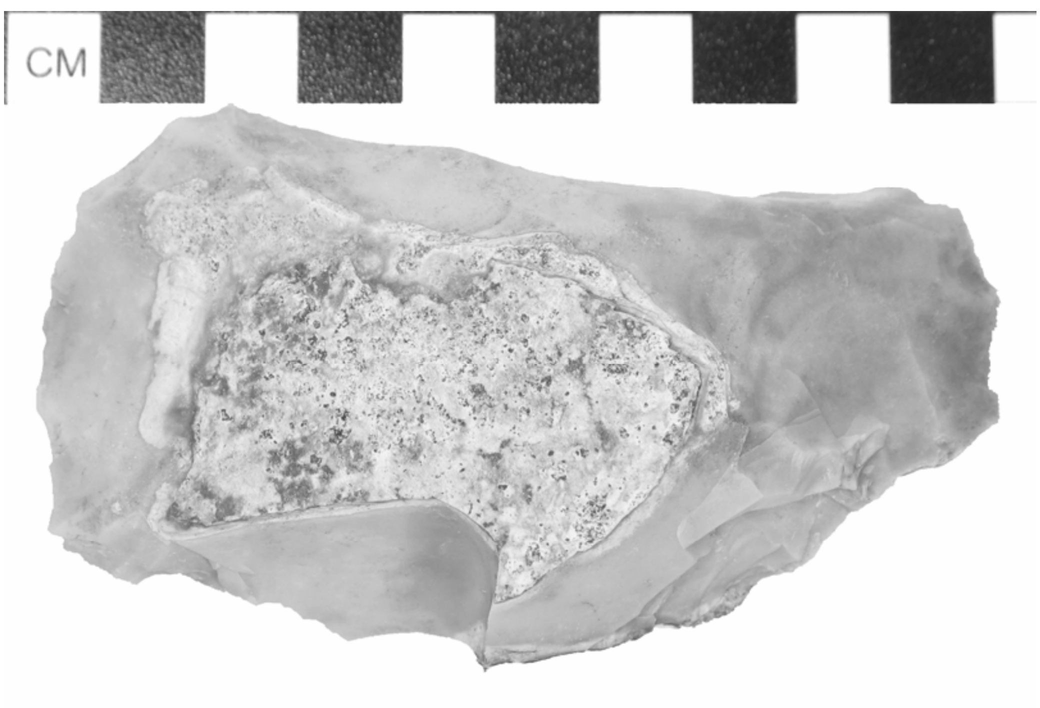
Unit17, 70cmbs

APPENDIX F: PHOTOGRAPHS OF NON-PROJECTILE POINT BIFACES

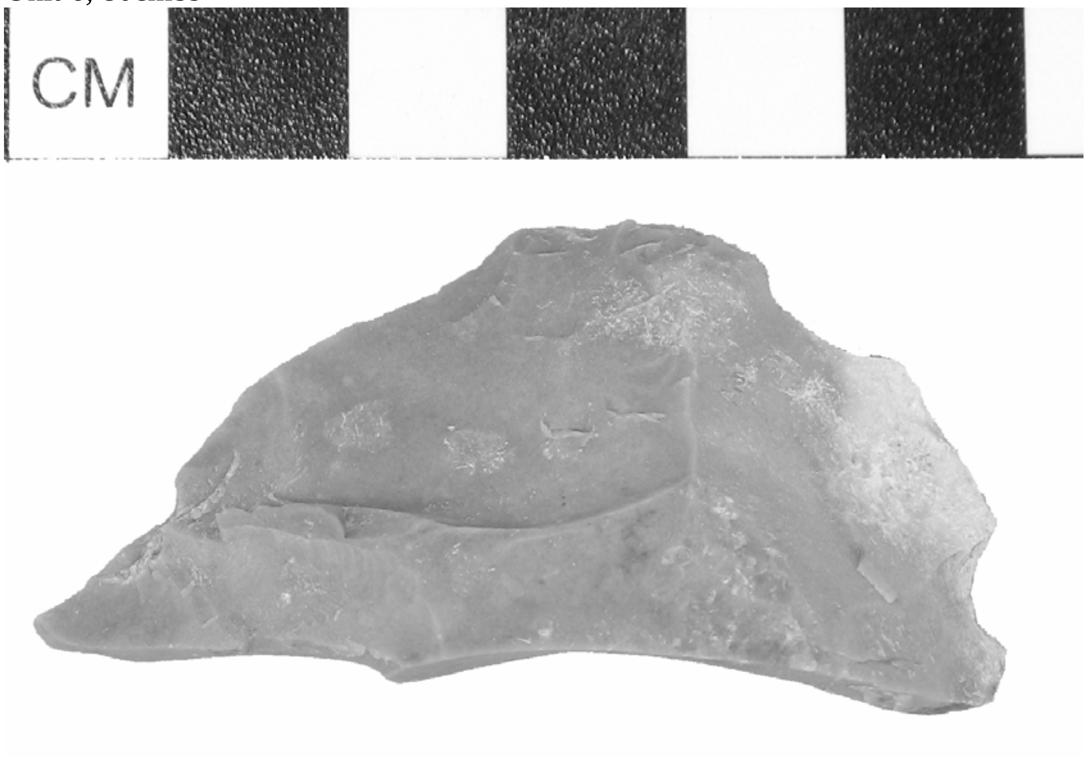
Unit 6, 40cmbs



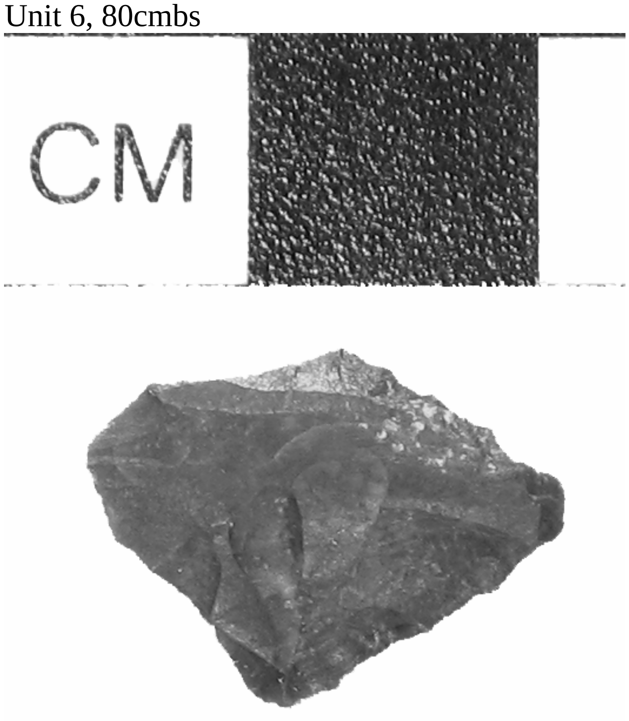
Unit 6, 60cmbs



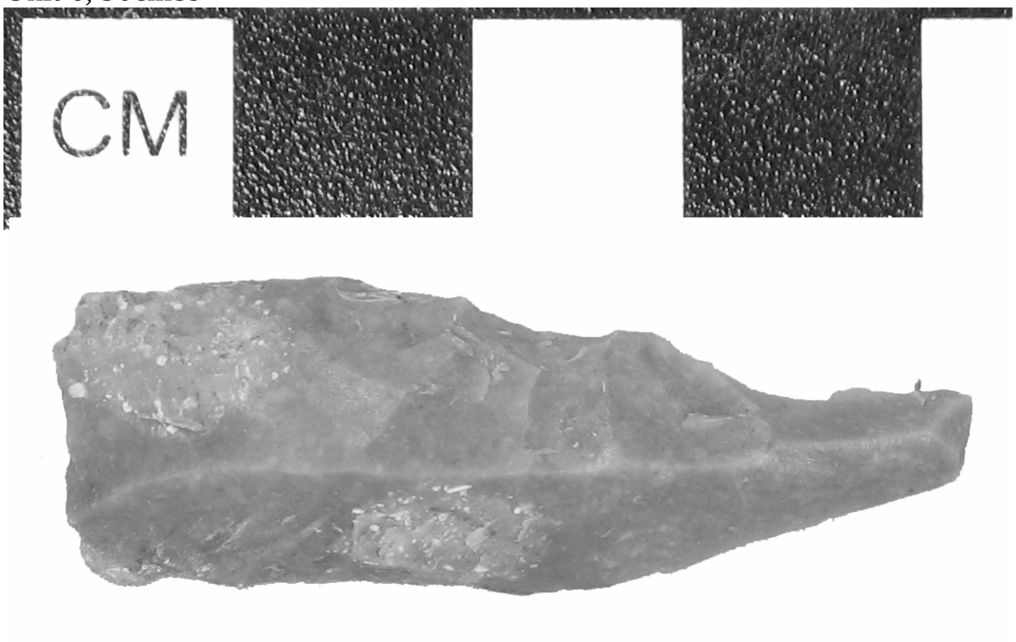
Unit 6, 80cmbs



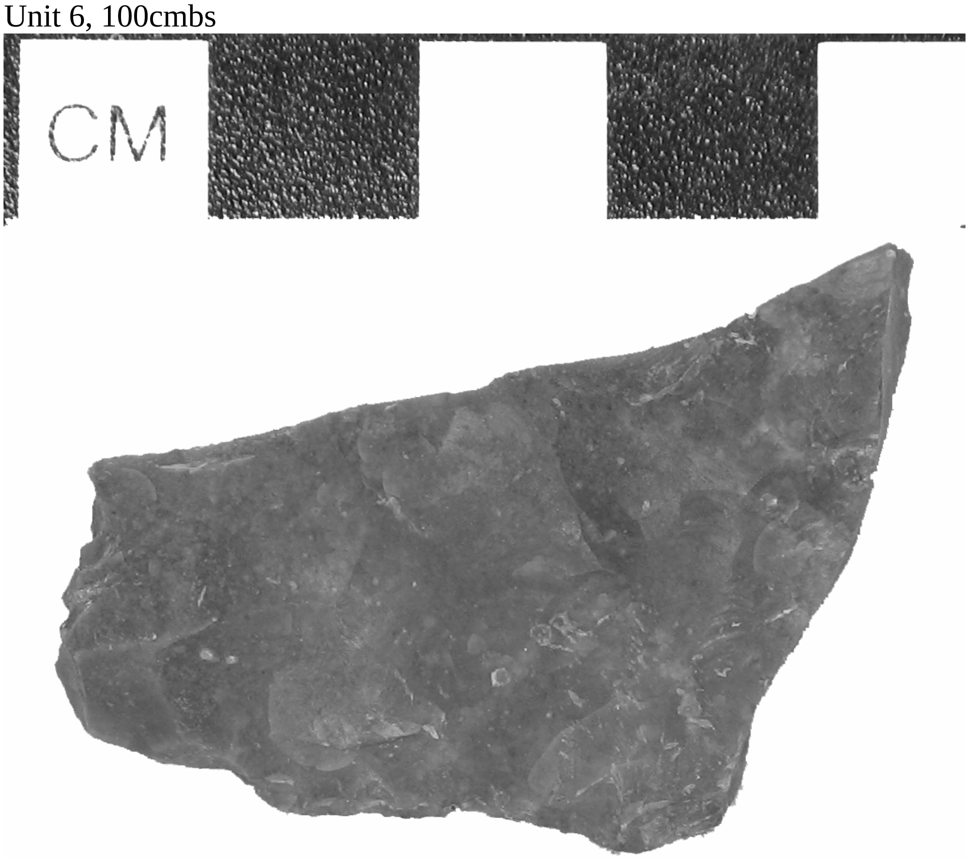
Unit 6, 80cmbs



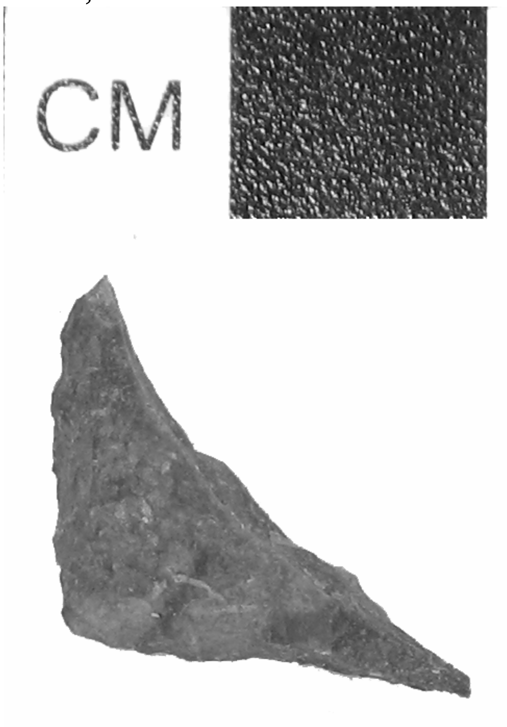
Unit 6, 90cmbs



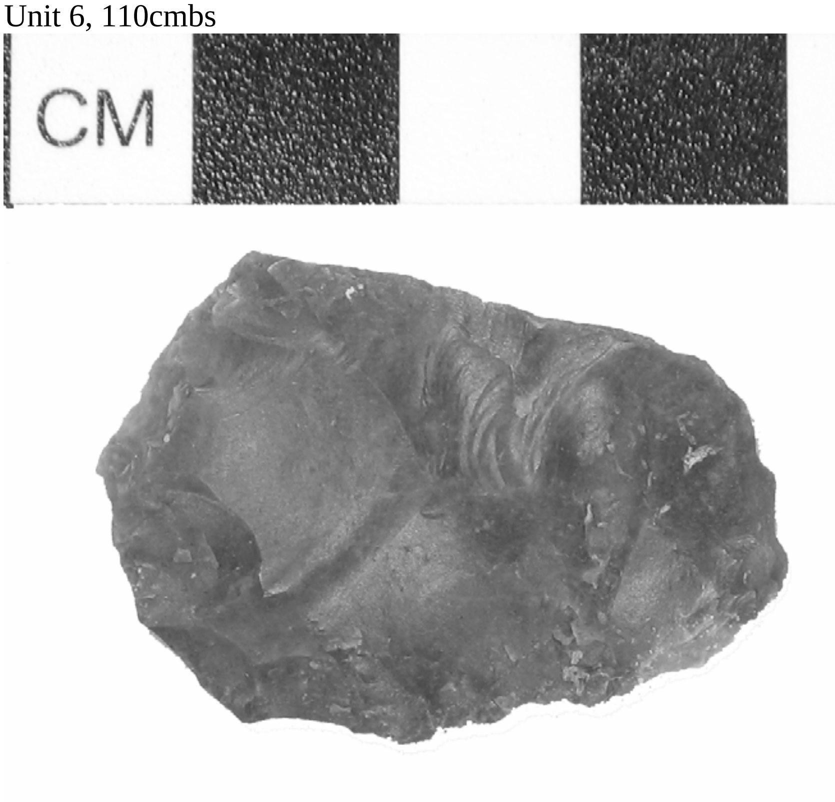
Unit 6, 100cmbs



Unit 6, 100cmbs



Unit 6, 110cmbs

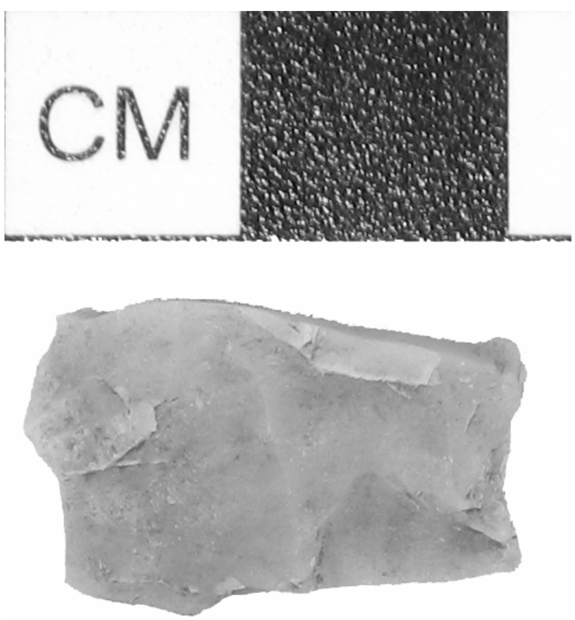


Unit 6, 110cmbs

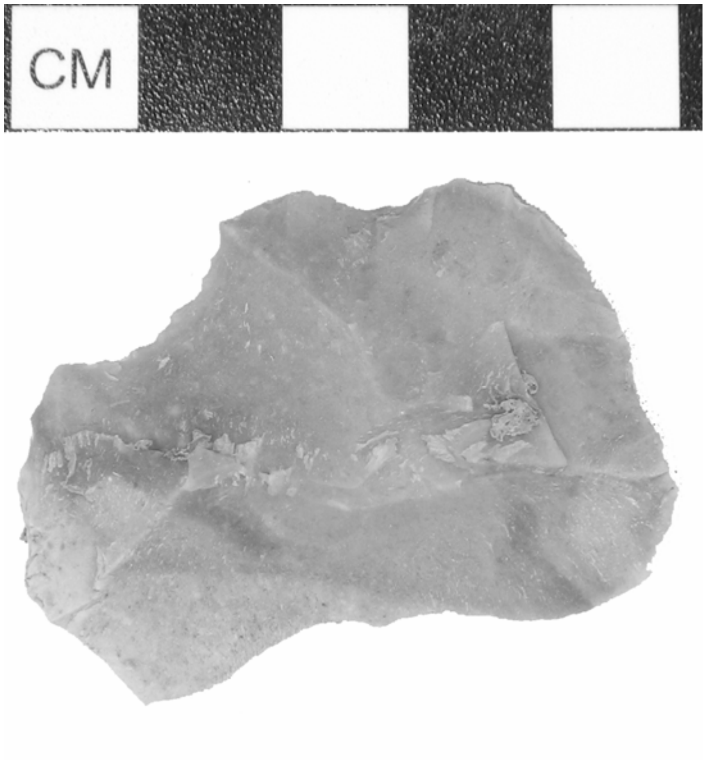
Unit 6, 120cmbs

Unit 6, 120cmbs

Unit 6, 130cmbs

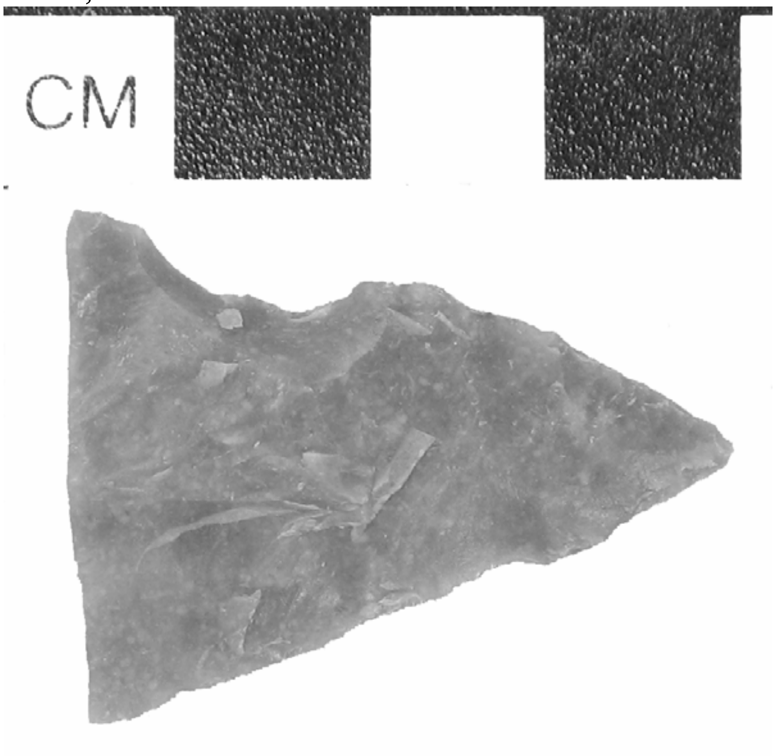


Unit 6, 130cmbs

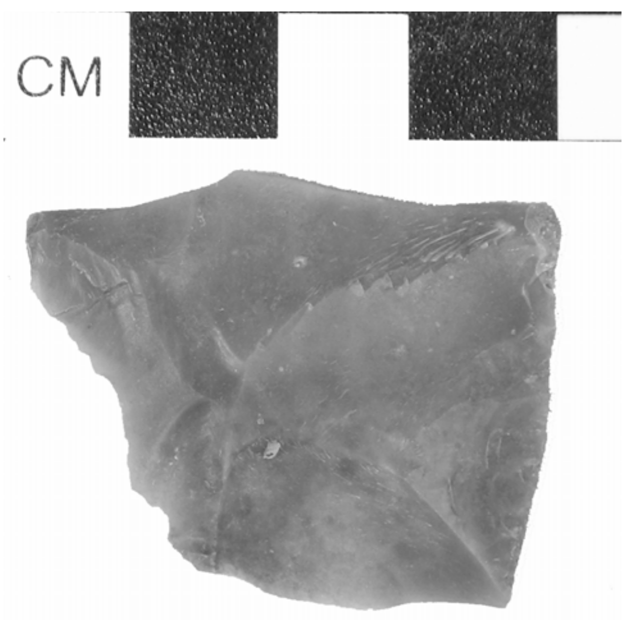


Unit 6, 140cmbs

Unit 6, 150cmbs

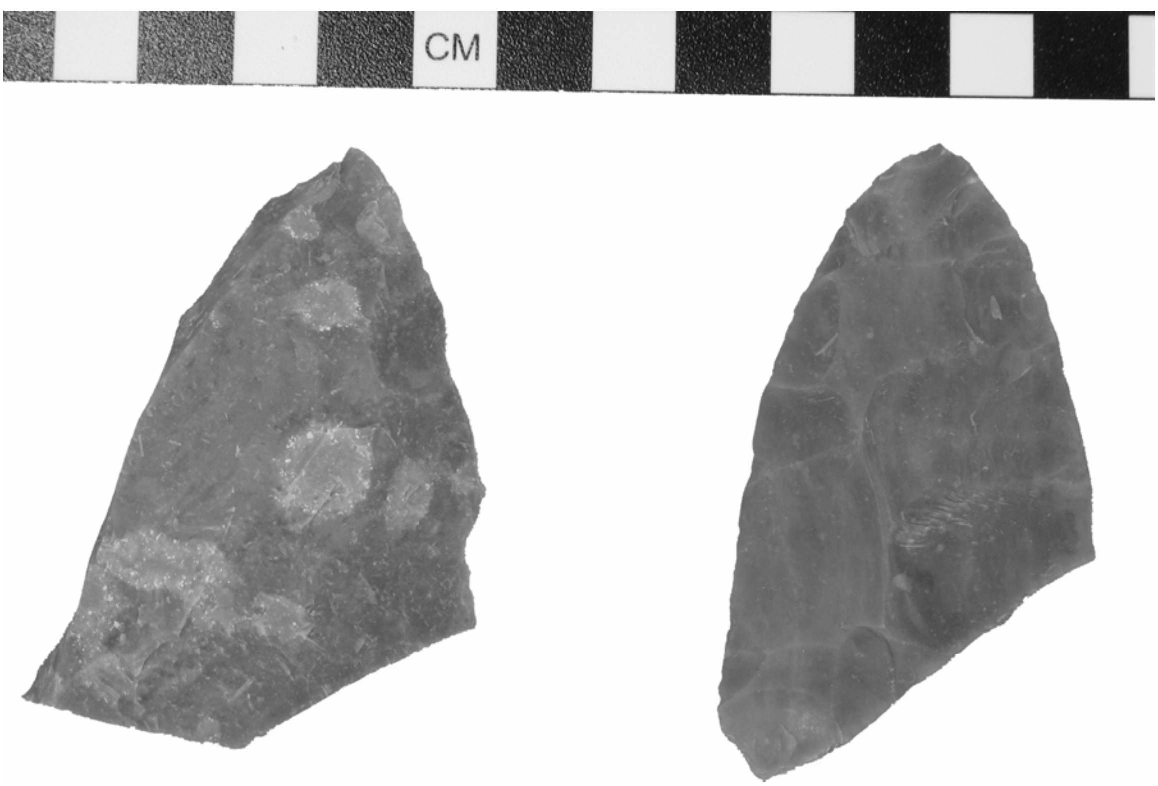


Unit 7, 150cmbs

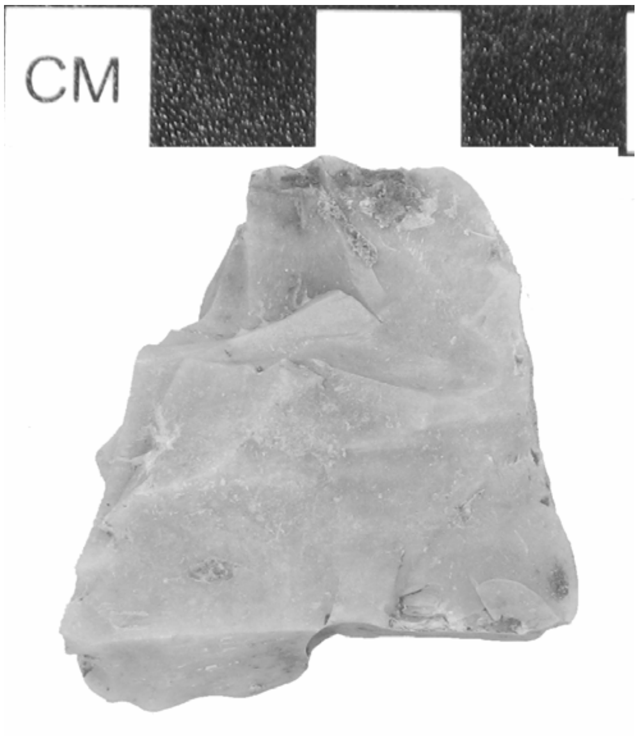


Unit 7, 150cmbs

Unit 8, 80cmbs



Unit 8, 150cmbs



Unit 9, 70cmbs

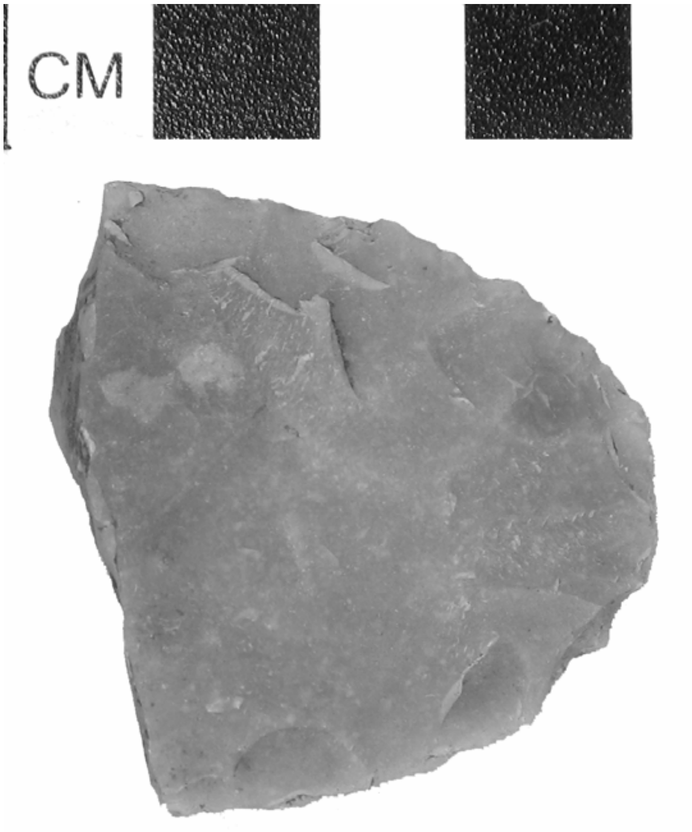
Unit 9, 100cmbs

Unit 9, 120cmbs

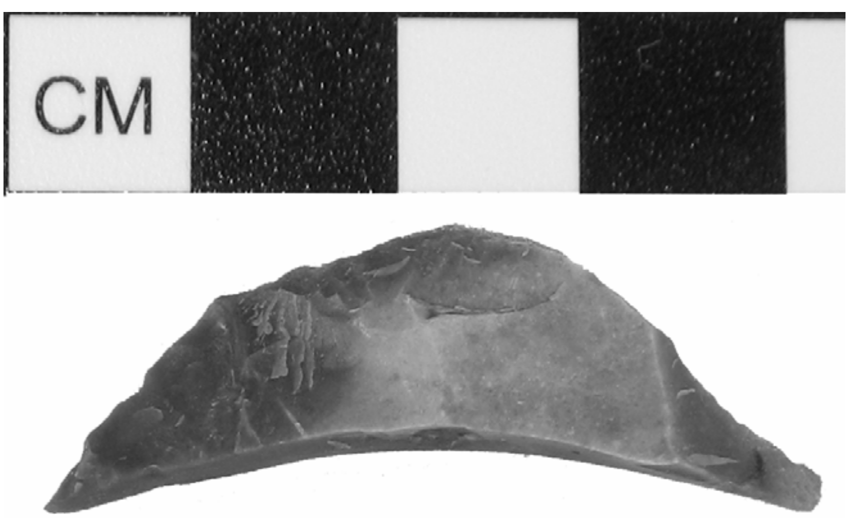
Unit 9, 150cmbs

Unit 9, 150cmbs

Unit 10, 70cmbs



Unit 10, 80cmbs

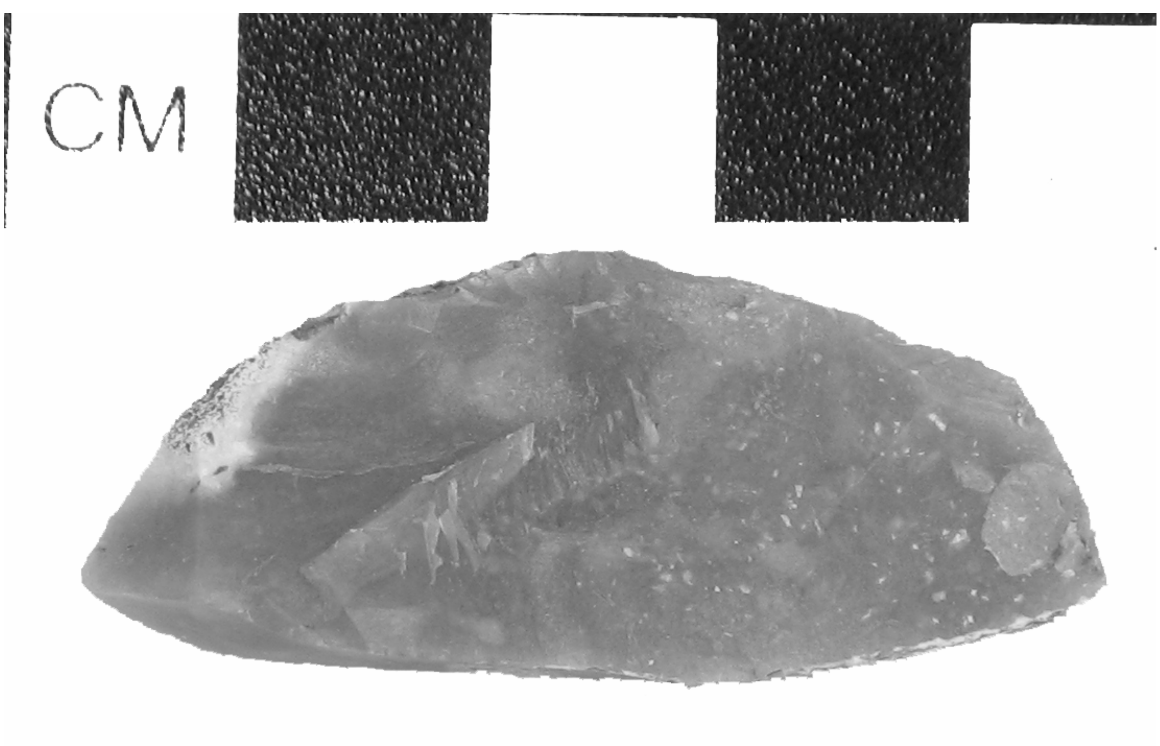


Unit 10, 130cmbs

Unit 10, 140cmbs

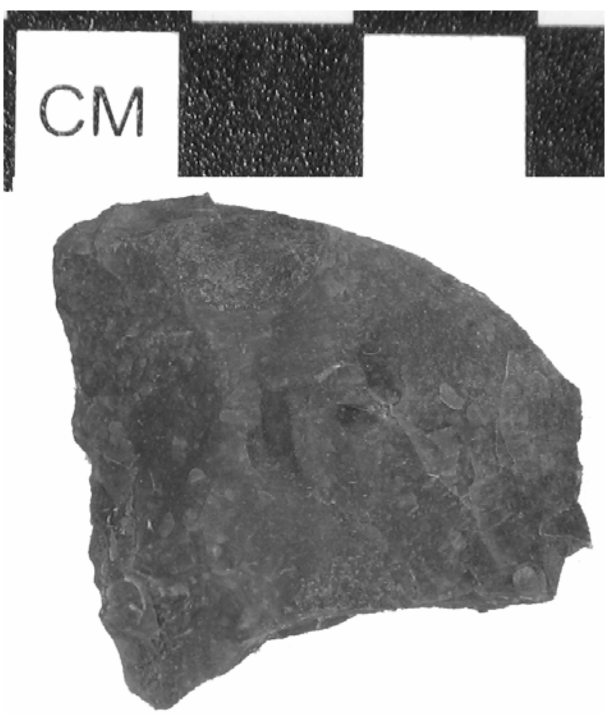
Unit 11, 100cmbs

Unit 11, 100cmbs

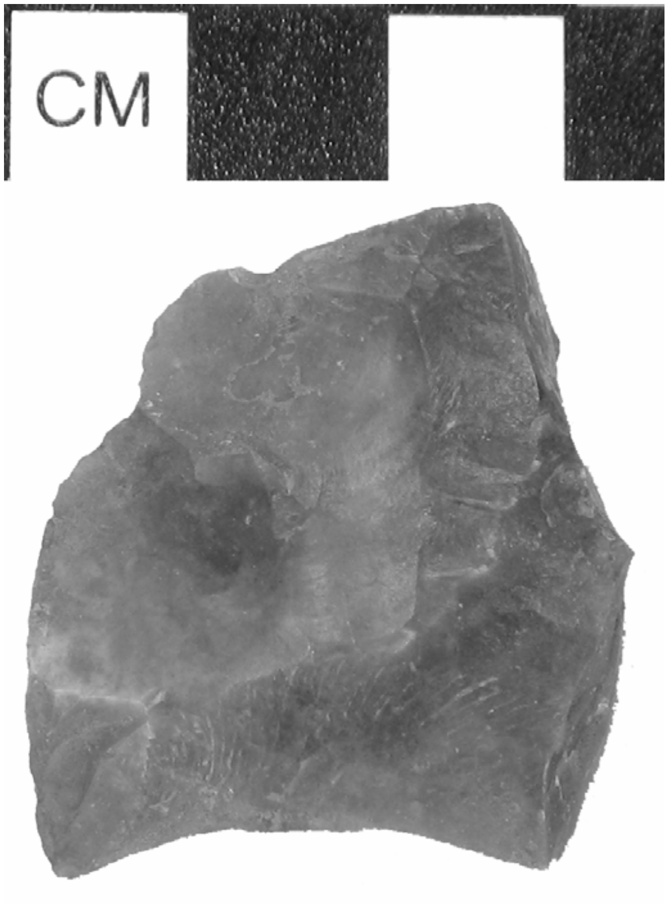


Unit 11, 110cmbs

Unit 11, 110



Unit 11, 120cmbs



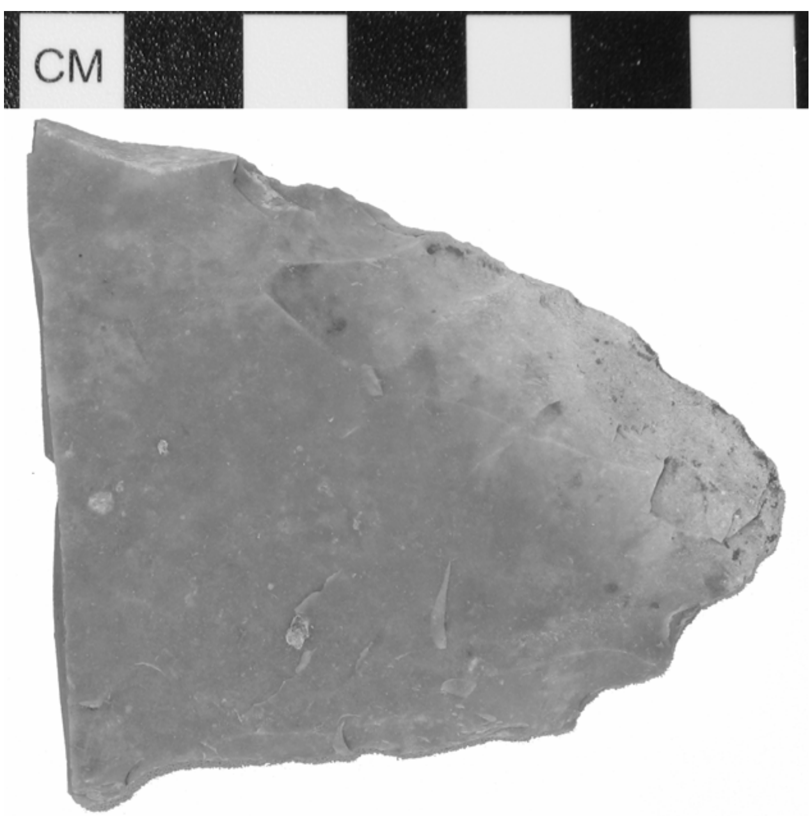
Unit 11, 130cmbs

Unit 11, 150cmbs

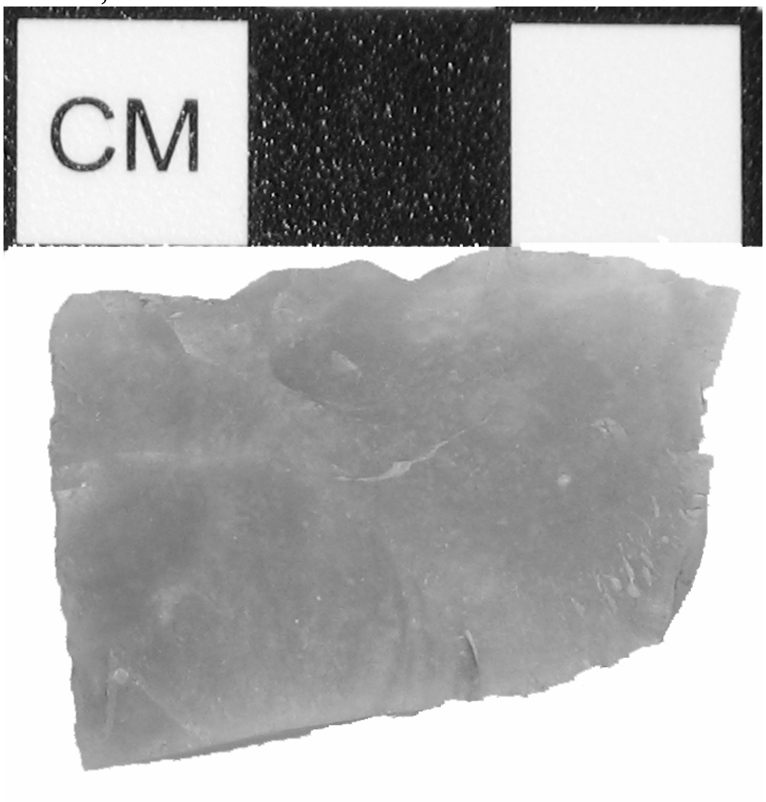
Unit 11, 150

Unit 12, 70cmbs

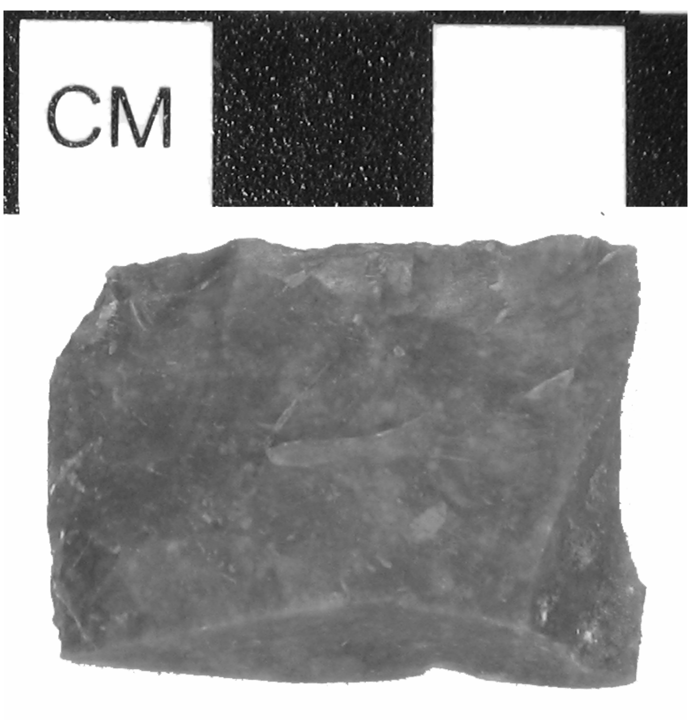
Unit 12, 80cmbs



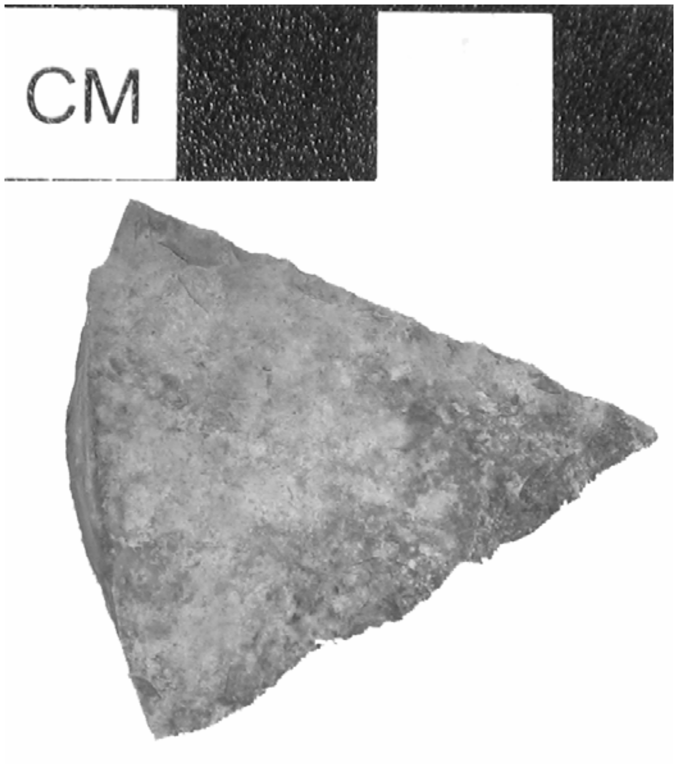
Unit 12, 90cmbs



Unit 12, 90cmbs



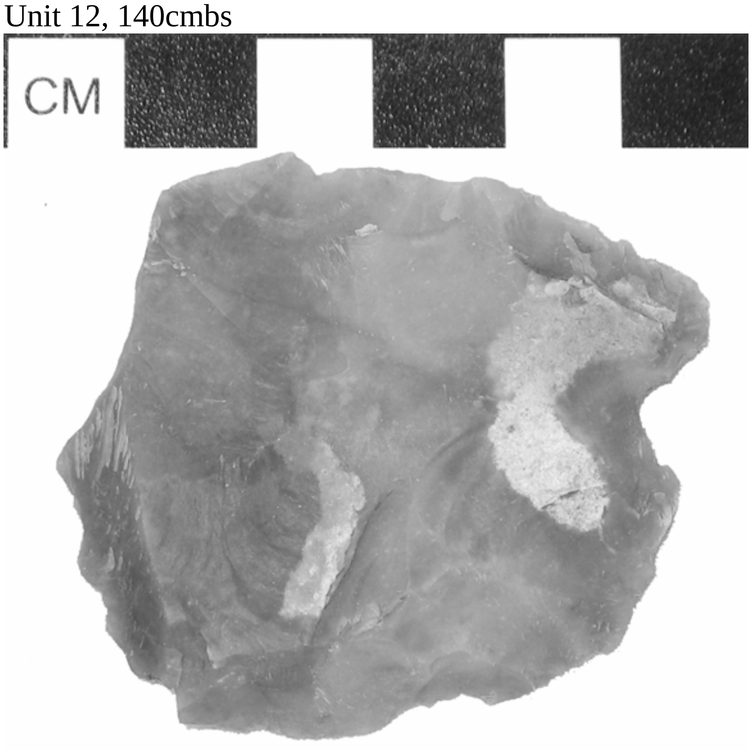
Unit 12, 110cmbs



Unit 12, 120cmbs

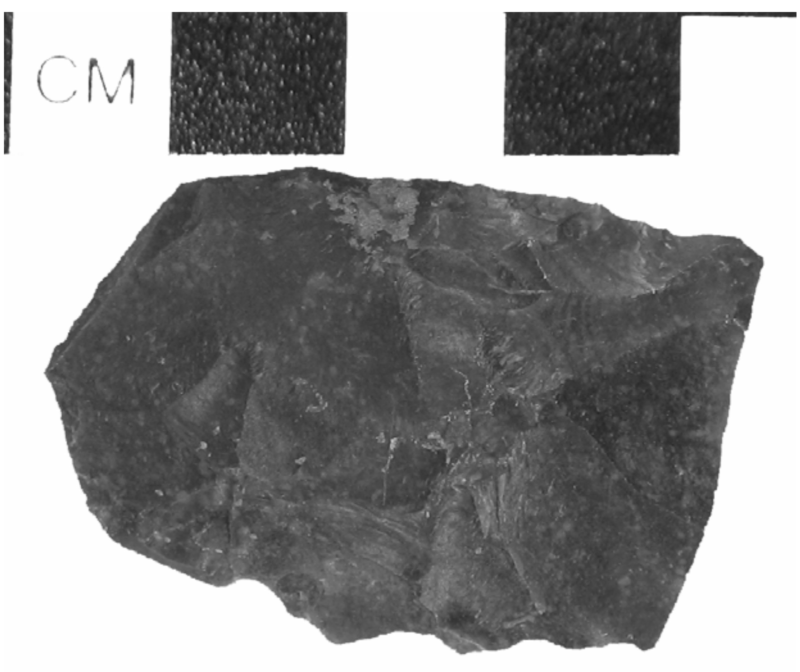
Unit 12, 140cmbs

Unit 12, 140cmbs



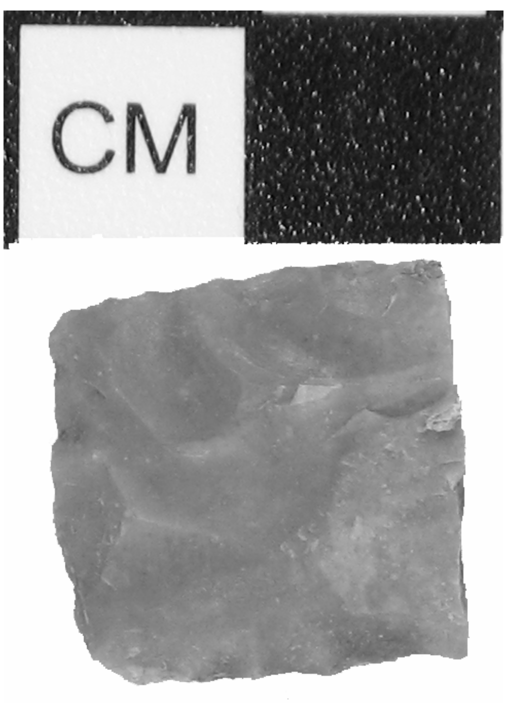
Unit 12, 150cmbs

Unit 12, 150cmbs



Unit 13, 90cmbs

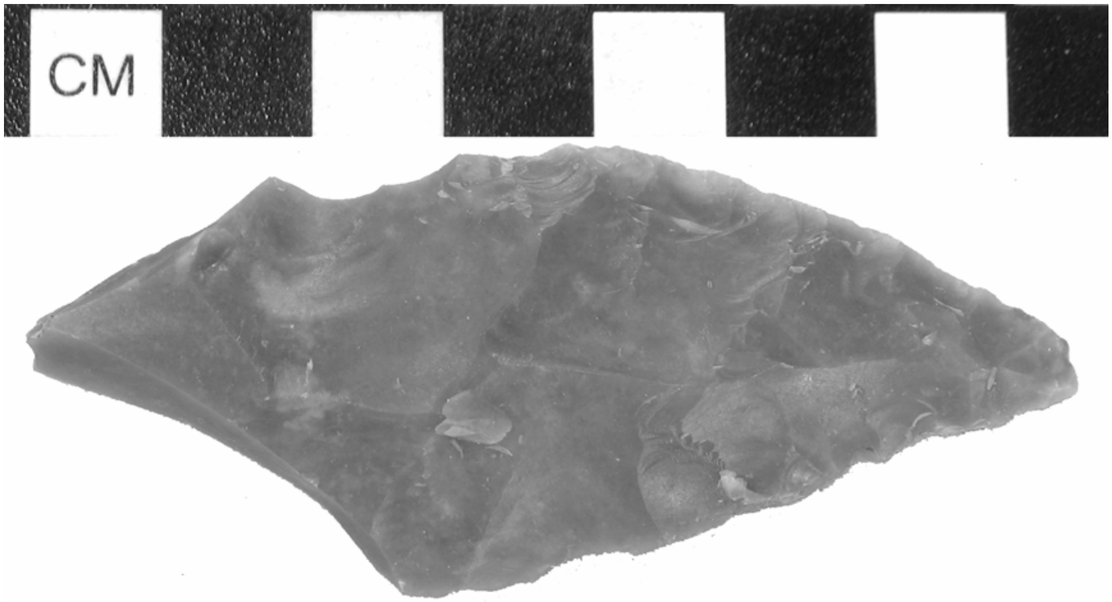
Unit 13, 90cmbs



Unit 13, 90cmbs

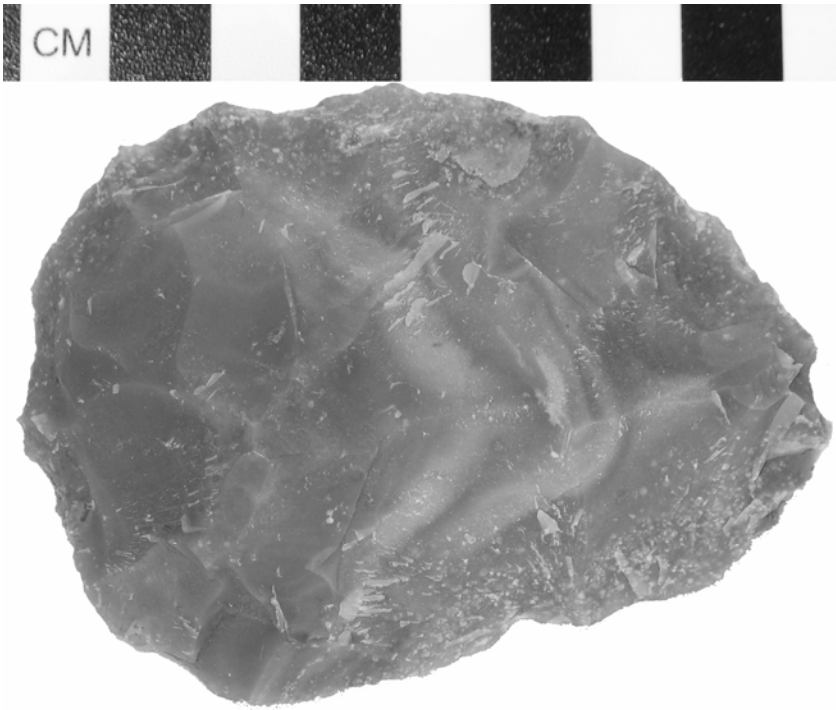
Unit 13, 130cmbs

Unit 13, 130cmbs

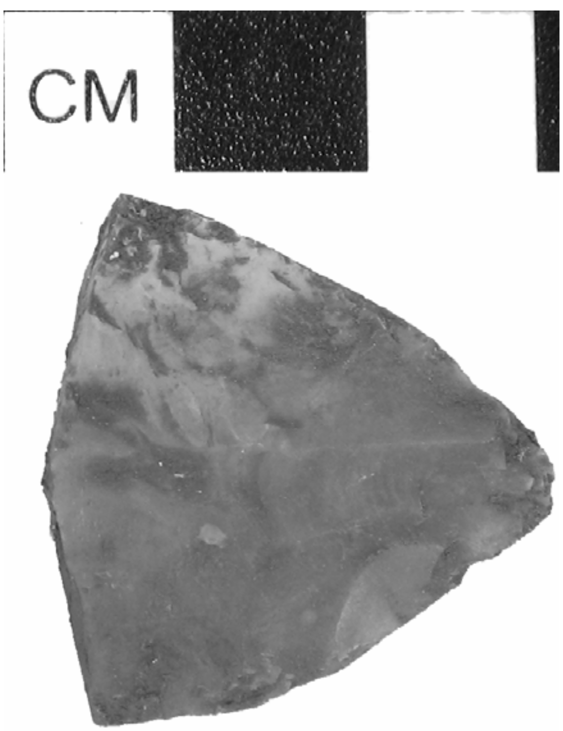


Unit 13, 150cmbs

Unit 14, 70cmbs

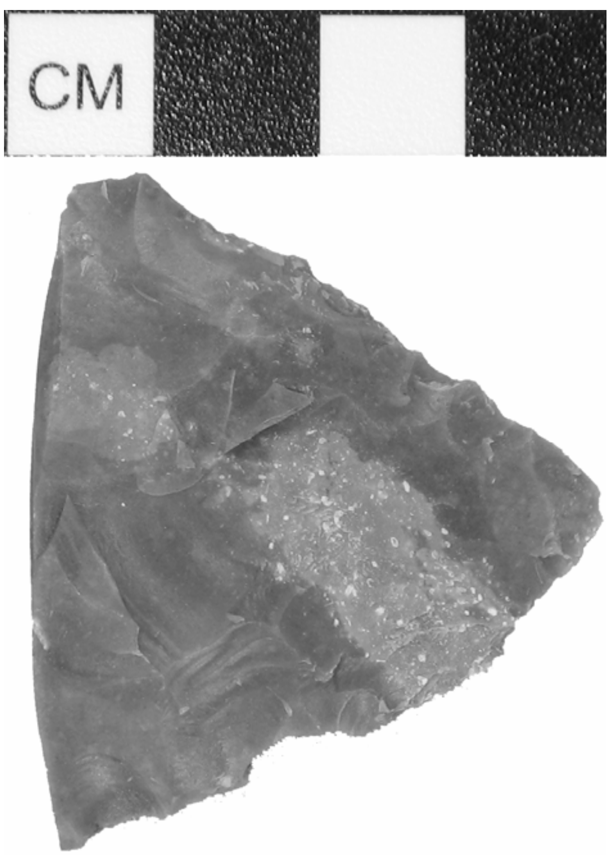


Unit, 90cmbs



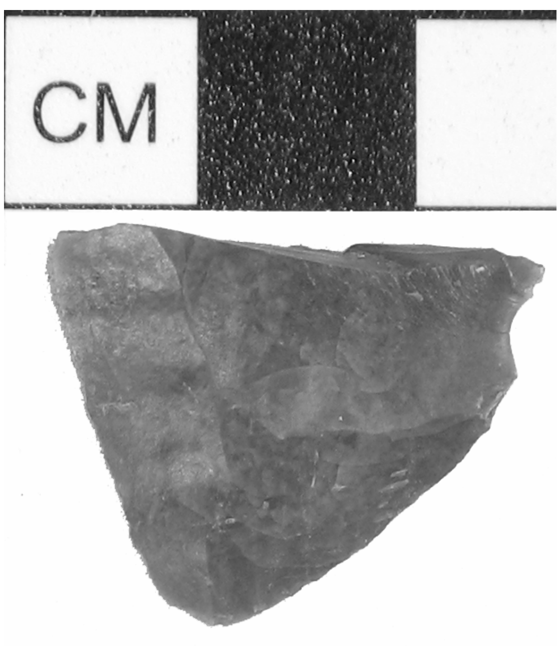
Unit 14, 110cmbs

Unit 15, 70cmbs

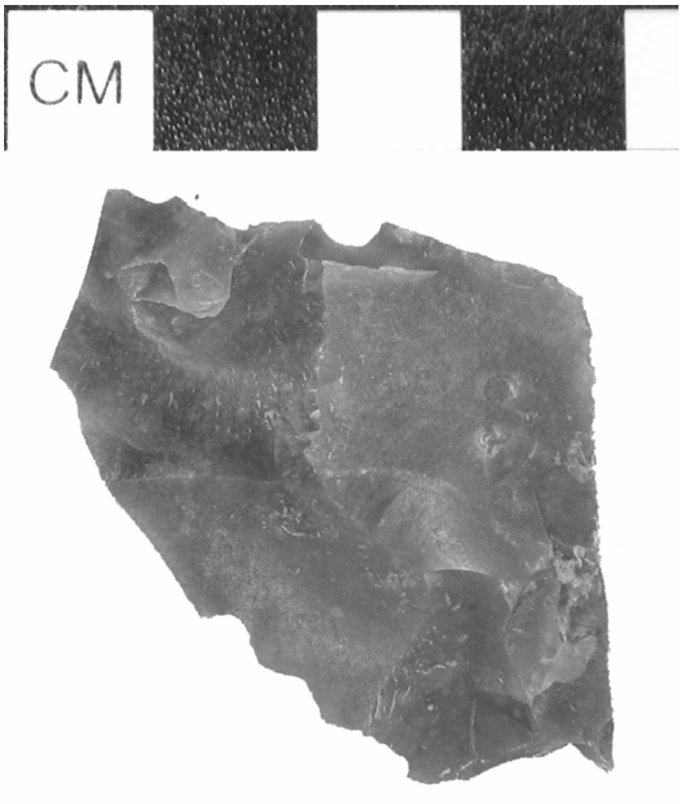


Unit 15, 90cmbs

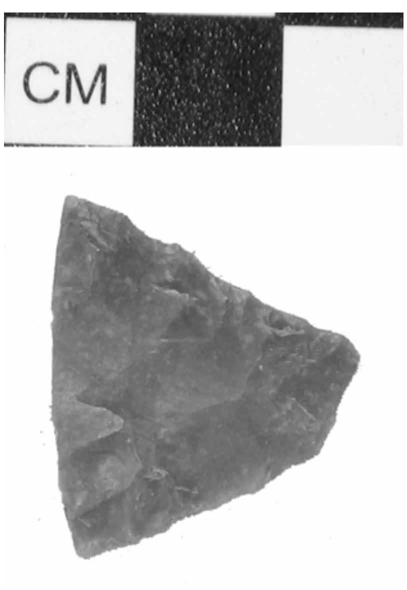
Unit 15, 130cmbs



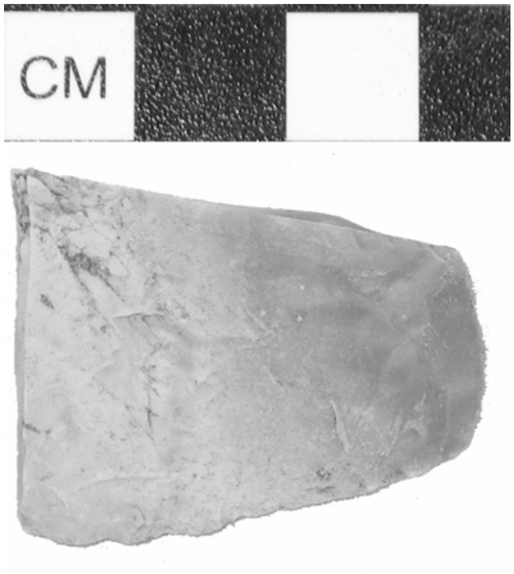
Unit 15, 140cmbs



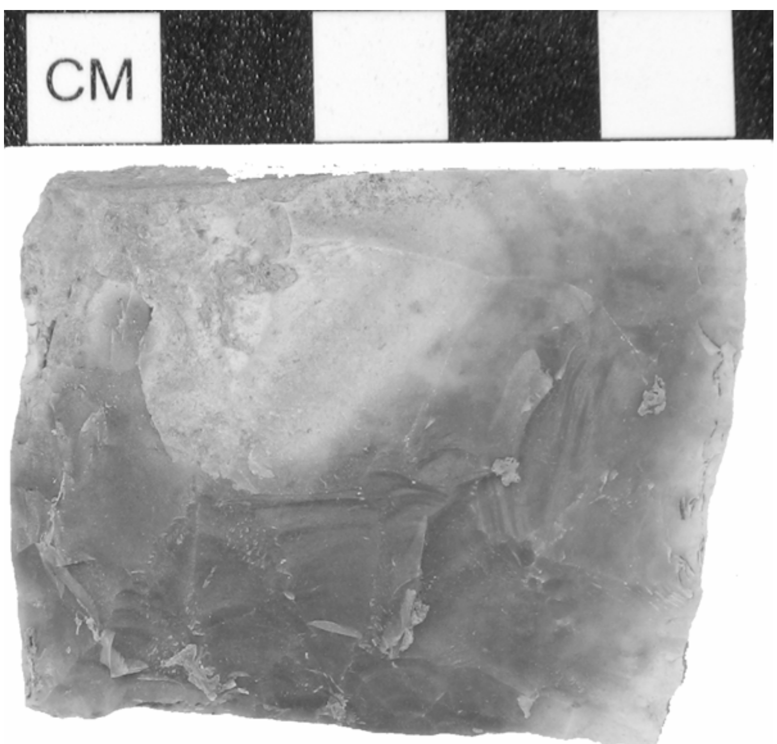
Unit 15, 150cmbs



Unit 16, 130cmbs

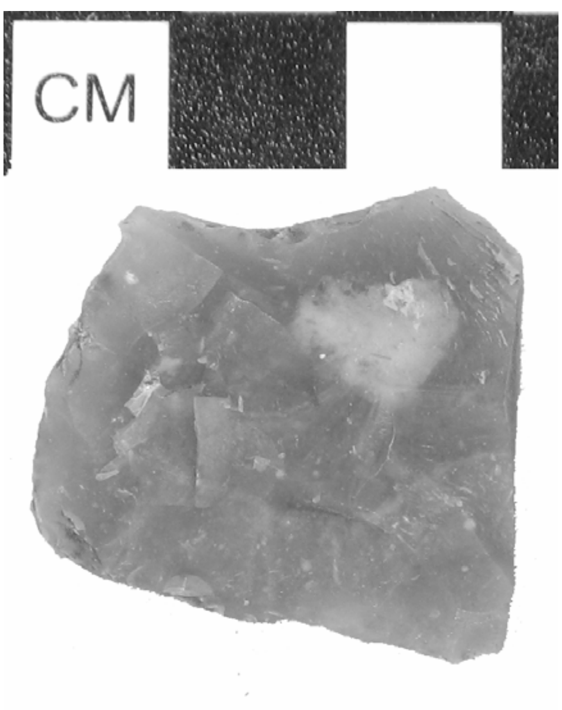


Unit 16, 140cmbs



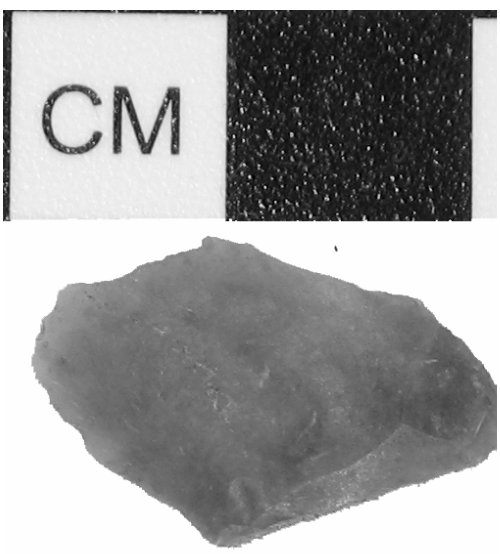
Unit 16, 150cmbs

Unit 16, 150cmbs



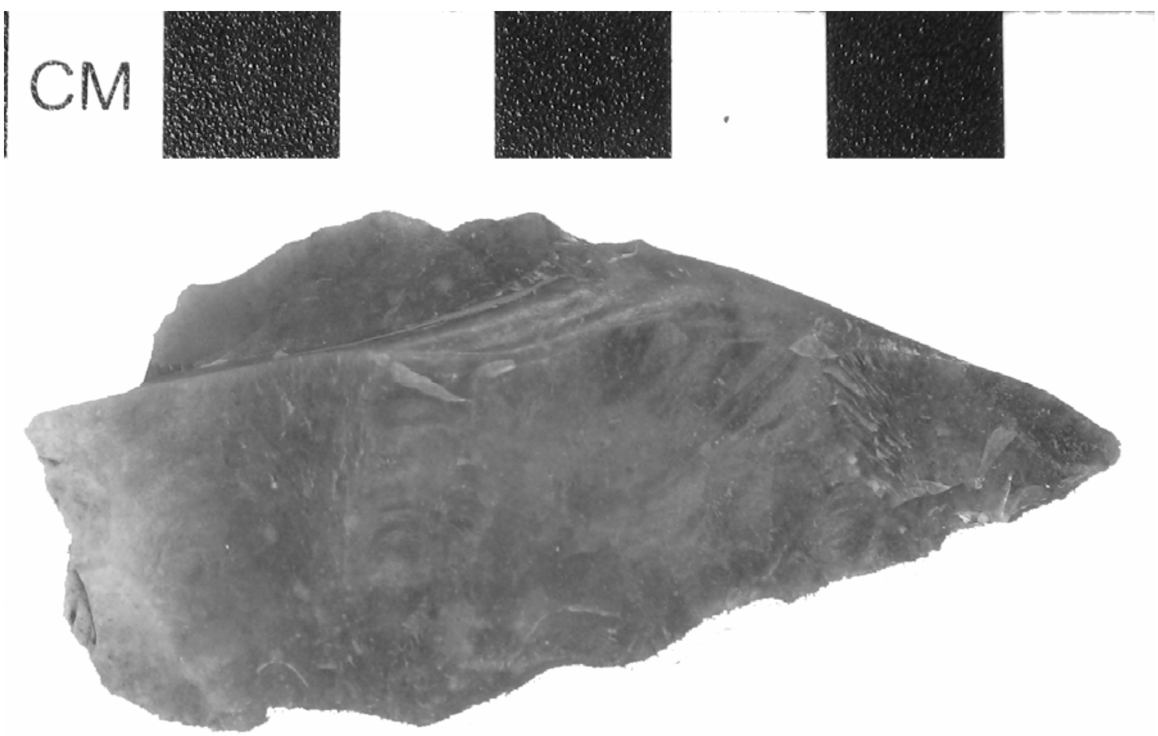
Unit 17, 70cmbs

Unit 17, 80cmbs



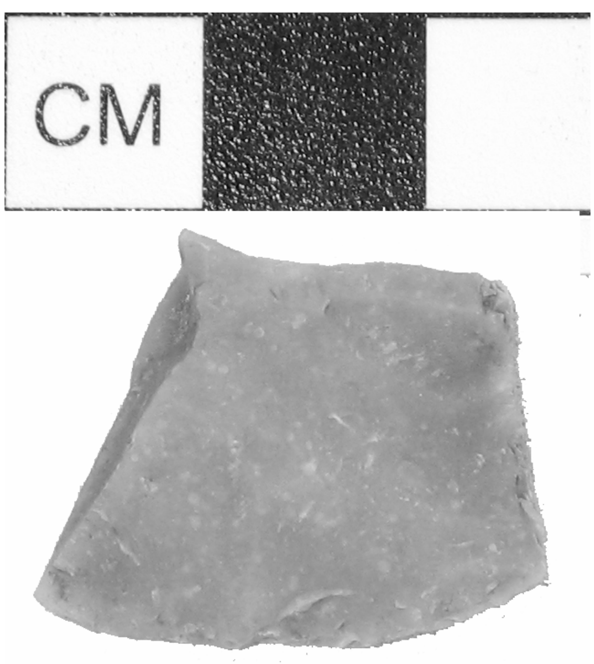
Unit 17, 90cmbs

Unit 17, 100cmbs

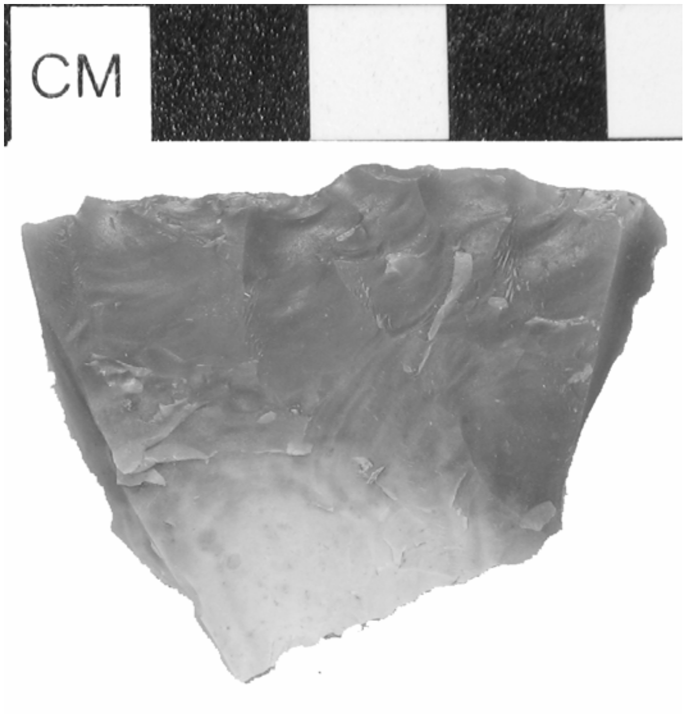


Unit 17, 130cmbs

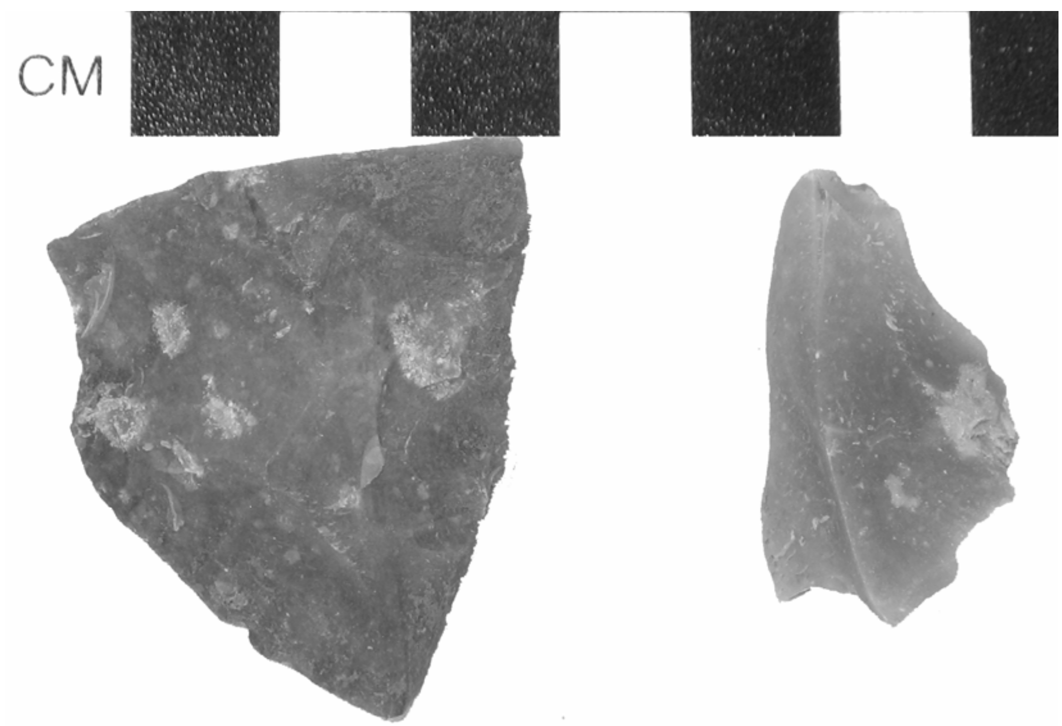
Unit 17, 130cmbs



Unit 17, 140cmbs

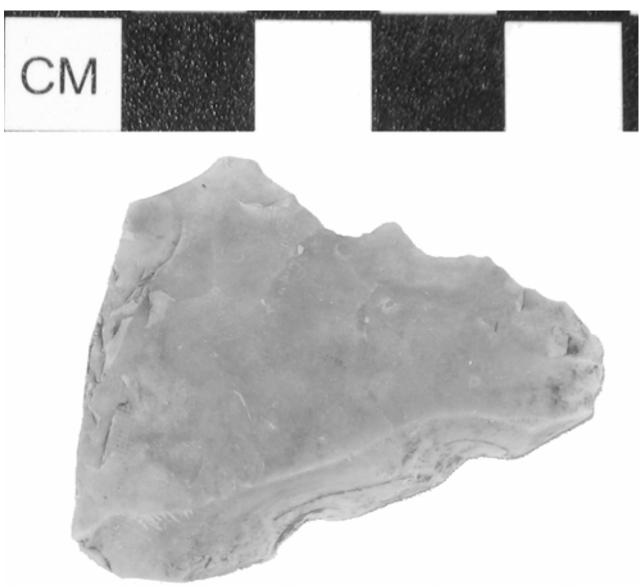


Unit 17, 150cmbs

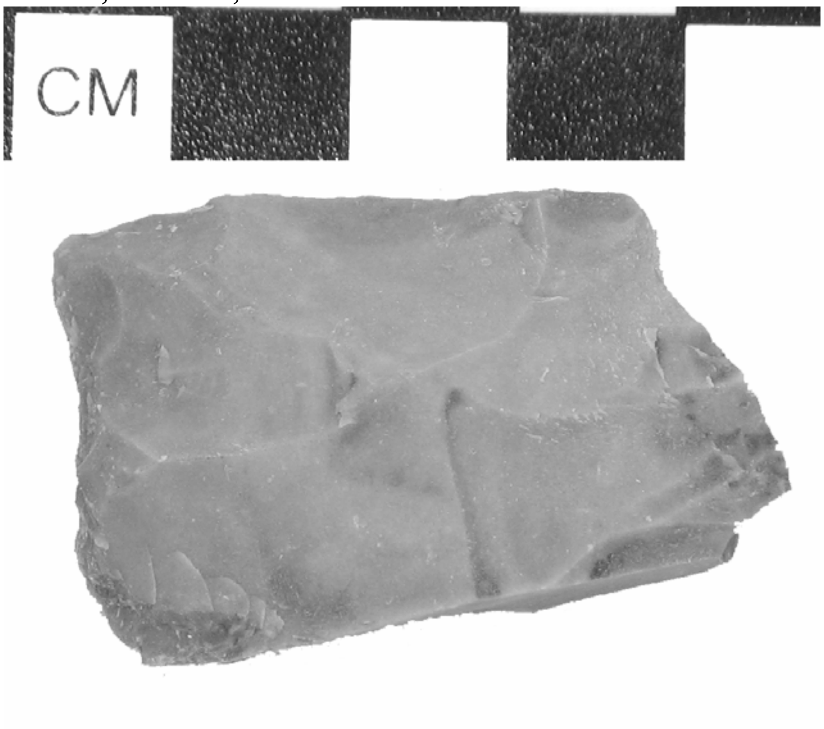


Unit 8, 150cmbs, biface or point base

Unit 11, 120cmbs, adze/graver



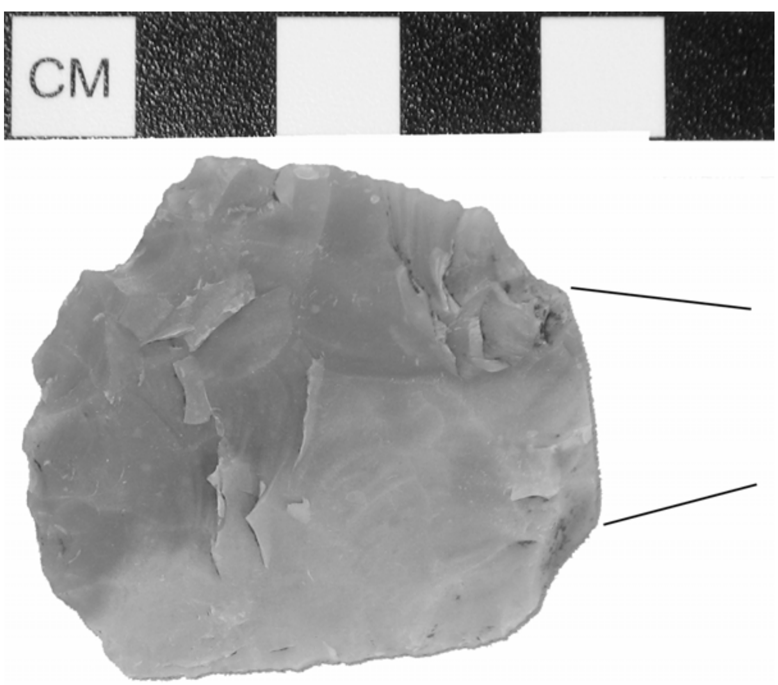
Unit 10, 150cmbs, adze



Unit 12, 150cmbs, adze

Unite 13, 130, adze

Unit 10, 50cmbs, drill



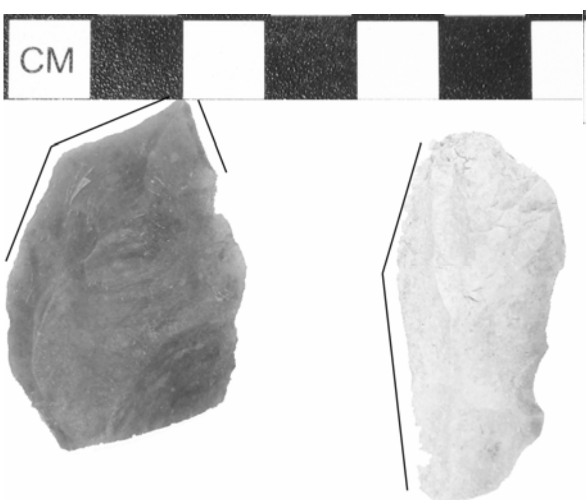
Unit 6, 100cmbs, gouge

APPENDIX G: PHOTOGRAPHS OF UTILIZED FLAKES

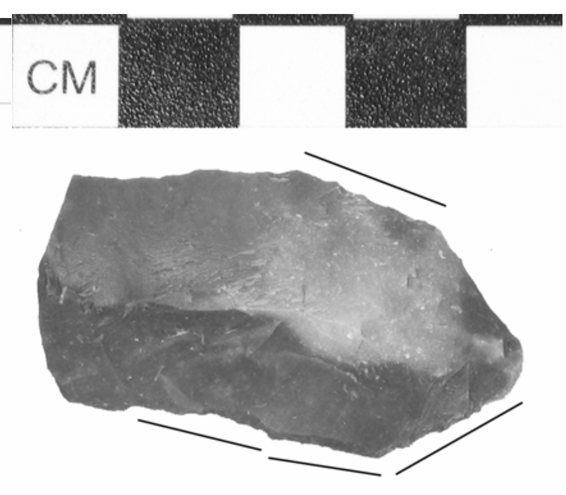
Unit 6, 20cmbs

Unit 6, 60cmbs

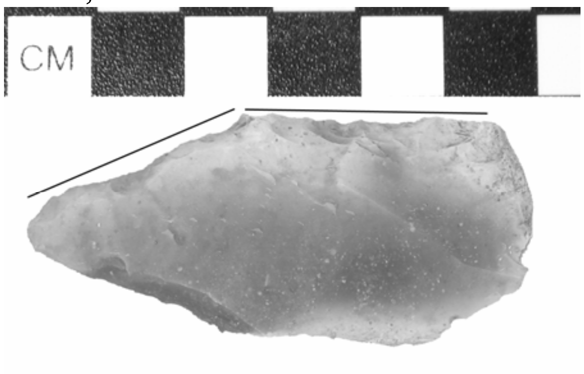
Unit 6, 70cmbs



Unit 6, 90cmb



Unit 6, 150cmbs

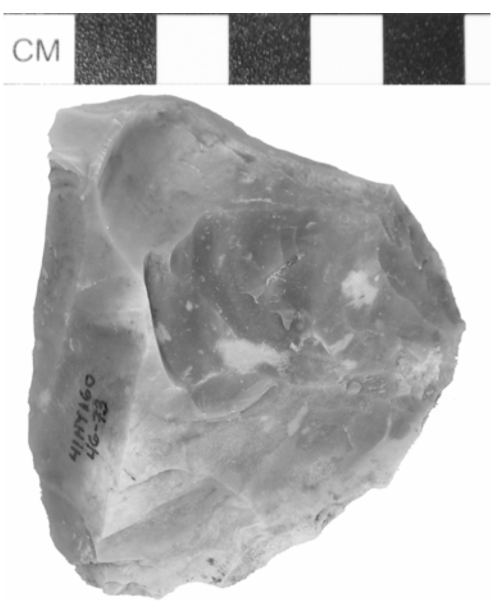


Unit 17, 140cmbs

APPENDIX H: PHOTOGRAPHS OF CORES

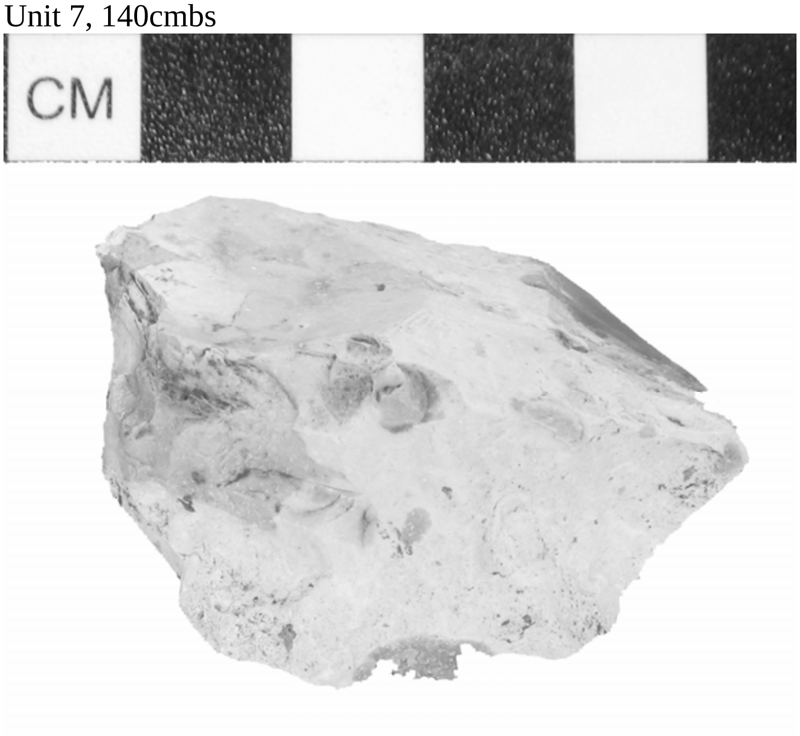
Unit 6, 30cmbs

Unit 6, 40cmbs



Unit 6, 120cmbs (fragment left, core right)

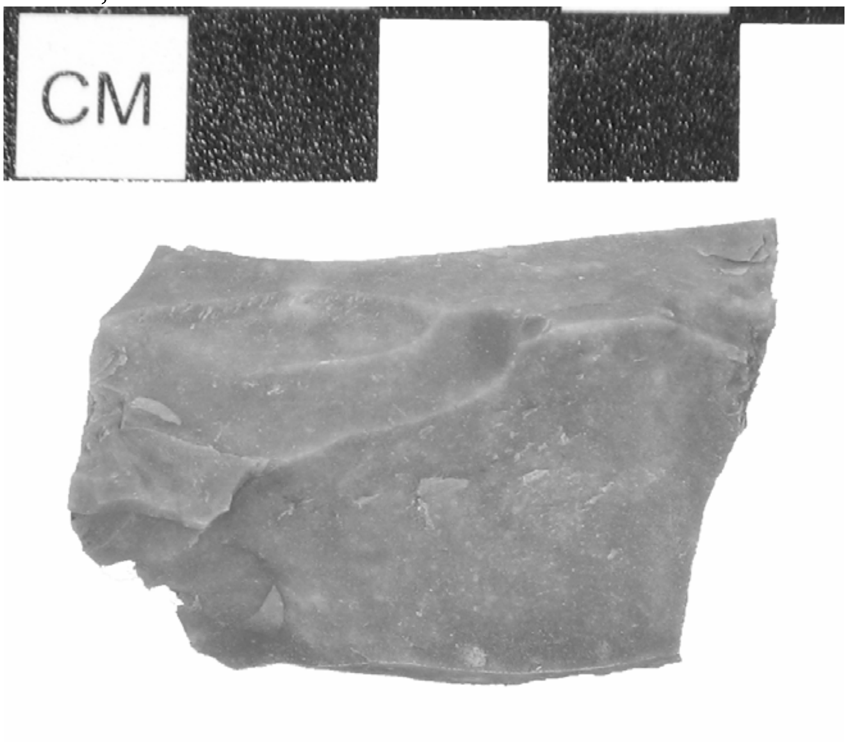
Unit 7, 140cmbs



Unit 7, 150cmbs

Unit 10, 50cmbs

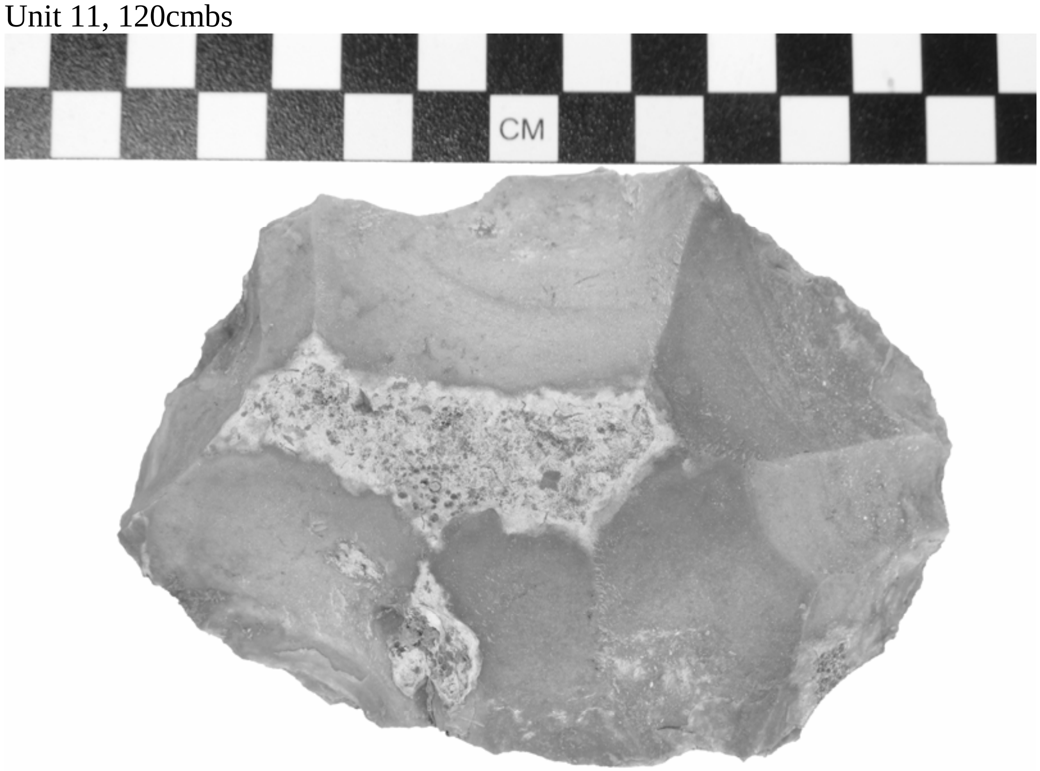
Unit 10, 150cmbs



Unit 10, 150cmbs

Unit 11, 100cmbs

Unit 11, 120cmbs



Unit 12, 100cmbs

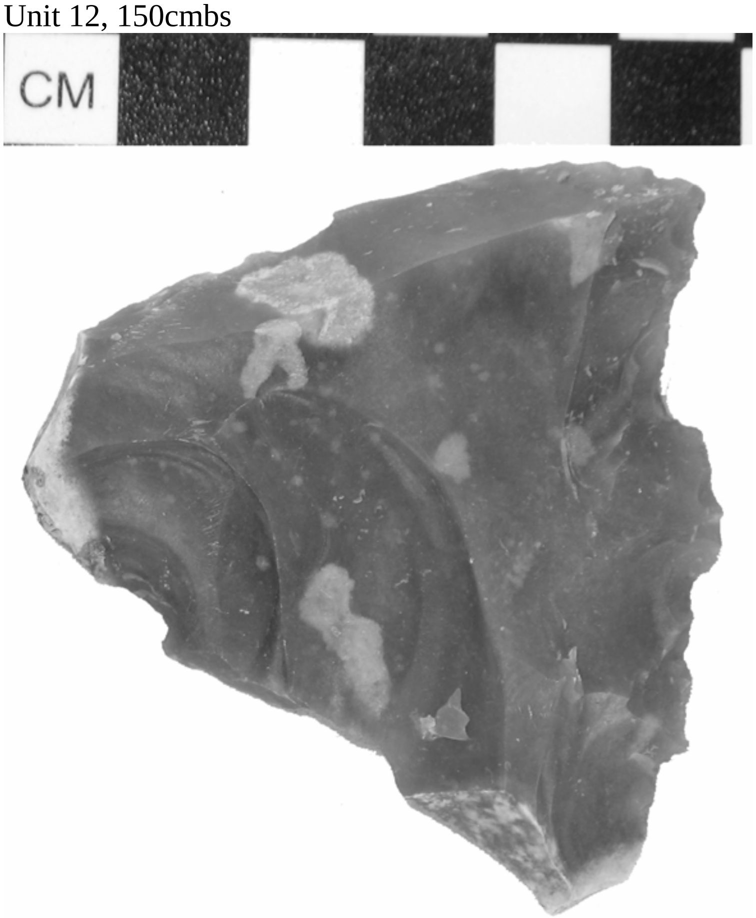
Unit 12, 120cmbs

Unite 12, 140cmbs

Unit 12, 140cmbs

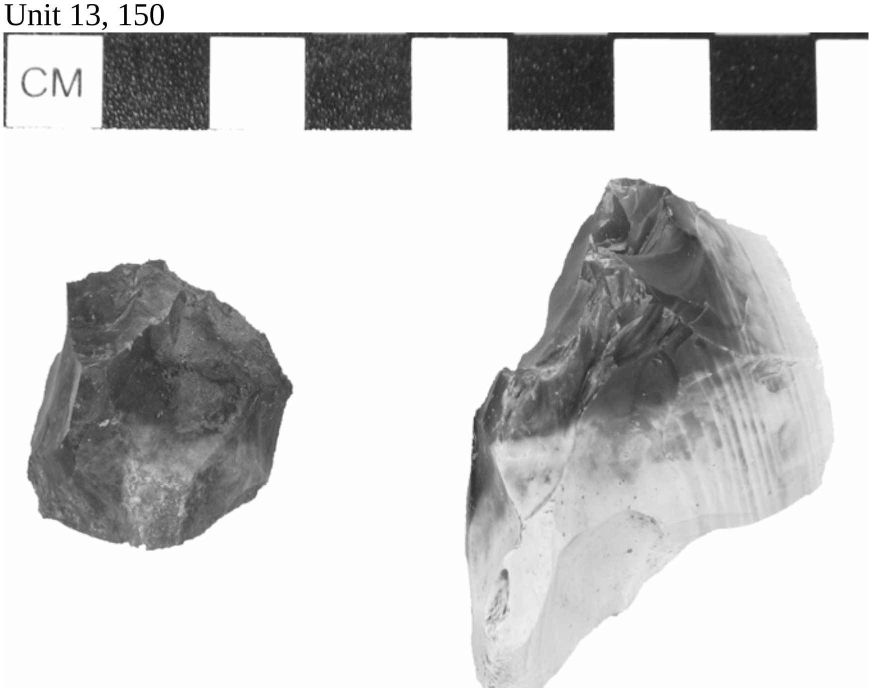
Unit 12, 140cmbs

Unit 12, 150cmbs



Unit 13, 90cmbs

Unit 13, 150

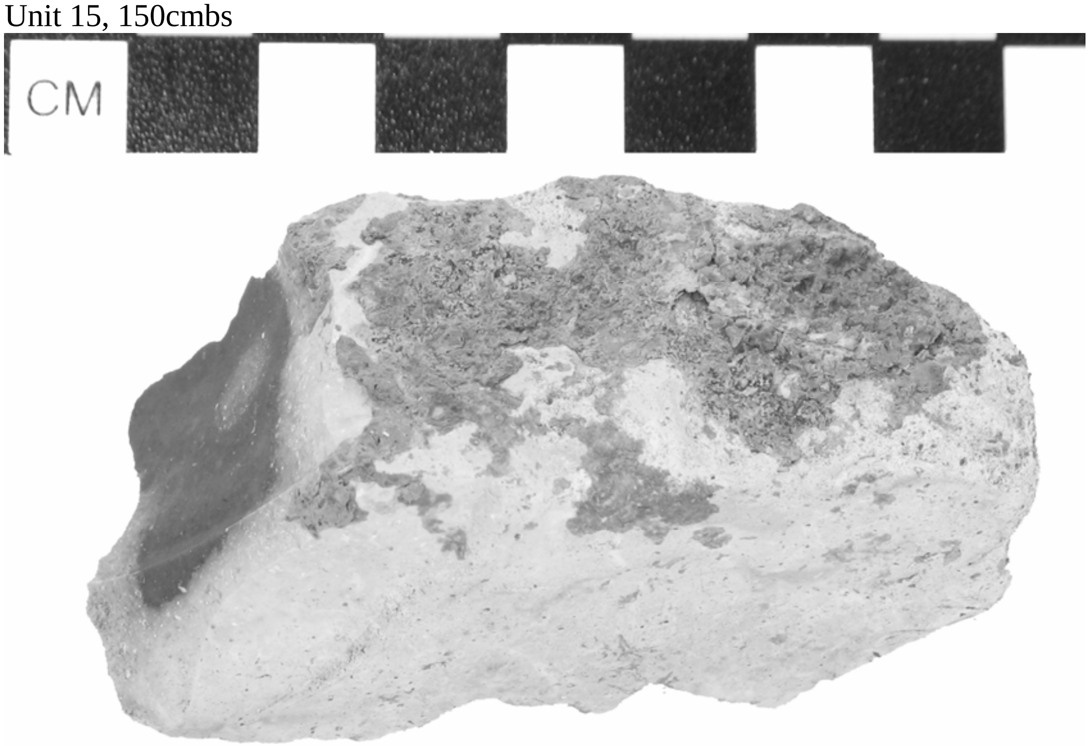


Unit 15,50cmbs

Unit 15, 130cmbs

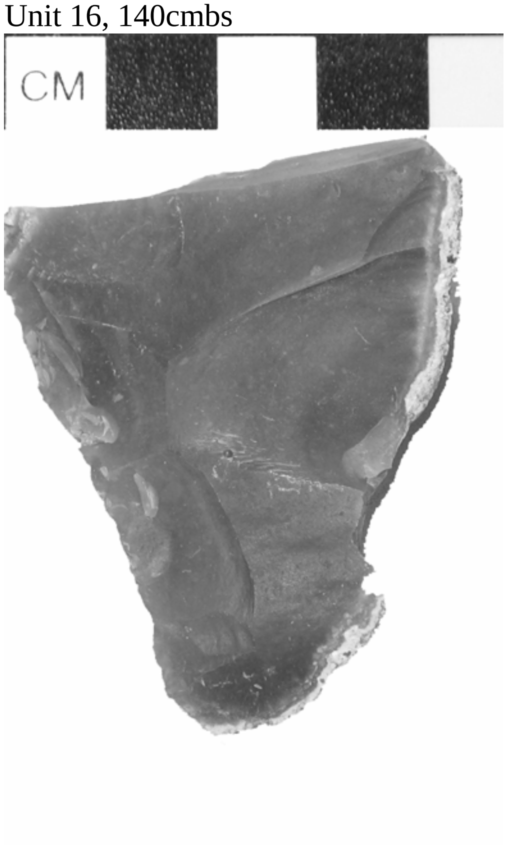
Unit 15, 140cmbs

Unit 15, 150cmbs

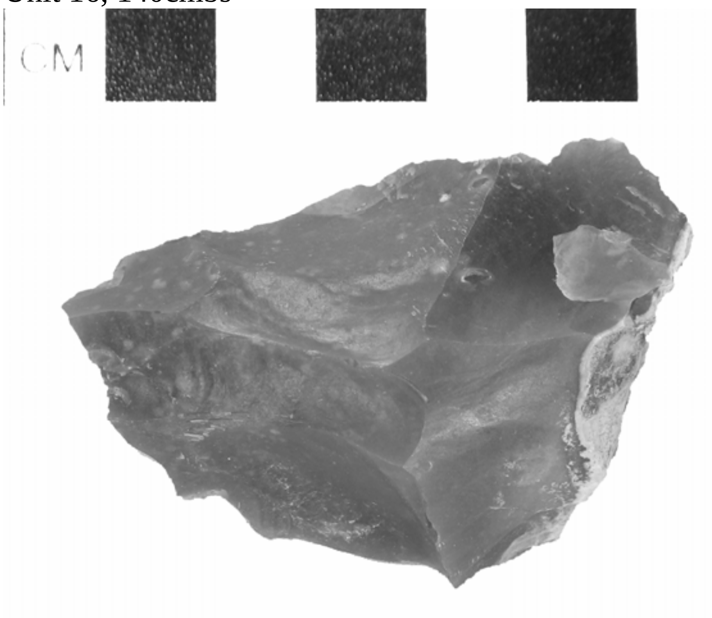


Unit 16, 130cmbs

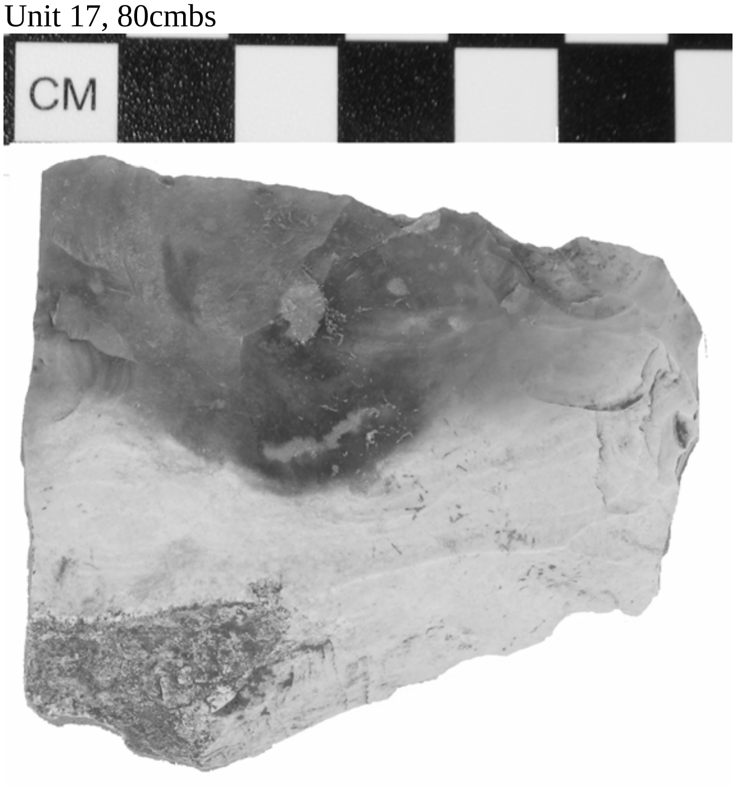
Unit 16, 140cmbs



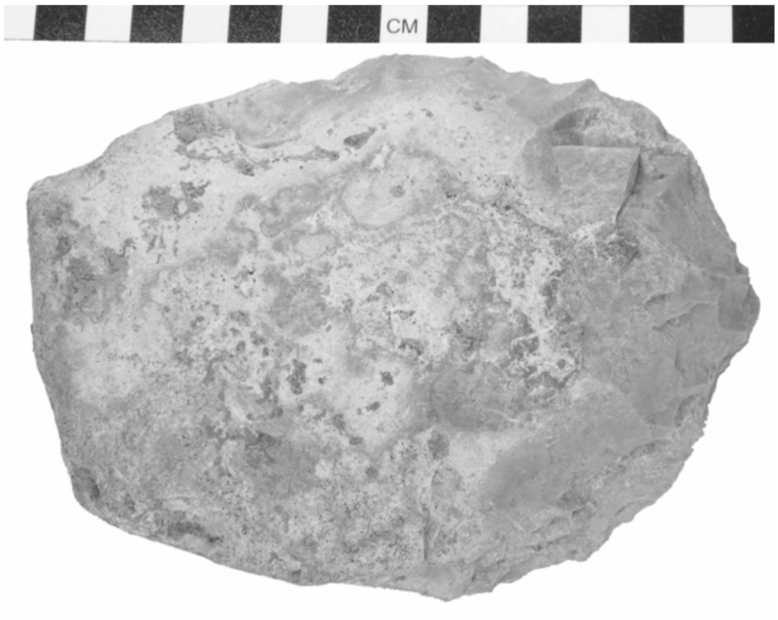
Unit 16, 140cmbs



Unit 17, 80cmbs



Unit 10, 140cmbs



Unit 11, 100cmbs

Unit 13, 80cmbs

Unit 16, 140cmbs

APPENDIX I: STATISTICAL ANALYSIS

Chi-Square

I did a standard chi-square with 2 and with 4 categories; neither turned out to be significant, but the version that combined the 4 categories into two measures showed significance at alpha=0.30. It is important to keep in mind that chi-square is not considered reliable if the majority of the cell values are less than 5, as is the case with this data-set.

I also did an adjusted residual to see which cells were contributing most to the significance.

observed			
depth	**extensive/ moderate (count)**	**little/none (count)**	Total (count)
70	1	2	3
80	2	5	7
90	1	8	9
100	2	8	10
110	3	5	8
120	4	3	7
130	3	1	4
140	0	5	5
150	5	8	13
Total	21	45	66

expected		
depth	**extensive/ moderate**	**little/none**
70	0.95	2.05
80	2.23	4.77
90	2.86	6.14
100	3.18	6.82
110	2.55	5.45
120	2.23	4.77
130	1.27	2.73
140	1.59	3.41
150	4.14	8.86
	21.00	45.00
	66.00	

(o-e)^2/e		
depth	**extensive/moderate**	**little/none**
70	0.0022	0.001
80	0.0232	0.0108
90	1.2128	0.566
100	0.439	0.2048
110	0.0812	0.0379
120	1.4109	0.6584
130	2.3442	1.0939
140	1.5909	0.7424
150	0.1803	0.0841
	sum:	10.684
	df=8	
	x^2C=9.524 at a=.3	

depth	EXTENSIVE	MODERATE	LITTLE/ NONE	NONE	TOTAL
70	0	1	2	0	3
80	1	1	2	3	7
90	0	1	3	5	9
100	1	1	5	3	10
110	1	2	5	0	8
120	2	2	3	0	7
130	1	2	0	1	4
140	0	0	3	2	5
150	1	4	7	1	13
	7	14	30	15	
	66				

depth	EXTENSIVE	MODERATE	LITTLE/ NONE	NONE
70	0.5256	-0.5256	0.7552	-0.9614
80	0.3344	-2.1335	-0.9488	1.3442
90	-1.1119	-2.7119	-0.7858	2.5288
100	-0.0676	-2.9773	0.3134	0.5958
110	0.1856	-1.5096	1.0329	-1.6363
120	1.6327	-1.1556	-0.146	-1.5176
130	0.9646	0.2294	-1.8837	0.1119
140	-0.8012	-2.5861	0.6794	0.9587
150	-0.3807	-1.4453	0.6781	-1.4435

(o-e)^2/e				
depth	**EXTEN SIVE**	**MODE RATE**	**LITTLE/ NONE**	**NONE**
70	0.5256	-4.4281	2.0516	-0.9614
80	1.3248	-4.6022	-9.1646	2.0398
90	-1.1119	-5.0807	-18.239	2.4149
100	-16.867	-5.3132	70.086	9.7019
110	3.574	-8.1593	15.237	-1.6363
120	0.0826	-8.6169	-67.802	-1.5176
130	0.0013	13.663	-1.8837	7.0477
140	-0.8012	-2.5861	7.9256	1.1311
150	-5.0072	-20.515	58.941	-4.1363
			sum=	-5.0072
			df=9	
			x^2C= 16.919 at a=.05	

adusted residual 2-factor				
depth	**extensive/moderate**	**little/none**		
70	0.0577	-0.0577		at a=.05 zC=2
80	-0.1951	0.1951		so, no cells are sig, but 90, 120, 130, and 140 are close,especially 130.
90	-1.4352	1.4352		
100	-0.8711	0.8711		
110	0.3681	-0.3681		
120	1.5215	-1.5215		
130	1.9131	-1.9131		
140	-1.5889	1.5889		
150	0.5739	-0.5739		

G-K Gamma

I performed an analysis of ordinal variance (Goodman's and Kruskal's gamma) 90-130cmbs in order to perform a test to see if trend line increase in resharpening that coordinates with increase in depth are significantly associated. I isolated the trend line for this and I used the both the four and combined two-category versions of degrees of resharpening, as in the Chi-square test. Both were significant. I also did this for the line 90-70, but it did not turn out to be significant, but it may be because there is not a large enough sample.

analysis of ordina variance, isolating the trend line 90-130					
	90	**100**	**110**	**120**	**130**
Extensive	0	1	1	2	1
Moderate	1	1	2	2	2
Little	3	5	5	3	0
None	5	3	0	0	1
	c=90	g=-0.54082			
	d=302	z=-2.06506			
	Zc=1.96				
	significant!				
depth	**extensive/moderate**	**little/none**			
90	1	8			
100	2	8			
110	3	5			
120	4	3			
130	3	1			
	c=51				
	d=220				
	g=-0.62362				
	z=-2.13036				
	Zc=1.96				
	significant!!				

analysis of ordinal variance, isolating the trend line 70-90			
	70	**80**	**90**
Extensive	0	1	0
Moderate	1	1	1
Little	2	2	3
None	0	3	5
	3	7	9
c=27			
d=21			
g=.493976			
z=1.01581	Zc=1.96		
no significant			
depth	**extensive/moderate**	**little/none**	
70	1	2	
80	2	5	
90	1	8	
c=29			
d=11			
g=0.45			
z=0.73114	Zc=1.96		
not significant			

Pearson's R

To do the Pearson's r, I used the combined 2 measures of resharpening, and converted them to percentages; then I only used the more resharpened percentage (since it is a reflection of the other), and it came out very close to 1, indicating a near-perfect relationship.

depth	**extensive/ moderate**	**little/ none**	sum						
90	1	8	9		**90**	11.11%	10	8100	0.012346
100	2	8	10		**100**	20.00%	20	10000	0.04
110	3	5	8		**110**	37.50%	41.25	12100	0.140625
120	4	3	7		**120**	57.14%	68.57143	14400	0.326531
130	3	1	4		**130**	75.00%	97.5	16900	0.5625
			38		110	0.401508	237.3214	61500	1.082001
					r=	0.992781			
						df=3			
						rc=0.8783			
						so, significant!			
						closer to 1 is more perfect relationship			

VITA

Deidra Ann Aery Black was born March 17, 1980 and raised in Vidor, Texas, daughter of Lisa Ann and Bradford Silas Aery. After completing a 3-year graduate plan at Vidor High School in Vidor, Texas in 1997, she entered the University of Texas at Austin. She completed her undergraduate degrees of pre-Columbian archaeology and archaeological anthropology in 2001. The work for these degrees included excavations in Belize and at the Gault Site. Afterwards, she began work as a contract archaeologist in Texas, Arkansas, and Mississippi, working for different private firms and during summer 2004 she subcontracted to the Department of Homeland Security. She then entered the Graduate College of Texas State University-San Marcos in 2005, and supervised field work at Aquarena Springs for the Texas State summer 2006 field school to add data to her thesis.

Permanent Address: 1190 Timberlane Drive
Vidor, Texas 77662

This thesis was typed by Deidra Ann Aery Black.