THE ARCHAEOLOGY OF SKILES SHELTER (41VV165): A LONG-TERM PLANT ROCKSHELTER BAKING FACILITY IN THE LOWER PECOS CANYONLANDS OF TEXAS

by

Bryan E. Heisinger

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Committee Members:

Stephen L. Black, Chair

C. Britt Bousman

J. David Kilby

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DEDICATION

I dedicate this thesis to my Mother who is a constant source of inspiration in my life.

Thanks Mom.

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There are so many incredible people to acknowledge for their help and support on this project and thesis. I first would like to send a warm thanks to the landowners Jack and Wilmuth Skiles who graciously allowed research to be conducted in Eagle Nest Canyon. Your generosity and archaeological stewardship will continue to expand our knowledge the past peoples who resided in Eagle Nest Canyon for thousands of years.

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ABSTRACT

Skiles Shelter (41VV165) is located at the mouth of Eagle Nest Canyon, roughly 250 meters northwest from the Rio Grande in the Lower Pecos Canyonlands of southwest Texas. Skiles Shelter is characterized by a fading panel of Pecos River Style rock art, numerous bedrock milling features, and a massive burned rock midden (BRM) accumulation of fire cracked rock (FCR) and cultural refuse. In 2013 and 2014, archaeologists with the Ancient Southwest Texas Project (ASWT) of Texas State University carried out extensive excavations in Skiles Shelter to better understand the rockshelter and how its archaeological deposits formed. Based on the initial excavation results, Skiles Shelter was hypothesized to have been used primarily as an earth oven facility for the baking and processing of plant and animal foods. This thesis further explores Skiles Shelter's use as an earth oven facility through the examination of artifacts, samples, and data from the 2013 and 2014 excavations.

1. INTRODUCTION

This thesis serves three goals: (1) it reports the investigative methods and results of the 2014 Skiles Shelter excavation; (2) it addresses the site's features, formation processes, burned rock midden (BRM), lithic and ground stone assemblages, and faunal and macrobotanical remains to explore how earth oven baking in rockshelters contributed to the Late Prehistoric economy in the Lower Pecos Canyonlands; and (3) it reviews ways representational art, mortuary evidence, ethnology, and artifacts have portrayed gender in the Lower Pecos Canyonlands. I use this information and the excavation data from Skiles Shelter to infer the gendered dynamics of the prehistoric people who used the site.

1.1 Skiles Shelter (41VV165)

Over thousands of years, the Lower Pecos Canyonlands of Texas has preserved the material remains of past indigenous people. It is no surprise that time and time again this region has sparked the interests of archaeologists (Black 2013; Shafer 1986). Within the western part of the Lower Pecos region near the town of Langtry, Texas is Eagle Nest Canyon – a deeply incised box canyon that feeds into the Rio Grande (Figure 1.1). What makes this canyon truly spectacular is its many rockshelters, some of which contain colorful rock art panels and well-preserved archaeological deposits.

Skiles Shelter (41VV165) is located near the mouth of Eagle Nest Canyon, roughly 250 meters upstream from the Rio Grande. Skiles Shelter (Figure 1.2) is characterized by a fading panel of Pecos River Style rock art, numerous bedrock milling features, and a massive

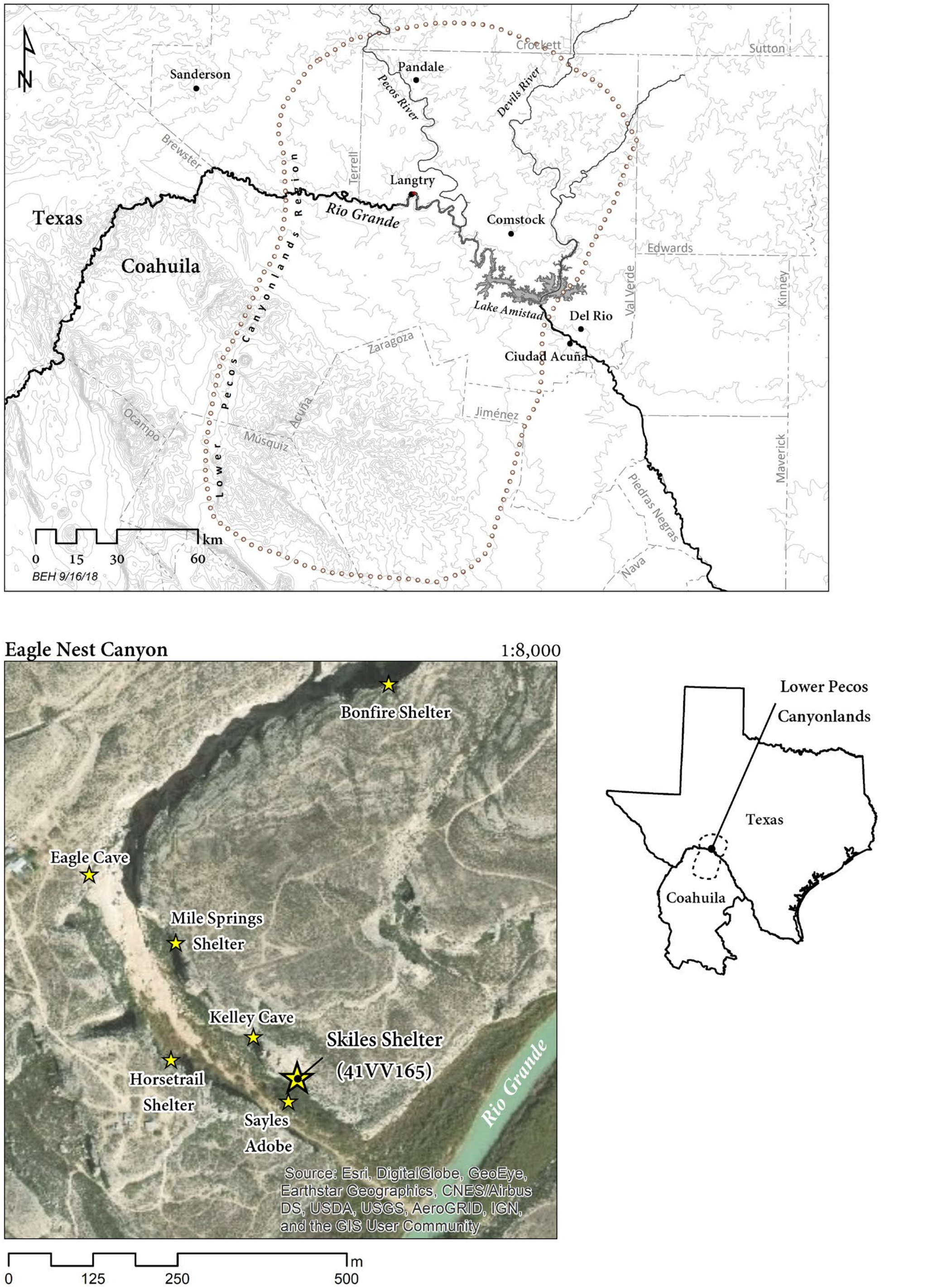


Figure 1.1: (Top) Map of the Lower Pecos Canyonlands region (adapted from Turpin 2012: Figure 1). (Bottom) Orthographic photo of Eagle Nest Canyon, showing location of Skiles Shelter in relation to other sites in the canyon. (Right) Inset map of Lower Pecos region.

Figure 1.2: Skiles Shelter (41VV165). The tufa mound dividing the shelter is visible in the center of the photo.

burned rock midden (BRM) accumulation of fire-cracked rock (FCR) and cultural refuse. The shelter faces south and measures approximately 36 m in length, by 7 m in width. Skiles is not "dry" like many of the region's rockshelters due to its shallow overhang exposing the shelter to driving rain.

Because of its proximity to the Rio Grande, Skiles Shelter is the most threatened rockshelter in Eagle Nest Canyon by catastrophic flooding events from the Rio Grande and Lake Amistad (see Chapter 6). At the request from the landowner Jack Skiles, archaeologists with Texas State University's Ancient Southwest Texas Project (ASWT) conducted testing and archaeological excavations in Skiles Shelter during the years of 2013 and 2014 to learn about the site and help mitigate any additional damage to its deposits from future flooding in the canyon.

The 2013 testing was small in scale and showed that both Skiles Shelter and adjacent Kelly Cave were used intermittently throughout the Early Archaic to Late Prehistoric periods (Rodriguez 2015). This testing revealed that (1) Skiles Shelter's formation processes were affected by a massive 14th-century flood, and (2) undocumented historical digging and looting had affected parts of the top 0.5 – 1 m of the deposits at both rockshelters. Rodriguez (2015:190) argued that Skiles Shelter has little signs of habitation other than evidence for plant and animal cooking and processing but recommend that his conclusions be re-evaluated in the future with a larger dataset.

In 2014, ASWT archaeologists expanded upon Rodriguez' work in Skiles Shelter. The research objectives for this new round of excavations were to: (1) use expedient methods to excavate the burned rock midden (BRM) at the mouth of the rockshelter; (2) estimate the number of earth ovens built at the site; (3) understand the site's formation processes; (4) use SfM photography to create a 3D record of the site and excavation; and (5) relate Skiles Shelter to other sites in Eagle Nest Canyon (Koenig 2015).

As discussed in Chapter 5, a total of fifteen radiocarbon dates were obtained from the 2013 and 2014 excavations. These assays were collected from various stratigraphic contexts and features; all but two of the assays dated to the Late Prehistoric period (1000-350 RCYBP). The outlier – and deepest radiocarbon date from the site – dated to the Early Archaic period (9000-6000 RCYBP). One Middle Archaic date from Skiles Shelter and relative dating from projectile point types suggest that Skiles Shelter was intermittently used throughout most of the Archaic period (9000-1000 RCYBP).

1.1-1 Skiles Shelter as an Earth Oven Facility

Rodriguez (2015) hypothesized that Skiles Shelter was an earth oven facility where plant and animal cooking/processing took place. In its most basic form, an earth oven is an indigenous cooking technology designed to bake food underground. As explained by Black and Thoms (2014:208), the basic structure of an earth oven consists of seven layers (Figure 1.3), from bottom to top : (1) a prepared pit surface, (2) heated coals and ashes, (3) thermally heated rocks, (4) green plants for packing material, (5) the food being baked, (6) upper packing material, and (7) the earthen cap. Per ethnographic and experimental accounts, earth ovens are constructed by stacking a pyre of firewood in teepee fashion on a prepared surface. Rocks are placed within the stack of firewood and pit, and the entire structure is ignited (2014:209). After the fuel burns down to coals, the heated rocks are arranged in a layer on the prepared surface forming a distinctive heating element. The first layer of packing material is added on top of the hot rocks to provide moisture, serve as a barrier, and prevent the food from burning and charring. Subsequently, the food, the second layer of packing material, and earthen cap are added, sealing the moist heat. The food in earth ovens is baked at low temperatures (~100°C) between the moist packing material for up to several days.

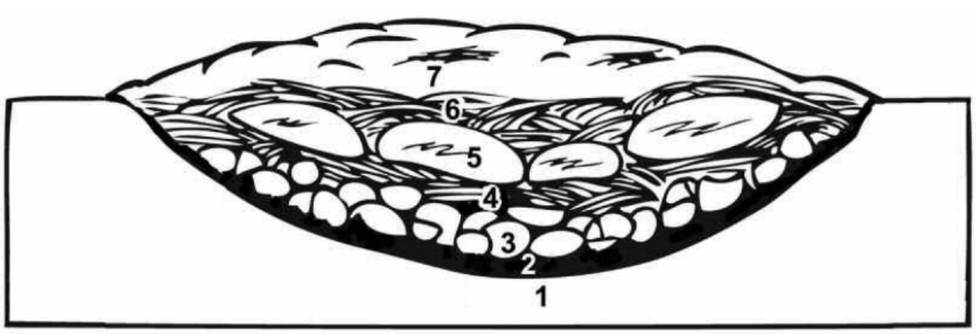


Figure 1.3: Section of an earth oven.(1) the earthen pit, (2) hot wood ashes, (3) heated rocks, (4) packing material, (5) food, (6) packing material, and (7) earthen cap. Figure from (Black and Thoms 2014: Figure 1).

Rocks inside of an earth oven function as a heating element. Because of their high thermal mass, rocks serve as an efficient way to store and slowly release the generated heat from a fire (Black and Thoms 2014:208). Larger rocks work better at holding heat due to their high surface area to mass ratio. Solid rocks which are thick and dense, with minimal porous activity or fractures, are better at absorbing and holding heat than those of lesser character; these rocks will cool more slowly and release heat in a controlled manner over hours, or days if insulated properly. A rock becomes "fire-cracked" after it is exposed to one or more cycles of thermal heating/cooling in an earth oven. If rocks are continuously used, they will begin to fracture into smaller, angular shaped pieces. Once the rocks become fist size or smaller, they can no longer effectively store heat and are discarded in favor of larger/newer rocks.

Thus, a cycle of use, reuse, and discard are present at most earth oven sites. Fire-cracked rock (FCR) waste begins to build up over time and often forms the shape of a ring around the earth oven. When earth ovens are built inside of rockshelters such as Skiles Shelter, the discarded FCR can amass in a rock-strewn talus slope (Figure 1.4). Black and Thoms (2014:210) add that areas with "accretional accumulations" of debris from continuous earth oven reuse can be considered earth oven facilities.

Burned rock middens (BRMs) are one of the archaeological signatures of prehistoric earth oven use. BRMs consist of FCR, charcoal, organic-rich soils, and artifacts. BRMs are typically 10 m (or greater) in diameter and are a common and visible archaeological feature. Within the past decade, researchers in the LPC have made it a point to individually analyze BRMs and their associated heating elements (see Chapter 5-1) in excavations and survey (Roberts and Alvarado 2011, Koenig 2012, Campbell 2012, Basham 2015, Rodriquez 2015, Knapp 2015). Thoms (2009:586) holds that archaeologists can measure the change in food

Figure 1.4: Talus slope of Skiles Shelter filled with fire cracked rock.

production through time at sites with well-dated burned rock middens. An increase in discarded and fractured burned rock in a BRM is the result of an increase of repeated plant baking in earth ovens. On this note, attempts have been made to evaluate land-use intensification hypotheses using burned rock accumulations (Campbell 2012, Knapp 2015). At the Little Sotol site (41VV2037), Knapp (2015:37) argued that earth oven intensification and plant processing increased in the upper strata of the site's BRM during the Late Archaic and Late Prehistoric periods. This thesis examines if the same holds for Skiles Shelter.

1.1-2 Late Prehistoric Use of Skiles Shelter

In the Lower Pecos Canyonlands, significant changes in the archaeological record take place during the Late Prehistoric period (1000-450 RCYBP; Turpin 2004:274). Most notably, the adoption of the bow and arrow sometime between 1350-1050 RCYBP (AD

600-900) signals a transformation in weapon styles, and differences in site types, rock art styles, and mortuary customs are documented throughout the region.

The use of earth ovens during the Late Prehistoric period is argued to have intensified at open-air sites (Turpin 1985; 2004). This argument is based on the relative lack of Late Prehistoric archaeological data from rockshelters during this period. Moreover, radiocarbon dates from open-air burned rock middens consistently, and possibly deceivingly, date to the Late Prehistoric period (Turpin 2004:274; Kenmotsu and Wade 2002:115).

Late Prehistoric deposits are present in four of Eagle Nest Canyon's rockshelters: Eagle Cave, Kelley Cave, Skiles Shelter, and Horse Trail Shelter (Nielsen 2017; Rodriguez 2015). Radiocarbon dates and projectile points from Skiles' deposits show that sustained intervals of rockshelter earth oven baking were taking place during the Late Prehistoric period. As will be explained in Chapter 10, Skiles Shelter helps address how the use of rockshelters for plant baking contributed to the subsistence and settlement economy of the Lower Pecos during the Late Prehistoric period.

1.1-3 Gender and Skiles Shelter

Gender is defined as the cultural characteristics that identify humans as being masculine, feminine, or other. Gender is not static, but fluid, and varies according to social and cultural contexts. Understanding gender requires the recognition of how learned traits conform to masculinity or femininity across cultures (Whelan 1995: 49). The study of gender in archaeology is no longer novel, and there has been a growing literature on the subject (Nelson 2004:1; 2006:1). Additionally, the theory and methods of gender archaeology continue to improve and expand as more archaeologists adopt the study of gender in their research. Wylie (1992:31) notes how gender theory in archaeology has gone through three stages: (1) the critique of androcentrism in science, (2) women-focused studies that identified women in the archaeological record, and (3) the restructured perception of gender as being sex integrative. Even though these phases overlapped and are not separable from one another, they provide the basis on which the body of gender theory was developed.

Burned rock midden facilities can offer an avenue for gender discussion. Earth ovens were used to cook food, and ethnographic tasks associated with the gathering, preparation, cooking, and cleanup of food has been known as women's work in many cultures (Nelson 2004: 66). It is true that a correlation exists between women and cooking in many groups around the world. However, it is problematic to assume that women were always the primary laborers when it came to food processing and cooking tasks. Ethnographers have recorded both men and women in North American hunter-gather societies as taking part in cooking duties (Murdock and Provost 1973).

Gender-related discussions in Lower Pecos archaeology are currently formative and have primarily focused on rock art and painted pebble research (Bass 1989, 1994; Mock 1987, 2011, 2013). The challenge of exploring gender at Skiles Shelter is taking its artifactual and feature data and exploring topics such as the gendered division of labor, social organization, and use of space by men, women, and children. In the past, archaeologists have tried to work around this problem by bridging archaeological data to the ethnographically recorded tasks of males and females. This process has proved to be problematic. Appeals to the frequency of a trait in the ethnographic record is a flawed approach to understanding gender, and as Kelley (1995:338) adds, foragers past and present were shaped by specific and varying environmental, social, and historical conditions.

Dering (1999) notes how xeric conditions increased in the Lower Pecos Canyonlands during the Archaic period, persisting through the Late Prehistoric. Lechuguilla and sotol, which were common succulents processed in earth ovens, were likely used during periods of subsistence stress. On the other hand, Riley (2008) argues that lechuguilla and sotol were seasonal staples that were used as part of an opportunistic, broad-spectrum subsistence strategy. Jeradino et al. (2009:55) define hunter-gatherer opportunistic subsistence as "foragers [taking] advantage of local resources that are in close proximity to their camps and on an encounter basis." If desert succulents served as seasonal diet staples or famine foods during times of unfavorable conditions, then men, women, and children may have closely cooperated in the collecting and processing of plant resources. If so, was Skiles Shelter a cooperative workspace, where cooking activities were equally gendered?

The gendered arrangement of cooking activities taking place at Skiles Shelter is not visible through a standalone study of material remains. However, gender can be investigated through a combination of ethnohistory and ethnographies, depictions of humans in rock art, mortuary arrangements, artifacts, and the use of space in residences. In this fashion, a "three-field approach" incorporating physical anthropology, both dirt and rock art archaeology, and cultural anthropology may be the best avenue for exploring and forming arguments about gender at Skiles Shelter and the Lower Pecos Canyonlands.

1.2 Research Objectives

In addition to reporting the 2014 excavation of Skiles Shelter, subsequent chapters examine various sets of archaeological data from the site's deposits to explore how earth oven baking in rockshelters contributed to the Late Prehistoric economy in the Lower Pecos Canyonlands. The research objectives of this thesis are as followed: (1) examine Skiles Shelter's stratigraphy to determine how earth oven construction and other cultural and natural factors have impacted the archaeological deposits and formation processes at the site;

(2) research the morphology, contents, and age of Skiles Shelter's features to better understand the cooking technology present at the site; (3) quantify the burned rock midden at Skiles Shelter to estimate the intensity and amount of earth oven construction taking place at the site over time; (4) categorize the chipped stone tools from Skiles Shelter by their morphological attributes and explore if any tools or tool classes may have been used for plant processing activities; (5) analyze the size and morphological attributes of the ground stone tools from the site to address if the ground stone designs and use wear correlate with Castaneda's (2015) bedrock feature research, and (6) explore Lower Pecos Canyonlands representational art, mortuary data, ethnographies and ethnohistory, artifacts, use of space, and food symbolism to hypothesize how cooking activities were gendered in Lower Pecos rockshelters.

1.3 Thesis Organization

This thesis is divided into twelve chapters. Chapter 2 discusses the environmental and regional background of the Lower Pecos Canyonlands and Eagle Nest Canyon. In Chapter 3, the investigative history of Skiles Shelter is presented. Chapter 4 details the excavation and analytical methods used in the 2014 excavation of Skiles Shelter. Chapter 5 examines the stratigraphy, features, and radiocarbon results from the 2014 excavation. Chapter 6 reviews the formation processes of Skiles Shelter. Chapter 7 presents the methods and results of Skiles Shelter's burned rock midden quantification. Chapter 8 and Chapter 9 examine the methodology and results of Skiles Shelter's lithic and ground stone analyses. Chapter 10 reviews the Early Archaic to Late Prehistoric use of Skiles Shelter. Chapter 11 explores the gendered use of Skiles Shelter, and Chapter 12 provides a summary of this thesis and offers conclusions and recommendations for future research.

2. ENVIRONMENTAL AND REGIONAL BACKGROUND

The Lower Pecos Canyonlands (LPC) is situated at the intersection of the Edwards Plateau and the Chihuahuan Desert. The crossover of these biotas creates an environment which shares flora and fauna elements of the Tamaulipan, Balconian, and Chihuhuan provinces (Dering 2002:2.3). Three major rivers dissect the LPC region. The most prominent river is the Rio Grande, which runs west to southeast through the area. The north to south flowing Devils and Pecos Rivers meets the Rio Grande as it works its way southeast to the Gulf of Mexico. South of the Rio Grande, the Rio San Diego - a perennial stream flowing north from the Serranias del Burro mountains - converges within what is now Amistad Reservoir (Dering 2002:2.2). Numerous intermittent streams flow into the major rivers described above and form narrow side canyons, mesas, ridges, and fingers that break up the uplands and shape the LPC landscape (Black and Dering 2008).

Centered on the mouth of the Pecos River, the defined cultural area of the LPC extends roughly 150 km north and south of the Rio Grande (Turpin 2004:266; see Figure 1.1). The Serranias del Burro Mountains mark the southernmost extent of the Lower Pecos. From east to west the LPC cultural area stretches from Sycamore Creek near the cities of Del Rio/Ciudad Acuna to the edge of the Stockton Plateau. The LPC does not have a static boundary. Instead, the defined area is subject to expansion as the known extent of both Lower Pecos rock art and material culture continue to be identified, especially on the Mexican side of the LPC where relatively little archeological research has been accomplished.

Most surface water in the LPC is found within canyons. Natural springs and streams arise where underground aquifers meet impervious geological formations of the Balcones Escarpment (Dering 2002:2.2). Two of the largest springs in Texas (San Felipe and

Goodenough Springs) are found in this region. There is an abundance of year-round flowing rivers, streams, and springs in the northern LPC, which make reliable water sources.

2.1 *Geology*

The LPC contains various Cretaceous-age limestone formations (USGS 2018). Frederick (2017:10) notes how three major geologic units are common in Eagle Nest Canyon (ENC). From oldest to youngest these units are (1) the Devils River Formation, (2) The Buda Formation, and (3) the Boquillas Flags. The "Uvalde Gravels," a Miocene-Pliocene aged gravel deposit, extends over and covers the Cretaceous bedrock in the southern portion of Val Verde County (Dering 2002:2.2). These gravels are the remains of ancient rivers that crossed the Lower Pecos landscape millions of years ago. To the early people who lived in this region, the various types of siliceous rocks in the Uvalde Gravels provided an abundant source of raw material for tool making and stone cooking.

2.2 *Soils*

Soils in Val Verde County are formed from weathered limestone, old alluvium over caliche and limy earth, and those developed in recent alluvium (Golden et al. 1982). The Langtry-Rock Outcrop-Zorra, which is a very shallow, rocky, and loamy complex, dominates the soils of this area (Dering 2002:2.2; Golden et al. 1982:5). The Ector-Rock Outcrop, Langtry-Rock Outcrop-Zorra, Lozier-Mariscal-Shumla, and Tarrant-Ector-Rock Outcrop groups make up approximately eighty-eight percent of the soils within Val Verde County (Golden et al. 1982:4).

2.3 *Climate*

The Lower Pecos Canyonlands falls within a semiarid climatic zone (Dering 2002). On average, there is little annual precipitation (>10 inch) in the southern and western areas of this region. The northern edge of the Lower Pecos receives slightly more rainfall (about 19 inches) on any given year. The peak seasons for rainfall are spring and early fall. Most of the recorded rainfall comes from sporadic Gulf of Mexico induced thunderstorms, which can occur during all months (Golden et al. 1982:2). In winters, there is little precipitation, and temperatures can fall below 50 °F. In the summer, the average maximum daily temperature is 98°F. Val Verde County sees an average relative humidity of 54% in the mid-afternoon, increasing to 79% throughout the night (1982:3). Northwesterly winds are dominant in Val Verde County from November to March (Golden et al. 1982:2).

2.4 Biological Environment

The Lower Pecos region lies at the convergence of three major biological zones (Dering 2002:2.3). To the southeast, the Tamaulpian Biotic province consists of mesquite and thorn-brush savannah. The Balconian Biotic province to the north is characterized by juniper-oak savannah. South, desert scrub vegetation of the Chihuahuan Biotic province covers most of the Lower Pecos landscape. All of the region is part of a shrub-short grass savannah (Dering 1999:660). Several varieties of oak (*Quercus* spp.), little leaf walnut (*Juglans microcarpa*), mesquite (*Prosopis glandulosa*), Mexican ash (*Fraxinus greggi*), and native pecan (*Carya illinoinensis)* flourish in the canyons (Dering 1999:660; Dering 2002:2.4). On the uplands, desert hackberry (*Celtis pallida*), Texas persimmon (*Diospyros texana*), acacia (*Acacia* spp.), yucca (*Yucca* spp.), prickly pear and tasajillo (*Opuntia* spp.), and lechuguilla *(Agave lechuguilla)* are abundant.

Mammals commonly found in Val Verde County fall under the West Texas Plains Country geographic distribution (Schmidly and Bradley 2016). Commonly seen in this group are several species of bats, white-tail deer (*Odocoileus virginianus*), desert cottontail rabbits

(*Sylvilagus audubonii*), jackrabbits (*Lepus californicus*), javelina (*Tayassu tajacu*), skunk (*Mephitis mephitis*), and porcupine (*Erethizon dorsatum)*; National Park Service 2017). Nine species of amphibians, over 200 species of native and migratory birds, 37 species of reptiles, and a variety of insects and arachnids reside within the Amistad National Recreation Area of Texas.

2.5 Paleoenvironment

Pollen recovered from the lowest strata in Bonfire Shelter suggest that Southwest Texas was covered by woodland, pinyon parkland, and scrub grassland vegetation from 22,500 to 14,000 RCYBP during the Wisconsin Full-Glacial period (Bryant and Holloway 1985:48). Brought on by the retreat of continental glaciation, the Late-Glacial period from 14,000-10,000 RCYBP is believed to have seen a decrease in pinyon and juniper woodlands and a rise in grass and shrublands. The cooler and wetter glacial periods were capable of supporting herds of now-extinct megafauna such as *Bison antiquus* (Turpin 2004:266).

In the Post-Glacial period from 10,000 years ago to the present, pollen data from the Lower Pecos region show a progressive deterioration of mesic vegetation in the area (Bryant and Holloway 1985:57). Around 5,000 years ago a xeric climate prevailed across the Lower Pecos Canyonlands (Turpin 2004:266). These conditions briefly retreated to cooler conditions around 3000 RCYBP, allowing for the expansion of grasslands and associated fauna. Arid conditions resumed in following millenniums and accelerated into the prehistoric and historic periods

2.6 *Cultural Chronology*

The cultural chronology of the Lower Pecos is divided into seven periods: the Paleoindian, Early, Middle, and Late Archaic, Late Prehistoric, and Historic (Shafer 1986; 2013, Story and Bryant 1966). Each period is further divided into subperiods (Table 2.1). Chronological overviews by Turpin (2004) and Shafer (2013) are used for this discussion.

2.6-1 *Paleoindian Period (12,000 – 9,000 RCYBP)*

The *Aurora* subperiod (before - 12,000 RCYBP) marks the earliest known arrival of people into the Lower Pecos (Turpin 2004). Two sites - Cueva Quebrada and Bonfire Shelter - bear evidence of this subperiod. At Cueva Quebrada, stone tools and lithic material associated with broken and burned bones of Pleistocene fauna date to 14,500 – 12,100 RCYBP (Turpin 2004:269). Evidence of human activity in the Pleistocene deposits of Bone Bed 1 at Bonfire Shelter is less concrete than Cueva Quebrada; however, remains of elephant, camel, horse, and bison were identified with out-of-place limestone boulders suggesting the boulders use as anvil stones. The *Bonfire* subperiod (10,800 -10,200 RCYBP) is associated with bison hunting and the use of Folsom and Plainview dart types; this subperiod is represented in Bone Bed 2 of Bonfire Shelter. The *Oriente* subperiod (10,300 to 9,400 RCYBP) signals the end of the Paleoindian Period. Early Archaic adaptations begin to appear in the archaeological record during this time as well as indications of a broader subsistence strategy and fiber industry.

2.6-2 *Archaic Period (8900-1000 RCYBP)*

During the Early Archaic, or *Viejo* subperiod (8900-5500 RCYBP), characteristics that define the Lower Pecos Archaic culture begin to appear at sites across the region (Turpin 2004:269-270). These adaptational changes include, (1) an increase in rockshelter use; (2) a reliance on the desert succulents sotol and lechuguilla for dietary and utilitarian needs; (3) the

Table 2.1: Lower Pecos Cultural Chronology. Adapted from Shafer 2013:62

Period *Subperiod*	Radiocarbon Years (RCYBP)
Early – Middle Paleoindian	**<11,500 – 10,200**
Aurora	<11,500 – 10,800
Bonfire	10,800 – 10,200
Late Paleoindian	**10,300 – 9,000**
Oriente	10,300 – 9,000
Early Archaic	**8,900 – 5,500**
Viejo	8,900 – 5,500
Middle Archaic	**5,500 – 3,200**
Eagle Nest	5,500 – 4,100
San Felipe	4,100 – 3,200
Late Archaic	**3,150 – 1000**
Cibola	3,150 – 2,300
Flanders	ca. 2,300
Blue Hills	2,300 – 1,300
Late Prehistoric	**1000 – 450**
Flecha	1000 - 450
Protohistoric	**450 - 250**
Infierno	450 - 250
Historic	**350 – 1<**

widespread use of Baker and Bandy style dart points, and (4) the use of painted pebbles and clay fired figurines. In the *Eagle Nest* subperiod (5500-4100 RCYBP) lithic style is seen to change (2004:270), and the regionally defined Pandale projectile points appear in sites across the region.

From 4100-3200 RCYBP, the *San Felipe* subperiod is a time of increasing regionalization (Turpin 2004:270). The introduction of the Langtry, Val Verde, and Arenosa projectile points and the emergence of Pecos River style rock art in the LPC are visible markers of the San Felipe subperiod. Pecos River style rock art is one of the defining components of the Middle Archaic and as Turpin (1994:71) asserts:

> "The uniformity in [the Pecos River Style] design, style, theme, and technique clearly indicates…that all these people were part of a unified belief system with all the implications for shared ideologies, worldviews, economy, and technology."

Population density along rivers and upland sites during the San Felipe subperiod is believed to have increased due to subsistence intensification (Turpin 2004:272).

The *Cibola* subperiod (3150-2300 RCYBP) marks the beginning of the Late Archaic in the LPC (Turpin 2004:272). Along with pollen evidence, the identification of modern bison in archaeological sites around the region – especially the upper bone bed (Bone Bed 3) of Bonfire Shelter – imply a return to cooler, wetter conditions. Turpin (2004:272) holds that the Red Linear pictograph style emerged during this time. However, a re-examination of Red Linear pictographs in the LPC identified 38 examples of Red Linear being superimposed underneath Pecos River Style figures (Boyd et al. 2013). This study suggests that the Red Linear style is older than Pecos River style (see Chapter 11.1-1).

Arid conditions return to the Lower Pecos during the *Flanders* subperiod (ca. 2300 RCYBP; Turpin 2004:274-275). This subperiod is noted by Turpin (2004:274) as being the most elusive in the Lower Pecos cultural chronology, and is signaled by the introduction of the Shumla dart point style. The earliest glyphs (named the Serpentine Style) at Lewis Canyon – a bedrock petroglyph site along the Pecos River – are also attributed to this period based on designs that resemble a Shumla Point. The *Blue Hills* subperiod (2300-1000 RCYBP) characterizes the end of the Late Archaic (2004:275). Ensor and Frio points, and bundled burials are hallmark characteristics of this period.

2.6-3 Late Prehistoric Period (1000-250 RCYBP)

The *Flecha* subperiod (1000-450 RCYBP) is marked by the introduction and adoption of bow and arrow technology in the LPC (Turpin 2004:274). During the Late Prehistoric, evidence suggests that upland sites were frequently visited for earth oven cooking and plant processing. Other cultural markers from the Flecha subperiod include the appearance of rock cairn and cremation burial customs, as well as the Red Monochrome and Bold Line Geometric rock art styles. The *Infierno* subperiod (450-250 RCYBP) designates the latter half of the Late Prehistoric. Sites on high promontories overlooking springs or water holes (2004:277) often date to this period. These archaeological sites often contain stone rings, lithic toolkits, and poorly fired ceramics.

2.7 History of Archeological Research in the Lower Pecos And Eagle Nest Canyon

The history of archaeological research in the Lower Pecos Canyonlands is marked by four eras (Black 2013; Turpin 2004). The first consisted of museum-sponsored antiquarian research expeditions in the 1930s that were seeking well-preserved artifacts for their collections (Davenport 1938; Jackson 1938; Martin 1932; Pearce and Jackson 1933; Woolsey 1936). Moreover, initial efforts to document the rock art in the LPC took place toward the end of the 1930s (Kirkland 1937; Jackson 1938).

The second era began after World War II with the construction of Amistad International Reservoir. This work spawned the largest archaeological projects in the history of the Lower Pecos region (Turpin 1984b:7; Black 2013). Archaeologists of the Amistad era were interested in constructing a refined local chronology of the region and focused on excavating deeply stratified sites that were threatened by inundation, such as Arenosa Shelter (Black 2013:144). Concurrently, a reinvigorated effort to document threatened pictographs in the Amistad inundation zone was carried out during this salvage work (Turpin 1984b:8).

Post-Amistad, the third era is encapsulated by two significant archaeological projects in the region – the excavations at Hinds and Baker Caves (Dering 1979; Word and Douglas 1970; Chadderdon 1983). Archaeologists from Texas A&M and the University of Texas at San Antonio focused on the macro-botanical, faunal, and coprolite remains from these two rockshelters (Black 2013:148). Their research yielded new information about past environmental conditions as well as the health and diet of Lower Pecos people.

Moreover, through the 1980s and early 1990s, Solveig Turpin and colleagues from the University of Texas at Austin carried out work in Seminole Canyon, Seminole Sink and Bonfire Rockshelter (Black 2013:148; Turpin 1982, Turpin 1985; Bement 1986). Turpin has been a leading scholar on the archaeology of the Lower Pecos, and her synthesis of the region's archaeological data into a proposed cultural chronology is central to the current understanding of Lower Pecos lifeways (Knapp 2015:41).

The fourth era started in the 1990s, when Carolyn Boyd and the Shumla Archaeological Research and Education Center began to refine the region's pictograph documentation methods (Dering 2002:3.2; Boyd 2003). Shumla continues to use state-of-the-art approaches to document the vanishing rock art of the Lower Pecos Canyonlands. Most recently, Boyd has interpreted the White Shaman panel on the Pecos River using ethnography and Shumla's groundbreaking documentation methods (Boyd and Cox 2016).

In 2009, Texas State University's Ancient Southwest Texas Project (ASWT) began a new wave of interdisciplinary research in the LPC. With the help of graduate students, staff, colleagues, and volunteers, ASWT principal investigator Dr. Stephen Black carried out archaeological projects and field schools in several areas of the region including the Shumla Ranch, Dead Man's Canyon, and Eagle Nest Canyon (Campbell 2012; Koenig 2012; Knapp 2015; Basham 2015; Rodriguez 2015, Castañeda 2015, Nielsen 2017, Pagano 2019).

2.7-1 Eagle Nest Canyon

Following the same trajectory as the region's history of archaeological work, the earliest excavations in Eagle Nest Canyon began in the 1930s. In 1932, E.B. Sayles, working for the Gila Pueblo Archaeological Foundation in Globe, Arizona, opened small trenches in both Eagle Cave and Kelley Cave (Sayles 1935). Sayles's work was briefly mentioned in his publication, *An Archaeological Survey of Texas*. In the summer of 1932, Forest Kirkland and his wife Lula illustrated the pictographs in Eagle Cave and Skiles Shelter (Kirkland 1937; Kirkland and Newcomb 1967: 8).

Later that year, J. Walker Davenport and Harding Black from the Witte Museum conducted small test excavations in Eagle Cave looking for intact, museum-quality artifacts (Black 2013:142). Pleased with what they found, the pair returned to Eagle Cave the following year and excavated a massive 73 ft. T-shaped trench (Davenport 1938). The Witte Museum in San Antonio holds the artifacts from these excavations.

In 1939 and 1940, George C. Martin who was involved in other Witte-related work in the Lower Pecos carried out uncontrolled digging in Kelley Cave, possibly Skiles Shelter, and other rockshelters in adjacent canyons (Rodriguez 2015:26). The only documentation of this work is found in a collection photo album sets titled, "Photographic Record of the Material Culture of the Big Bend Basket-Maker" (Martin 1932). Martins's digging may have been extensive and likely focused along the rear walls of the shelters.

Toward the end of the 1940s, Herbert Taylor from the University of Texas tested rockshelters and burned rock middens in the LPC as part of his master's thesis. Taylor (1949:65) commented how some of his work took place about seven hundred yards up the mouth of Mile Canyon (Eagle Nest Canyon) in "Skiles Cave" above a permanent spring in the floor. In 2013, Rodriguez (2015:27) recognized that the shelter Taylor mentioned did not match the location of Skiles Shelter (41VV165), but rather that of the unrecorded rockshelter across the canyon from Eagle Cave. Rodriguez proceeded to formally record and name the new site Mile Spring Shelter (41VV2163).

Gene Mear, from the Texas Memorial Museum at the University of Texas excavated in Eagle Nest Canyon in December of 1949. Mear was looking for evidence of Paleoindian occupations with extinct Pleistocene fauna and excavated a 16-x-4 ft. trench in Kelley Cave (Mear 1949). Mear did not find any evidence of co-occurrence, and the field notes from his excavations are housed at the Texas Archeological Research Laboratory (TARL; Rodriguez 2015:30).

The late 1950s through 1960s brought about two of the most extensive and well-known excavations in Eagle Nest Canyon. Before the construction of the Amistad Reservoir, John A. Graham and William A. Davis conducted a reconnaissance survey in 1958. The pair recorded five sites in and around Eagle Nest Canyon. These sites were: Kelley Cave (41VV164), Skiles Shelter (41VV165), Eagle Cave (41VV167), Horse Trail Shelter (41VV166), and Langtry Rock Midden (41VV168). Following this survey, a major excavation of Bonfire Shelter (41VV218) and minor excavation in Eagle Cave took place from 1963 through 1964 (Dibble and Lorrain 1968; Ross 1965). The objective of the Bonfire excavations was to investigate the burned bone layer deposits to determine their age and if the deposits were cultural (Black 2008). In Eagle Cave, Richard Ross expanded upon Davenport and Black's Witte trench and opened new excavation units in the northern end of the shelter (Nielsen 2017).

At the end of the 1963-1964 Bonfire Shelter work, three Bone Bed layers were identified at the site. Bone Bed 1 was the lowest deposit and contained mixed remains of Pleistocene fauna such as mammoth, horse, bison, camel, and antelope (Dibble and Lorrain

1968). Several limestone boulders amongst splintered bones were the only possible evidence of humans in the deposits. Bone Bed 2 consisted primarily of bison bones and associated Paleoindian artifacts and features; this bone bed represents the oldest and southernmost bison jump in North America. Bone Bed 3 was dated to the Late Archaic and contained burned bison bones and Late Archaic artifacts.

Archaeological research continued at Bonfire Shelter in the 1980s and 2000s (Bement 1986; Byerley et al. 2005; Byerley et al. 2007; Meltzer et al. 2007). Solveig Turpin and a team of archaeologists from the University of Texas at Austin opened a larger area of the lowest bone bed (Bone Bed 1) in 1983-1984. The UT expedition was investigating if Bone Bed 1 was a natural or culturally induced occurrence (Black 2013:148). No definitive evidence of humans was found among the bone bed during these excavations.

In 2005, investigators from Southern Methodist University (SMU) conducted a GIS study of Bonfire Shelter to explore the jump locality and drive route above the canyon. They also screened a portion of the 1963 back dirt and re-evaluated some of the faunal and artifact collections at TARL. The SMU team argued that the faunal remains in Bone Bed 2 were not from a primary kill event – a claim that spurred a debate between past and present Bonfire archaeologists (Bement 2007; Prewitt 2007). Aside from the intermittent work in Bonfire Shelter, the Texas Archeological Society's Rock Art Task Force re-documented the various pictographs in Eagle Cave, Skiles Shelter, and Kelley Cave in the 1990s (Black and Koenig 2013).

2.7-2 The ASWT Eagle Nest Canyon Expeditions

In partnership with Shumla, the Ancient Southwest Texas Project (ASWT) conducted its first investigations in the canyon during Texas State University's 2013 Eagle

Nest Canyon Archaeological Field School. Drs. Stephen Black and Carolyn Boyd directed this collaborative effort. Test excavations took place in Kelley Cave, Skiles Shelter, and along the Canyon edge (Rodriguez 2015; Basham 2015).

In the winter of 2014, ASWT continued the multiyear investigation of Eagle Nest Canyon. During the first season, Black and Koenig, with the help of staff (including the author of this thesis), interns, and volunteers carried out an extensive excavation in Skiles Shelter. The team opened units in Eagle Cave to test and refine their methodology for the following 2015 field season. The 2014 field season also provided the data for Christina Nielsen's Eagle Cave thesis research (Nielsen 2017). The bedrock features in Eagle Cave, Kelley Cave, Skiles Shelter, and Horsetrail Shelter were documented by Amanda Castaneda (2015) as part of her thesis research investigating bedrock features in the Lower Pecos region.

In 2015, Eagle Cave was the sole focus of field work. Under the direction of Charles Koenig, the crew re-exposed and documented the stratigraphy of the UT trench excavated by Ross in 1963. Black and Koenig directed another Texas State University field school in the summer of 2015, which focused on the excavation of Horse Trail Rockshelter (41VV166).

Work in Eagle Cave continued through the 2016 and 2017 Field Season. Victoria Pagano (2019) led a new excavation during the 2016 field season for her thesis research at Sayles Adobe (41VV2239) - a newly documented site in the canyon's bottom below Skiles Shelter. In 2017, the Eagle Cave trench was stabilized and backfilled in a remarkable effort from ASWT crew members and volunteers. Additionally, new research in Bonfire Shelter began in the summer of 2017 by Dr. James Kilby. The research in Bonfire Rockshelter is currently ongoing.

3. INVESTIGATIVE HISTORY OF SKILES SHELTER

As outline in the previous chapter, the 1930s marked the beginning of Skiles Shelter's archaeological investigations. In the winter of 1932 E.B. Sayles surveyed Eagle Nest Canyon and drew a crude sketch map of the locations of the rockshelters within the canyon (Figure 3.1). On this map, Sayles drew the location of Skiles Shelter with two small brackets denoting the two halves of the bifurcated site and sketched a perforated line denoting the sandy terrace directly below the site. Sayles labeled this area as being "sandy adobe" – an observation that would be revisited 83 years later by the Ancient Southwest Texas Project.

Sayles returned to Eagle Nest Canyon the following May and was assisted by J. Charles Kelley. That spring the pair commenced excavations in both Eagle Cave and Kelley Cave and established a numerical site numbering system for the canyon (Rodriguez 2015: 41). Sayles designated Skiles Shelter as Tex:X:2:8, and adjacent Kelley Cave, Tex:X:2:1. Although no excavations were conducted in Skiles Shelter during the Sayles expedition, he does mention the site in his field notes. Two of Sayles' photographs from that field season feature Skiles Shelter (Figure 3.2 and 3.3). Sayles and Kelley's work in Eagle Nest Canyon was cursorily described in the 1935 publication of *An Archaeological Survey of Texas* (Sayles 1935:63).

3.1 1930's: The Kirklands

The first documentative work in Skiles Shelter can be credited to the efforts of Forest Kirkland. During the summer of 1935, Forest and his wife Lula were on a mission to document and illustrate Native American pictographs (Kirkland and Newcomb 1967: 8).

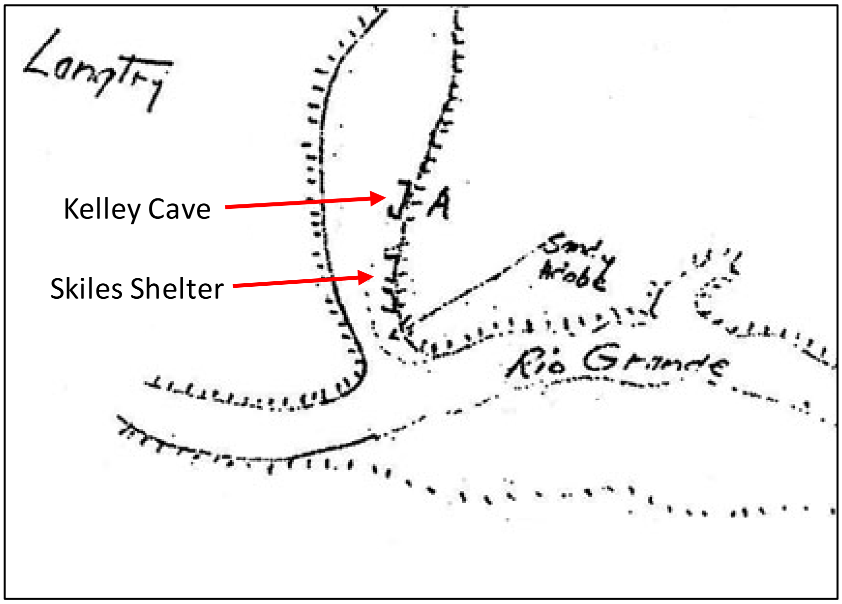


Figure 3.1: Lower portion of Sayles 1932 map of Eagle Nest Canyon. The brackets indicate the location of Skiles Shelter directly above the arrow pointing to "Sandy Adobe." Map courtesy of the Texas Archeological Research Laboratory.

After a brief visit to the Davis Mountains, Kirkland and Lula learned of pictographs near the Pecos River in Val Verde County. On August 2nd, Forest and Lula illustrated the rock art panels in Eagle Cave and Skiles Shelter using watercolors (Figure 3.4 and 3.5). The journal entry from their 1935 visit to Skiles Shelter, which they named simply "Shelter No. 2", remarked:

> "This panel of paintings is in a shelter near those illustrated in Plate 9 No. 2 [Eagle Cave]. The floor is not piled up with debris, as it is in many shelters, and the pictographs are high on the back wall. Thus protected, every design is still complete except the left end of the black figure in the center of No. 2. Gray dust covered the entire group so that individual designs could not be clearly seen until treated with water. When dampened, however, they appear clear and sharp and are so copied. The entire back of the shelter is covered with one continuous design." (Kirkland and Newcomb 1967: 42)

Figure 3.2: Sayles 1932 photo of Kelley Cave (Left) and Skiles Shelter (Right). Photo courtesy of the Texas Archeological Research Laboratory.

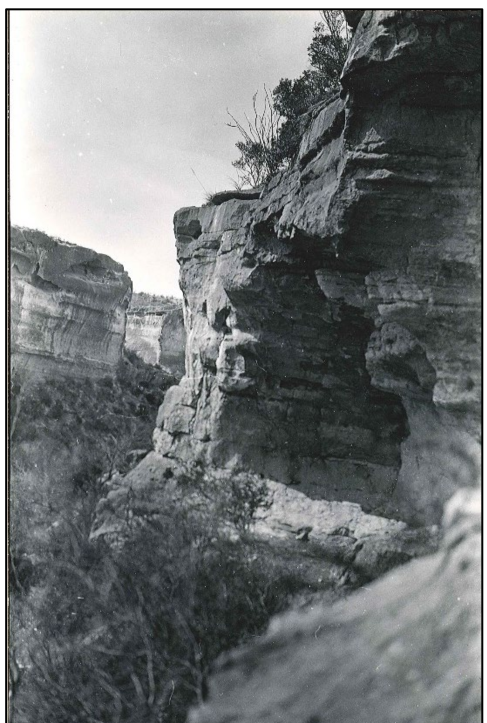


Figure 3.3: Sayles 1932 photo of the upstream end of Skiles Shelter. Photo courtesy of the Texas Archeological Research Laboratory.

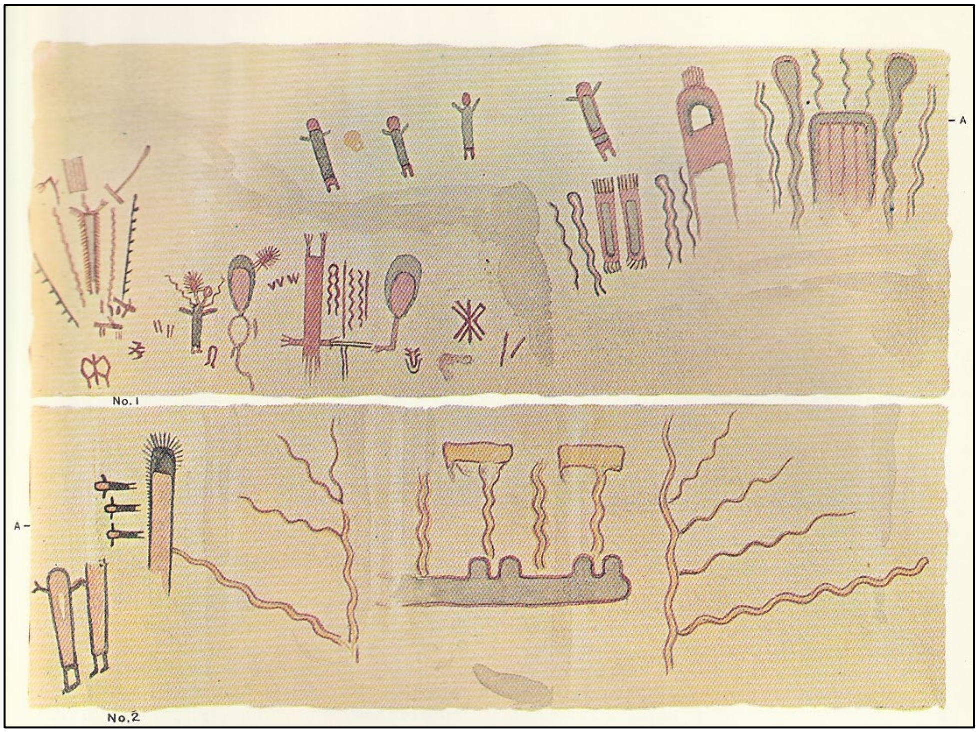


Figure 3.4. Forest and Lula's watercolor renderings of Skiles Shelter's rock art panel. Image from Kirkland and Newcomb 1967: 42.

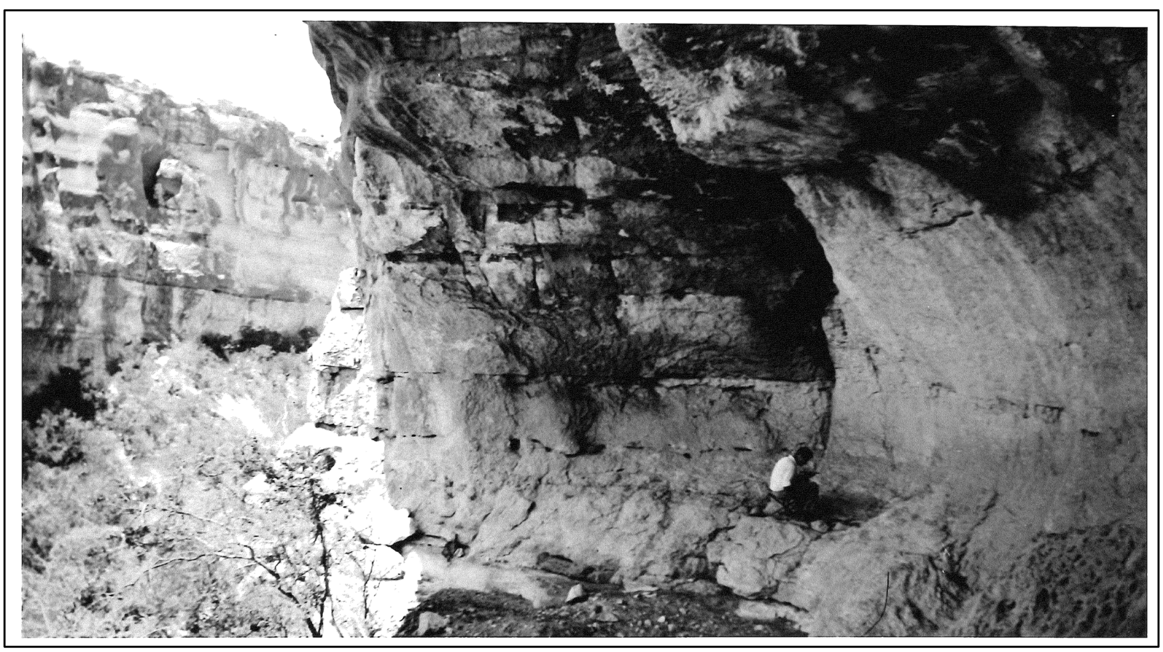


Figure 3.5. Forest Kirkland illustrating the pictographs in Skiles Shelter. Image from Kirkland and Newcomb 1967.

3.2 1939-1940: George C. Martin

George C. Martin, a wealthy patron of the Witte Museum, carried out uncontrolled digging in Eagle Nest Canyon and vicinity in 1939 and 1940 (Black and Koenig 2013). Based on photographic evidence from these digs, Martin dug into Eagle Cave and Kelley Cave; these photographs are currently the only records documenting Martin's work. Although speculative, it is likely that Martin dug along the back wall and other parts of Skiles Shelter during one of his visits to Eagle Nest Canyon. The looters pit (see Chapter 6.4) in Skiles' may have been dug by Martin, and some of the unprovenanced artifacts in his "Photographic Record of the Material Culture of the Big Bend Basket-Maker" might have come from Skiles Shelter.

3.3 1995: TAS Rock Art Task Force

On December 29-31st,1995, and January 1st, 1996, The Texas Archeological Society (TAS) Rock Art Task Force recorded the pictographs in Skiles Shelter. The team worked from the right to left ends of the panel sketching in the pictographs and providing brief descriptions of each figure. Digital copies of the notes and sketches of the TAS Rock Art Task Force's work in Skiles' are on file at the Shumla Archaeological Research and Education Center.

3.4 2011: Connolly Cupule and Incised Groove Research

Cara Connolly (2011) conducted cursory research at Skiles Shelter in January of 2010 as part of her master's thesis at the Univeristy of Nevada, Las Vegas. Connolly visited ten rockshelters in the Lower Pecos – including Skiles Shelter – to better understand the Lower Pecos "cupule and groove rock art style"(Connolly 2011). For her thesis, she explored the following hypotheses: (1) are the cupules and grooves related to food processing? (2) are the cupules and grooves a result of bone tool/knife sharpening? (3) do the cupules and grooves signal women's fertility practices? (Connolly 2011:27).

In her thesis, Connolly erroneously comments that Skiles Shelter was excavated in 1949 by archaeologists from Texas A&M and mixed up the site's trinomial number with adjacent Kelley Cave. Nevertheless, she drew a sketch map of Skiles Shelter and provided photographs of the location of the cupule and groove marks at the site. Connolly argued that Skiles Shelter has incised grooves on the site's tufa mound, and the incised grooves are on the same platform as bedrock mortars – a finding observed at six other rockshelters in her study area (2011:67). Due to the presence of ground stone stations next to the grooves, the author believes that the cupule and grooves were related to food production activities. Since women were known ethnographically as the predominate users of ground stone and bedrock mortars, their shared location with grooves suggests that these areas were women's work areas (Connolly 2011:80).

Connolly also tested – through experimental research – the functional aspect of the grooves (Connolly 2011, 2012). Based on her own experimental studies, the author found that chert flakes were the only tools capable of creating the incised grooves. She argued that the presence of groove marks in inefficient locations at some rockshelter sites insinuate that they served no obvious function (2011:80). Connolly holds that there is ample ethnographic evidence to support the idea that the cupule and groove marks were created as part of a fertility ritual (Conolly 2011:81). Red Linear depictions of fertility were present in two of the ten rockshelters she studied; yet, there was not enough documentation and research on this topic in the Lower Pecos to fully support her hypothesis.

3.5 2011: Shumla Rock Art Documentation

In 2011, the Shumla Archaeological Research and Education Center began a full figure documentation of the pictographs in Skiles Shelter. Their work in the site was intermittent, and the complete documentation of the rock art panel, including photography, illustrations, attribute data collection, as well as 3D modeling of the shelter and the creation of orthographic maps was finished in 2012 (Castañeda 2019 personal communication).

Three panels of rock art were recognized at Skiles Shelter. The main pictograph panel – Panel 1 (Figure 3.6) – is located on the back wall of the upstream lobe of the shelter. Panel 2 is the groove marks on the tufa mound of the site (previously recorded by Connolly 2011 and later documented in detail by Gershtein et al. 2016). Panel 3 is located on the wall of the little alcove immediately behind the tufa mound at the site. Table 3.1 provides the rock art styles and number of pictographs observed on each panel. Anthropomorphs were figures with at least three human characteristics, enigmatics were figures with not enough human or animal characteristics to be labeled as such (e.g., zigzags, a box with legs, crenelated shapes, etc.). Zoomorphs were figures with at least three animal characteristics; no zoomorphs were observed at Skiles Shelter.

Pecos River was determined to be the predominant rock art style at the site. Some of the figures that are possibly the Bold Line Geometric or an unidentified style were located low on the wall in the southwest portion of Panel 1. Eight of the Pecos River style pictographs in Skiles Shelter with black paint were tested with a pXRF in 2011 and all returned high readings for manganese (Koenig et al. 2014). This study helped confirm the use of manganese (Mn) for Pecos River style black paints. Shumla returned to Skiles Shelter in 2018 as part of the Alexandria Project and completed a gigapan of Panel 1, a Shumla Rock

Art Site Form and a TexSite revisit. The rock art panel in Skiles Shelter is the best-preserved and most threatened example of rock art in Eagle Nest Canyon.

Table 3.1: Distribution of Skiles Shelter's rock art styles, types, and counts by panel as documented by Shumla.

	Style	Type	# of Figures
Panel 1	Pecos River	Anthropomorph	12
	Pecos River	Enigmatic	13
	Possible Bold Line Geometric or Unknown Style	Enigmatic	5

	Style	Type	# of Figures
Panel 2	Cupule and Groove	Groove Marks	710 (Gershtein et al. 2016)

	Style	Type	# of Figures
Panel 3	n/a	Graffiti	8
	n/a	Remnant Paint	8

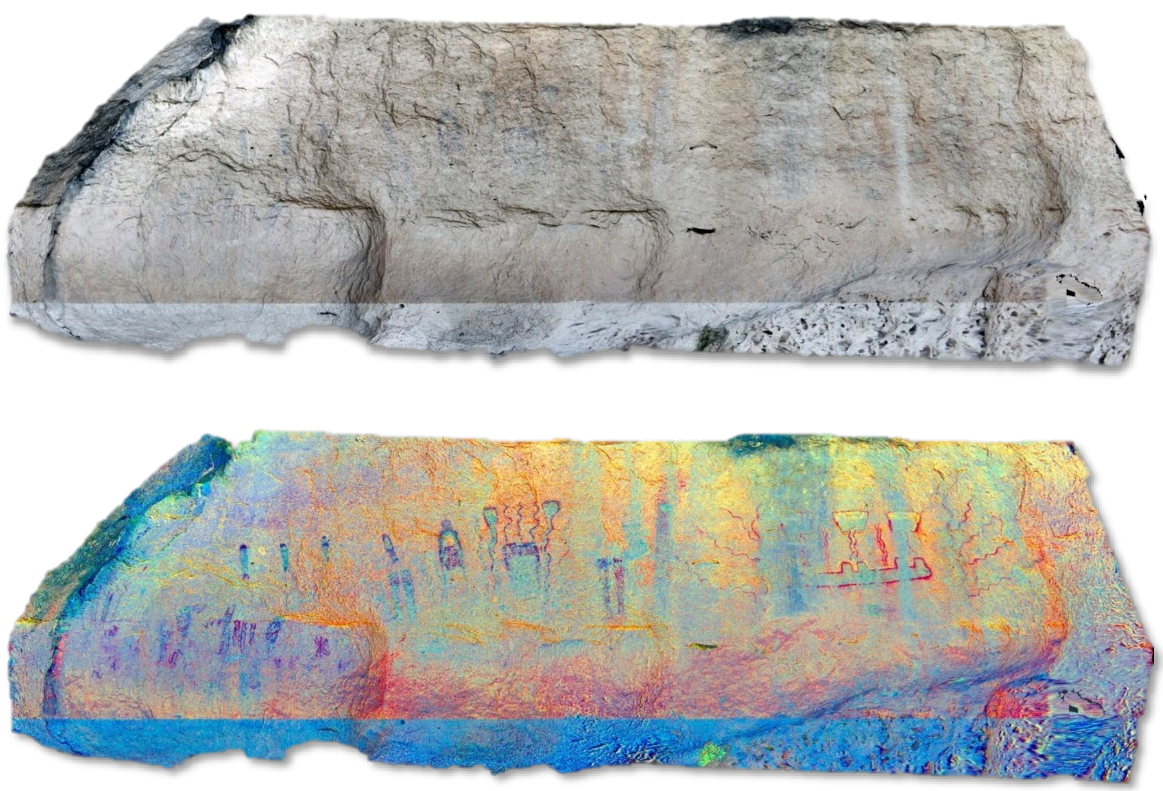


Figure 3.6: (Top) 3D Rendering of Skiles Shelter's Panel 1. The white line on the bottom of image indicates the 2010 flood line. (Bottom) 3D Rendering of Panel 1 with D-stretch enhancement.

3.6 2013: Rodriguez Test Excavations

The first archaeological excavations in Skiles Shelter (41VV165) began during the 2013 Eagle Nest Canyon archaeological field school. Daniel Rodriguez with the help of students excavated two adjacent 1-x-1 m units (Units A and B) near the center of the western, upstream side of Skiles Shelter (Rodriguez 2015). As part of his thesis research, Rodriguez was interested in understanding the behavioral and site formation patterns within and between Skiles Shelter and Kelley Cave, and to evaluate where intact deposits extant. Another 1-x-1 m unit (Unit C) was placed on the eastern, downstream side of the shelter. These three units were excavated through a combination of natural and arbitrary layers. Structure-from-Motion (SfM) photography was used to create 3D models of the bottom surface of each excavation layer.

All excavated sediment from these units was screened through ½ and ¼ inch mesh; material was retained on ⅛ inch mesh and gathered in bags (Rodriguez 2015). Rodriguez treated the excavation units as sampling columns in which matrix samples (approx. 2 liters) were collected from unscreened sediment in each layer. All thermally altered rock from each layer and feature was quantified using Rock Sort – a documentation routine used by ASWT to consistently document and quantify fire-cracked rock (FCR; see Chapter 4.7). After excavations were complete, a sampling column was opened in Unit A to sample the stratigraphic units below the flood deposit for botanical, faunal, and ⅛ inch screen analyses. Moreover, geoarchaeological magnetic susceptibility and phosphorous samples were collected from the north wall of Unit A upon completion of the excavation (Chapter 6.3, Figure 6.3).

In total, Rodriguez excavated 31 layers in Units A, B, and C. In Units A and B, excavations ended after reaching travertine spalls approximately 125 cm below surface (cmbs); in Unit C excavations were terminated approximately 65 cmbs after hitting bedrock. Seven distinct stratigraphic layers and one feature were documented in the north profile of Units A and B. Three stratigraphic layers and one feature were recorded in Unit C. In anticipation of the 2014 field season, Units A and B were not backfilled at the end of Rodriguez' fieldwork and plywood sheets were placed over the open units.

Rodriguez obtained five radiocarbon dates from Units A and B. Two of the assays were collected above and below the flood deposit, while the remaining three were obtained from the lower strata. The results of his radiocarbon dates revealed that the alluvial sand, which caps the lower deposits in Skiles Shelter was likely deposited in the mid-14^{th} century (Rodriguez 2015:77). The date of his lowest assay was younger than expected and temporally out of sequence (Chapter 5.5). Rodriguez hypothesized that this could have been the result of heavy modification to the cultural deposits in Skiles Shelter during the Late Prehistoric period. Rodriguez concluded:

> "Skiles Shelter shows little signs of habitation or any other cultural behavior beyond those linked to processing and cooking botanical and faunal resources. There is very little evidence of any symbolic expression in the lower deposits beyond a single piece of ochre, nor is there evidence of bead manufacture, storage, or other occupational activity seen at Kelley Cave" (Rodriguez 2015: 178).

His data showed that both Skiles Shelter and Kelly Cave were used intermittently throughout the Early Archaic to Late Prehistoric. The sites formation processes were effected by a massive 14^{th}-century flood and 20^{TH} century undocumented digging and looting had effected the top 0.5 – 1 m of the deposits at both sites. Rodriguez recommended that his conclusions be re-evaluated in the future with a larger dataset (Rodriguez 2015: 190).

3.7 2014: Koenig and Black Excavations

During the fall of 2013, the Ancient Southwest Texas Project (ASWT) Eagle Nest Canyon (ENC) project was formally created. Part of the plan of action for the January through June expedition was to expand upon Rodriguez' work in Skiles Shelter (Black and Koenig 2013). The first new units in Skiles were staked out on January 9^{th}, 2014. Units were only placed on the western, upstream half of the shelter due to the relatively sparse cultural deposits found in the eastern side of the shelter during the Rodriguez excavations.

The 2014 excavations lasted five months, and eight excavation units were opened up within Skiles Shelter. Two of these units (O and P) were used as Rock Sort and matrix sampling columns. Like Rodriguez, an attempt was made to collect approximately 2-liter samples from each layer for geoarchaeological, botanical, faunal, and entomological analyses. The FCR from each layer was counted, weighed and quantified using the Rock Sort routine on the site's talus slope. Four units were expediently excavated along four cleared senderos (paths) down the burned rock talus slope for the calculation of the total estimated volume of the BRM. The methodology and results from the Black and Koenig excavations are discussed in greater detail in the succeeding chapters.

Five radiocarbon assays were collected below the flood deposit. All of these assays dated to the Late Prehistoric, complimenting those from Rodriguez' testing. The dates were obtained for a preliminary site analysis during which Koenig made the first effort to quantify the FCR in Skiles Shelter's burned rock midden, and later gave several presentations on his research (Koenig 2015). His preliminary work provided the framework for this thesis. Given that the estimated age of the site spans 6500 years, Koenig (2015) reasoned that only one or less earth ovens per year may have been constructed at Skiles Shelter. This statement agrees with other tested BRM sites on the Devils River (e.g., Knapp 2015).

3.8 2014-2015: Castañeda Bedrock Feature Research

In 2014, Castañeda conducted a pilot residue study with collaborators Drs. Tammy Buonasera and Dani Nadel, Mark Willis, Julie Shipp, and Eli Gershtein (Castañeda 2015: 83). On site, the team studied the grooved features on Skiles' tufa mound using SfM techniques and collected small samples of rock from a few bedrock features to look for remnants of lipids and phytoliths from food processing. The pilot residue study proved to be only moderately successful, as only one feature contained identifiable residue traces, that of neotigonen – a saponin found in agave (2015: 84). This study sheds light on the possible nature and use of the bedrock features in Skiles Shelter, especially in relation to the processing of baked plants, and was the first documented occurrence of agave residue on bedrock features in North America (Koenig et al. 2017).

Regarding the polished, pecked and grooved surface of Skiles Shelter's tufa mound (Figure 3.7), Gershtein et al. (2016:6) tested the panel for organic residues, use-wear, and phytoliths. The team studied the grooves using a DSLR with a macro lens, extension tube, and Dino-lite digital microscope. Orthophotos and 3D models were created from targeted groove locations. In total, 710 marks were observed on the tufa mound during the study; all culturally produced marks on the panel were divided by the authors into two groups based on the width, depth and general shape (Figure 3.8). These being, (1) marks with a width and depth > 1 mm, and (2) delicate incisions (n=102), with width and depth measurements < 1 mm, and mostly even < 0.5 mm (n=608). Additionally, Gershtein et al. (2016:11) tested for organic residues and phytoliths using core and control samples from the bedrock features and shiny surface on the tufa mound.

Figure 3.7: Oblique photo of Skiles Shelter's tufa mound. Note the bedrock mortars (top), pecking (center) and incised marks (bottom). Photo from Gershtein et al. 2016: Figure 2.

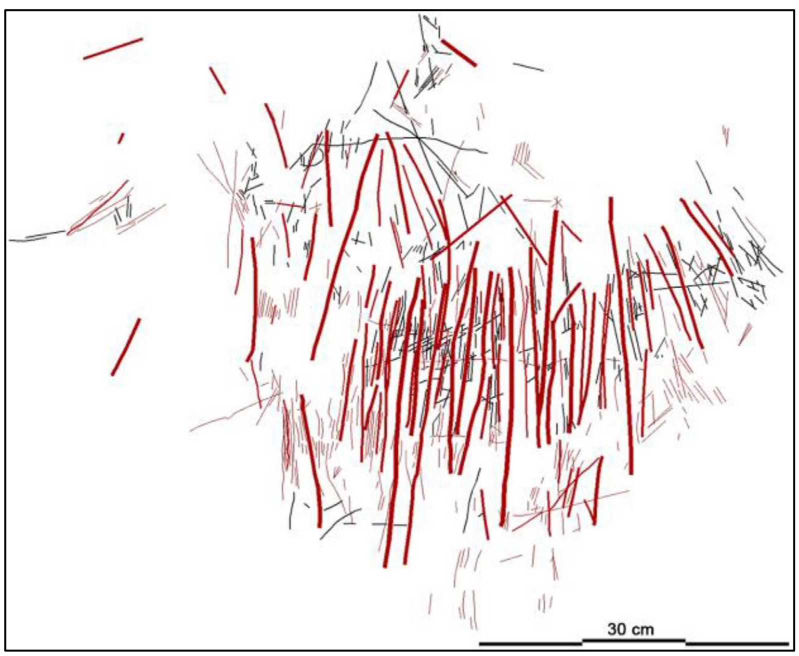


Figure 3.8. The 710 marks documented on Skiles' tufa mound. Red lines indicate marks with a width and depth > 1 mm; black and grey lines indicate delicate incisions with width and depth < 1mm. Figure from Gershtein et al. 2016: Figure 5.

Gershtein et al. (2016) hypothesize that most of the marks on the surface of the tufa mound were human-produced, linear, and vertically cut into the rock from repeated motions with a thin and sharp cutting tool (2016:12). Additionally, the authors identified a black substance in many of the delicate incisions (n=301). Their residue study revealed that the shiny surface on the tufa mound was surficial and only covered the shoulders and rims of the bedrock features and marks; an observation that implies human contact with the mound and plant or hide processing on top of the surface. The phytolith and organic residue study of the shiny surface were not as conclusive as the authors hoped and low lipid concentrations were found to be present in both the mortars and polished surface of the tufa mound. This result was possibly due to past flooding events in the shelter or the processing of foods that were more carbohydrate-rich (e.g., yucca, agave, and mesquite pods).

In 2015, Amanda Castañeda examined and recorded the morphological attributes of the bedrock features in Skiles Shelter. Her work in Skiles was a component of her master's thesis, which focused on the creation of a Lower Pecos regional typology of bedrock features from sites within the Rio Grande, Pecos River, and Devils River drainages (Castañeda 2015: 295). Her goals were, (1) to understand the morphological variation of bedrock features; and (2) advance hypotheses about the roles that bedrock features played in Lower Pecos foraging.

Castañeda (2015:69) documented six permanent bedrock feature areas and one movable limestone feature within Skiles Shelter (Figure 3.9). Interestingly, Skiles Shelter contained the largest number bedrock features (n=126) from the sites she studied in Eagle Nest Canyon. Skiles Shelter contained the second highest number of bedrock features of the ten sites in her overall study. She found that the maximum depth measurement of the 126 bedrock features ranged from 0.2 – 18.6 cm; the maximum length measurements ranged from 2.9 – 36.6 cm; and the maximum width measurements ranged from 2.8 – 19.8 cm. Further, most of the features (n=69) had a maximum length-width ratio of 1 – 1.25 cm (Table 3.2).

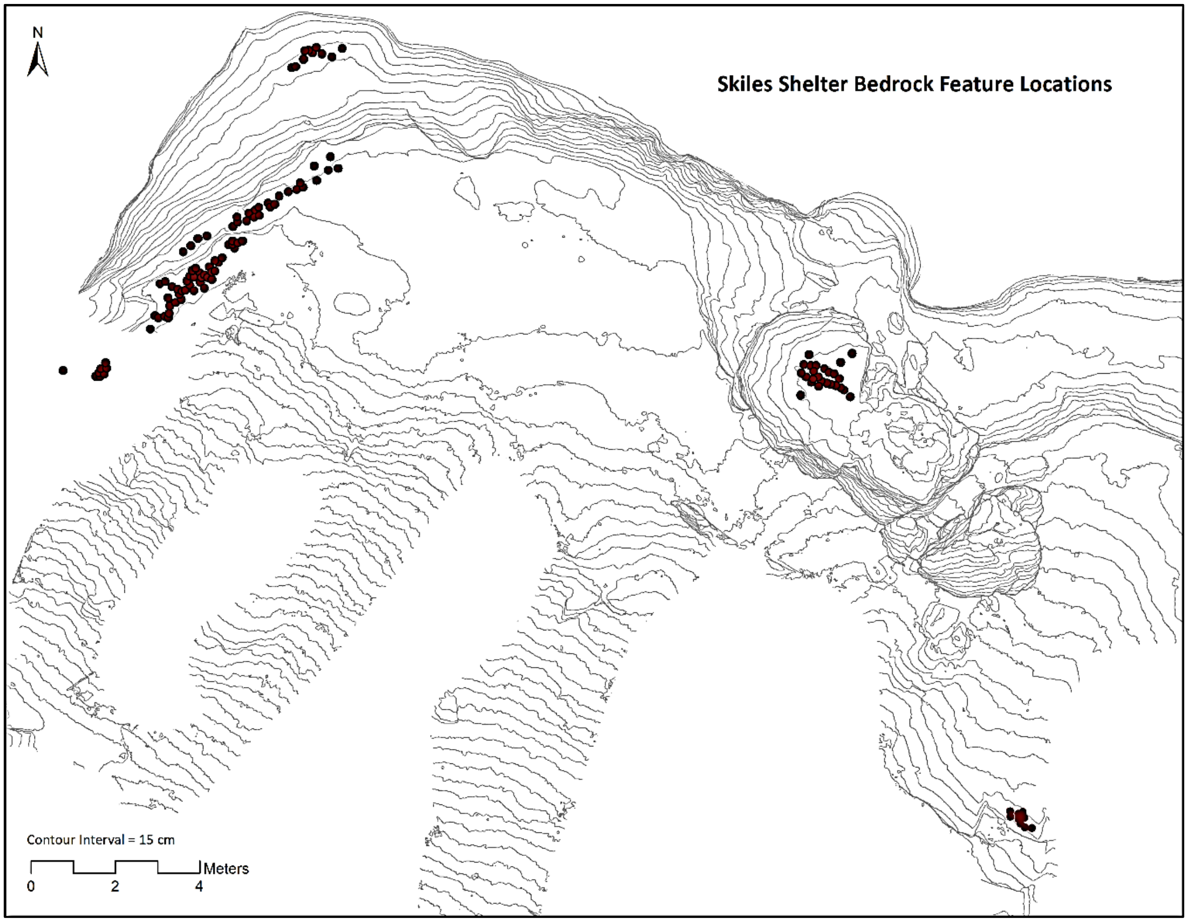


Figure 3.9. Contour map of Skiles Shelter showing the locations (dots) of the six permanent bedrock feature areas.

Overall, the bedrock features from Skiles Shelter fell within Castañeda's defined Clusters 1(n=124) and 3 (n=2). Cluster 1 was the largest and contained the greatest ranges in depth, length, and width measurements (Castañeda 2015: 264). She hypothesizes that these features were multi-purpose in function. Cluster 3 features have large openings, are relatively shallow in depth, and would allow for "broad, forceful strokes — characteristics useful for a variety of processing activities" (2015:267). Due to the high variability among the attributes of Clusters 1 and 3, these groups were classified by Castañeda as "general grinding surfaces."

Table 3.2: Descriptive Statistics for Skiles Shelter's bedrock features (from Castañeda 2015:191).

	Depth (cm)	Axis 1 (cm)	Axis 2 (cm)	L/W Ratio
Mean	2.55	13.76	10.36	1.32
Standard Error	0.21	0.51	0.30	0.03
Median	1.78	12.61	10.17	1.22
Standard Deviation	2.37	5.78	3.32	0.31
Sample Variance	5.60	33.36	11.04	0.10
Kurtosis	18.82	2.74	0.02	1.74
Skewness	3.59	1.33	0.36	1.51
Range	18.38	33.65	16.98	1.41
Maximum	18.59	36.57	19.78	2.41
Minimum	0.20	2.92	2.80	1.01
Count	126	126	126	126

* Modes for each variable were not indicated due to lack of duplicated values.

4. EXCAVATION AND ANALYTICAL METHODS

The 2014 excavation of Skiles Shelter combined both traditional and cutting-edge field methods. Horizontal and vertical mapping controls for Skiles Shelter were referenced to Eagle Nest Canyon's benchmark datum set to local coordinates: 3000 m East, 5000 m North, and 900 m elevation. A total data station (TDS) was used to geo-reference and plot Skiles Shelter's seven site datums (Datums A, B, C, E, F, G, and X; Figure 4.1). Descriptions of the site datums can be found in Table 4.1. All units were plotted south of Datum E in 1-x-1 m or 1-x-2 m blocks on north/south and east/west gridlines.

Koenig used Pole Aerial Photogrammetry (PAP; see Campbell 2012) with the Structure from Motion (SFM) technique to take overlapping photographs of both the inner floor and walls of Skiles Shelter. SfM is a digital photography method that has gained considerable traction in archaeological applications over the last five years (Willis et al. 2016). SfM has been used to create 3D renderings of archaeological sites by simply using a digital camera and photo processing software (Koenig et al. 2017a:54). Once 3D models from a site have been created and geo-referenced, available software can export the models as a raster image such as an orthographic photo and/or digital elevation model (DEM); these raster images can have sub-centimeter accuracy.

Vegetation was cleared along four cleared paths (senderos) of the downslope talus of Skiles' burned rock midden (BRM), and PAP was used to photograph the senderos. The PAP photographs from both the inner shelter and senderos were then inputed into Agisoft Photoscan to render a high-resolution 3D model of the site.

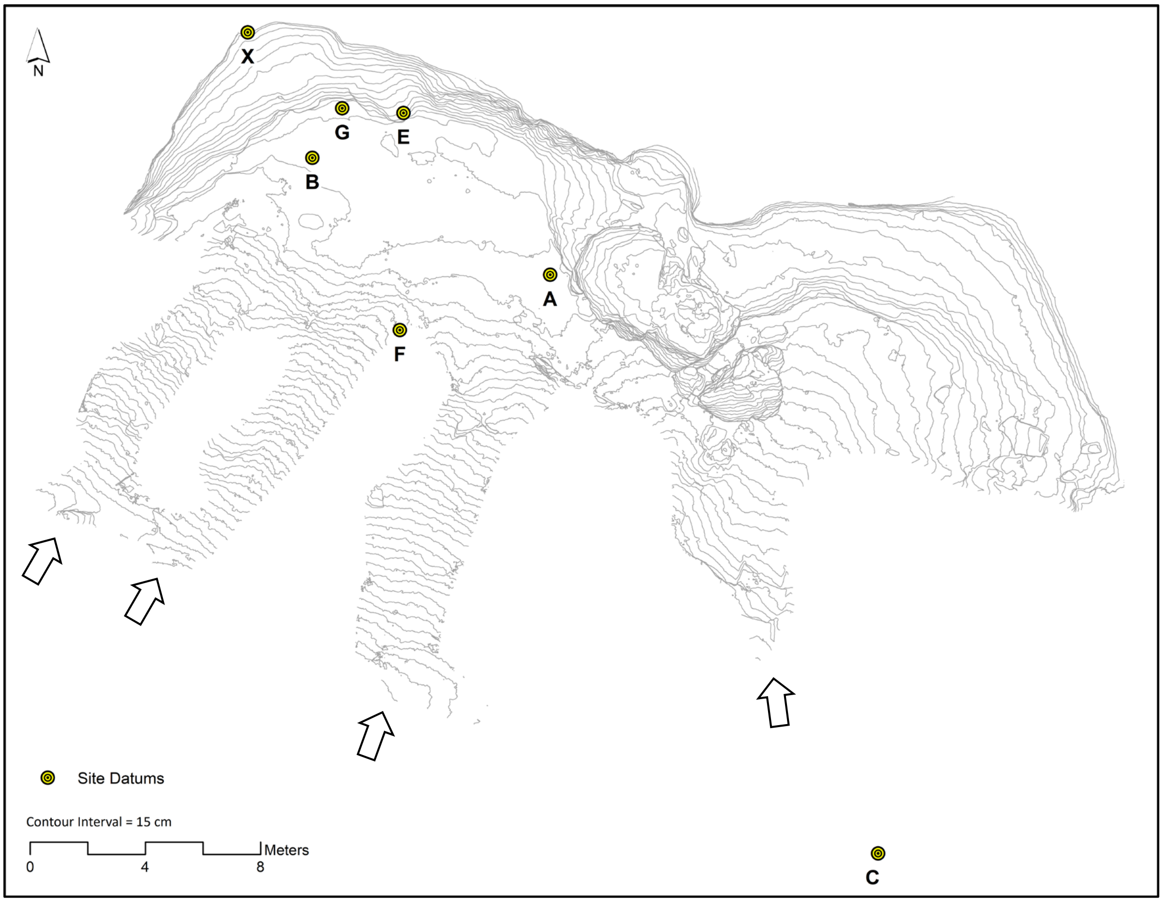


Figure 4.1: Skiles Shelter site datums (A, B, C, E, F, G, and X). Arrows indicate the locations of the cleared senderos.

Table 4.1: Skiles Shelter site datum descriptions.

Datum	Northing	Easting	Elevation	Description
DAT-A	5052.947	3095.152	966.699	Backsight location; located next to tufa mound
DAT-B	5057.007	3086.896	966.933	Rebar; by Units D/G
DAT-G	5058.731	3087.931	966.876	Screw in bedrock located in front of the upstream pictographs
DAT-E	5058.568	3090.058	967.459	By Unit F in travertine Spall
DAT-F	5051.03	3089.93	966.878	By Unit H in tree
DAT-X	5061.391	3084.617	969.702	Nail in wall near pictographs
DAT-C	5032.855	3106.529	964.625	Main mapping datum located south of site

4.1 Excavation Units

Over the course of the 2014 season, thirteen excavation units (Figure 4.2) were opened at Skiles Shelter to (1) expose north-south and east-west oriented profiles, (2) document the site's stratigraphy using SfM photogrammetry, (3) estimate the volume and mass of Skiles Shelter's BRM, (4) collect samples from the site for lithic, macrobotanical, entomological, faunal, and geoarchaeological analyses, and (5) estimate the number of earth ovens constructed at the site. The corners of each unit were staked out with nails, and the coordinates of each unit corner were plotted with the TDS. Unit names were a continuation from the 2013 excavations and designated by a letter sequence (i.e., Unit D, Unit E, etc.). Units were only placed on the western upstream half of the shelter due to the relatively sparse cultural deposits found in the eastern side of the shelter during the 2013 Rodriguez excavations.

Each unit was excavated following a stratigraphic approach (Harris 1989; see Chapter 5.2). All unit-layers were sequentially numbered within an excavation unit, and layers followed natural stratigraphic breaks or were arbitrarily established if needed. Information about unit-layers was collected on Unit-Layer Forms (Appendix A). All unit, unit-layers, features, and profiles were photographed using SfM techniques and reproduced as 3D models. Excavated sediment was screened through ½ and ¼ inch mesh. If features – patterns of related artifacts and ecofacts thought to represent behavioral events – were identified in an excavation unit, they were recorded separately on Feature Forms (Appendix A) and excavated apart from the unit-layer in which they were found. Chapter 5 discusses and interprets the features from Skiles Shelter in greater detail.

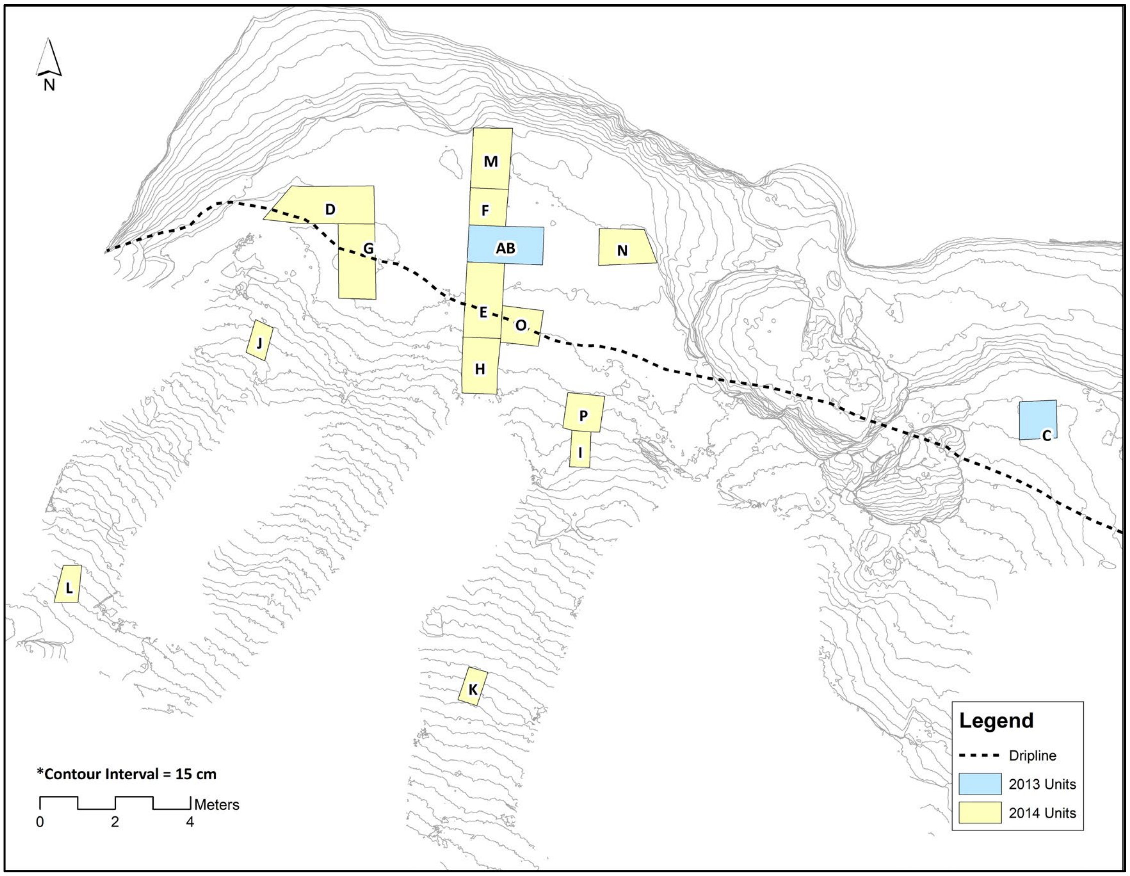


Figure 4.2: Skiles Shelter excavation units. Blue colored units denote those previously excavated in 2013.

Units D, G, M, and N successfully reached bedrock. Units AB (which was a continuation and combination of the 2013 Units A and B), E, F, and O hit a thick deposit of travertine spall. An attempt was made in Unit A to shovel and pick through the travertine. However, solid bedrock was not reached. Unit H on the site's dripline, and Units I, J, K, and L on the senderos were excavated through the burned rock midden; each of these units reached travertine spall. The total volume excavated from Skiles Shelter was estimated in ArcGIS using the CutFill tool (Table 4.2). Roughly, 15.95 cubic meters of fill were removed from the site during the 2014 excavation.

Table 4.2: Estimated volume of material removed from the 2014 Skiles Shelter excavation units.

Unit	Layers	Volume Excavated (m^3)
AB	4	2.76
D	4	1.19
E	7	2.27
F	6	1.02
G	5	2.28
H	6	1.18
I	1	0.42
J	1	0.54
K	1	0.17
L	1	0.29
M	6	1.25
N	2	0.68
O	9	1.07
P	7	0.83
Total:		**15.95**

4.2 *Profile Sections*

Four Profile Sections were documented during the 2014 excavation (Figure 4.3). Profile Sections were unique, sequentially numbered exposures upon which stratigraphy was documented. Data pertaining to Profile Sections were collected on Profile Section Forms (Appendix A). Profile Section 1 (PS01) exposed the stratigraphy on the south wall of Unit AB. Profile Section 2 (PS02) exposed the stratigraphy along the east walls of Unit D and G. Profile Section 3 (PS03) exposed the stratigraphy along the west walls of Units M, F, AB, E, and H, and Profile Section 4 (PS04) exposed the stratigraphy along the east walls of Units M and F.

Strats, which were defined by ASWT as unique, sequentially numbered names given to definable stratigraphic units of deposition or truncation, or an interface such as the outline of a pit. Data pertaining to individual starts were collected on a Strat Form (Appendix A). A total of thirty-five stratums were recorded in the four profile sections. A table and more detailed discussion of Skiles Shelter's stratigraphy can be found in Chapter 5.

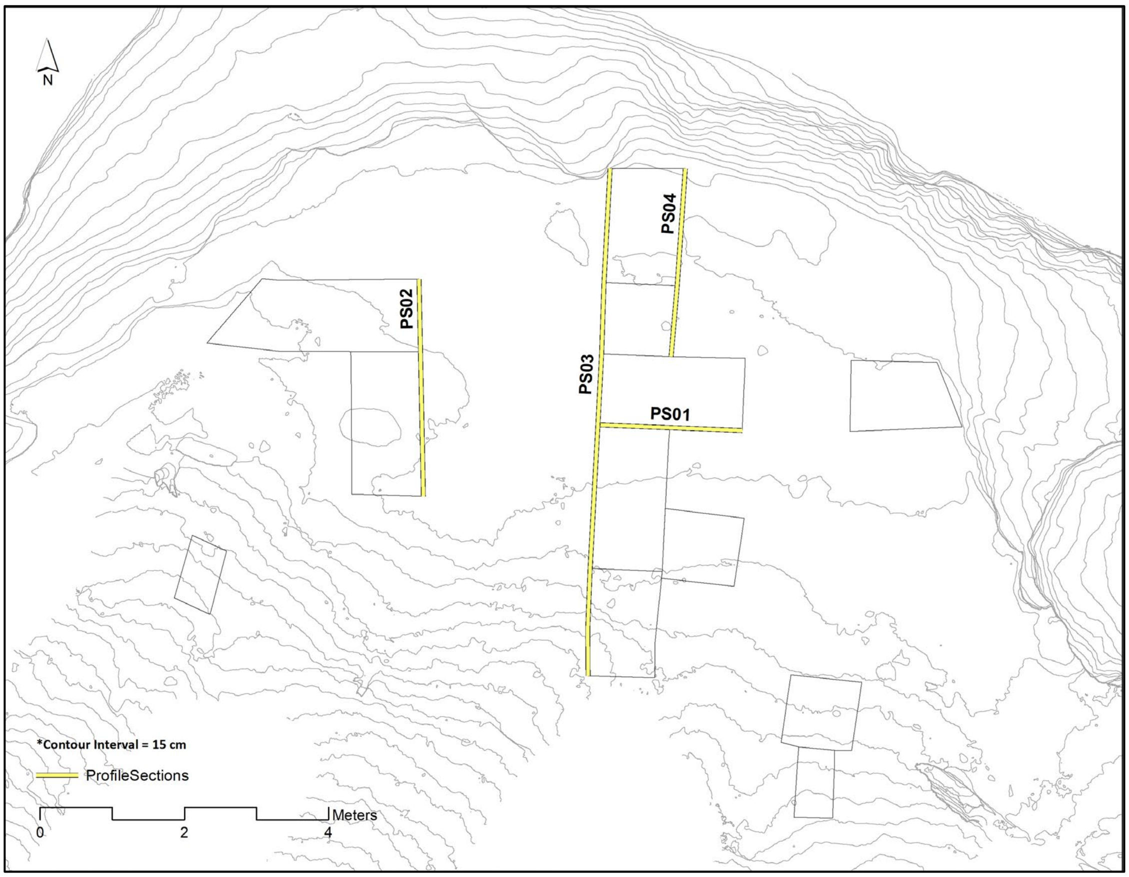


Figure 4.3: Contour map of Skiles Shelter showing the locations of the SfM documented profiles.

4.3 Sampling

The sampling strategy in Skiles Shelter focused on the collection of six types of samples: (1) matrix samples, (2) spot samples, (3) residue rocks, (4) micromorph samples, (5) geomatrix samples, and (6) radiocarbon samples. Matrix samples are bulk collected bags of matrix from the site (typically 2 liters or greater) that can be used for macrobotanical, faunal, entomological, and geoarchaeological analyses. In total, 138 matrix samples were collected from Skiles Shelter in 2014. Spot samples are small ½ oz. bags of undisturbed, point-provenienced sediment that were collected in anticipation for future rockshelter deposit analyses; seven spot samples were collected from Features 3, 5, and 7. Residue rocks are relatively large rocks from seemingly intact feature contexts that are anticipated to be used for starch grain and organic residual studies. Twenty-five residue rocks were collected for future analyses.

Micromorph samples are blocks of intact soil from profiles that are embedded in resin and thinly sliced to capture in-situ stratigraphy (Nielsen 2017:57). Micromorph samples are useful for identifying site formation processes, stratigraphic boundaries, and the relationships between deposits. Fifteen micromorph samples were collected by collaborating geo-archaeologists Dr. Charles Frederick and Ken Lawrence within Skiles Shelter. Ten of the samples were collected from across the face of PS03; three samples were collected from the north and east walls of Unit O, and one sample was collected from both Feature 2 in Unit E and Feature 3 in Unit F.

Additionally, a total of 123 geo-matrix samples were collected across the face of PS03 (Figure 4.7). These samples ranged from 100-300 g in volume and it is anticipated that these samples will be used to determine if phosphorous is seeping downward into the lower strata; no formal analyses of the micromorph and geo-matrix samples are being conducted at this time.

Radiocarbon samples were strategically collected and point-plotted with field number (FN) designations. For this thesis, some of the samples used for dating were obtained from sieved, point plotted matrix samples. Unit O was used as a sampling column, and a two-liter matrix sample from each layer was collected for geoarchaeological, botanical, faunal, and entomological analyses.

4.4 Rock Sort

Rock Sort is a standardized quantification method that can provide information about the use-life of fire-cracked rocks (FCR) before they were discarded. In Skiles Shelter, Rock Sort was used to systematically quantify and categorize the FCR from features and sampling columns to (1) estimate the total volume of Skiles Shelter's BRM, (2) estimate the total FCR mass of the BRM, and (3) estimate the number of earth oven firing episodes the BRM represents. FCR from each layer/strat were collected, separated, counted, and weighed based on four size classes (< 7.5 cm, between 7.5-11 cm, between 11-15 cm, and > 15 cm) to identify thermal fracture stages. Rocks smaller than <7.5 cm were only weighed. This information was then used to determine whether a cultural deposit is related to a discard event (rocks < 11 cm), a cooking event (rocks >11 cm), or a combination thereof. In addition to the size classes, the attributes of each rock (e.g., pitted limestone, roof spall, igneous/metamorphic rock) was recorded to help identify the source of the rock (e.g., upland vs. canyon bottom vs. within rockshelter).

Rock Sort was only conducted on features and sampling columns. The burned rock attribute data from the sampling columns (Units O and P) was collected and recorded in layers that followed the natural strata of the midden, and a photo was taken of the sorted rocks from each layer on a gridded board. Burned rock attribute data from features were collectively gathered, photographed, and recorded on feature forms. Table 7.1 in Chapter 7 provides a summary of the Rock Sort data from Skiles Shelter. The Rock Sort table used in the 2014 excavation can be found in Appendix A. The results and discussion of the burned rock quantification can be found in Chapter 7.

4.5 Laboratory Methods

The initial processing of field data and samples, as well as the cleaning and labeling of the artifacts recovered from Skiles Shelter was primarily carried out during the 2014 field season at the Shumla Research Campus, which served as the ASWT field headquarters, and additional lab work was done at Texas State University. Lithic analyses were conducted at Texas State University. All samples and artifacts will be curated following practices specific to the Center for Archaeological Studies (CAS) at Texas State University (CAS 2015). All archaeological contexts, artifacts, and samples from Skiles Shelter were cataloged in an excel database using the ASWT's Field and Lot Number system.

4.6 Field Numbers

Each documented context (e.g., profile sections, strata, unit-layers, features, and point-plotted artifacts and samples) were given a unique, sequential primary key called a Field Number. In Skiles Shelter, Field Numbers (FN) started with 20000 and were assigned in sequential order into an FN Log. FNs assigned to primary context areas (e.g., Unit-Layers, Stratums, Profile Sections, etc.) were also used as Lot Numbers. Lot Numbers serve to group cataloged artifacts and samples by their archaeological context.

4.7 Faunal Analysis

Faunal remains from the 2014 excavation of Skiles Shelter were analyzed by Dr. Christopher Jurgens. Faunal specimens from Units B, D, G, and H were examined during and after the excavation of the site. For this thesis, the faunal analysis focused on excavation units that had features (Units D, E, G, F, O). Given that Units D and G were previously analyzed (Rodriguez 2015), the remains from Unit E, F and O were prioritized for examination. In addition to the aforementioned units, all bone artifacts from the site were analyzed. All faunal specimens were identified taxonomically and the age (adult or juvenile), skeletal element, portion of the skeletal element, cultural modification, and size class were noted, if present. All specimens were cleaned with distilled water and brushed with a soft-bristle toothbrush. Dry brushing was used on specimens that were friable.

Faunal remains with substantial calcium carbonate build up were soaked in either 9 - 10% percent acetic acid solution, then cleaned with water and brushed to remove the encrustation. Broken faunal fragments were rejoined using an acryloid B-72 solution dissolved in acetone. The microscope used by Jurgens was a Baush & Lomb 7-30x stereoscope. Taxonomic identifications were made using comparative collection and osteological reference materials. The complete results of the faunal analysis conducted for this thesis can be found in Appendix E. For this thesis, only faunal remains from Skiles Shelters features are discussed. The full analysis and reporting of the Skiles Shelter faunal data (N=1020) will be the subject of future publication.

Discussions of heat-related discoloration of faunal data from Skiles Shelter's features are based on Jurgens dissertation research. Jurgens (2005: 105) notes how faunal specimens with overall burning across their surface are assumed to indicate bone discard practices, while specimens with partial burning indicate insulation from meat during roasting.

4.8 Macrobotanical Analysis

Botanical remains from Skiles Shelter were examined by Dr. Kevin J. Hanselka. For this thesis, botanical remains were initially gathered from sieved matrix samples, and only matrix samples from Skiles Shelter's features were analyzed. During the 2014 excavation, no matrix samples were collected from Features 1 and 2. Therefore, only botanical remains from Features 3, 4, 5, and 6 were analyzed. All botanical remains were identified taxonomically, and further classified by their count, weight, and percent of carbonization. Results of the macrobotanical analysis can be found in Chapter 5 and Appendix F.

5. SKILES SHELTER'S STRATIGRAPHY, RADIOCARBON RESULTS, AND FEATURES

Stratigraphy is defined by Goldberg and Macphail (2009:30) as "the three-dimensional organization in space and time of geological layers, soils, archaeological features, and artifacts." The stratification of an archaeological site conforms to four laws (Harris 1989). (1) The *Law of Superposition* states that in a series of stratified layers, the upper layers are younger and the lower layers are older (1989: 30). This law is the first measure in examining the stratigraphic sequence of an archaeological site. (2) The *Law of Original Horizontality* posits that any archaeological layer will be deposited in a horizontal position through natural circumstances. Harris (1989:32) argues that if a layer is not deposited horizontally, then reasons for the non-horizontal surface should be sought. This law is most useful for identifying features at archaeological sites. (3) The *Law of Original Continuity* states that the ends of archaeological deposits should be laid down with either feathered or thick edges (if abutting the side of the basin of deposition). If the end(s) of a deposit are vertical, part of that stratum may have been removed through non-natural disturbances. (4) The *Law of Stratigraphical Succession* complements the Law of Superposition and describes that a stratum is directly related to the deposits above and below it (1989:34). Other than what is directly above and below a particular stratum, the superpostional relationship to any other stratum is redundant.

5.1 Profile Sections

As discussed in Chapter 4, thirty-five distinct stratums were observed and documented in four carefully studied profiles of record in Skiles Shelter (Profile Sections: PS01, PS02, PS03, and PS04). Each profile was photographed using SfM techniques and reproduced as a high-resolution 3D model. The profile renderings were built at the ASWT field headquarters soon after the photos were taken. These were then printed out, taken to the site, and the stratigraphy of Skiles Shelter was annotated in the field and explained on ASWT strat forms (Appendix A). Upon completion of the field annotations, the profiles were digitized using Adobe Photoshop and ArcGIS. Additional information regarding the stratigraphy of Units AB and C are described by Rodriguez (2015).

5.1-1 Profile Section 1 (PS01)

Profile Section 1 (PS01) was an exposure on the south wall of Units AB. PS01 is located in the approximate center of the upstream lobe of the site and runs parallel to the back wall of the shelter (Figure 5.1). Seven stratums were recorded, and point plotted in the profile. Starting from the top of PS01, Strat 1 (S001) is the uppermost horizontal stratum and consists of a heterogenous disturbed silt loam that is friable/loose in consistency; cultural inclusions include FCR, charcoal, lithics, and fiber. Animal dung and bioturbation are recognized in the stratum. The lower strat boundary of S001 is abrupt and distinct from the underlying strata. Strat 2 (S002) is a disturbed horizontal stratum of a homogenous upward fining sand and silt loam from the Rio Grande. This stratum is a flood deposit; no cultural inclusions are recognized in the matrix. The upper and lower strat boundaries of S002 are abrupt and contrasted from the surrounding strata.

Strat 3 (S003) is a horizontally laid dark, ashy, heterogenous silt loam with sparse fire-cracked rock (FCR) and lithic and faunal cultural matrix inclusions. The lower boundary between S003 and S004 is difficult to discern. Strat 4 (S004) is a homogenous and horizontally bedded fine silty loam that contained gray, ashy, and carbon stained matrix. S004 had a high amount of charcoal, but contained FCR, lithics, and faunal remains; no bioturbation was recognized. The lower boundary of S004 is abrupt and discernable from

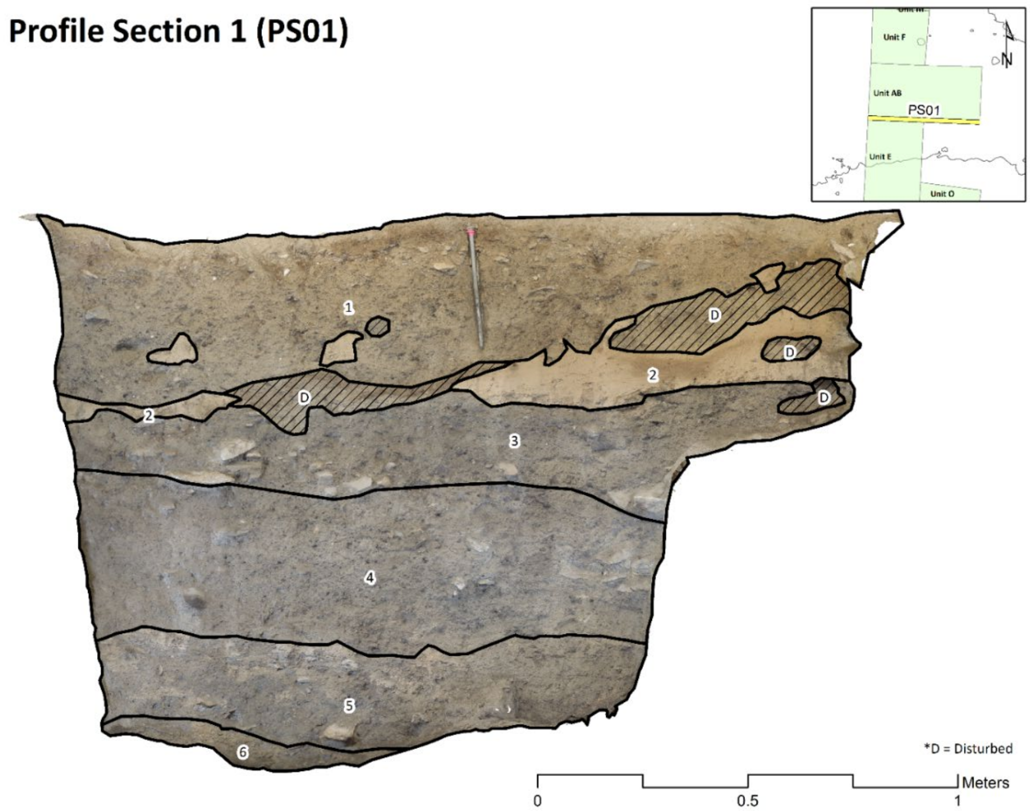


Figure 5.1 Profile Section 1 (PS01) and defined Strats 1-6 (S001-S006). Strats 7 and 8 (S007 and S008) continue below Strat 6 but were not photographed in this exposure due to the SfM photographs being taken prior to reaching the lower strats. Obvious disturbances are hatchered and labeled with the letter "D."

the top surface of S005. Strat 5 (S005) is a band of horizontally deposited sediment that slopes from east to west in Unit AB. The matrix in S005 was noted as a compact, homogenous, light tan silt that was similar in consistency to alluvium. S005 is laminated with small horizontally aligned rocks; this strat is broken up by bioturbation. FCR was the only cultural inclusions identified in the profile. There was a clear separation between S005 and S006. Strat 6 (S006) is a horizontally bedded sandy-loam that consists primarily of small roof spalls 2 to 4 cm in size. Cultural matrix inclusions are present in S006 and include FCR and charcoal; the boundary between S006 and S007 is diffuse. Strat 7 (S007) was minimally visible but consists of a horizontally laid sandy-loam filled with 60% roof spalls. FCR and charcoal are present in the S007 matrix. Strat 8 (S008) is almost entirely made up of roof spalls; no cultural inclusions are identified in this strat.

5.1-2 Profile Section 2 (PS02)

Profile Section 2 (PS02) was an exposure on the east walls of Units D and G (Figure 5.2). PS02 is located near the bedrock mortar panel in the western end of the shelter and runs perpendicular to the backwall. PS02 ranged from 1-2 m in depth and consisted of a relatively dark, ashy matrix in the upper strata and a darker brown silt-loam in the lower strata. The remnants of the alluvial flood deposit documented in PS01, PS03, and PS04, was identified in the top northern end of PS02. The most prominent strat in PS02 was a sloping layer of FCR (S025) that decreases in elevation as it moves from south to north across the face of the profile. The bottom of the profile touches bedrock.

Ten strata were recorded and point plotted in the profile. Strat 22 (S022) is the uppermost stratum and is defined as a heterogenous disturbed silt loam that is friable/loose in consistency; this stratum consists of the same matrix in S001. The lower boundary of this strat is abrupt and slightly undulating. Strat 23 was divided into three parts (A, B, and C) to account for subtle distinctions in the overall composition of the deposit. Strat 23A (S023A) is a patchy, homogenous sand and silt loam from the Rio Grande. This stratum is thought to be a flood deposit; no cultural inclusions are recognized in the matrix. The lower boundary of S023A is abrupt, irregular, and discontinuous. Strat 23B (S023B) is a horizontally bedded, loose and structureless silt loam with flecks and pieces of charcoal; the lower boundary of S023B is clear and distinguishable. Strat 23C (S023C) is a silt-loam with lithic, faunal, and

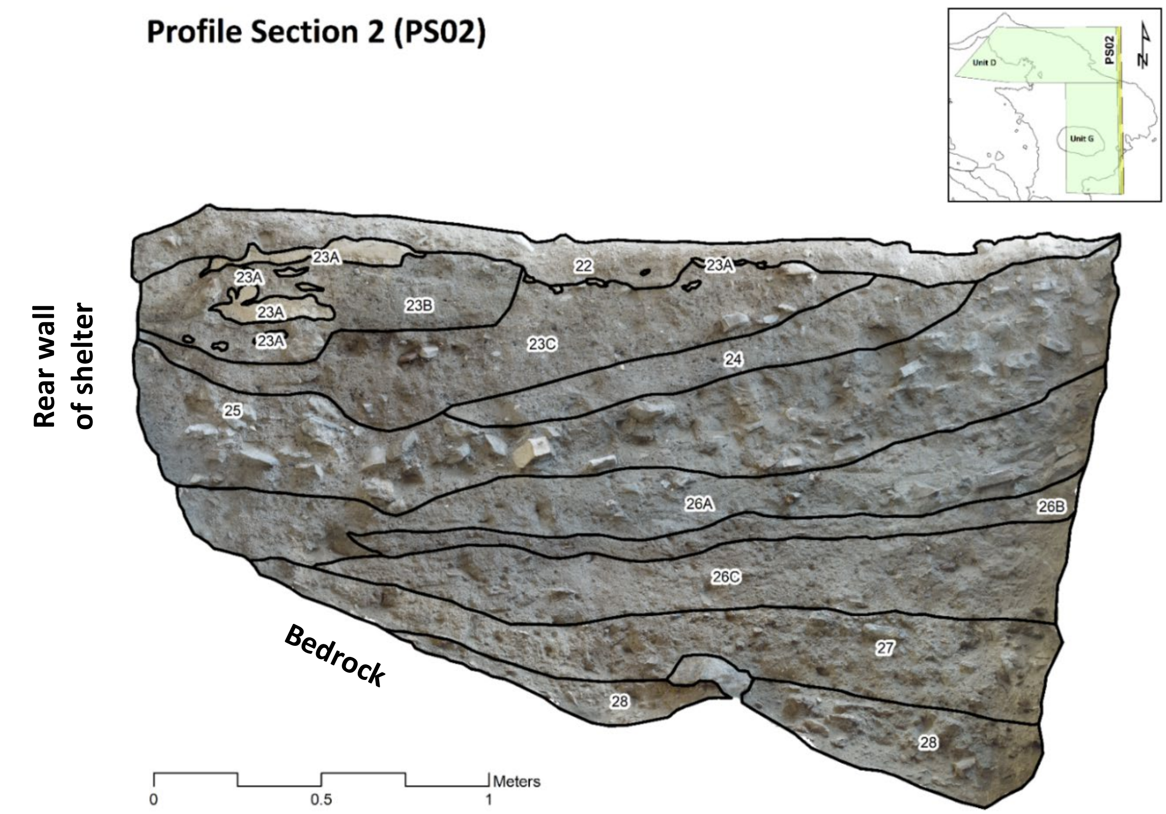


Figure 5.2: Profile Section 2 (PS02) and its defined Strats 22-28 (S022-S028).

charcoal inclusions; burned snail shell is in the matrix as well. S023C was deposited horizontally and appears to be a series of ashy lenses; the lower boundary of this strat is abrupt and sloping. The admixture of alluvium and cultural materials in S023 may be a result of earth oven construction activities. Strat 24 (S024) is a silt-loam with pieces and flecks of charcoal and snail shell in the matrix. The bottom of S024 is abrupt and sloping. Strat 25 (S025) is a silt loam that is comparable in consistency to S024. Cultural inclusions in S025 include lithics, FCR, and burned faunal remains. Rodent burrowing was observed near the southern end of this stratum. S025's lower boundary is abrupt and sloping upward toward the front of the shelter. Stratum 26A (S026A) is a horizontally deposited silt loam with lithic, FCR, charcoal, and snail shell inclusions. The FCR in this matrix is horizontally oriented, and the lower stratum boundary is abrupt and gently slope upward toward the front of the shelter. Stratum 26B (S026B) is a silt loam with lithic inclusions, and its lower boundary is abrupt and sloping upward in the direction of the mouth of the shelter; this stratum was deposited horizontally. Stratum 26C (S026C) is a loose and structureless, horizontally bedded silt loam that has an abrupt lower boundary that gradually slopes up and south toward the dripline. Stratum 27(S027) is a horizontally deposited silt loam. Other than one large flake that was observed in the profile, this stratum appeared to be sterile. Stratum 28 (S028) consists of roof spall and small boulders. The lower boundary of this stratum slopes downward toward the site's dripline and abuts bedrock.

5.1-3 Profile Section 3 (PS03)

Profile Section 3 was an exposure of the west walls of units M, F, AB, E, and H (Figure 5.3). This profile is the most critical and informative stratigraphic exposure documented at the site. The section runs perpendicular from the backwall of the site, through the center of the upstream lobe, to the top of the talus slope. PS03 has a large alluvial deposit (S010) that slopes upward toward the dripline as it moves from north to south across the profile. This alluvial deposit caps a dark and ashy midden deposit (S011) that rests on bedrock at the rear of the shelter. The alluvial deposit then slopes upward toward the drip line approximately 3 m from the back of the shelter. The ashy midden zone (S011) in PS03 is overlying a brown wedge of burned rock midden (BRM) and non-BRM deposits (S012, S013, S014, S015, S016, S021). Beneath this zone contains non-cultural roof spall deposits (S017, S018, S019, S020). PS04 was systematically sampled by geo-matrix and micromorph samples (see Chapter 4.5) A total of 123 geo-matrix samples were removed from the profile (Figure 5.4); these samples were spaced apart 40 cm (horizontally) by 20 cm (vertically). In addition, ten micromorph samples were collected from different strata and stratum interfaces in PS03 (locations not shown on Figures 5.3 or 5.4).

Thirteen distinct strata were identified, and point plotted in PS03. Stratum 22 (S022) is the uppermost stratum and the same upper stratum that was defined in PS02. S022 is defined as a heterogenous disturbed silt loam that is friable/loose in consistency; the matrix in this stratum is likely the same as S001. Stratum 10 (S010) is a homogenous sand and silt loam flood deposit from the Rio Grande. No cultural material and little natural inclusions are present in the matrix. S010 had subtle changes in its consistency, texture, and color and was subdivided into four sub-layers (A, B, C, D). The lower boundary of S010 is very abrupt and slope up and southward toward the dripline. Strat 11 (S011) is a heterogenous silt loam that is loose in consistency and slopes up and south toward the dripline. FCR, charcoal, faunal remains, and snail shell inclusions are observed in S011. This stratum was horizontally deposited and noted to have considerable rodent bioturbation.

Strat 12 (S012) is a heterogenous silt loam that is loose in consistency and has an abrupt and sloping lower boundary that has been disturbed by bioturbation. FCR, charcoal, faunal, and snail shell inclusions are observed in the matrix. Strat 14 (S014) is a heterogenous silt loam that is loose in consistency and includes lithic, charcoal, snail shell, and macrobotanical inclusions; the lower boundary of S014 is abrupt and sloping. Strat 15 (S015) is a heterogenous silt loam with an abrupt and sloping lower strat boundary, with no cultural inclusions in the matrix. Strat 16 (S016) is a heterogenous silt loam that is loose in consistency and contained noticeable amounts of lithic inclusions. The lower strat boundary of S015 is abrupt and sloping. Lithics were the only cultural inclusions observed in S016.

Strat 17 (S017) is made up of roughly 80% angular limestone roof spalls. The matrix in between the spalls is loose in consistency, and the lower strat boundary of S017 is abrupt.

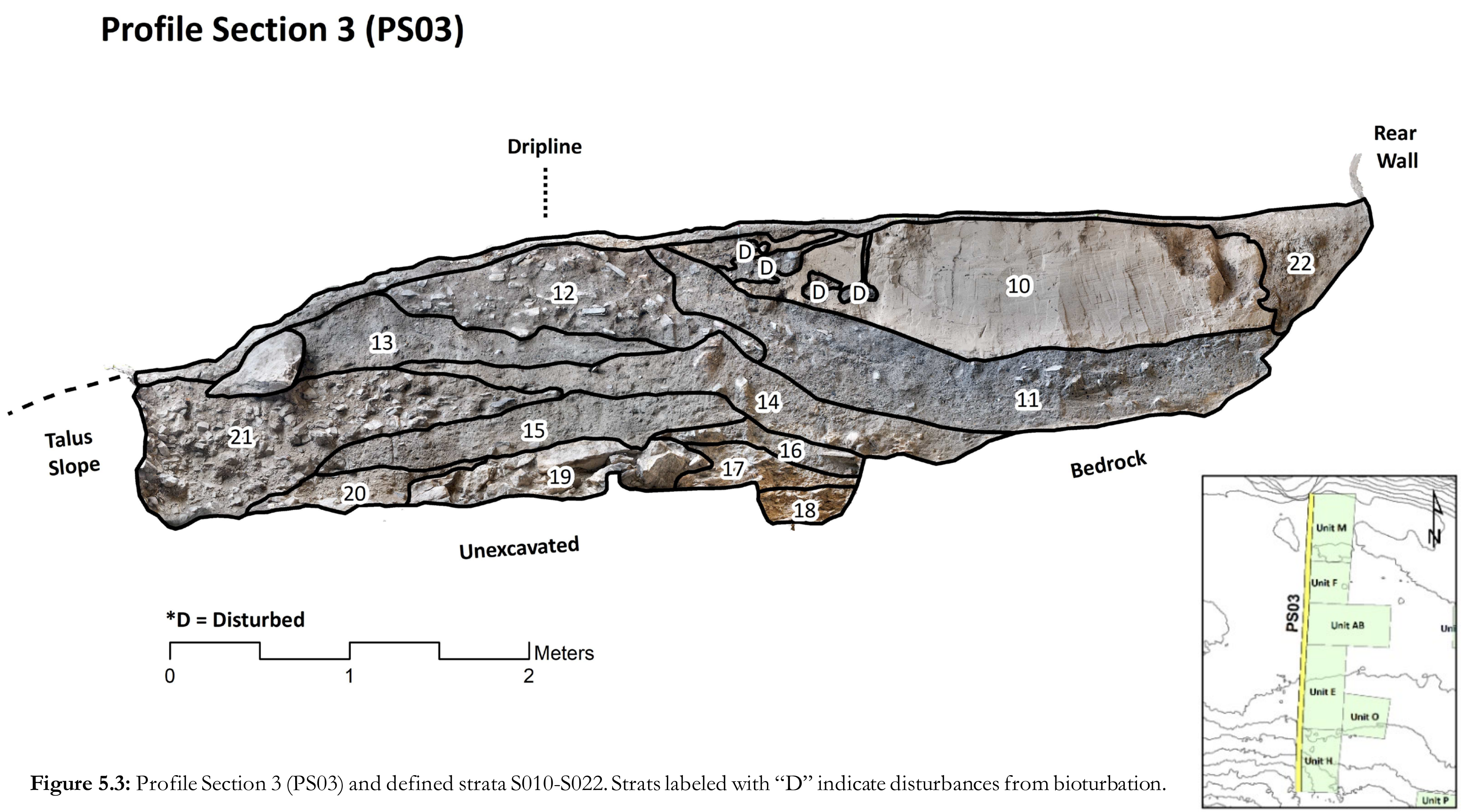


Figure 5.3: Profile Section 3 (PS03) and defined strata S010-S022. Strats labeled with "D" indicate disturbances from bioturbation.

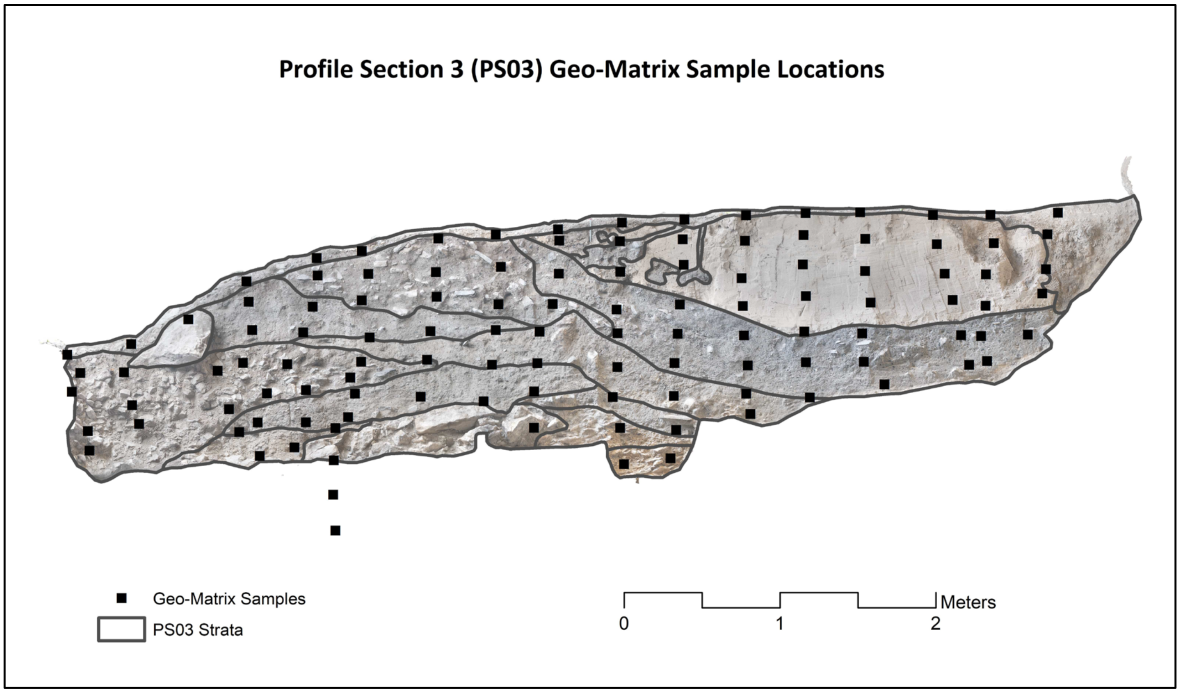


Figure 5.4.: The plotted locations of the 123 Geo-Matrix samples collected from the face of PS03.

Strat 13 (S013) is a heterogenous silty clay loam with an abrupt and smooth lower boundary; no cultural material was observed in this stratum. Strats 18 (S018) and 19 (S019) are culturally sterile, horizontally bedded layers of angular, tabular limestone spalls at the base of PS03. Strats 20 (S020) and 21 (S021) comprise a horizontally bedded, midden deposit located along the dripline of the site; these strats are the upper part of Skiles Shelter's talus slope. S021 is dense with FCR

5.1-4 Profile Section 4 (PS04)

Profile Section 4 (PS04) is approximately 2.5 m in length and was exposed after excavating units M and F at Skiles Shelter (Figure 5.5). A looter's pit (S022) was dug to bedrock toward the north end of the profile. The flood deposit (S010) in PS04 is thick, slopes up toward the drip line, and directly overlays a midden deposit that gets thicker from

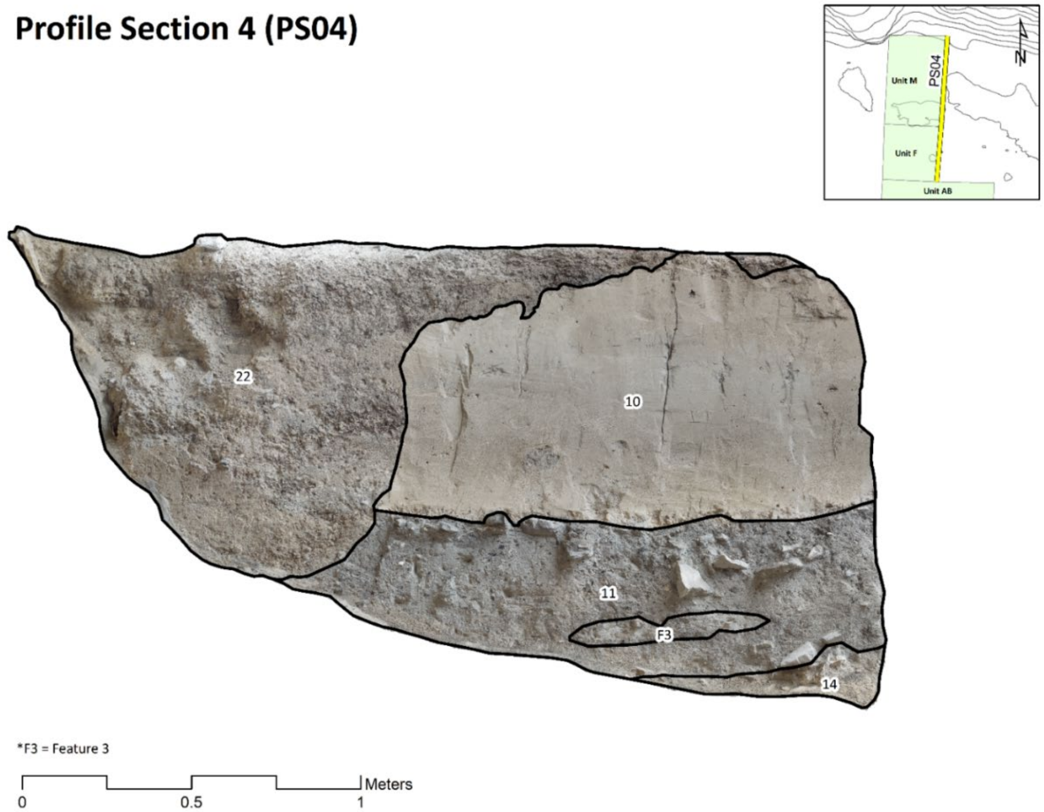


Figure 5.5: Profile Section 4 (PS04) and defined strata.

north to south. Feature 3 occurs within S011; one micromorph sample was taken from the ash and charcoal layers associated with Feature 3.

No strata were formally defined in this profile due to the similarity of PS03 and PS04s strats. Four strata and one feature from the opposite wall (PS03) were extrapolated and defined in PS04: S022 (looters pit/top disturbed layer), S010, S011, Feature 3, and S014. Descriptions of the strats in this profile can be found under the PS02 and PS03 subsections of this chapter.

5.2 Harris Matrix

Stratigraphic relationships in Skiles Shelter are organized and presented in a Harris Matrix. Used to display the stratification of an archaeological site in diagrammatic form, the Harris Matrix consists of a grid of rectangular boxes in which only three possible relationships between units of stratification are expressed: (1) strata have no connection, (2) strata are in superposition, and (3) strata are correlated (Harris 1989:36; Goldberg and Macphail 2009:41). The four laws of stratification determine the stratigraphic sequence in a Harris Matrix, and sequences should be non-artifactual; that is, they should only reference the defined strata and features. Goldberg and McPhail (2009:41) issue caution when using the Harris Matrix and describe how producing realistic and understandable diagrams is difficult at sites with complex stratigraphy. Nielsen (2017:162) adds that the Harris Matrix is not an accurate representation of stratigraphic deposits. Rather, it an interpretive schematic best used as a visualization tool for recognizing correlations between strata.

A combined Harris Matrix with strats from all of Skiles Shelter's Profile Sections (Figure 5.6) was constructed using the Harris Matrix Composer software (https://www.harrismatrixcomposer.com). For the matrix diagram, the symbol "T" represents the topmost layer of a profile. "T" overlies any deposit in the matrix that touches the surface of the site. Subsequent deposits underneath "T" are denoted by either a blue or red box featuring the strat or feature name. Blue boxes are deposits that are superimposed; these deposits can have correlations with other deposits. Red boxes are features that correlate to a stratum. Single direction black arrow lines leading from a box show the direction of superimposition. Grey dotted lines symbolize if two or more strats are

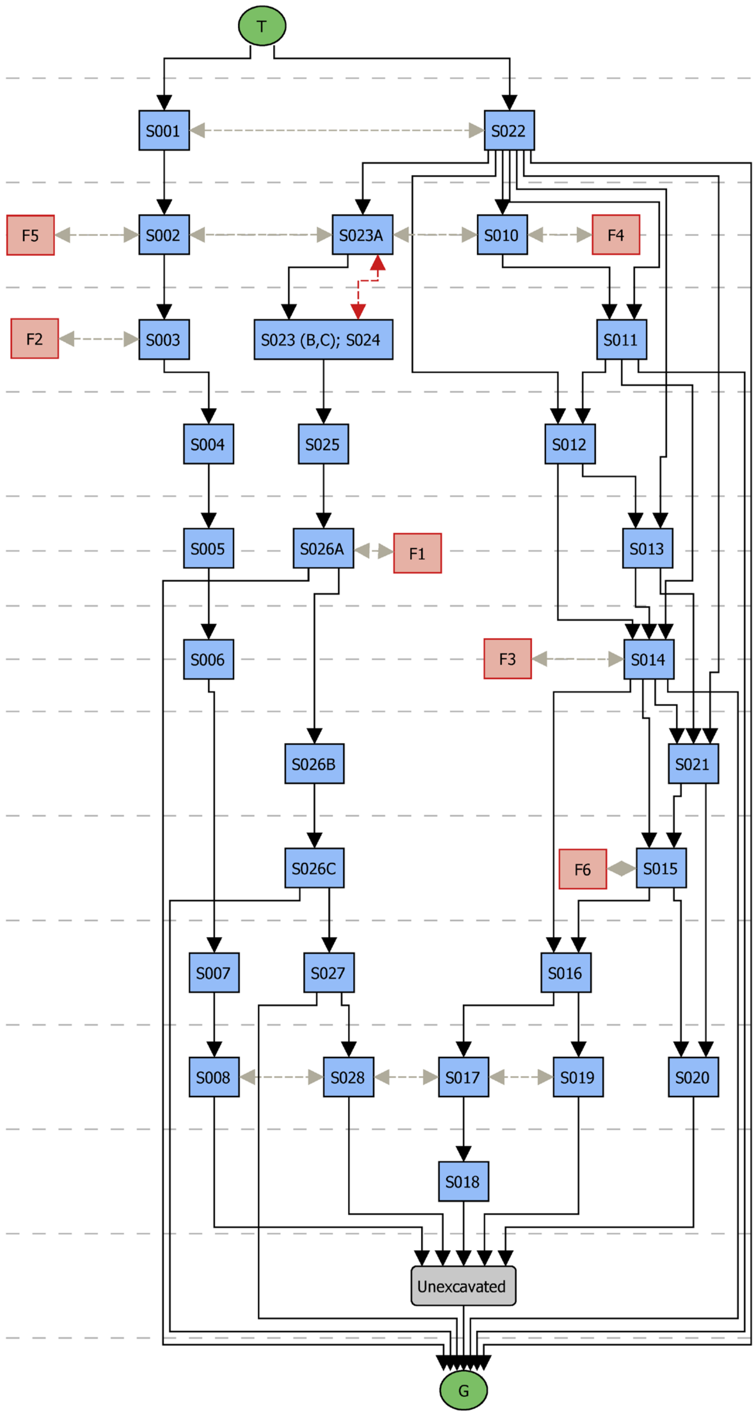


Figure 5.6: Harris Matrix showing the stratigraphic relationships of Skiles Shelter's defined strata.

correlated. If a strat is superimposed but correlated with another strat, a multidirectional red dotted line with arrows will the connect the boxes. At the bottom of each matrix diagram, the "Unexcavated" symbol is displayed if deposits touch areas that were not excavated. The symbol "G" represents the underlying geology (bedrock).

5.3 Re-defining Skiles Shelter's Deposits

Skiles Shelter strata were redefined into depositional units for easier cross-site comparison. My recategorization of Skiles' strata is strictly based on content, description, and stratigraphic position. Conversely, examining and recategorizing individual strata by their chemical characteristics is a more fine-tuned and high-resolution approach for analyses of rockshelter deposits (Nielsen 2017). Seven depositional unit types are used: (1) Surface Deposits, (2) Flood Deposits, (3) Earth Oven Construction Deposits 1-3, (4) Earth Oven Discard Deposits 1 and 2, (5) Upper Limestone Roofspall Deposits and (6) Lower Limestone Roof Spall Deposits. Descriptions of each type can be found in Table 5.1.

S001 and S022 make up the *Surface Deposits* at the site. The deposits in these strata were shallow, mixed, trampled from humans and livestock, and dug into from looting. Below the surface deposits, *Flood Deposits* were encountered in many of the excavation units. The flood deposits – which have been dated to the 1340s in Units AB– were defined as strats S002, S010, and S023A. The flood deposit was thickest in Units AB (S002), Units F, M, N (S010), and O (S010). The flood deposit was partially recognized in Unit D (S023A) as well. Based on the location of Feature 4 –which was dug into the upper flood alluvium and dates to the 14th century– hot-rock cooking and surface hearth activities continued in Skiles Shelter after the flood. Radiocarbon dates from Feature 5 reveal that the flood alluvium (undefined) in the upper part of Unit O may be a separate flood event.

Underneath the flood deposit(s) are strata that correlate with Earth Oven Construction Deposits 1, 2 and 3. These deposits represent the lower, centralized, and uppermost cooking area in Skiles Shelter. Radiocarbon dating and artifacts from these areas imply that the deposits are mixed and were formed and transformed during the Early Archaic to Late Prehistoric periods. Many these deposits slope down toward the back of the rockshelter in PS02 and PS03 and resemble a centralized cooking area of a burned rock midden. Before being capped by flood alluvium, Earth Oven Construction Deposits 2 and 3 (EOC 2 and 3) likely formed by repeated events over hundreds of years. It is likely that some of the deposits in EOC 1, 2, and 3 could have been partially or wholly scoured out during earlier flood events.

Earth Oven Discard Deposits 1 and 2 (EOD 1 and 2) are assumed to represent earth oven and hot-rock cooking cleanout events from EOC 1 and 2. The deposits in EOD 1 and 2 are characteristic of a burned rock midden with tightly clustered, smaller, angular, and heavily fractured FCR. Generally, these deposits were defined as earth oven discard based on the denser concentration of FCR in relation to other strata.

Directly below the earth oven construction and discard zones, are limestone spall deposits. Upper-Limestone Spall Deposits are generally sterile with a few traces of cultural remains. Testing of the Lower-Limestone Spall Deposits revealed that these layers are sterile.

5.4 Features

ASWT defines features as any distinctive pattern of related artifacts and ecofacts thought to represent a behavioral event. Features stood out in contrast to surrounding layers and were typically made up of several distinct depositional components. The Rock Sort was conducted on each feature (see Chapter 4.4) if FCR was present. In total, six features were identified in 2014. Aside from Feature 4, which was a small basin-shaped organic-rich deposit in the north profile of Unit F, all excavated features from Skiles Shelter are considered to represent remnants of earth oven heating elements. For this discussion, the heating element terminology defined by Black and Thoms (2014) are used to describe Skiles Shelter's features.

Table 5.1: Depositional unit types, definitions, and strat reclassifications. Strat type definitions from Nielsen (2017:147). Depositional units in the table are described in order from earliest to latest in age.

Depositional Unit Types	Description	Skiles Shelter Strats	Associated Features
Surface Deposits	Deposits disturbed from historic activities and looting	S001, S022	
Flood Deposits	Deposits consisting of silty, Rio Grande alluvium	S002, S010 (A-D), S023A	F4, F5
Earth Oven Construction Deposit 3	Upper deposits containing cultural materials such as lithics, charcoal, and low densities of FCR	S003, S021, S023(B,C), S024, S011	F2
Earth Oven Discard Deposit 3	Upper deposits with moderate to higher densities of FCR and charcoal in relation to other artifact classes	S012, S025, S004	
Earth Oven Construction Deposit 2	Central deposits mixed with charcoal, low densities of FCR, and other cultural materials	S026A, S013, S006, S014	F1, F3
Earth Oven Discard Deposit 1	Lower deposits with high to moderate density of FCR and charcoal in relation to other artifact classes	S021, S026B	
Earth Oven Construction Deposit 1	Lower deposits mixed with charcoal, low densities of FCR, and other cultural materials	S005, S015, S026C, S016	F6
Upper Limestone Roofspall Deposits	Deposits directly above limestone roofspall that are either sterile or contains sparse cultural material	S007, S027	
Lower Limestone Spall Deposit	Naturally formed, sterile, éboulis deposits	S008, S028, S017, S018, S019, S020	

5.4-1 Heating Elements

Traditionally termed "hearths" by most archaeologists (Black 2013b), heating elements are found within the centers and outsides of BRMs and represent the remains of an earth oven/hot-rock cooking bed where activities associated with intense heat and fire were taking place (Black and Thoms 2014:211). These features can range from .5 – 3 plus meters in diameter and are commonly found to be a shallow or steep-sided pit/basin with concave upper and lower surfaces. In conditions where preservation is favorable, heating elements retain evidence of "charred plant remains, ash, carbon-stained and thermally oxidized sediment, and FCR" (2014:215). FCR in heating elements will be larger (11-15 cm or greater), less fragmented, and fractured in place. Additionally, the amount and size of FCR in a heating element can reflect how much the feature was used.

5.4-2 Remnant Heating Elements

Remnant heating elements are the remains of once-intact heating elements. These features become disarticulated from rock borrowing or other cultural or natural formation processes (Black and Thoms 2014:216). Remnant heating elements have visible signatures similar to intact heating elements; however, discerning the original form of these feature remnants is often difficult– especially at sites that lack organic preservation and when only partially exposed during excavation . Five remnant heating elements (Features 1, 2, 3, 5 and 6) were identified in Skiles Shelter.

5.4-3 Feature 1

Type: Remnant Heating Element
Age: Late Archaic?
Temporal Markers: Shumla projectile point (FN20048.2)
Size Within Unit (cm): 102 length by 73 width by 20 depth

Feature 1 (F1) was identified in Layers 3 and 4 of Unit G. This feature was a loose concentration of large burned rocks and numerous stream-rolled cobbles that did not form a tight cluster or uniform surface (Figure 5.7). Two layers of FCR were observed within the feature; in these layers, the 11-15 and 15 cm or greater FCR weight classes were the most prominent (Figure 5.8). F1 may have been present in Layer 4 of Unit D but was not recognized as a feature during the excavation of the layer.

Seven river cobbles in the northern part of the feature were point plotted with the total data station (TDS) and collected. These cobbles include one mano-like formed handstone (FN20035.6; see Chapter 9: Figure 9.5), one possible handstone (FN20044.15), two manuports (FN20052.4 and FN20037), two cores (FN20036.14, FN20051.3), and one possible core tool (FN20045.16; see Chapter 8: Figure 8.13). One Late Archaic Shumla projectile point was recovered from Layer 4 in Unit G (see Chapter 8: Table 8.3). Refer to Chapters 8 and 9 for descriptions and discussions of tool types. No radiocarbon assays or matrix samples were collected from this feature.

The faunal remains from Feature 1 (N=22) are robust and include avian, deer, fish, rabbit, rodent, turtle, and indeterminate large and medium mammal species (Table 5.2). When combined, the rabbit species *Leporidae, Lepus californicus, and Sylvilagus sp*. constitute the largest MNI and NISP numbers (N=7). Of the bone from Feature 1, 63% (n=14) show signs of cultural modification. Discard burning was recognized on 32% (n=7) of the bone; two of the seven specimens are calcined from intense heat. Further, grooving, shaping, or cutmarks were observed on 50% (n=11) of the bone. One bone pressure tool fragment (FN20048.1) and bone manufacturing debris (FN20048.5, FN20048.6, FN20048.20) was identified among the twenty-two faunal specimens from Feature 1. Lithic debitage and one micromorph sample were collected from F1 (Appendix B).

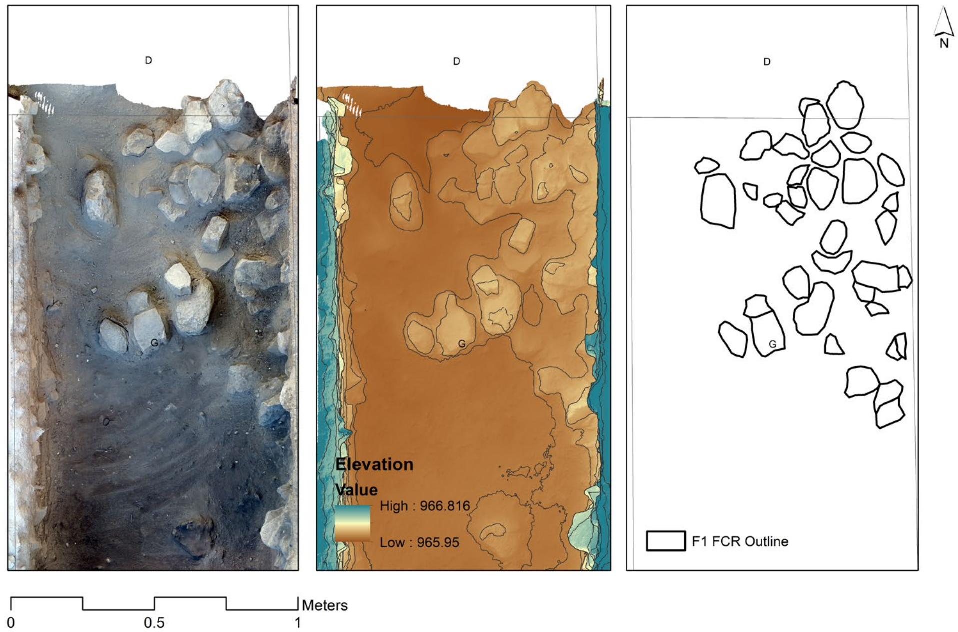
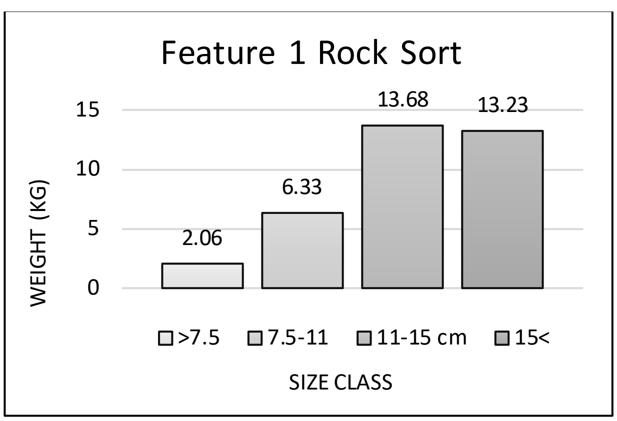


Figure 5.7: (left) Feature 1 (F1) orthographic photo, (middle) F1 contour and elevation map, (right) F1 outline; due to problems with 3D modeling, outline only shows Layer 1 of F1.



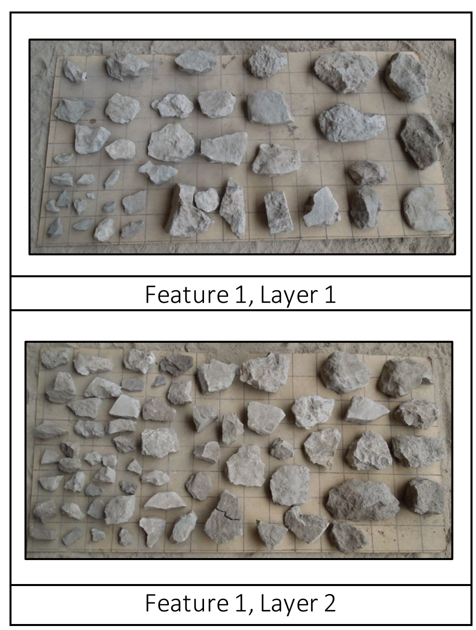


Figure 5.8: (left) F1 combined Layers 1 and 2 Rock Sort weights by size class; (right) rock sort photographs.

Table 5.2: Feature 1 faunal remains separated by Minimum Number of Individuals (MNI) and Number of Identified Specimens (NISP).

	Avian	Deer	Fish		Rabbit			Rodent	Turtle	Indeterminate		Total
Taxon	*Aves*	*Artiodactyla*	*Ictalurus cf. punctatus*	*Osteichthyes*	*Leporidae*	*Lepus californicus*	*Sylvilagus sp.*	*Rodentia*	*Apalone spinifera*	Large mammal	Medium mammal	--
MNI:	2	3	1	1	1	1	7	1	1	3	1	22
Class Total:	2	3	2		9			1	1	4		--
NISP:	2	3	1	1	2	1	7	1	1	3	2	24
Class Total:	2	3	2		10			1	1	5		--

5.4-4 Feature 2

Type: Remnant Heating Element
Age: Late Archaic?
Temporal Markers: Figueroa projectile point (FN20027.3)
Size Within Unit (cm): 100 length by 100 width by 30 depth

Feature 2 (F2) was identified in Layer 4 of Unit E. This feature was an exposure of FCR pressed into a mixture of alluvium and midden soil (Figure 5.9). The rocks in F2 were tightly packed and sloped down toward the back wall of Skiles Shelter; some of the rocks had vertical alignments. The 7.5-11 cm and 11-15 cm FCR size classes had the highest FCR weight (Figure 5.10). The sediment under the bottom layer of FCR in F2 was disturbed from bioturbation. One mano-like formed handstone (FN20028.6; see Chapter 9: Figure 9.5) was recovered from Layer 4 of Unit E. One Figueroa projectile point was recovered from the same unit layer (L4) in which F2 was excavated. See Appendix B for a complete list of samples and artifacts collected from F2.

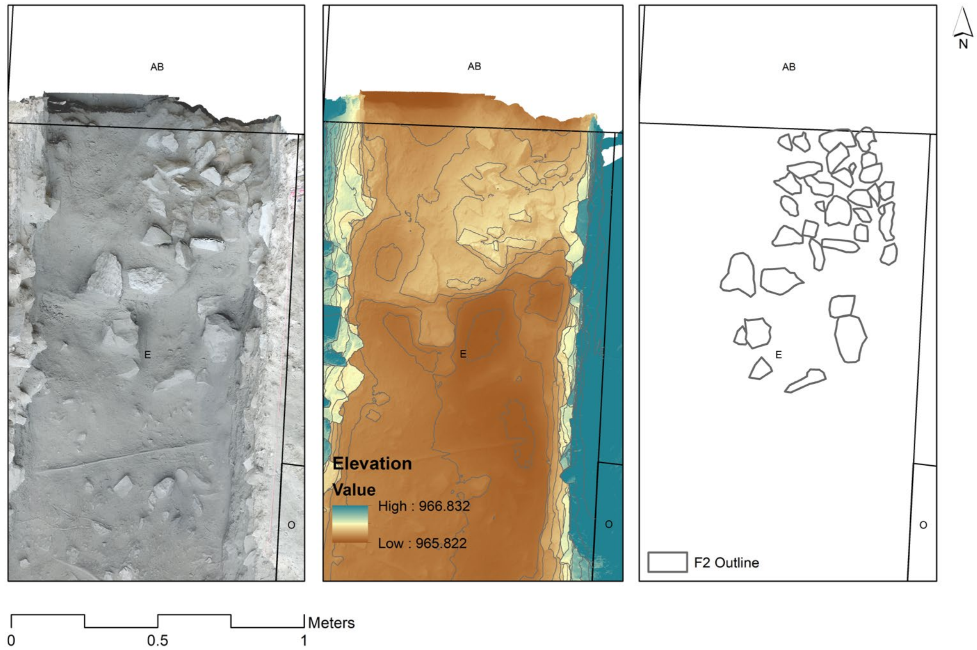


Figure 5.9: (left) F2 orthographic photo, (middle) F2 contour and elevation map, (right) F2 outline.

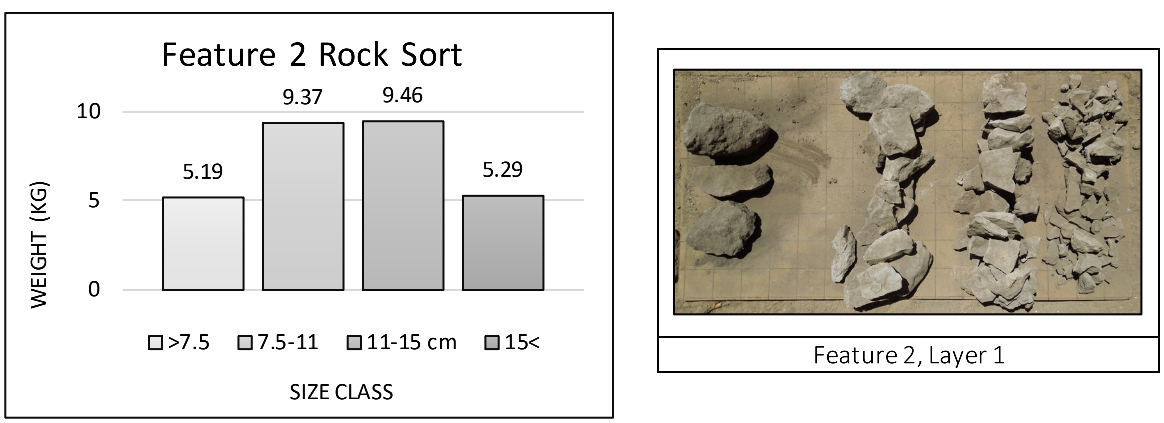


Figure 5.10: (left) F2 Rock Sort weights by size class, (right) rock sort photograph.

The faunal remains from Feature 2 are sparse (N=5) and include deer, rabbit and indeterminate medium mammal species (Table 5.3). Cultural modification was observed on 80% (N=4) of the faunal specimens from Feature 2. The *Lepus californicus* specimen is a scapula that was calcined from intense heat and has a discard burning pattern. Three conjoining pieces of an *Odocolieus sp.* right frontal showed signs of skinning cutmarks and burning patterns that are indicative of roasting.

Table 5.3: Feature 2 faunal remains separated by Minimum Number of Individuals (MNI) and Number of Identified Specimens (NISP).

	Deer	Rabbit	Indeterminate	Total
Taxon	*Odocoileus sp.*	*Lepus californicus*	Medium mammal	--
MNI:	1	1	1	3
NISP:	3	1	1	5

5.4-5 Feature 3

Type: Remnant Heating Element
Age: Late Prehistoric
Radiocarbon Dates: 969-751 median cal. BP
Size Within Unit (cm): 60 length by 75 width by 30 depth

Feature 3 (F3) was a remnant heating element identified in Layer 5 of Unit F (Figure 5.11). This feature had a semi-circular arrangement of four, vertically slanted and tightly packed FCR layers – three of which seemed to form a small basin with abundant ash and charcoal. The fourth and bottom layer of FCR nearly rested on bedrock. The 11-15 cm and 15 or greater FCR size classes were the most prominent in this feature (Figure 5.12).

Feature 3 appeared to be relatively intact near its southern portion. Bioturbation likely mixed some of the matrix within its northern portion. In addition to lithic debitage and botanical and faunal remains, one micromorph sample, three 14c samples, six spot samples, five residue rocks, and nine matrix sample bags (10.6 L) were collected from F3 (Appendix B). One bone tool was (FN 20145.1) collected from Feature 3.

Three AMS radiocarbon assays (carbonized *Dasylirion texanum, Acacia sp, Agavaceae sp.)* from F3 all returned Late Prehistoric dates (969-751 median Cal. BP; Figure 5.13; Table 5.11). The dates suggest that F3 was likely used on more than one occasion. Two of the assays (D-AMS #10264 and D-AMS #31631) differ by roughly 230 years and were collected from underneath F3. The third date (D-AMS #31630) was collected from underneath the FCR in F3 that crushed the bone tool (FN 20145.1). This date and D-AMS #31631 are possibly associated with the same cooking event; both assays fall within one standard deviation of each other.

A one-liter matrix sample (FN20148.4) from F3 was analyzed by Dr. Kevin Hanselka for macrobotanical contents. This sample was collected beneath the flat rocks that were crushing the bone tool (FN20145.1) Six different plant species were identified (Table 5.4). *Agave lechuguilla* (lechuguilla) leaf fragments and *Celtis sp.* (hackberry) seeds are the most common types in the sample..

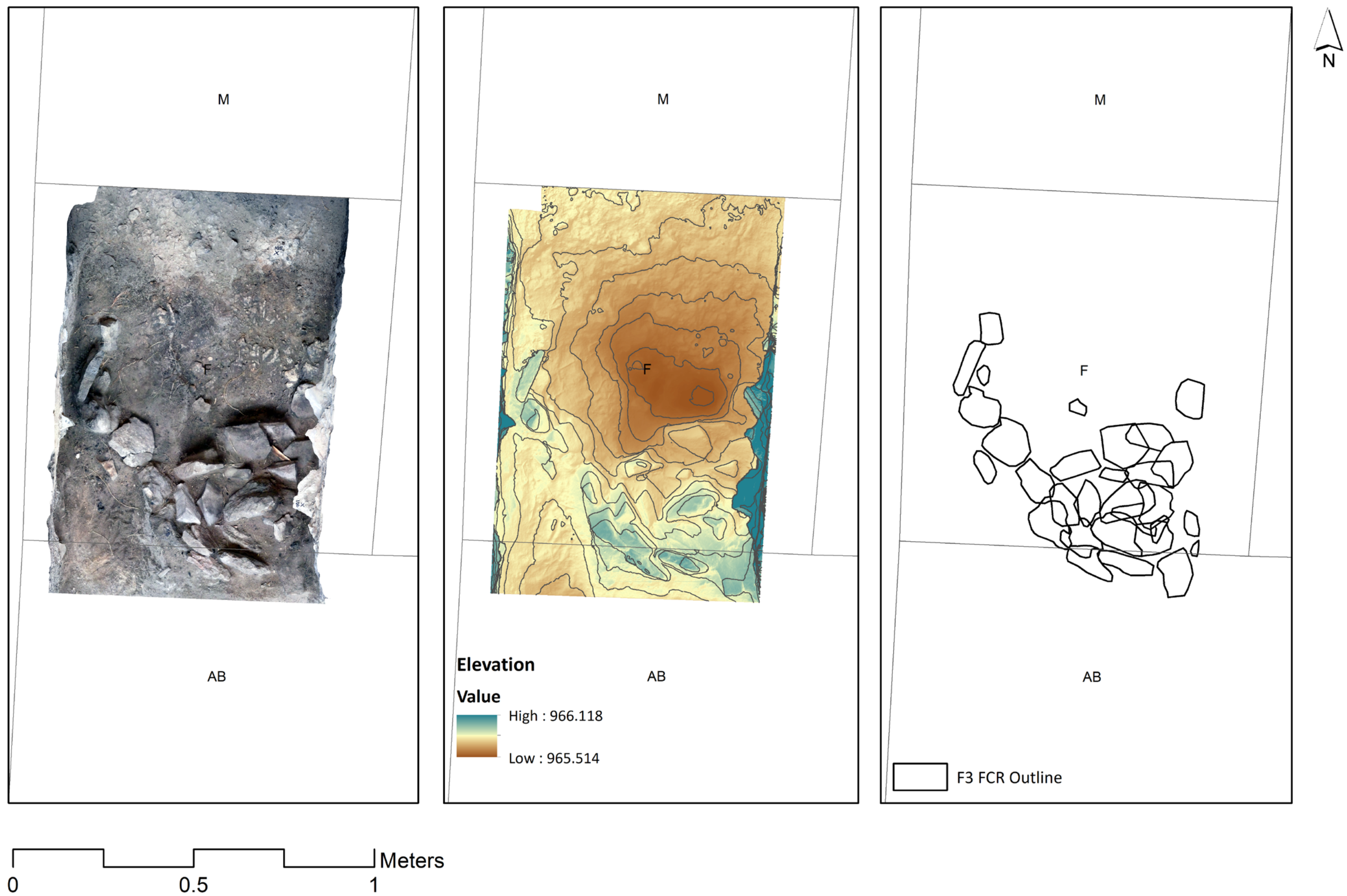
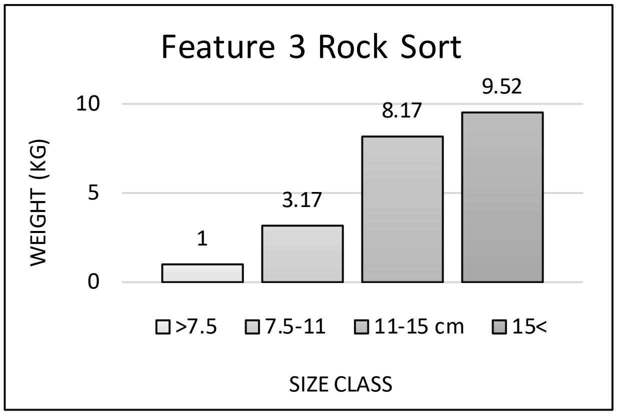


Figure 5.11: (left) F3 orthographic photo, (middle) F3 contour and elevation map, (right) F3 outline.



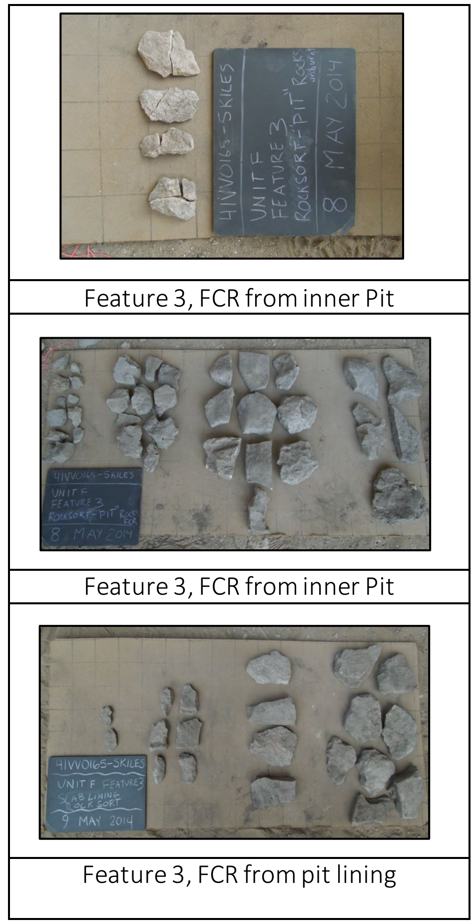


Figure 5.12: (left) F3 Rock Sort weights by size class, (right) rock sort photographs.

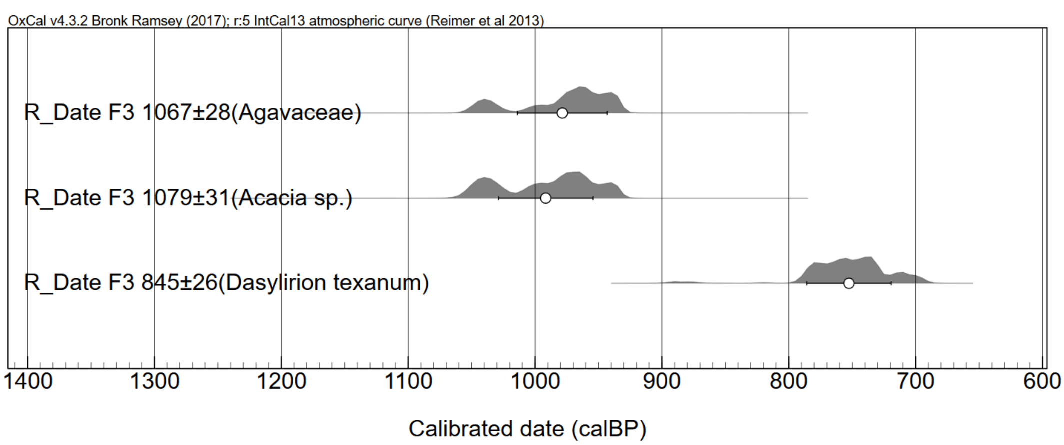


Figure 5.13: Multi-plot showing the calibrated (IntCal 13) ages of the three AMS radiocarbon assays from F3. Y-axis provides the carbonized plant species name and uncalibrated RCYBP date. X-axis provides the calibrated ages. White dots on histogram indicate the mean and black line extending from dots indicate 1 standard deviation.

Table 5.4: Feature 3 macrobotanical results from 1-liter matrix sample (FN20148.4). See Appendix B for complete list of items identified in this sample.

Plant	Plant Part	Count	% Carbonized
Agave lechuguilla	leaf fragments	19	100
Juglans microcarpa	nutshell	1	100
Quercus sp.?	acorn nutshell	1	0
Chenopodium	seeds	1	0
Celtis sp	seeds	11	0
Portulaca sp.	seeds	1	100

The faunal remains from Feature 3 (N=12) include avian, deer, and indeterminate large and medium mammal species (Table 5.5). Cultural modification was observed on 75% (N=9) of the faunal specimens from Feature 3. Roasting burning patterns are on 16 % (n=2) of the bones, while discard burning patterns constitute another 16% (n=2). Cutmarks were observed on 41% (n=5) of the Feature 3 faunal remains. One spatulate bone tool (FN 20060.1) was identified among the twelve faunal specimens from Feature 3.

Table 5.5: Feature 3 faunal remains separated by Minimum Number of Individuals (MNI) and Number of Identified Specimens (NISP).

	Class					
	Avian	Deer		Indeterminate		Total
Species:	*cf. Aves*	*Artiodactyla*	*Odocoileus spp.*	Large mammal	Medium mammal	--
Count:	3	3	9	1	2	12
MNI:	1	1	2	1	2	7
Class Total:	1	3		3		--
NISP:	3	1	2	1	2	9
Class Total:	3	3		3		--

5.4-6 Feature 5

Type: Remnant Heating Element
Age: Late Prehistoric
Radiocarbon Dates: 710-660 median cal. BP
Temporal Markers: Clifton (FN20080.4), Edwards (FN20080.1), and Perdiz (FN20080.2) projectile points
Size Within Unit (cm): 45.5 length by 24.5 width by 15 depth

Feature 5 (F5) was a cluster of burned rock in Layers 2 and 3 of Unit O (Figures 5.14 -5.15). One of the rocks in F5 was cracked in place. This feature had two layers of FCR; the first layer was vertically oriented and tightly packed; the second layer was pressed into an alluvium separate from the AD 1340 alluvium in Units AB, F, and M. Areas of thermal alteration (oxidation) were observed in the alluvium directly underneath the layers FCR The matrix between and below the bottom layer of FCR in F5 was disturbed and heavily impacted by bioturbation. Below the alluvium in F5, another layer of rock was encountered and later designated as Feature 6**.**

Lithic debitage, botanical and faunal remains, two micromorph samples, three 14c samples, one spot sample, four residue rocks, and eleven matrix samples (10.4 L) were collected from F5 (Appendix B).Returned AMS radiocarbon dates from two pieces of carbonized wood and a carbonized agave leaf fragment from F5 dated to the Late Prehistoric period (710-660 median cal. BP; Figure 5.16; Table 5.11). D-AMS assays #31628 (*Agavaceae*) and #11120 (hardwood) were collected from an ash lens above the oxidized layer in F5. D-AMS #31627 (*Prosopis sp.*) was collected from beneath an intact feature rock. Both of the carbonized hardwood assays (D-AMS #11120, D-AMS #31627) strongly overlap at one standard deviation. Based on the small size of F5 and its radiocarbon results, I reason that this feature was a single-use cooking event. The date from the carbonized agave leaf fragment likely represents the true age of the feature.

Interestingly, F5, which is assumed to have been dug into the same alluvium as Feature 4 (Section 5.4-1), yielded earlier ages from the radiocarbon assays (AD 1238-1308) than Feature 4. The age of F5 implies that, (1) the alluvium in F5 was transported into the site by humans, or (2) the alluvium is a separate flood event, unrelated to the alluvium below Feature 4. Late Prehistoric Clifton (n=1; FN20080.4), Edwards (n=1; FN20080.1), and Perdiz (n=2; FN20080.2,3) projectile points, as well as one untyped arrow point (FN20078.10), were collected from Layers 2 and 3 of Unit O.

Seven different plant species were identified in a one-liter matrix sample (FN20094.9) from F5 (Table 5.6). *Opuntia sp.* (prickly pear) seeds, *Setaria sp.* (bristlegrass) seeds, and *Celtis sp.* (hackberry) seeds are the most common types present in the sample.

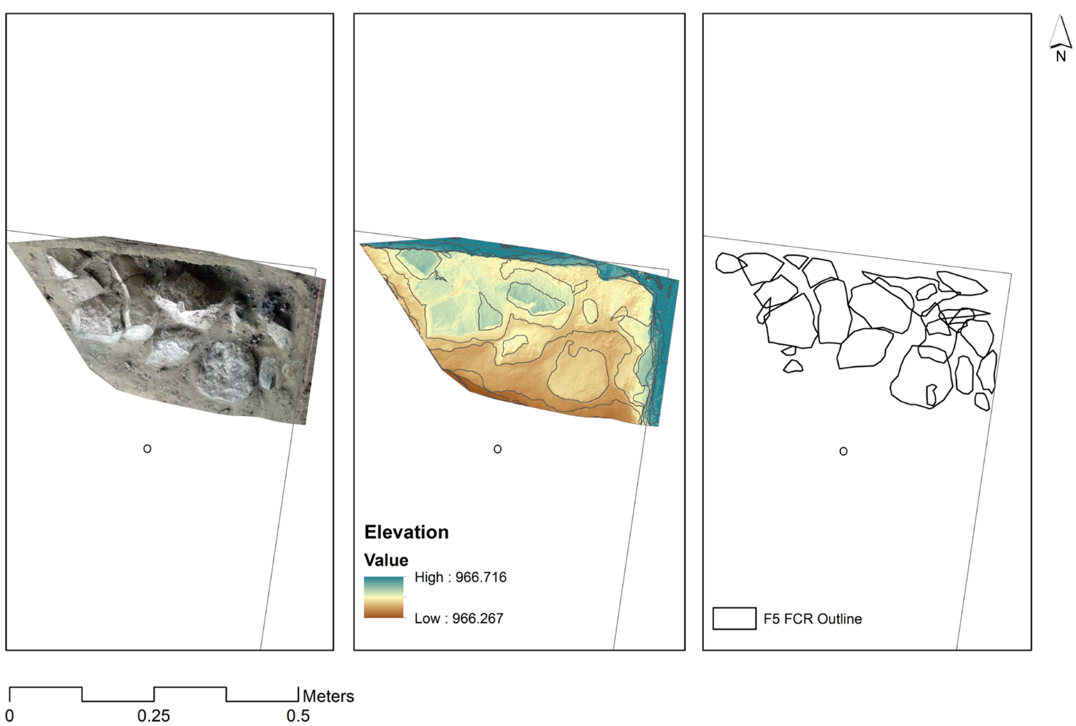
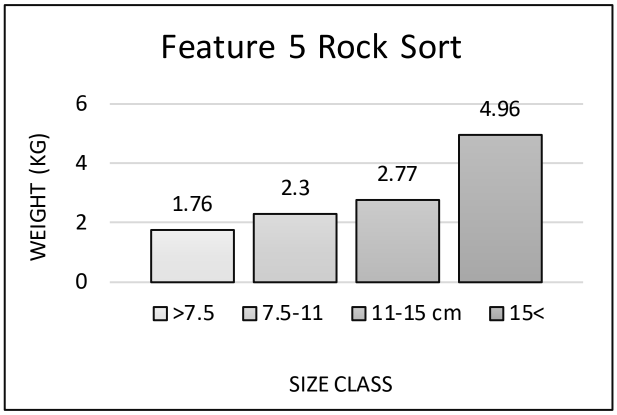


Figure 5.14: (left) F5 orthographic photo, (middle) F5 contour and elevation map, (right) F5 outline (layers 1 and 2).



Feature 5, Layers 1 and 2

Figure 5.15: (left) F5 Rock Sort weights by size class, (right) rock sort photograph.

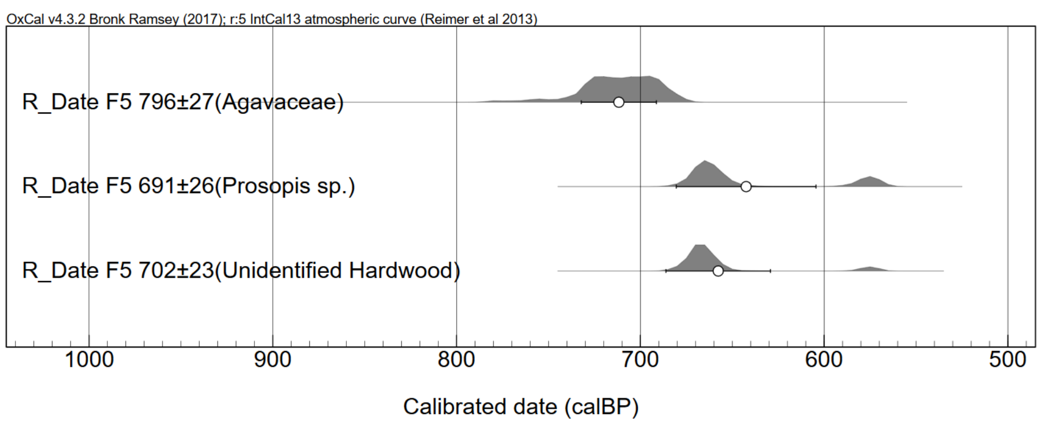


Figure 5.16: Multi-plot showing the calibrated (IntCal 13) ages of the three AMS radiocarbon assays from F5. Y-axis provides the carbonized plant species name and uncalibrated RCYBP date. X-axis provides the calibrated ages. White dots on histogram indicate the mean and black line extending from dots indicate 1 standard deviation.

Table 5.6: Macrobotanical results from 1-liter matrix sample (FN20094.9). Sample was collected from oxidized layer beneath the FCR in F5.

Plant	Plant Part	Count	% Carbonized
Agave lechuguilla	leaf fragments	2	100
Chenopodium sp.	seeds	2	0
Amaranthus sp.	seeds	3	0
Opuntia sp.	seeds	44	0
Setaria sp. (Poaceae)	seeds	118	0
Yucca sp.	seeds	4	100
Celtis sp	seeds	16	0

The faunal remains from Feature 5 are sparse (N=3) and include deer and rabbit species (Table 5.7). Cultural modification was observed on one of the three faunal specimens from Feature 5; this specimen was a spatulate bone tool (FN2088.5).

Table 5.7: Feature 5 faunal remains separated by Minimum Number of Individuals (MNI) and Number of Identified Specimens (NISP).

	Deer	Rabbit	Total
Taxon	*Artiodactyla*	*Lepus californicus*	
MNI:	1	2	3
NISP:	1	2	3

5.4-7 Feature 6

Type: Remnant Heating Element
Age: Early to Middle Archaic
Radiocarbon Dates: 7387-3729 median cal. BP
Size Within Unit (cm): 100 length by 100 width by 30 depth

Feature 6 (F6) was identified in Layer 7 of Unit O. Rather than one obvious arrangement of rocks, F6 contained remnants of roughly 3-6 different heating elements (Figure 5.17). Feature 6 was first observed in the east wall of Unit E. Unit O was then excavated to further expose this feature. Much of the FCR in F6 were larger than 11 cm and cracked in place. The 11-15 cm FCR size class were the most prominent in F5 (Figure 5.18). A baked alluvium-like deposit was observed in the west portion of the feature. The FCR in the eastern portion of F6 appeared to be arranged in a semi-circular shape. Roughly 10-15 cm of sediment containing fine pea-sized gravels and possible remnants of a lower alluvial deposit was underneath the bottom layer of FCR in F6. Below this deposit was another concentration of larger burned roof spalls.

Lithic debitage, two manuports, one biface, and one uniface, as well as two spot samples and four matrix samples (10.76 L) were collected from F6 (Appendix B). One possible handstone pebble (FN20119.6) was found in association with the top layer of FCR in F6; no usewear was visible on the specimen. Three plant species were identified in a one-liter matrix sample (FN20129.3) from F6 (Table 5.8). *Agave lechuguilla* (lechuguilla) leaf fragments and *Celtis sp*. (hackberry) seeds are the most common types in the sample.

AMS radiocarbon assays from a possible sotol leaf base (*Dasylirion texanum)* and an *Agavaceae sp*. leaf base date F6 to the Early and Middle Archaic periods (7387-3729 median cal. BP; Figure 5.19; Table 5.11).The oldest assay (D-AMS #10262) was collected underneath the largest flat rock in the western side of Unit O. The Middle Archaic assay (D-AMS #31629) was collected beneath the large, flat rocks in the western side of F6. Both median calibrated dates differ by roughly 3,600 years. Based on this age gap and the large amount of FCR in the 11-15 size range, I argue that this area was used repeatedly for cooking purposes – younger events intruding into and disturbing earlier events.

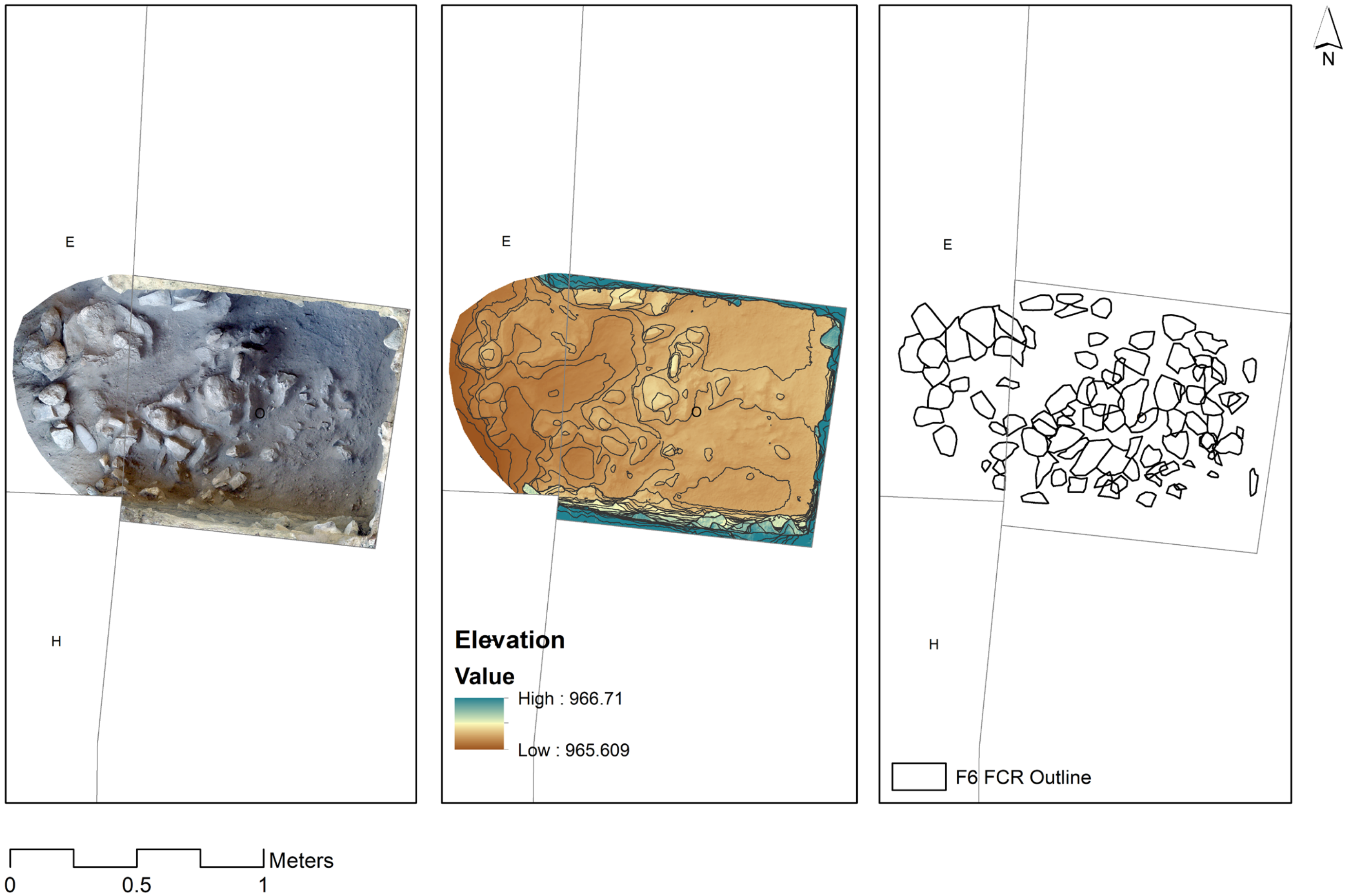
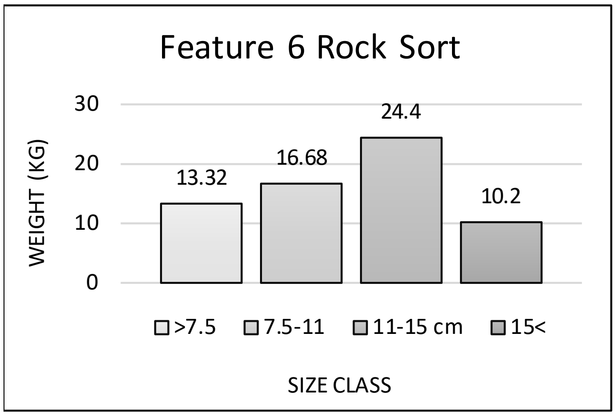


Figure 5.17: (left) F6 orthographic photo, (middle) F6 contour and elevation map, (right) F6 outline(Layers 1-6).



Feature 6, Layers 1-6 (L7B-G) rock sort

Figure 5.18: (left) F6 rock sort weights by size class, (right) rock sort photograph.

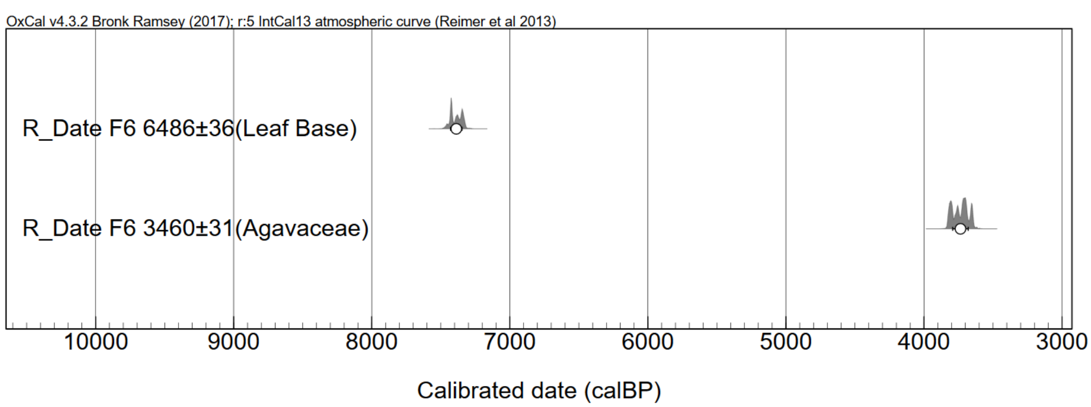


Figure 5.19: Multi-plot showing the calibrated (IntCal 13) ages of the two AMS radiocarbon assays from F6. Y-axis provides the carbonized plant species name and uncalibrated RCYBP date. X-axis provides the calibrated ages. White dots on histogram indicate the mean and black line extending from dots indicate 1 standard deviation.

Table 5.8: Macrobotanical remains from 1-liter matrix sample (FN20129.3). The sample was collected from beneath the large, flat rocks in the western portion of F6.

Plant	Plant Part	Count	% Carbonized
Agave lechuguilla	leaf fragments	6	100
Setaria sp. (Poaceae)	seeds	1	0
Celtis sp.	seeds	4	0

The faunal remains from Feature 1 (N=22) include rabbit and indeterminate large, medium, and small mammal species (Table 5.9). Cultural modification was identified on 35% (n=5) of the specimens. Discard burning was recognized on 21% (n=3) of the bone; one of the three specimens are calcined from intense heat. Cutmarks were observed on 21% (n=3) of the bone.

Table 5.9: Feature 6 faunal remains separated by Minimum Number of Individuals (MNI) and Number of Identified Specimens (NISP).

	Indeterminate			**Rabbit**	**Total**
Taxon	Large mammal	Medium mammal	Small mammal	*Sylvilagus spp.*	--
MNI:	3	2	1	5	11
Class Total:	6			5	--
NISP:	3	4	2	5	14
Class Total:	9			5	--

5.4-8 Hearths

Hearths are defined as "relatively small surface features used for short term dry-heat cooking, warmth, and light" (Black and Thoms 2014:204). Hearths often lack the layered arrangements of FCR and organic material that are found in most heating elements, and at sites where preservation conditions are poor, these features can be hard to recognize or even invisible once degraded. One hearth-like feature (Feature 4) was identified in Skiles Shelter.

5.4-9 Feature 4

Type: Hearth
Age: Late Prehistoric
Radiocarbon Dates: 969 median cal. BP
Size Within Unit (cm): Length (not determined) by 60 cm length by 5 cm depth

Feature 4 was a small, shallow, basin-shaped, organic-rich layer with burned fiber in Layer 1 of Unit M and Unit F (Figure 5.20). This feature did not extend more than a few cm into Unit M before being truncated by an animal burrow. Beneath the burned fiber was an oxidized and charcoal stained layer of sediment. Most of the feature was lost due to poor excavation methods and animal burrowing. Nevertheless, the entire fiber layer in the profile of Unit F was removed as a matrix sample. One AMS assay from a leaf fragment (*Agavaceae sp.*) in F4 dated to the Late Prehistoric (969 median cal. BP; Figure 5.21; Table 5.11). This date translates to 1346 AD and is consistent with the Rodriguez (2015) hypothesis that the flood deposit dates to the fourteenth century.

F4 and F5 are evidence of cooking activities taking place at the site after the flood event. The macrobotanical results from F4 are robust, and fifteen plant species were identified in the sample (Table 5.10). *Chenopodium sp., Amaranthus sp.,* and *Opuntia sp.* seeds were the most common plant types present. Moderate counts of *Setaria sp., Agave lechuguilla,* *cf. Juncus sp.*, and *Yucca sp.* were present. The combined availability of the plant species in this sample spans all seasons.

Figure 5.20: Oblique photograph of Feature 3 in the north profile of Unit F. Yellow arrow points to the basin shaped, charcoal rich feature.

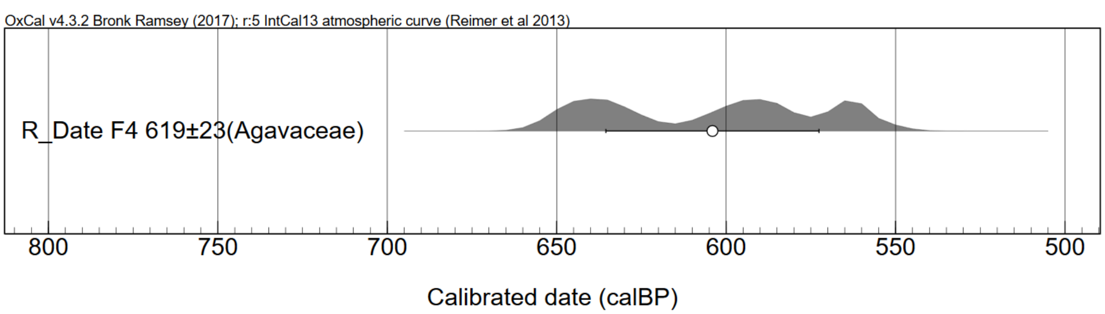


Figure 5.21: Multi-plot showing the calibrated (IntCal 13) ages the AMS radiocarbon assay from F5. Y-axis provides the carbonized plant species name and uncalibrated RCYBP date. X-axis provides the calibrated age. White dots on histogram indicate the mean and black line extending from dots indicate 1 standard deviation.

Table 5.10: Feature 4 macrobotanical results from 0.8-liter matrix sample (FN20070.9.).The entire F4 fiber layer was collected as a matrix sample.

Plant	Plant Part	Count	% Carbonized
Agaveaceae	Leaf Fibers	n/a	0
Agave lechuguilla	Leaf Fragments	37	100
Dasylirion sp.	Leaf Fragments	2	7
Dasylirion sp.	Marginal Spines	2	100
Allium drummondii	Bulb Cloak	12	0
Prosopis glandulosa	Endocarp	12	33
Juglans microcarpa	Nutshell	8	63
cf. Juncus sp.	Seeds	28	100
Poaceae	Seeds	8	100
Poaceae	Stem	2	50
Chenopodium sp./Amaranthus sp.	Seeds	206	Mostly Carbonized
Opuntia sp.	Seeds	71	61
Dyospyros texana	Seeds	1	100
Setaria sp. (Poaceae)	Seeds	58	48
Yucca sp.	Seeds	25	

5.5 Radiocarbon Dating

As mentioned in the introduction, five radiocarbon assays from the Rodriguez (2015) excavations dated the deposits in Unit AB to the Late Prehistoric (1000 – 350 RCYBP). Four more assays were processed soon after the 2014 Koenig and Black excavations (Table 5.11). Three of these four assays complimented the Late Prehistoric dates obtained by Rodriguez (2015); one of the four assays from Feature 6 dated the lower deposits to the Early Archaic (9000 – 6000 RCYBP).

Burned rock middens (BRMs) are localities where intense burning, digging/re-digging, artifact recycling, and refuse dumping take place (Black and Ellis 1997:10). Consequently, thousands of years of hot-rock cooking activities inside of Skiles Shelter have likely cleaned out and mixed deposits of different ages, compromising the stratigraphic position and context of datable materials and artifacts at the site (see Leach et al. 2005). If not careful, radiocarbon dating strategies or studies looking at technological and cultural changes in artifact types based on their stratigraphic position in rockshelter BRM deposits can be misleading.

In instances where mixing is likely to be encountered, archaeologists should focus on identifying the "last use events", that is, events in the deposits such as rock-lined, fiber lined, and unlined cooking pits. Miller et al. (2011:14) mentions how final/last use events can establish terminal age estimates for features, and assays from these events provide the most accurate age estimates of the last represented episodes of cooking. In a rockshelter setting, artifacts, samples, and radiocarbon assays collected from "last use" features are a reliable way to establish chronological control.

For this thesis, six new radiocarbon samples were selected for accelerator mass spectrometry (AMS) radiocarbon dating and were processed at the Center for Archaeological Research at the University of Texas at San Antonio. Prior to lab analyses, all six samples were identified taxonomically by Hanselka. The samples were collected from Feature 3 (n=2), Feature 4 (n=1), Feature 5 (n=2), and Feature 6 (n =1) AMS assays can be as small as single fragments or seeds from identified short-lived plant species (Black and Ellis 1997:10). AMS dating allows archaeologists to minimize old wood biases and produce tighter age estimates with small samples. Five of the six new AMS assays from Features 3, 4, and 5 date to the Late Prehistoric period (Table: 5.6; Figure 5.22). The AMS assay recovered from Feature 6 dates to the Middle Archaic. Unfortunately, no samples or datable material was recovered from Features 1 and 2.

Table 5.11: Complete list of radiocarbon assays from Skiles Shelter (N=15). Direct AMS#s 5252-5255 and 5257 were obtained by Rodriguez (2015). Direct AMS #s 10262-10264, and 11120 were processed by Koenig (2015). Direct AMS #s 31626-31631 were processed in 2019.

Direct AMS #	Unit	Layer	Feature	$\delta(^{13}C)$ Per mil	DAMS-RCYBP	Oxcal median cal. BP (IntCal 13)	Part	Material	Comments
5252	B	8	--	-21.8	591±28	598	Wood	Rhys sp.	Flotation Sample #9
5253	A	4	--	-22.6	498±24	518	Wood	Indeterminate	Material in mortar hole on underside of slab
5254	A	11	--	-4.6	807±28	677	Leaf base	Agavaceae	Flotation Sample #4 (split sample)
5255	A	13	--	-28.7	577±27	602	Wood	Fabaceae	Flotation Sample #28
5257	A	11	--	-7.6	762±26	669	Leaf base	Agavaceae	Flotation Sample #4 (split sample)
10262	O	7	F6	-12.1	6486±36	7387	Leaf base	Indeterminate	Spot sample under large flat rock in the west end of feature
10263	F	5	F3	-21.5	845±26	751	Leaf base	Dasylirion texanum	Spot sample beneath outer rock lining towards the west end of F3
10264	O	--	--	-29.6	752±26	666	Wood	Prosopis sp.	Charcoal spot sample located at interface between upper ashy midden and lower brown sediment on UO north wall
11120	O	2,3	F5	-24.3	702±23	685	Wood	Hardwood	Spot sample from ash lens above red oxidized layer in F5; sample collected from north profile after feature was removed
31626	M	1	F4	-9.7	619±23	600	Leaf fragment	Agavaceae	Collected from matrix sample
31627	O	2,3	F5	-17.3	691±26	660	Twigs	Prosopis sp.	14c spot sample from beneath the largest intact feature rock
31628	O	2,3	F5	0.7	796±27	710	Leaf fragment	Agavaceae	Collected from Matrix Sample directly above oxidized layer
31629	O	7	F6	-9.6	3460±31	3729	Leaf fragment	Agavaceae	Collected from matrix sample under western F6 rocks
31630	F	5	F3	-1.2	1067±28	969	Leaf fragment	Agavaceae	Collected from matrix sample beneath F3 rocks that had crushed the bone tool
31631	F	5	F3	-17.2	1079±31	984	Wood	Acacia sp.	Spot sample beneath tabular rock lining in F3

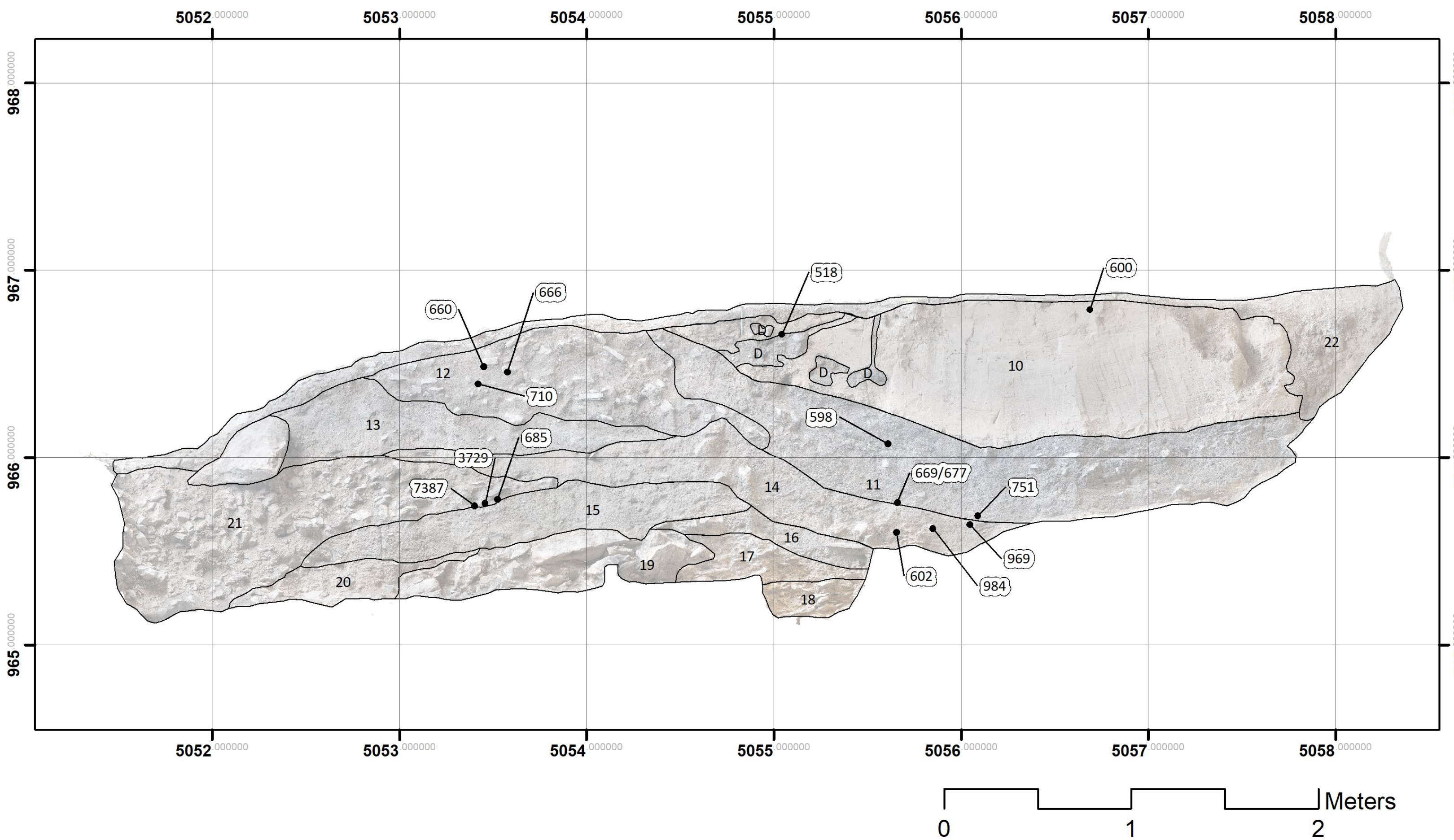


Figure 5.22: All radiocarbon dates from Skiles Shelter plotted on Profile Section 3. The ages shown above indicate the median cal. BP date. (Note: the 669/677 age represents the split radiocarbon assay processed by Rodriguez 2015).

6. FLOODS, MUDS, AND PLANT BAKING: THE FORMATION PROCESSES OF SKILES SHELTER

From the outset, four things are clear about Skiles Shelter's formation processes (1) historic ranching, looting, and bioturbation have played a role in recent alterations to the site's deposits, (2) Skiles Shelter has and will continue to be affected by catastrophic flooding in the canyon (Rodriguez 2015:58; Frederick 2017), (3) Skiles Shelter was used as an earth oven facility – as shown by the burned rock midden at the mouth of the site and the large oven pit at the back of the shelter, and (4) the gradual weathering of Skiles Shelter has contributed to the creation of the site and its deposits.

Skiles Shelter's deposits are considered to have formed over five temporal phases: (1) Late Pleistocene and Early Holocene spalling, (2) Early to Middle Archaic earth oven construction, (3) Late Archaic to Late Prehistoric earth oven construction, (4) Late Prehistoric flooding, and (5) modern disturbances. The previous chapter has shown that Skiles Shelter's deposits are complex, mixed, relatively shallow in depth, and formed from various cultural and natural events. In 2014, Charles Koenig succinctly characterized Skiles Shelter's deposits as being the product of "floods, muds, and plant baking." With this quote in mind, and using the evidence presented in Chapter 5, this chapter highlights the critical formation processes in Skiles Shelter.

6.1 Natural Formation Processes of Rockshelter Deposits and Skiles Shelter

Limestone rockshelters in the Lower Pecos Canyonlands have been subject to various atmospheric (aeolian, fluvial, and chemical) activities that contribute to their formation (Nielsen 2017:16). The rockshelters within Eagle Nest Canyon have likely formed over geologic time from the growth of crystals, which apply stress to cracks and fissures within the canyon walls (Frederick 2017:18). These crystals, ice (cryoclastism) in glacial periods, and gypsum and calcium oxalate (haloclastism) during interglacial periods, gradually wedge spalls (éboulis) away from the inner rockshelter surfaces (2017:19). The rate and character of spall deposition are largely based on environmental conditions (Nielsen 2017:16). Active spalling can be seen in the canyon today, and limestone spalls (éboulis) have been found in the Late Glacial deposits of Eagle Cave, Bonfire Rockshelter, and Skiles Shelter. The character of the éboulis varies at each of these sites and is likely the result of differential weathering processes and site settings.

Deposits within rockshelters can be categorized as either autochthonous (endogenous) or allochthonous (exogenous; Goldberg and Macphail 2009:175). Autochthonous deposits include those derived from within the rockshelter, while allochthonous deposits are transported from the outside (see Goldberg and Macphail 2009: Table 8.2). Both allochthonous and autochthonous deposits can originate from cultural, animal, or natural processes. Rockshelter deposits in the Lower Pecos Canyonlands are a combination of these.

The lowest deposits in Skiles Shelter (S008, S017, S018, S019, S0028) are likely a result of Late Pleistocene and Early Holocene freeze/thaw and chemical weathering (Frederick 2017:19). The thickness of the éboulis in Skiles Shelter was undetermined. However, up canyon at Eagle Cave, the éboulis deposits in the UT North trench were noted as being over a meter in depth (Nielsen 2017:165). Although some rockshelters in Eagle Nest Canyon have signs of human use during the Early Holocene, there is currently no evidence of such use at Skiles Shelter.

6.2 *Skiles Shelter Burned Rock Midden Formation*

Burned rock middens (BRMs) develop through the repeated discard of fire cracked rock from earth ovens (Black et al. 1997; Leach and Bousman 2001:135). In addition to FCR, large amounts of charcoal, ash, vegetal/animal waste, and sediment from the earth oven and earthen cap are discarded onto the midden after a cooking event. Leach and Bousman (2001:133) define these depositional events as "aprons," and as a midden grows, prior aprons will be covered by succeeding ones. Due to sediment borrowing in the construction of earth ovens, aprons can be mixed from a variety of activities and may contain sediment and artifacts from different periods (2001:134). Aprons should theoretically contain the successive history of a middens use-life. After a midden is abandoned, natural events such as turbation and erosion can lead to the deflation and compression of a BRM (2001:135). Any fine-grained matrix that was once on the surface of the midden will dissipate downslope and outward leaving only the intermixed artifacts, and FCR exposed.

Leach and Bousman use the term anthromantle to describe the formation processes explained above

> "the midden and its associated off-midden deposits are the result of the interaction between human land-use and disposal practices within the natural context, physiographic, and micro-topographic parameters of the site area. The subsequent erosion results in a denuded midden bare of its fine sediment, and more tightly packed in its downward movement" (Leach and Bousman 2001:135).

Anthromantles are important when trying to understand BRM formation and should be regarded as convoluted deposits that have complicated depositional histories (2001:145). The interpretation of these deposits should therefore consider the bioturbative, erosional, and human activities that may have had direct or indirect influence on the formation of the BRM.

Many Lower Pecos rockshelters have BRM components (Pearce and Jackson 1933; Woolsey 1936; Shafer and Bryant 1977; Word and Douglas 1970; Epstein 1963; Taylor 1948; Maslowski 1978; Ross 1965; Rodriguez 2015). Considering the overhang of LPC rockshelters, the deflation and compression of burned rock midden sections within rockshelters should be less severe than open-site BRMs exposed to weathering. One should expect a greater retention of fine midden matrix, as well as organic material (such as short-lived plant species), artifacts with residues, and faunal remains intermixed in the discarded FCR; all of which can provide insight on the use of hot-rock cooking.

The burned rock midden at Skiles Shelter formed from thousands of years of hot-rock cooking. Various parts of the rockshelter would have been repeatedly cleaned out, reused, and covered by cooking refuse. Activities such as lithic, bone tool, fiber product manufacturing, and plant and animal processing would have added debris and artifacts in and around the cooking pits that were built. The recycling of soil and rocks would have possibly mixed artifacts and deposits from different parts of the site. As the FCR in these oven pits thermally broke down to a negligible size, they were discarded out toward the dripline of the site.

Over time, the FCR toss zone amassed into what is now the burned rock midden at the mouth of Skiles Shelter. I reason during the Early and Middle Archaic periods, the lower strata in Earth Oven Construction Deposit 1 (S015, S016, S026C) formed. During the Late Archaic and Late Prehistoric periods, the use of Skiles Shelter appears to increase, and hot-rock cooking activities would have created Earth Oven Construction Deposits 2 and 3

(S003, S006, S011, S013, S014, S023B-C, S024, and S026A) and Earth Oven Discard Deposits 1 and 2 (S012, S025, S004, S021, S026B).

6.3 Flooding and Karstic Development

Catastrophic flooding has been a sporadic but re-occurring event in Eagle Nest Canyon (Rodriguez 2015; Frederick 2017) and past flood frequencies from the nearby Pecos River have been described by Patton and Dibble (1982). Before the inundation of Amistad Reservoir, flooding in the canyon occurred from the Rio-Grande after intense rainfall. In recent history, flooding has been accentuated from the backing up of Lake Amistad into Eagle Nest Canyon.

Frederick (2017:113) notes that hydrologist George Hermann recently estimated the probable flood return period in Eagle Nest Canyon based on a 70 year record of Rio Grande floods at Langtry, TX. Skiles Shelter – the lowest rockshelter in the canyon – was found to have the highest probable flood return period of 110 and 160 years. Rodriguez (2015:58) cites three recent major flooding events in the canyon starting in 1954, the two most recent floods took place in 2010 and 2014 (Figure 6.1 and Figure 3.6). Bearing testament to the transformational nature of canyon flooding, the 2010 flood left the waterline mark that is still visible on the back wall of Skiles Shelter (Figure 6.2), and past flooding in the canyon have deposited sediment in Skiles Shelter and accelerated the degradation of its organic material. It is unknown if the 1954 flood reached Skiles Shelter; the 2014 flood did not.

In 2013, Magnetic Susceptibility, Loss-on-Ignition, calcium carbonate, and phosphorus tests were conducted along the north profile of Unit A by Frederick and Lawrence (see Rodriguez 2015:51; Figure 6.3). Magnetic Susceptibility (MS) can measure cultural activity areas at archaeological sites based on the amount of enhanced magnetic

Figure 6.1: Skiles Shelter inundated by the Rio Grande during the 2010 flood.

Figure 6.2: Watermark line in Skiles Shelter from the 2010 flood. The watermark is lighter in color and can be seen running along the back wall of the shelter.

minerals present in the soil. In other words, higher MS values correlate to sediments that were used in association with cultural activities (Nielsen 2017:64; Gale and Hoare 1991:201-202). MS values can be skewed if organic matter is present in the sample (Nielsen 2017:65).

The Loss-on-Ignition (LOI) test is used to adjust the MS values for the organic matter present in the sample. In addition to MS and LOI tests, the amount of calcium carbonate and phosphorous were measured. Both calcium carbonate, which is a common component of limestone, and wood and phosphorous, which has higher detectable traces in anthropogenic soils, can signal if a soil was used for cultural activities (Nielsen 2017:66-67).

The results of the Loss-on-Ignition and Magnetic Susceptibility test show that Skiles Shelter's flood deposit (In Unit AB) formed from a single depositional event (Rodriguez 2015:71). The flood alluvium texture fined upward, which is indicative of slack water sediments (Figure 6.3; Frederick 2017:111). Compared to the deposits below the flood deposit, calcium carbonate levels were low.

Low and variable levels of organic phosphorous were present in the flood alluvium as well. Rodriguez attributed this variability to the downward movement of phosphorus from animal dung on the surface of the site through bioturbation or leeching (Rodriguez 2015:72). Radiocarbon assays collected above and below the flood deposit in Unit AB, F, M, and E reveal that the alluvium was deposited in the 14th century (Rodriguez 2015; Koenig et al. 2017b). However, other alluvial deposits were identified in Units AB, E, and O that could represent older flood events. Feature 2 and Feature 5 (which was older than AD 1340, but still Late Prehistoric in age) were dug into these alluvial deposits.

Unrelated to flooding, Skiles Shelter has significantly more karstic development than any other rockshelter in Eagle Nest Canyon (Koenig et al. 2017b:44). This development is signaled by the large tufa mound and Pleistocene spring vents along the back walls.

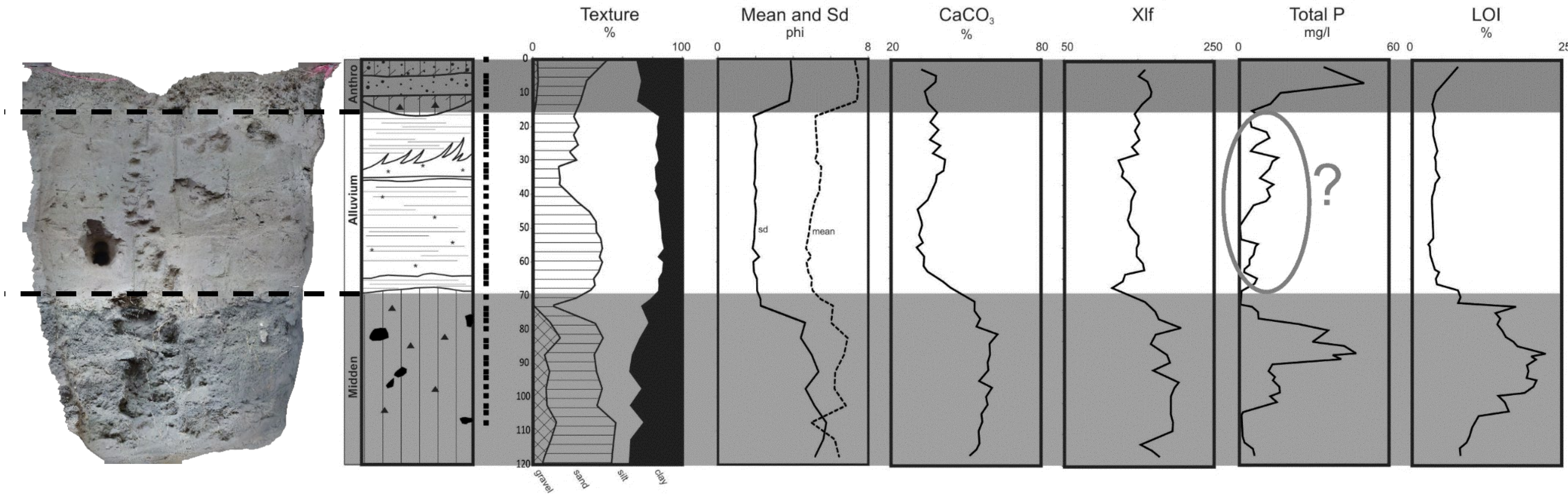


Figure 6.3: Geoarchaeological results along the north profile of Unit A. (left) Orthographic photo of Unit A, north profile; black serrated lines denote and separate the anthropogenic, alluvium, and midden deposits. (Right) Texture percentage of gravel, sand, silt, and clay (Texture %); Mean and Standard deviation (Mean and Sd phi); calcium carbonate percentages ($CaCO_3$); Magnetic Susceptibility (Xlf); Total phosphorus (Total P mg/l). Question mark indicates variability to the possible downward movement of phosphorus from animal dung on the surface of the site through bioturbation or leeching; Loss on Ignition percentage (LOI %). Data from Rodriguez 2015; Figure courtesy of Charles Frederick.

Water flowing through spring vents on the eastern side of the shelter possibly contributed to the flushing out of rockshelter sediments in the past (Rodriguez 2015:61).

6.4 Historic Ranching and Vandalism

As ENC landowner and Langtry historian Jack Skiles has chronicled, ranching in Langtry, Texas began in the early 1880s when the town (originally called Eagle's Nest) was established (Skiles 1996:154). By 1883, railroad workers, ranchers, merchants, and saloon keepers had permanent residences in the town. Some ranchers in the Langtry area stock grazed on leased land on both sides of the Rio Grande. Eagle Nest Canyon was used as one of the main crossings to move livestock between these grazing lands (1996:134). Ranching continued in Langtry well into the 1940s when Jack Skiles' father Guy Skiles purchased the canyon (Black 2017). During the early 20th century, goats and sheep frequented Eagle Nest Canyon's rockshelters and were penned up in Eagle Cave, where some of the wooden fence posts are still visible. The heavy presence of goat and sheep dung on the top surface of Skiles Shelter bears evidence of ranching activities that were taking place in the canyon.

Evidence of vandalism in the form of graffiti and looter pits is present in some of the rockshelters in Eagle Nest Canyon. Other rockshelter sites such as Fate Bell Shelter, which was used previously by private landowners as a pay to dig site, and Leaping Panther Shelter, where collectors removed part of the rock art panel, provide a few examples of some of the destructive activities that have taken place in sites across the region (Mueller 2010). At Skiles Shelter, a looters pit that held historic trash was observed along the back wall (S022 in PS03 and PS04), and looting activity was noted in the upper deposits of Units AB by Rodriguez 2015. In 2016, new graffiti from unauthorized site visitors was observed along the back wall of the site.

6.5 Turbative Processes

Rodriguez (2015:62) discusses how active turbation from humans, animals, and insects is occurring at Skiles Shelter. To summarize his observations, native javelinas *(Pecari tajacu)*, feral hogs, rodents, sheep, insects, and humans have all caused considerable disturbance to the site's deposits. At Skiles Shelter and adjacent Kelley Cave, digging and excretion from feral hogs has been destructive to the upper deposits at these sites. In addition to feral hogs, burrowing animals and insects, such as the digger wasp (*Sphex lucae* or *S. texanus)* have tunneled into and removed some areas with softer sediment at Skiles Shelter. Rodent burrows were commonly encountered during the 2014 excavations and care was taken to screen this matrix separately. Disturbance form animal bioturbation was more common in the softer deposits near the back of the shelter and less severe near the BRM, which is denser in composition and difficult for animals to dig through. Despite the heavy presence of livestock dung on the top surface of the site, the dung itself made a useful key for distinguishing if subsurface deposits were disturbed from bioturbation.

7. QUANTIFYING EARTH OVEN USE AT SKILES SHELTER

Prehistoric earth oven baking is the most significant cultural activity contributing to the formation of Skiles Shelter's deposits. In this chapter, I quantify the burned rock midden accumulation at Skiles Shelter to determine the intensity and amount of earth oven construction taking place at the site over time. Quantifying the fire cracked rock in Skiles Shelter's burned rock midden (BRM) is a somewhat complicated process that requires estimations of (1) the total volume of the BRM, (2) the average FCR density in the BRM, and (3) the total mass of FCR within the BRM. Moreover, (4) the rate at which FCR fractures from thermal stress, and (5) the amount of rock used in a single earth oven event should be taken into consideration to broaden interpretations of how earth ovens and FCR were reused at the site over time. The approach I use to quantify Skiles Shelter's BRM is based on methods established by previous researchers and incorporates the Rock Sort data collected from the sampling column Units O and P (Black et al. 1997; Black and Lucas 1998; and Knapp 2015). More specifically, the calculations in this chapter are a refined version of Koenig's (2015) methodology and findings.

7.1 Burned Rock Midden Volume, Density, Mass, and FCR Reuse

The **total volume** of Skiles Shelter's BRM was estimated using the top and bottom digital elevation models (DEMs) from Units I, J, K, and L. Using these DEMs and ArcGIS, two topographic surfaces across the extent of the BRM (top and bottom) were modeled and the total volume of the midden was estimated using the CutFill tool in ArcGIS. The volume of Skiles Shelter's burned rock midden was estimated from CutFill to be approximately 180 m^3. **FCR density** was calculated by dividing the total weight (kg) from each sampling

Table 7.1: Unit O and P Rock Sort counts, mass, and densities by FCR size classes.

Unit	Layer	Volume Excavated (m^3)	FCR (<7.5 cm)		FCR (7.5-11 cm)			FCR (11-15 cm)			FCR (>15 cm)		
			FCR Mass (kg)	FCR Density (kg/m^3)	Count	FCR Mass (kg)	FCR Density (kg/m^3)	Count	FCR Mass (kg)	FCR Density (kg/m^3)	Count	FCR Mass (kg)	FCR Density (kg/m^3)
O	1		11.54		43	10.63		19	20.58		7	10.54	
	2		9.84		44	34.23		12	5.36		0	0	
	3		17.28		51	14.18		30	14.76		4	4.94	
	4		4.09		10	1.58		5	2.65		2	1.57	
	5		3.89		11	2.09		1	1.81		0	0	
	6		11.08		54	10.79		10	4.87		3	1.82	
	7		13.32		62	16.78		38	24.4		10	10.2	
	8		1.82		NC	3.45		NC	1.29		0	0	
Total:		1.19	72.86	61.22	275	93.73	78.76	115	75.72	63.63	26	29.07	24.42
P	1		34.5		129	25.02		18	6.3		0	0	
	2		52.57		196	43.58		22	7.93		1	1.13	
	3		54.33		124	24.05		1	0.29		0	0	
	4		57.28		141	28.08		7	3.38		0	0	
	5		38.04		157	34.05		38	19.65		6	4.96	
	6		27		65	17.4		14	10.4		4	6.5	
	7		1.35		5	1.25		0	0		0	0	
Total:		0.83	265.07	319.36	817	173.43	208.95	100	47.95	57.77	11	12.59	15.16

Table 7.2: Units O and P FCR Density Totals, Average FCR Density, and Total FCR Mass

Unit	FCR Density Row Totals
O	228
P	601

Estimated BRM Volume:	180 m^3
Average FCR Density:	415
Total FCR Mass:	74637

column (Units O and P) FCR size class by volume (m^3) excavated (Table 7.1). The FCR density row totals from Units O and P were averaged to find the average FCR density (Table 7.2).

The **total estimated FCR mass** (74,637 kg) in Skiles' BRM was determined by multiplying the average FCR density (414.65 kg/m^3) by the total estimated volume of the midden[1] (Table 7.2). Then, the total estimated mass of FCR was adjusted to consider **FCR reuse**. As discussed in Chapter 1.1-1, rocks in earth ovens were often re-used for multiple cooking events, and after several exposures to thermal stress, rocks will begin to fracture into smaller, angular shaped pieces. Based on previous studies and experimental research in the Lower Pecos (Knapp 2015), large burned rocks are considered to be minimally thermally fractured and used in only one firing event. Medium size rocks are assumed to have been subjected to two firing events, and small to very small rocks to three or more firing events.

[1] Total FCR mass (kg) = Total volume of BRM (m^3) * Average total FCR density from Rock Sort columns (kg/ m^3)

To account for FCR reuse, the four rock size classes (very small: < 7.5 cm, small: 7.5-11 cm, medium: 11-15 cm, and large: >15 cm) were used to roughly estimate the number of times that rocks in the BRM were reused before being discarded. The number of firing events (e.g., 1-4) attributed to each size class was used in the FCR reuse equation[2] to calculate FCR reuse. As Knapp notes, estimating FCR reuse is

> "a simplified means to quantify use events represented in the burned rock midden. The enumeration of earth oven firing events is best presented as equations, though the results should be thought of as an estimate rather than a precise measure. The number is not meant to be taken literally but as a tool useful in characterizing the use and reuse of the earth oven facility" (Knapp 2015: 156).

To consider FCR reuse, the total FCR mass from Units O and P is multiplied by the total FCR mass percentage of the sampling columns and then multiplied by the number of assumed firing events for each FCR size class (Table 7.3). The adjusted total FCR mass of Skiles Shelter's BRM is estimated to be 236,597 kg. It is important to note that the adjusted total FCR mass is not an estimation of the *true* mass of FCR within the midden. Rather, the adjusted total FCR mass is a number that is used to estimate the intensity of earth oven use at Skiles Shelter.

7.2 Intensity of Earth Oven Use at Skiles Shelter

The final objective of the burned rock quantification is to estimate how many earth oven firing events created the burned rock midden at Skiles Shelter. Critical to this goal is temperatures in an earth oven heating element.

[2] FCR Reuse = [(kgvery small × %very small)4] + [(kgsmall × %small)3] + [(kgmedium × %medium)2] + [(kglarge × %large)1]

Table 7.3: Units O and P total FCR mass, percentages, and FCR reuse by rock sort size classes.

Total FCR Mass	<7.5 FCR	7.5-11 cm	11-15 cm	>15 cm	Row Total:
Unit O	73	94	76	29	271
Unit P	265	173	48	12	499

Column Total:	338	267	124	42	770
Percent:	44%	35%	16%	5%	100%

FCR Reuse	FCR Mass Total * FCR Mass % * 4	FCR Mass Total * FCR Mass % * 3	FCR Mass Total * FCR Mass % * 2	FCR Mass Total * FCR Mass % * 1	Row Total:
Column Total:	130,953	77,646	23,962	4,036	236,597

first understanding how much rock was needed to bake desert succulents at sustained Based on experimental studies, earth oven researchers have estimated that anywhere from 100 kg to 300 kg of rock was required per earth oven (Black et al. 1997; Dering 1999). In his study of earth oven features, Basham (2015:132) estimated that individual heating element features along the canyon edge of Eagle Nest Canyon ranged from 115 kg to 309 kg in FCR weight. Basham's data compared favorably with weight ranges from other upland Lower Pecos heating element features (Campbell 2012).

To estimate the number of earth oven firing events at Skiles Shelter, the adjusted total FCR mass is divided by a conservative estimation of 100 (kg) of rock per single earth oven event (Table .7.4). Based on this average, the burned rock midden at Skiles Shelter is estimated to have formed from the construction of roughly 2,366 earth oven events. Returning to the radiocarbon dates from Chapter 5 and relative projectile point ages discussed in Chapter 8, Skiles Shelter is estimated to have been used over an approximate period of 6,869 years (7387-518 median cal. BP). Dividing the average number of earth oven events at Skiles Shelter by the estimated number of years the site was occupied, projects that far less than one earth oven per year was constructed at the site.

Table 7.4: Total corrected FCR Mass of Skiles Shelter's BRM.

Total Corrected FCR Mass (kg)	/100 kg
236,598	2,366

7.3 Discussion

Based on archaeological data from hot-rock cooking sites across western North America, Thoms (2009:573) argues that an increase in hot-rock cooking signal land-use intensification and population packing – wherein, more high-cost foods were being cooked to feed growing populations. Thoms found an initial increase in cook-stone intensification during the early to middle Holocene followed by another marked increase during the late Holocene. Additionally, in central Texas, a plot of 141 radiocarbon dates from burned rock midden excavations follow the national intensification trend in western North America – that is, an initial increase in hot-rock cooking about 7000 RCYCP, followed by another increase around 2000 RCYBP (Black and Creel 1997; Thoms 2009:580). At Little Sotol (41VV2037), Knapp (2015) also recognized that earth oven intensification and plant processing increased during the Late Archaic/Late Prehistoric periods.

When compared to both regional and national land-use intensification datasets, Skiles Shelter represents a case for Lower Pecos rockshelters where the intensification of hot-rock cooking is highly visible during the Late Prehistoric period. Considering the BRM quantification results, I infer that the site was periodically visited based on seasonal foraging rounds. Dering (2005:251) describes how mobility in the Lower Pecos was influenced by the depletion of nearby food resources. Seasonal rounds from forager groups in the region were dictated by the exhaustion of local resources with both low productivity and seasonal availability from unpredictable rainfall (2005:253). This implies that Skiles Shelter was not a permanent residence, but rather one of many temporary homes or workstations that was used for activities including the cooking and processing of local foods in the canyon and surrounding uplands.

8. SKILES SHELTER CHIPPED STONE ANALYSIS

This chapter reviews the chipped stone lithic assemblage from the 2013 and 2014 excavations at Skiles Shelter. All lithic material from the site was counted and weighed and organized into six general categories: debitage, unifaces, bifaces, projectile points, and cores (Table 8.1; Appendix C). The entire collection of unifacial and bifacial tools from the site were analyzed to examine the lithic tools associated with rock shelter earth oven/plant processing facilities. The methodology I use is based on the analyses conducted by Prilliman and Bousman (1998) and Dial and Collins (1998).

Table 8.1: Chipped stone counts from the 2013 and 2014 Skiles Shelter excavations.

Type:	Debitage	Unifaces	Bifaces	Projectile Points	Cores
Count:	14, 344	77	133	62	27

8.1 *Lithic Debitage*

Lithic debitage are pieces of rock removed by percussion or pressure (Andrefsky 2005). Approximately 14,344 pieces of debitage were recovered from Skiles Shelter (Figure 8.l; Table 8.2). Aside from the debitage in Units AB and C that was screened through ½ and ¼ inch mesh screens in 2013, and Units M, F, AB, E, and H in the main trench that were also screened through ½ and ¼ mesh during the 2014 excavations, the debitage counts from the remaining 2014 excavation units reflect what was recovered from ½ mesh screens. Micro-debitage smaller than ¼ inch was collected while sieving matrix samples from Units O and P. Other than counting and weighing, no formal analyses were conducted on the debitage from Skiles Shelter. From my general observation of the material, most of the flakes were detached from fine-grained chert. Units H, I, J, K, and P contained the highest densities of debitage.

Table 8.2: Skiles Shelter lithic debitage counts, weights, and density by unit and volume excavated. The upper table displays units where debitage was collected from ½ and ¼ mesh. The bottom table displays units where debitage was collected only from ½ mesh.

Unit	Debitage Count	Debitage Weight (g)	Volume Excavated (m^3)	Debitage Density (g/m^3)
AB	1311	861	2.76	312
C	316	177	0.31	573
E	3574	2958	2.27	1303
F	451	314	1.02	308
H	3460	2995	1.18	2539
M	348	389	1.25	311
Total:	9460	7697	8.79	5347

Unit	Debitage Count	Debitage Weight (g)	Volume Excavated (m^3)	Debitage Density (g/m^3)
D	1185	1240	1.19	1042
G	1758	1803	2.28	791
I	252	1046	0.42	2490
J	454	1555	0.54	2880
K	107	402	0.17	2366
L	93	427	0.29	1474
N	108	428	0.68	629
O	299	965	1.07	902
P	944	3228	0.83	3889
Total:	5200	11095	7.47	16463

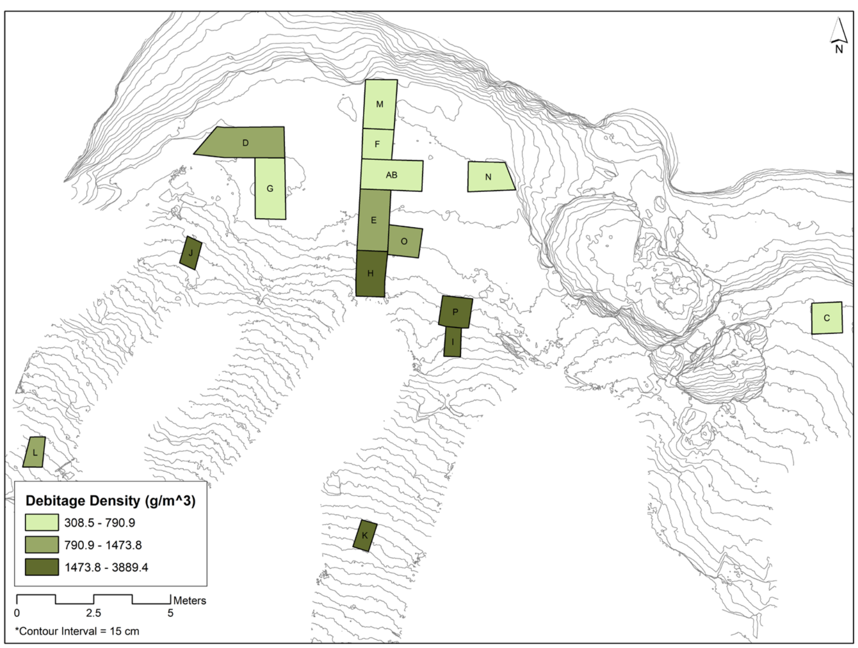


Figure 8.1: Map of Skiles Shelter showing debitage densities by unit.

8.2 Projectile Points (N=62)

A projectile point is defined as a "biface that contains a haft area and is used as a projectile tip" (Andrefksy 2005). Common names for projectile points include arrow points, dart points, and spear points. Many variations can exist among projectile point types, and often, archaeologists examine points that have been re-sharpened down to a form that differs from its original shape and size. Sixty-two projectile points were recovered from Skiles Shelter. Elton R. Prewitt typed the entire assemblage.

The relative ages of the points span from the Early Archaic to Late Prehistoric periods. Fifteen of the points are untyped (n=15) but could still be assigned to a period. Two of Skiles Shelter's points are Early Triangular and Bandy types, which date to the Early Archaic (6500- 5500 RCYBP; Table 8.3). Fifteen (32%) of the typed points are Langtry, Val Verde, Arenosa, Almagre and Pandale types, which date to the Middle Archaic (5,500-3,200 RCYBP). Thirteen (27%) of the typed points from Skiles Shelter are Ensor, Frio, Edgewood, Paisano, Figueroa, and Montell types of the Late Archaic Period (3150-1,000 RCYBP).

The largest number of points (36%; n=17) from Skiles Shelter are Clifton, Perdiz, Sabinal, Edwards, Scallorn, and Livermore types of the Late Prehistoric period (1,000-450 RCYBP). Eight of these points were plotted in situ (Figure 8.2; Table 8.4). Supplementary reference on the descriptions, distributions, and relative ages of the point types from Skiles Shelter can be found in Suhm and Jelks 1962; and Turner et al. 2011.

Table 8.3: Skiles Shelter projectile point assemblage as typed by Prewitt. Yellow stars indicate points that were plotted in situ. Figure adapted from Koenig et al. 2017b: Figure Skiles.11; Shafer 2013:62; Turpin 2004.

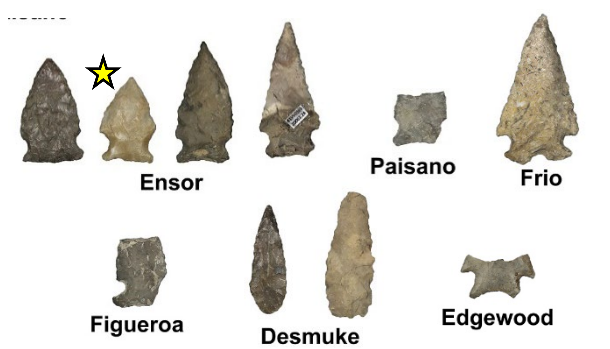
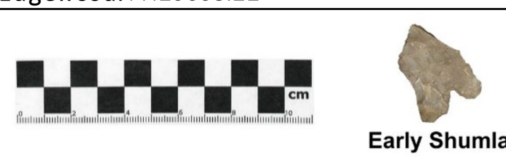
Period	Radiocarbon Years B.P.	Subperiod (Turpin 2004)	Index Markers
Late Prehistoric	*1,000-450*	*Flecha*	
			Perdiz (top left): FN20011.1, FN20023.6, FN20080.2, (bottom left): FN20029.1, FN20082.2, FN20080.3, FN25014 (not pictured) **Livermore:** FN20082.3 **Cliffton**: (top left): FN20080.4, FN20029.3, FN20029.2, (bottom left): FN20018.1, FN20020.1, FN20000.1 **Sabinal**: *FN20043.6 (point plotted) **Edwards**: FN20080.1 **Scallorn**: FN20071.1
Late Archaic	*2,300-1,000*	*Blue Hills*	
			Ensor: FN20031.1, *FN20013.8 (point plotted), FN20016.1, FN20063.24, FN20105.1, FN25027(not pictured) **Paisano:** FN20023.1 **Frio:** FN20105.1 **Figueroa:** FN20027.3 **Desmuke:** FN20121.1, FN20016.3 **Edgewood:** FN20063.22
	ca. 2,250	*Flanders*	
			Shumla: FN20048.2

Table 8.3 (cont.): Skiles Shelter projectile point assemblage. Yellow stars indicate points that have been plotted in situ. Figure adapted from Koenig et al. 2017: Figure Skiles.11; Shafer 2013:62; Turpin 2004.

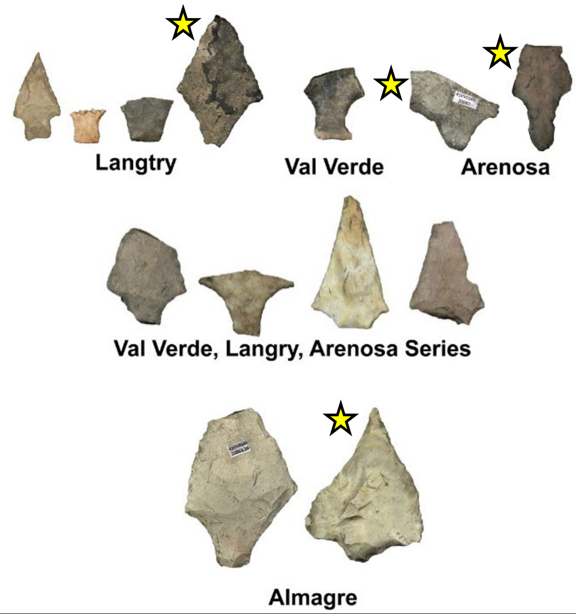
<table>
<tr><td rowspan="2">Late Archaic</td><td rowspan="2">3,150-2,300</td><td rowspan="2">Cibola</td><td>
</td></tr>
<tr><td>Montell: FN20016.2</td></tr>
<tr><td rowspan="4">Middle Archaic</td><td rowspan="2">4,100-3,200</td><td rowspan="2">San Felipe</td><td>
</td></tr>
<tr><td>Langtry: FN20029.4, FN20050.1, FN20033.2, *FN20039.20(point plotted), FN25029(not pictured)
Val Verde: FN20059.1
Arenosa: *FN20097.1(point plotted), *FN20038.19(point plotted)
Val Verde, Langtry, Arenosa Series: FN20112.4, FN20059.4, FN20105.2, FN20107.3
Almagre: FN20063.20, *FN20127.22(point plotted)</td></tr>
<tr><td rowspan="2">5,500-4,100</td><td rowspan="2">Eagle Nest</td><td>
</td></tr>
<tr><td>Pandale: FN20063.23</td></tr>
</table>

Table 8.3 (cont.): Skiles Shelter projectile point assemblage. Yellow stars indicate points that have been plotted in situ. Figure adapted from Koenig et al. 2017: Figure Skiles.11; Shafer 2013:62; Turpin 2004

<table>
<tr><td rowspan="2">Early Archaic</td><td rowspan="2">6,500-5,500</td><td rowspan="2">Late Viejo</td><td>
Early Triangular Bandy</td></tr>
<tr><td>Early Triangular: FN20032.4
Bandy: *FN20131.23(point plotted)</td></tr>
<tr><td colspan="4">Untyped/Untypeable Projectile Points</td></tr>
<tr><td rowspan="2">Late Prehistoric</td><td rowspan="2" colspan="2">1,000-450 RCYBP</td><td>
Untyped Arrow Points</td></tr>
<tr><td>Untyped Arrow Points: FN20068.1, FN20068.2, FN20078.10</td></tr>
<tr><td rowspan="2">Late Archaic</td><td rowspan="2" colspan="2">3,150-1,000 RCYBP</td><td>
Untyped Late Archaic</td></tr>
<tr><td>Untyped Late Archaic: FN20063.1</td></tr>
<tr><td rowspan="2">Early Archaic</td><td rowspan="2" colspan="2">6,500-5,500 RCYBP</td><td>
Untyped Early Archaic
</td></tr>
<tr><td>Untyped Early Archaic: FN20030.1, FN20054.1, *FN20122.21(point plotted)</td></tr>
</table>

Table 8.3 (cont.): Skiles Shelter projectile point assemblage. Yellow stars indicate points that have been plotted in situ. Figure adapted from Koenig et al. 2017: Figure Skiles.11; Shafer 2013:62; Turpin 2004

Archaic	*6,500-1,000 RCYBP*	
		Untyped Archaic: (top) FN20033.1, *FN20021.20(point plotted), FN20040.4, (bottom) FN20064.8, FN20059.13, FN20117.1, FN20056.9

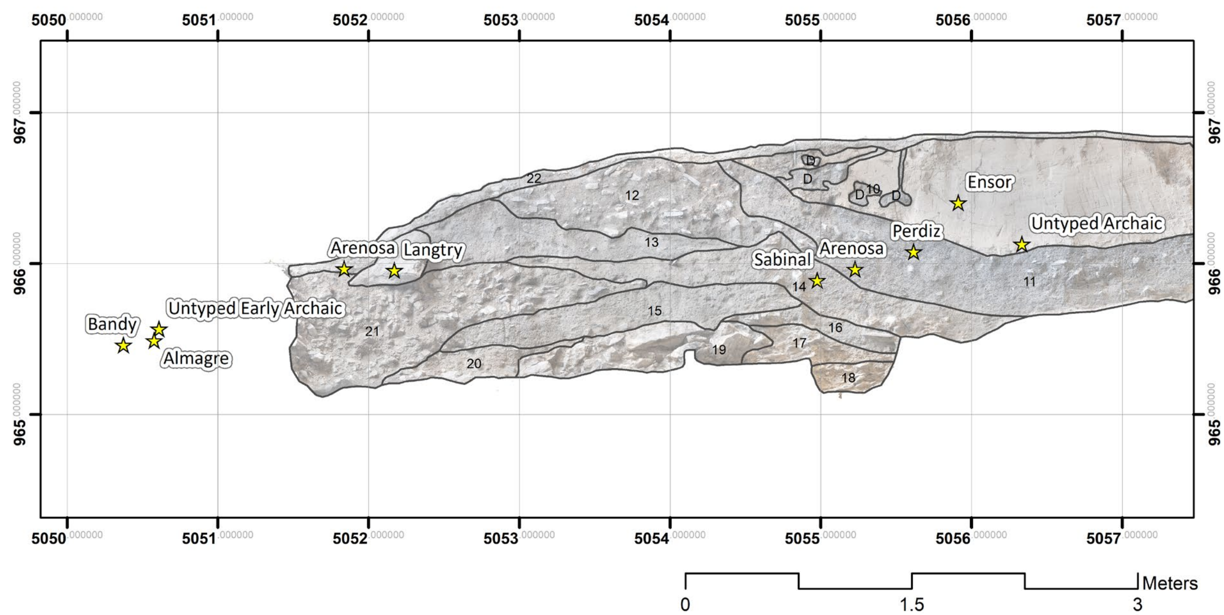


Figure 8.2: In situ projectile points from Skiles Shelter superimposed on Profile Section 3. The grid displays local easting (x) and elevation (y) coordinates.

Table 8.4: Descriptive data for Skiles Shelter's plotted projectile points.

Elevation	Unit	Layer/Strat	Field Number	Point Type	Age
966.40	D	2	20013	Ensor	Late Archaic
966.12	D	4	20021	Untyped Archaic	Archaic
966.07	A	8	25014	Perdiz	Late Prehistoric
965.96	H	3	20038	Arenosa	Middle Archaic
965.96	G	S002	20097	Arenosa	Middle Archaic
965.95	H	3	20039	Langtry	Middle Archaic
965.88	B	3	20043	Sabinal	Late Prehistoric
965.56	P	5	20122	Untyped Early Archaic	Early Archaic?
965.49	P	5	20127	Almagre	Middle Archaic
965.46	P	5	20131	Bandy	Early Archaic

8.3 Unifacial Chipped Stone Tool Analysis (N=77)

Any chipped stone item not classified as debitage is considered a tool. Tools are objective pieces that have been modified into a specific product and will have less mass than their original pre-modified form (Andrefsky 2005:76). Tools are divided into two categories: unifaces and bifaces.

Unifacial tools possess a degree of modification that distinguishes the tool from its original form (Andrefsky 2005:78). Expedient, unifacial tools often lack in-depth analyses in archaeological reports when compared to more diagnostic chipped stone artifacts (Prilliman and Bousman 1998:597). When reported, expedient tools are typically grouped in general functional categories, which can lead to misleading interpretations of function and form (1998:631).

Following Prilliman and Bousman (1998), all unifacial tools from Skiles Shelter were examined by their portion, edge angle, cortex amount, retouch morphology, the location of and the number of modified edge segments, and edge modification thickness. A list of descriptions for each attribute can be found in Appendix C. All information above was documented unless it was physically missing from the artifact. The combined attributes were then used to specify artifact form, which for this study was subdivided into seven classes: thick unifaces, thin unifaces, edge-modified flakes, retouched blades, denticulates, sequent flake tools, and multiple tools. Descriptions of each class are discussed below.

Total Edge Modification (TEM) and Potential Edge Modification (PEM) measurements were also collected with a tailor measuring tape to evaluate reduction intensity. As stated by Ledoux and Lohse,

> "TEM is defined as any edge that shows continuous flake scarring for at least 2 mm along its length. PEM is the modified edge combined with any unmodified edge that could have been flaked. PEM excludes the platform and any fractured edges (see Prilliman and Bousman 1998:598, Figure 17-1) …. a ratio [is] calculated by dividing the Total Edge Modification (TEM) by the Potential Edge Modification (PEM). This ratio is referred to as the TEM:PEM; when multiplied by 100, it indicates the intensity of artifact usage as a percentage to three decimal places." [Ledoux and Lohse 2011:248]

Each unifacial tool was measured with the platform (if present) positioned distally. Measurements were taken on the maximum length, width, and thickness of intact tools to the nearest whole millimeter using Mitutoyo absolute digital calipers and weighed using a Scout-Pro 400 g scale. The circumference of each tool was collected with a tailor measuring tape. Last, each specimen was quickly examined under a low powered microscope to search for the presence of mammal hairs and plant epidermis fragments. This analysis sought to identify tools that may have been used for plant processing activities.

8.3-1 Thick Unifaces (N=5)

Thick unifaces are tools that have a maximum thickness ≥ 15 mm and exhibit extensive, continuous, invasive (>1 cm), and regular retouch over one surface of the tool

(Prilliman and Bousman 1998:600). Flake retouch in this category is intentional and consists of three or more overlapping rows of flake removal along the marginal edges indicating a higher degree of modification when compared to edge-modified flakes. Five thick unifaces are identified. Of these, two are intact (Table 8.5). All thick unifaces in this study contain cortex and have steep edge angles (> 45°). Figure 8.3 illustrates examples of thick unifaces that were identified.

Table 8.5: Thick Uniface descriptive statistics (n=2). All measurements are in millimeters.

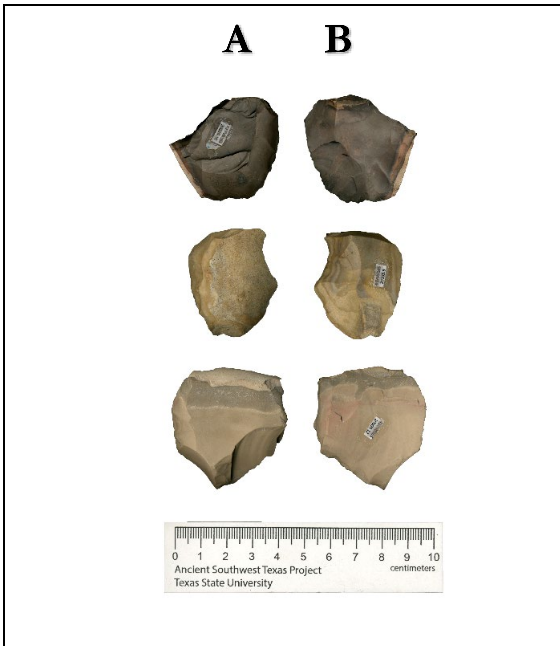
	Length	Width	Thickness	TEM	PEM
Minimum	42	38	17	55	135
Maximum	90	72	27	65	270
Range	48	34	10	10	135
Mean	66	55	22	60	202

8.3-2 Thin Unifaces (N=8)

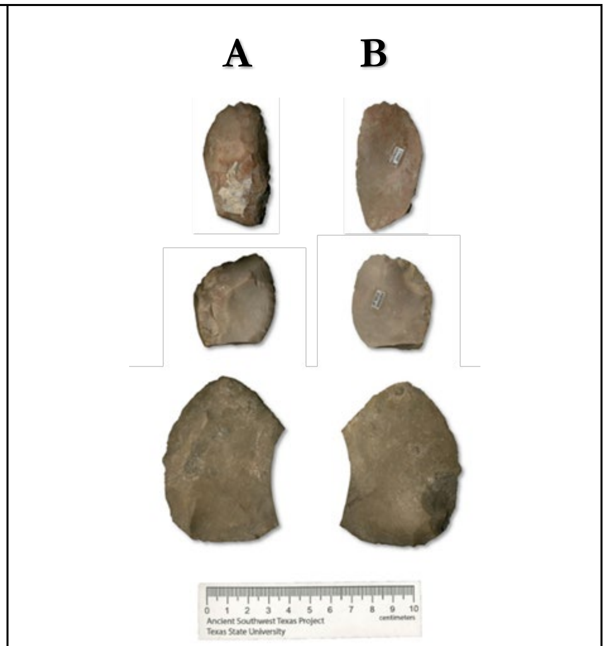
Thin unifaces are defined in the same manner as thick unifaces except they have a thickness less than 15 mm. In total, eight thin unifaces are identified, five of which are intact (Table 8.6). Four of the eight specimens contain cortex, and three of the thin unifaces have a steep edge angle (Appendix C). Figure 8.3 displays examples of thin unifaces from Skiles Shelter.

Table 8.6 Thin Uniface descriptive statistics (n=5). All measurements are in millimeters.

	Length	Width	Thickness	TEM	PEM
Minimum	37	31	9	35	107
Maximum	90	53	14	122	200
Range	53	22	5	87	93
Mean	63.5	42	11.5	78.5	153.5

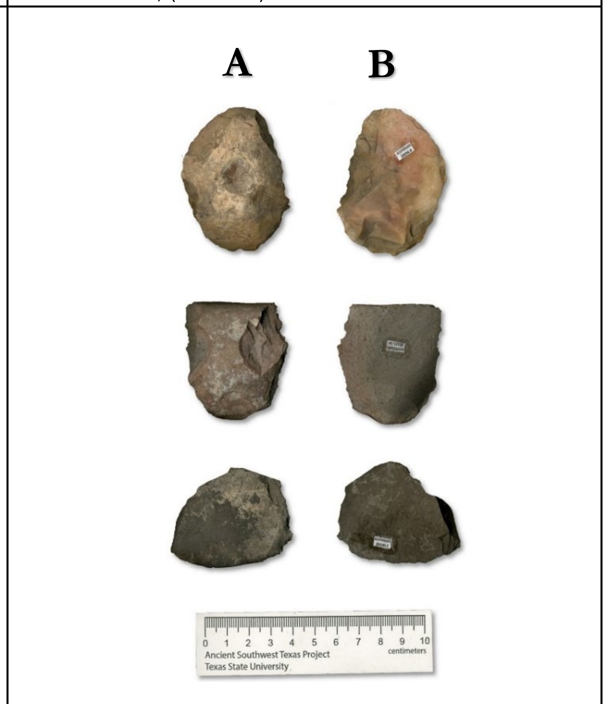


Thick Unifaces: (top) *FN20029.10, (middle) FN20105.9, (bottom) FN20000.12



Thin Unifaces: (top) *FN20062.1, (middle) FN20105.10, (bottom) *FN20073.1

Thin Unifaces: (top) 20031.4, (middle) *FN20003.1, (bottom) FN20018.15.1



Edge-Modified Flakes: (top) *FN20056.8, (middle)*FN20121.14, (bottom) *FN20100.2

Figure 8.3: Examples of Thick Unifaces, Thin Unifaces, and Edge-Modified Flakes from Skiles Shelter. (**A**) denotes dorsal surface of tools and (**B**) denotes ventral surface. Star(*) next to field number indicates if specimen is intact.

8.3-3 Edge-Modified Flakes (N=42)

Non-bifacial chipped stone tools that have regular, moderately invasive (2-9 mm), discontinuous or continuous edge flaking were defined as edge-modified flakes (Prilliman and Bousman 1998:603). In general, artifacts defined as edge-modified flakes display less alteration than thin or thick unifaces. Forty-two edge modified flakes are present among the unifacial assemblage. Seventeen of edge modified flakes are intact (Table 8.7). Twenty-six (62%) of the edge modified flakes exhibit shallow edge angles. Moreover, cortex is observed on twenty-six (62%) of the specimens. Figure 8.3 shows examples of artifacts in this class.

Table 8.7: Edge-Modified Flakes descriptive statistics (n=17). All measurements are in millimeters.

	Length	Width	Thickness	TEM	PEM
Minimum	18	23	5	10	50
Maximum	67	59	22	115	167
Range	49	36	17	105	117
Mean	42	41	13	62	108

8.3-4 Retouched Blades (N=3)

Retouched blades have a blade length twice as long as the maximum width (Prilliman and Bousman 1998:609). These tools exhibit platform preparation, worked marginal edges, and have a central arris, which indicates prior blade removal. Three intact retouched blades were identified (Table 8.8). More blade technology may be present among the un-analyzed debitage from Skiles Shelter. All of the retouched blades have shallow edge angles; only one of the blades contains cortex. Figure 8.4 illustrates examples of retouched blades from Skiles Shelter.

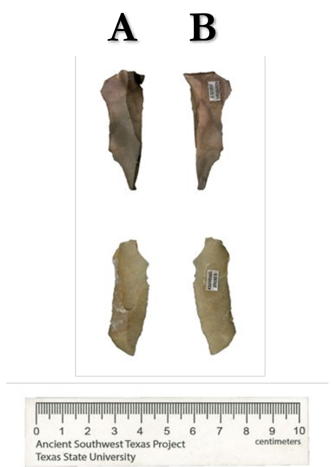
	
Retouched Blades: (top) *FN20015.5 (bottom) *FN20132.5	**Denticulates:** (top) FN20031.3, (bottom) FN20034.9
	
Sequent Flake Tools: (top) *20029.9, (middle) *FN20011.5, (bottom) *FN20029.9	**Multiple Tools**: (top) *FN20116.4 (middle), *FN20105.11, (bottom) *FN20073.5

Figure 8.4: Examples of Retouched Blades, Denticulates, Sequent Flake Tools, and Multiple-Tools from Skiles Shelter. (**A**) Denotes dorsal surface of tools and (**B**) denotes ventral surface. Star (*) next to field number indicates if the specimen is intact.

Table 8.8: Retouched Blades descriptive statistics (N=3). All measurements are in millimeters.

	Length	Width	Thickness	TEM	PEM
Minimum	44	14	4	10	90
Maximum	47	28	7	25	110
Range	3	14	3	15	20
Mean	45	21	5	17	100

8.3-5 Denticulates (N=4)

Denticulates are tools with notch modification along one or multiple edges (Prilliman and Bousman 1998:611). Notching on denticulates can take the form of coarse, regular to semiregular coalescent (saw-like appearance) or dispersed flaking. Four denticulates are observed in the assemblage, and all exhibit a steep edge angle. Cortex is observed on two of the four specimens. One complete denticulate tool was identified; descriptive statistics reflect this specimen (Table 8.9). Figure 8.4 illustrates examples of denticulates from Skiles Shelter.

Table 8.9: Denticulates descriptive statistics (n=1). All measurements are in millimeters

	Length	Width	Thickness	TEM	PEM
Minimum	62	42	12	55	145
Maximum	62	42	12	55	145
Range	--	--	--	--	--
Mean	62	42	12	55	145

8.3-6 Sequent Flake Tools (N=6)

Sequent flake tools are a distinctive class of artifacts commonly found in the Lower Pecos Canyonlands. Turner et al. (2011:249) comments that these tools are "made on oval flakes detached sequentially from elongated chert nodules." Sequent flake tools exhibit a positive and negative bulb of percussion, cortex along one of the marginal edges and flaking along the opposite edge. In profile, these tools have a characteristic "U" shape. Usewear and residue analyses on sequent flake tools from Hinds Cave in the Lower Pecos revealed that some of these tools were hafted and used as knives for processing plants with high silica content such as sotol, lechuguilla, yucca, prickly pear, and grasses (Shafer et al. 2005). The largest sample of formalized sequent flake tools in Hinds Cave was recovered from Early Archaic deposits. Shafer (2013:66) labels certain tools such as sequent flake tools "agave knives" and defines them as "relatively large oval flakes roughly formed to fit into a grooved or split-stick haft." According to Shafer, these knives are the single most common artifact found in Lower Pecos rockshelters. Others have defined "agave knives", more broadly, as any tool that was functionally used to cut and prepare desert succulents (Miller et al. 2011; Knapp 2015).

Six sequent flake tools are identified in the Skiles Shelter assemblage; an additional sequent flake is included in the multiple tool class. Four of the five sequent flakes have a steep edge angle, and four specimens contain cortex. Descriptive statistics for complete sequent flake tools can be found in Table 8.10. Examples of sequent flakes from Skiles Shelter can be found in Figure 8.4

Table 8.10: Sequent Flake Tools descriptive statistics (n=5). All measurements are in millimeters.

	Length	Width	Thickness	TEM	PEM
Minimum	24	29	6	31	72
Maximum	63	64	12	80	160
Range	39	35	6	49	88
Mean	43.5	46.5	9	55.5	116

8.3-7 *Multiple Tools (N=9)*

Multiple tools have a combination of two or more of the class characteristics described above (Prilliman and Bousman 1998). Multiple tools can exhibit additional flaking modifications such as spurs, notching, and burins. Nine multiple tools are identified in the assemblage, five of which are complete. Four of the five multiple tools contain cortex, and six of the tools exhibit a shallow edge angle. The multiple tool categories are presented in Table 8.11, and descriptive statistics for intact multiple tools can be found in Table 8.12. Examples of multiple tools from Skiles Shelter are displayed in Figures 8.4 and 8.5

Table 8.11: Multiple Tool categories.

Multiple Tool Category	Quantity	Field Number
Thick Uniface, Denticulate	1	FN20033.15
Thin Uniface, Denticulate	1	FN25013.22
Edge Modified Flake, Burin	1	FN20105.11
Edge Modified Flake, Notch	1	FN20066.6
Edge Modified Flake, Notch, Burin	2	FN20116.4, FN20063.18
Edge Modified Flake, Denticulate	2	FN20059.3, FN20132.3
Sequent Flake Tool, Denticulate	1	FN20073.5

Table 8.12: Multiple Tool descriptive statistics (n=5). All measurements are in millimeters.

	Length	Width	Thickness	TEM	PEM
Minimum	33	26	6	30	80
Maximum	43	81	15	123	214
Range	10	55	9	93	134
Mean	38	53	10	76	147

8.3-8 *Distribution of Cortex Amount by Unifacial Tool Class*

Many of Skiles Shelter's tools were constructed from either secondary (n=30) or interior flakes (n=30; Table 8.13). The only class made from flakes with primary or secondary cortex were thick unifaces. Varying cortex amounts are observed on specimens in the thin uniface, multiple tool, and sequent flake tool classes. Retouched blades in this assemblage were made from either secondary or interior flakes. Edge-modified flakes constructed on secondary flakes are the most common tool type in the cortex distribution.

Table 8.13: Distribution of cortex type by unifacial tool class.

	Cortex			
Tool Class	Primary	Secondary	Interior	Row Total
Denticulate Count	1	1	2	4
Edge Mod. Flake Count	9	18	16	43
Multiple Tool Count	2	2	5	9
Retouched Blade Count	0	1	2	3
Thick Uniface Count	2	3	0	5
Thin Uniface Count	2	2	4	8
Sequent Flake Tool Count	1	3	1	5
Column Total:	17	30	30	77

8.3-9 Unifacial TEM:PEM Ratios

The mean potential edge modification (PEM) and mean total edge modification (TEM) ratios on intact tools were calculated to measure the intensity of reduction. The intensity of reduction is expressed by the TEM:PEM ratios and rated by four scales: 1-25% = low reduction, 26-50% = moderate reduction, 51-75 % = moderately high reduction, and 76-100% high reduction. The results of the TEM:PEM ratios show that multiple tools and thin unifaces from Skiles Shelter have moderately high amounts of reduction (Figure 8.5; Table 8.14). Denticulates, edge-modified flakes, sequent flake tools, and thick unifaces show moderate amounts of reduction, and retouched blades show low reduction.

8.3-10 Uniface Microscopic Analysis

A microscopic examination was conducted on the unifacial tools from Skiles Shelter. All tools were inspected under low powered magnification to search for the presence of mammal hairs and plant epidermis or fiber fragments. A Dino-Lite microscope was used to

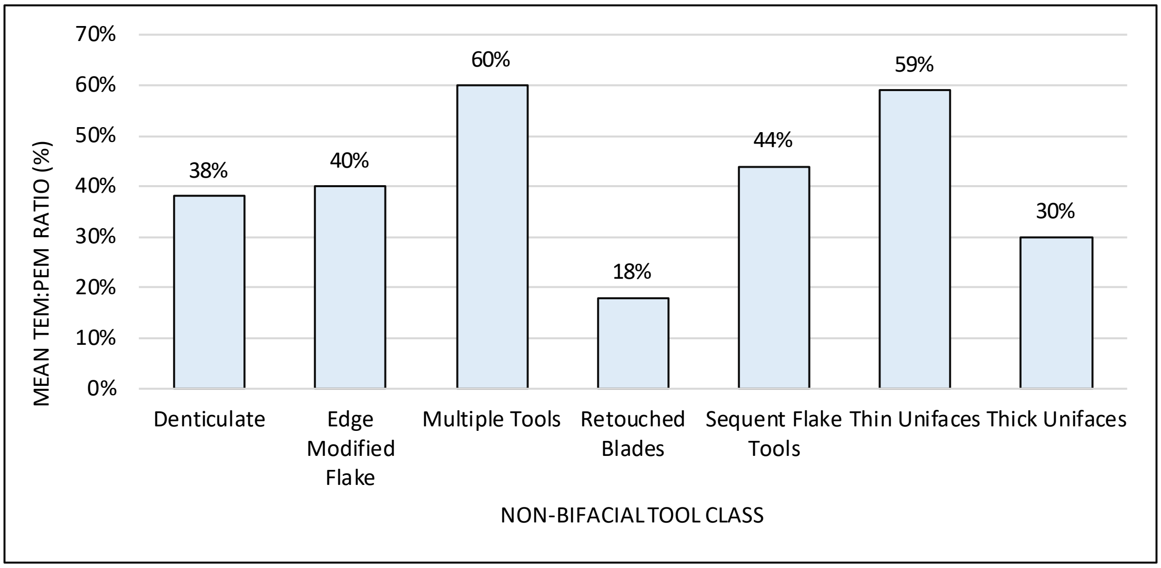


Figure 8.5: Mean Total Edge Modification (TEM) and Potential Edge Modification (PEM) ratios (%) by tool class.

Table 8.14: Table of mean Total Edge Modification (TEM), Potential Edge Modification (PEM) and TEM:PEM ratios by tool class.

Tool Class	Mean TEM	Mean PEM	Mean TEM:PEM %
Denticulates	55	145	38%
Edge Modified Flakes	44	109	40%
Multiple Tools	83	139	60%
Retouched Blades	18	100	18%
Sequent Flake Tools	58	133	44%
Thick Unifaces	60	202	30%
Thin Unifaces	93	158	59%

take photos of select tools. No mammal hairs were identified on any of the unifacial chipped stone tools in the assemblage. This is likely a result of Skiles Shelter's artifacts being washed during initial lab processing. In a similar use wear study on unifacial tools from Hinds Cave – a dry rockshelter in the Lower Pecos – mammal hairs were identified on fourteen of the fifty-five unwashed tools that were examined (Sobolik 1996). The preservation conditions at Skiles Shelter are less favorable than Hinds Cave, but comparable residues could have been present on the tools. Despite shortcomings in identifying mammal hair, unidentified plant epidermis/fiber fragments are recognized on twenty-two (28%) of the seventy-seven unifacial tools (Table 8.15 Table 8.16; Figure 8.6; Figure 8.7). Edge-modified flakes had the most tools with epidermis or fiber, followed by thin unifaces. Plant material was found on at least one tool from each tool class. The presence of plant epidermis or fibers on tools from each unifacial class infer their use for plant processing activities.

Table 8.15: Descriptive statistics for complete unifacial tools with microscopic epidermis/fiber fragments (n=11). All measurements are in millimeters.

	Length	Width	Thickness	TEM:PEM
Minimum	24	16	6	.17
Maximum	90	72	27	.77
Range	66	56	21	.6
Mean	57	44	16	.47

Table 8.16: Distribution of tools from the uniface assemblage with microscopic epidermis fragments.

Uniface Class	Tools with Epidermis or Fiber
Denticulate	1
Edge-Modified Flake (Figure 8.16)	10
Multiple Tool	3
Retouched Blade	1
Thick Uniface	2
Thin Uniface	4
Sequent Flake (Figure 8.15)	1
Total:	**22**

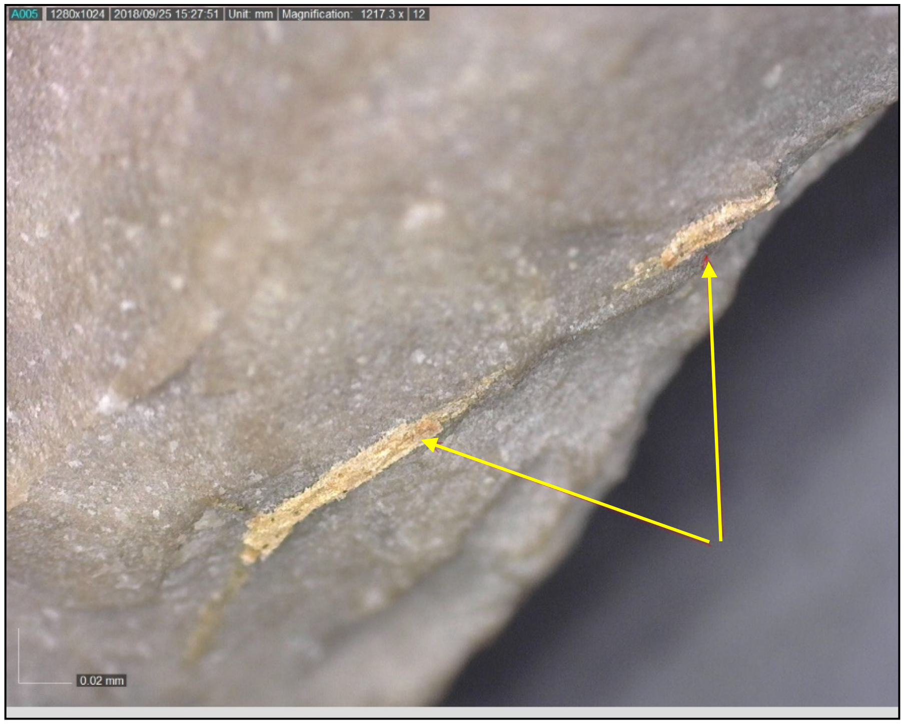


Figure 8.6 Unidentified plant epidermis fragment on the edge of a sequent flake tool (FN20029.9). Yellow lines point to epidermis fragments.

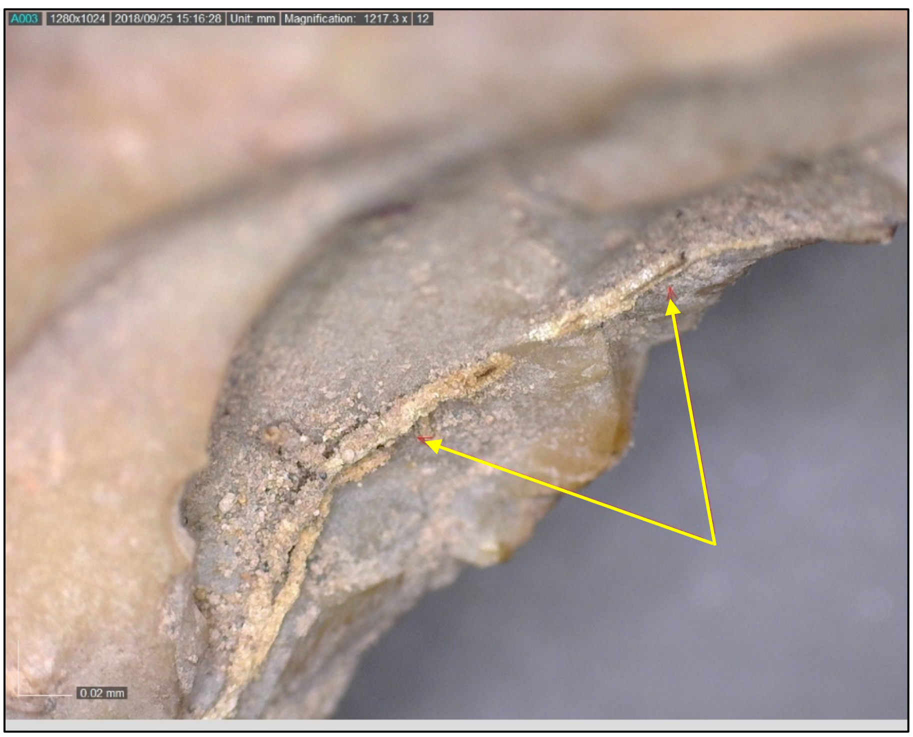


Figure 8.7: Unidentified plant epidermis fragment on the edge of an edge-modified flake (FN20056.8). Yellow lines point to epidermis fragments.

8.4 Non-Projectile Point Bifacial Tool Analysis (N=133)

Bifaces are tools that have been modified on both sides to create an edge that travels the entire margin of the artifact (Andrefsky 2005:77). Bifaces are further distinguished by the presence of a hafting element, which attaches the artifact to a handle or shaft. Hafted bifaces include functional types such as "arrow points," "hafted knives," and "hafted drills." Non-hafted biface forms include preforms, point tips, and bifacial knives. Additionally, biface fragments can be repurposed and used as burins or perforator tools (Dial and Collins 1998:537).

Following the methods established by Dial and Collins (1998) this analysis examines the technological variability in Skiles Shelter's bifacial tool assemblage. Excluding projectile points, all forms of bifacial technology from the 2013 and 2014 Skiles Shelter excavations were examined. General compositional data were first collected on each of the bifaces, which included their raw material type, and the presence or absence of cortex. Biface measurements, outline form (if complete), condition, fracture type and portion (if broken) were the reported attributes recorded for each specimen. Descriptions of the coding terminology used in this analysis can be found in Appendix C.

Biface measurements included maximum length, width, and thickness to the nearest whole millimeter. Measurements on broken specimens were only conducted on intact portions. Each bifacial tool was measured with the longest portion positioned vertically, and the base (if present) positioned proximal to the observer. The compositional data, attributes, and measurements were then used to group the bifacial tools into eleven classes: Stage 1-3 biface, or Class A-I bifacial tool. Like the unifacial tools, each specimen was inspected under low powered magnification to note the presence of mammal hairs and plant/epidermis fragments.

8.4-1 Stage 1 Bifaces (N=3)

Stage 1 bifaces are roughly shaped with crude flaked outlines (Dial and Collins 1998:539). This class can have considerable cortex. Three Stage 1 bifaces are identified (Figure 8.8), and all specimens are broken fragments. Consequently, no descriptive statistics are presented. The mean biface thickness for this class is 16 mm. One Stage 1 biface has edge collapse damage, while the other two specimens have complex fractures (bend/perverse and bend/edge collapse).

8.4-2 Stage 2 Bifaces (N=14)

Stage 2 bifaces have undergone a greater amount of thinning than Stage 1 bifaces and do not retain their original flake morphology (Dial and Collins 1998:543). These bifaces have a more regularized outline than Stage 1 and less cortex. Fourteen Stage 2 bifaces are present in the assemblage; only one Stage 2 biface is intact (Table 8.17). The mean thickness for specimens in this class is 8 mm. Of the fractures noted, 43% (n=6) of the tools have bend fractures, 21% (n=3) perverse fractures, 28% (n=4) complex fractures (bend/edge collapse and perverse/burin-like). Examples of Stage 2 bifaces are displayed in Figure 8.8.

Table 8.17: Descriptive statistics for complete Stage 2 bifaces (n = 1). All measurements are in millimeters.

	Length	Width	Thickness
Minimum	72	38	18
Maximum	72	38	18
Range	--	--	--
Mean	--	--	--

8.4-3 Stage 3 Bifaces (N=13)

Stage 3 bifaces exhibit more-regularized outlines and lateral edges than Stage 1 or 2 bifaces and have little to no cortex – this class represents the final stage of biface production (Dial and Collins 1998:545). Artifacts in this class have extensive to complete secondary

Stage 1 Bifaces: (top) FN20000.4, (middle) FN20059.8, (bottom) FN20059.2

Stage 2 Bifaces: (top) FN20063.10, (upper middle) FN20117.2, (lower middle) FN20068.5, (bottom) FN20064.4

Stage 3 Bifaces: (top) FN20000.9, (upper middle) FN20063.13, (middle) FN20059.12, (lower middle) FN20030.3, (bottom) FN20000.16

Class A (Knife-like): (top) FN20000.7 (middle), *FN20063.8, (bottom) FN20116.2

Figure 8.8: Examples of Stage 1, Stage 2, Stage 3, and Class A bifaces from Skiles Shelter. **A** and **B** denote front and back of biface. Star (*) next to field number indicates if the specimen is intact.

flaking on some specimens, and final flaking may have been in progress. Thirteen Stage 3 bifaces are observed, none of these specimens are complete. The mean thickness for this class is 8 mm. Five (38%) of the Stage 3 bifaces have bend fractures, 8% (n=1) perverse, 8% (n=1) edge collapse, and 38% (n=5) have complex fractures (bend/burin-like, bend/perverse, bend/spiral, and perverse/burin-like). Figure 8.8 provides examples of Stage 3 bifaces.

8.4-4 Class A (Knife-Like) (N=6)

Class A bifaces are grouped by their acute (<45°) lateral edges; these tools are similar to bifacial tools traditionally defined as "knives" (Dial and Collins 1998:549). Bifaces in this class vary in terms of their outline shape and method of manufacture. Six Class A bifaces are identified, two of which are intact (Table 8.18). The mean thickness for Class A bifaces is 7 mm. Of the four broken specimens in this class, bend fractures (n = 3) are the most common; the remaining specimen exhibits a perverse fracture. Examples of Class A bifaces can be found in Figure 8.8.

Table 8.18: Complete Class A bifaces descriptive statistics (n=2). All measurements are in millimeters.

	Length	Width	Thickness
Minimum	43	24	6
Maximum	56	41	9
Range	13	17	3
Mean	49	32	7.5

8.4-5 Class B (Steep-Edged) (N=3)

Class B bifaces (Figure 8.9) have steep, beveled lateral or distal edges(>45°) and are similar to tools traditionally defined as "bifacial scrapers" (Dial and Collins 1998:552). All Class B bifaces are intact (Table 8.19), and their mean thickness is 20 mm. The bifaces in this class are noted as being subtriangular (n=2) or asymmetrical (n=1) in outline form. The marginal edge modification for all three specimens is crude in appearance.

Table 8.19: Complete Class B bifaces descriptive statistics (N=3). All measurements are in millimeters.

	Length	Width	Thickness
Minimum	50	42	17
Maximum	94	55	24
Range	44	13	7
Mean	72	48	20

8.4-6 Class C (Planoconvex) (N=2)

Class C bifaces (Figure 8.9) look similar to unifacial tools, yet, they are bifacially flaked (Dial and Collins 1998:552). Specimens in this class have a significant amount of cortex and marginally flaked edges; the ventral surfaces on these tools are completely flaked and free of cortex. Four Class C bifaces are identified; two of these specimens are complete (Table 8.20). The Class C bifaces from Skiles Shelter exhibit a mean thickness of 11 mm. Both broken specimens have bend fractures

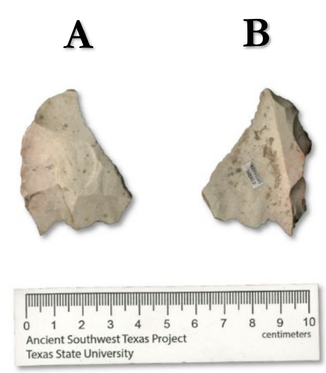
Table 8.20: Complete Class C bifaces descriptive Statistics (n=2). All measurements are in millimeters.

	Length	Width	Thickness
Minimum	46	40	9
Maximum	50	45	13
Range	4	5	4
Mean	48	43	11

Class B (Steep-Edged): (top left) *FN20018.5, (middle left) *FN20063.5, (bottom left) *FN20063.4

Class C (Planoconvex): *FN20063.9

Class D (Thick, Narrow, Elongate): (top) *FN20033.5, (bottom) *FN20073.2



Class E (Retouched Breaks): FN20132.2

Figure 8.9: Examples of Class B, Class C, Class D, and Class E bifaces from Skiles Shelter. **A** and **B** denote front and back of biface. Star (*) next to field number indicates if the specimen is intact.

8.4-7 Class D (Thick, Narrow, and Elongate) (N=4)

Class D bifaces (Figure 8.9) have a steep "turtleback" or irregular planoconvex face with a low width to thickness ratio (Dial and Collins 1998: 552). Three complete Class D bifaces are identified (Table 8.21); their mean thickness is 18 mm. The intact specimens are elongated and their outlines are noted as subtriangular and asymmetrical.

Table 8.21: Complete Class D bifaces descriptive statistics (n=3). All measurements are in millimeters.

	Length	Width	Thickness
Minimum	54	29	12
Maximum	64	42	24
Range	10	13	12
Mean	59	36	18

8.4-8 Class E (Retouched Breaks on Biface) (N=1)

Class E bifaces have breaks that have been retouched (Dial and Collins 1998:555). Specimens in this class were rare, and only one Class E biface is identified in the assemblage. The Class E biface from Skiles Shelter was fractured from an overshot flake and the upper ventral marginal edge of the specimen was retouched (Figure 8.9).

8.4-9 Class F (Naturally Backed Bifaces) (N=2)

Class F bifaces (Figure 8.10) have a "tabular facet or steep, cortex covered edge opposing an edge that is either acute or slightly beveled" (Dial and Collins 1998:556); the backing on these tools may have facilitated prehension. Only one Class F biface from Skiles Shelter is intact (Table 8.22). The mean thickness for both specimens is 11 mm, and the broken specimen exhibits a bend fracture.

Table 8.22: Complete Class F bifaces descriptive statistics (n=1). All measurements are in millimeters.

	Length	Width	Thickness
Minimum	53	36	11
Maximum	53	36	11
Range	--	--	--
Mean	--	--	--

8.4-10 Class G (Appendages) (N=37)

This class of bifaces was a catchall category for any broken biface appendage to small or fractured to be properly examined. Bifaces in this class include any distal, proximal, lateral edge, ear, tang, barb, stem, and in some cases medial fragments (Figure 8.10). If a fragment showed cleared signs of being a multi-tool (Class H), it was labeled as such. The mean thickness for specimens in this class is 6 mm. Of the bifaces in Class G, 73% (n=27) exhibited bend fractures; 8% (n=3) complex fractures (bend/longitudinal overshot, bend/radial/edge collapse, and radial/thermal) 8% (n=3) radial fractures, 6% (n=2) perverse fractures, 2% (n=1) thermal, and 2% (n=1) multi-hinge.

8.4-11 Class H (Multiple-Tool) (N=6)

Class H bifaces are like *Multiple-Tool* unifaces (Section 8.3-7) and have two or more unique edge-modifications (Dial and Collins 1998:552). Six Class H bifaces are identified; only one of these bifaces is intact (Table 8.23). The mean thickness for all Class H bifaces is 12 mm. Of the five broken specimens, three exhibit bend fractures, one has a longitudinal overshot fracture, and one has a complex fracture (bend/edge collapse). Table 8.24 list the categories of Class H bifaces and Figure 8.9 provides examples of Class H bifaces.

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<tr>
<td>Class F (Naturally Backed): *FN20012.7</td>
<td>Class G (Appendages): (top) FN20066.1, (upper middle) FN20121.2, (lower middle) FN20107.2 (bottom) FN20030.10</td>
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<tr>
<td>Class H (Multi-tool): (top) FN20063.11, (bottom) FN20056.1,</td>
<td>Class H (Multi-tool): (top) FN20030.7, (bottom) FN20063.15</td>
</tr>
</table>

Figure 8.10: Examples of Class F, Class G, Class H bifaces from Skiles Shelter. **A** and **B** denote front and back of biface. Star (*) next to field number indicates if specimen is intact.

Table 8.23: Complete Class H bifaces descriptive statistics (n=1). All measurements are in millimeters.

	Length	Width	Thickness
Minimum	76	39	12
Maximum	76	39	12
Range	--	--	--
Mean	--	--	--

Table 8.24: Class H (Multiple-tool) categories (N=6).

Class H Categories	Quantity	Field Number
F (Naturally Backed), Notch	1	FN20056.1
F (Naturally Backed), C (Planoconvex)	1	FN20082.5
G (Appendage), Notch	1	FN20063.11
B (Steep Edged), Notch	1	FN20063.15
A (Knife-Like), Notch	1	FN20030.7
Stage 2, Notch	1	FN20000.6

8.4-12 Class I (Indeterminate Bifacial Tools) (N=40)

All bifaces with puzzling shapes, sizes, and modifications were grouped under Class I. Many of the bifaces in this class were too fragmented to determine morphology. Of the forty Class I, only one specimen is complete (Table 8.25). This class represented the largest group of bifaces from Skiles Shelter.

Table 8.25: Complete Class I bifaces descriptive statistics (n=1)

	Length	Width	Thickness
Minimum	27	17	5
Maximum	27	17	5
Range	--	--	--
Mean	--	--	--

8.4-13 Distribution of Cortex on Bifacial Tool Classes

Cortex was recorded as being present or absent. Only 14% (n=19) of the 133 bifaces in the assemblage contain cortex (Table 8.26). Classes G and I have the highest numbers of tools with cortex. Low cortex amounts on bifacial tools in this assemblage reveal that many of the tools underwent a significant amount of modification.

Table 8.26: Distribution of cortex on bifacial tool classes.

Biface Class	Tools with Cortex Present	Percent
C	3	16%
D	2	11%
G	4	21%
H	1	5%
I	4	21%
Stage 1	1	5%
Stage 2	3	16%
Stage 3	1	11%
Total	**19**	**100%**

8.4-14 Distribution of Fracture Types on Bifacial Tool Classes

Break types on bifaces (n=119) in this assemblage consist of bend, perverse, overshot, thermal, edge-collapse, radial, multi-hinge, longitudinal overshot, burin-like, or multiple breaks (Table 8.28). Definitions of the break types can be found in Appendix C. Sixty-six (55%) of the bifaces from Skiles Shelter have bend fractures. The second and third most common fractures in the assemblage are perverse (11%; n=13) and radial (7%; n=9). Twenty-two (18%) of the bifaces have multiple fractures (Table 8.29); bend and edge collapse fractures (n=6) are the most common breaks in this category. The second most common multiple fracture type is bend and perverse fractures (n=5). Overall, Stage 3 and Class I bifaces exhibit the largest counts of complex fractures.

8.4-15 Biface Microscopic Analysis

Like the unifacial tools, a microscopic examination was conducted on the biface assemblage to search for the presence of mammal hairs and plant epidermis or fiber fragments. No mammal hairs were identified on any of the bifacial tools, a result likely due to artifact washing. Plant epidermis or fiber fragments are identified on 9 of the 133 bifacial tools that were analyzed (Table 8.27). The presence of epidermis on bifacial tools (7%) is low compared to the unifacial tools (28%). Figures 8.11 and 8.12 provide examples of bifaces with plant epidermis from Skiles Shelter.

Table 8.27: Distribution of bifacial tools with microscopic epidermis/fiber fragments.

Biface Class	Tools with Epidermis/Fiber	Percentage
A	2	22%
B	1	11%
G	1	11%
H	1	11%
I	2	22%
Stage 2	2	22%
Total:	**9**	**100%**

Table 8.28: Distribution of fracture types and counts for the Skiles Shelter biface assemblage. Tools with multiple breaks are further described in Table 8.29.

Class	Bend	Edge Collapse	Longitudinal Overshot	Multi-hinge	Overshot	Perverse	Radial	Thermal	Multiple Breaks (Table 8.29)	Grand Total
A	3					1				4
B										0
C	2									2
D										0
D		1								1
E					1					1
F	1									1
G	27			1		2	3	1	3	37
H	3		1						1	5
I	19			1		6	6	1	6	39
Stage 1		1							2	3
Stage 2	6					3			4	13
Stage 3	5	1				1			6	13
Grand Total	66	3	1	2	1	13	9	2	22	119

Table 8.29: Distribution of multiple fracture types and counts for the Skiles Shelter biface assemblage.

Biface Class	Bend, Burin Like	Bend, Edge Collapse	Bend, Longitudinal Overshot	Bend, Perverse	Bend, Radial	Bend, Radial, Edge Collapse	Bend, Spiral	Perverse, Burin-Like	Radial, Thermal	Thermal, Bend	Row Total
G			1			1			1		3
H		1									1
I		1		1	3					1	6
Stage 1		1		1							2
Stage 2		3						1			4
Stage 3	1			3			1	1			6
Grand Total	1	6	1	5	3	1	1	2	1	1	22

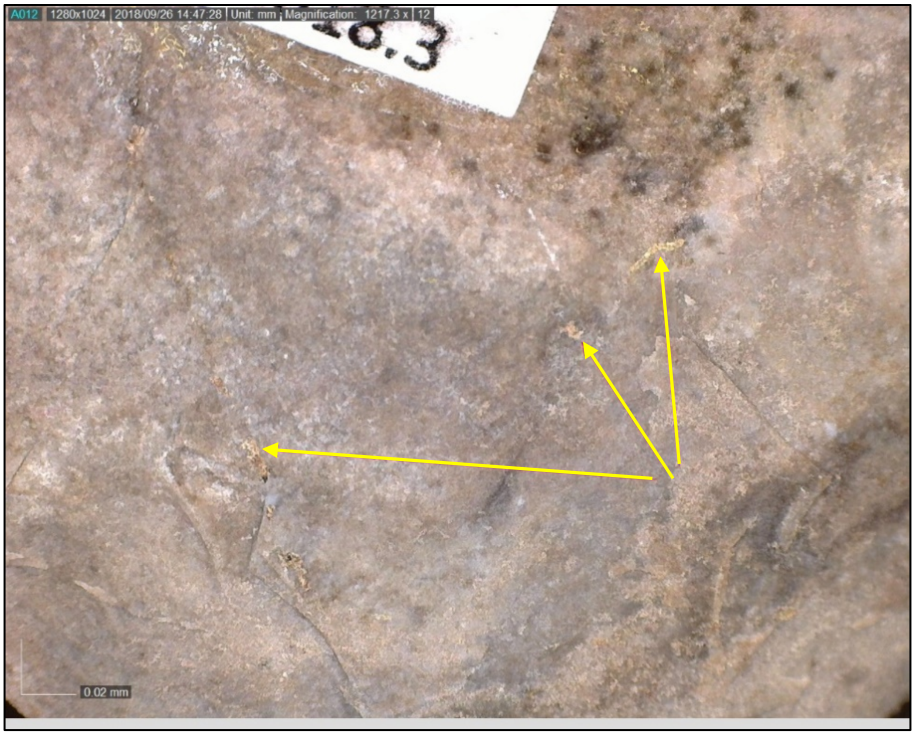


Figure 8.11: Unidentified plant epidermis fragment on the face of a Stage 2 biface (FN20018.3). Yellow lines point to epidermis fragments.

Figure 8.12: Unidentified plant epidermis fragment on the face of a Stage 3 biface (FN20000.9). Yellow lines point to epidermis fragments.

8.5 Cores (N=27)

Cores are defined by Andrefsky (2005:254) as a "nucleus or mass of rock that have signs of detached piece removal." Twenty-seven cores were identified in the chipped stone tool assemblage. No analysis of the cores from Skiles Shelter was conducted for this thesis. Based on the flaking patterns of some speciens, six cores from Skiles Shelter appear to have been used as tools (Figure 8.13).

Possible Core Tools: (From left) FN20045.16, FN20063.31, FN20166; FN20041.21

Figure 8.13: Examples of possible core tools from Skiles Shelter.

8.6 Discussion

Seven unifacial tool classes are recognized at Skiles Shelter: Thick Unifaces, Thin Unifaces, Edge-Modified Flakes, Denticulates, Retouched Blades, Sequent Flake Tools, and Multiple Tools. Edge-Modified Flakes (N=42) are the most prominent unifacial class in the assemblage (Appendix C: Table C.1). Multiple Tools (N=9) and Thin Unifaces (N=8) are the second and third most prominent classes. The occurrence of Retouched Blades is low (N=3; 3%). Additional non-retouched blade technology is likely present among the unanalyzed lithic debitage from Skiles Shelter. Overall, Units N and P (located in the burned rock midden) have the highest densities of unifacial chipped stone tools.

All bifacial tools from Skiles Shelter were analyzed to examine technological variability and subdivided into twelve morphological classes. Class G (appendages; N=37) and Class I (indeterminate; N=40) are the most prominent classes in the assemblage (Appendix C: Table C.6). Admittedly, the high number of Class G bifaces are partially a result of the author's inexperience in classifying bifaces. Nevertheless, many of the bifaces in this class were heavily altered or fractured beyond their original form making classification difficult. Excluding Class G and I, bifaces in Stage 2 (N=14), Stage 3 (N=13), Class A (N=6), and Class H (N=6) are the first, second, and third most prominent types in the assemblage. The highest densities of bifaces were recovered in Unit C in the eastern lobe of the site and Units I, J, K in Skiles' burned rock midden. Unidentified plant epidermis/fiber was identified on 9 of the 133 (7%) bifaces that were analyzed.

Per the research objective presented in Chapter 1, some inferences on the use of Skiles' tools for plant processing can be made through a comparison to Hinds Cave's unifacial tools. Shafer and Holloway (1977) and Sobolik (1996) have found that some unifacial tools from Hinds Cave were multifunctional and used to process different types of desert succulents as well as other plant and animal materials. In her study of 55 lithic tools from Hinds Cave, Sobolik (1996) recognized under magnification that 40 of the tools, with edge angles 49° or less, had organic residues. She argued that this designates their use for slicing or cutting activities. In addition to organic residue, Sobolik found a high amount of usewear polish on many of the specimens. On tools with polish she noted a high frequency of phytoliths and druse crystals – elements of agave and yucca (1996:468). In an earlier study, Shafer and Holloway (1977:128) examined a small sample of unifacial lithic tools from Hinds

Cave. The authors argued that the unifacial lithic technology from Hinds Cave was used opportunistically for different types of cutting or scraping activities.

Despite the many flood events that have impacted Skiles Shelter's deposits (see Chapter 6.3), it is possible that the tools from the site exhibited a partial degree of organic residue. These residues were possibly reduced after washing the artifacts for curation. Additionally, plant epidermis was found on at least one tool in each unifacial class. For bifacial tools, only a few tools exhibited plant epidermis or fiber on their surfaces. Based on the higher number of unifaces with plant material adhering to their surfaces, I argue that these tools may have been used more for plant processing activities.

9. SKILES SHELTER GROUND STONE ANALYSIS AND OTHER NON-CHIPPED STONE ARTIFACTS

This chapter covers the ground stone, and other non-chipped stone artifact assemblages from Skiles Shelter. Ground stone were counted and weighed and organized into four general typological categories: light use handstones, formed handstones, possible handstones, and manuports (Table 9.1). The methodology I use is based on the basic ground stone analytical procedures established by Adams (2002: Appendix D).

Table 9.1: Ground stone, possible ground stone, and non-ground stone counts from the 2013 and 2014 Skiles Shelter excavations.

Type:	Light-Use Handstones	Formed Handstones	Possible Handstones	Manuports
Count:	25	8	22	26

9.1 *Ground Stone*

Ground stone is any non-chipped lithic tool that is "primarily manufactured through mechanisms of abrasion, polish, or impaction or is itself used to grind, abrade, polish, or impact" (Adams 2002:3). Most ground stone artifacts fall within a broad classification scheme and are categorized as handstones, lapstones, or netherstones (Figure 9.1). Ground stone can fall under other categories such as hafted percussion tools, paraphernalia, bowls and containers, and structural stones. Ambiguity can exist among these categories and ground stone artifacts can be used for more than one function.

The analysis of Skiles Shelter's ground stone assemblage addresses the following research questions: (1) are specific clusters of ground stone designs present in the Skiles Shelter assemblage? (2) Do the morphological attributes of Skiles Shelter's ground stone correlate with Castañeda's (2015) bedrock feature research?

The attributes recorded for each specimen include: the artifact type, rock type, natural form, condition, surface texture, number of used surfaces, surface wear, surface configuration, stroke, and presence or absence of battering and polish. Definitions of the coding terminology used for this analysis can be found in Appendix D. Measurements were taken on the maximum length, width, and thickness on each ground stone specimen to the nearest whole millimeter using Mitutoyo absolute digital calipers, and each specimen was weighed using a Scout-Pro 400 g scale. Measurements were not taken on broken specimens. The collected attributes were then used to classify specimens in the assemblage as light use handstones, formed handstones, possible handstones, and manuports.

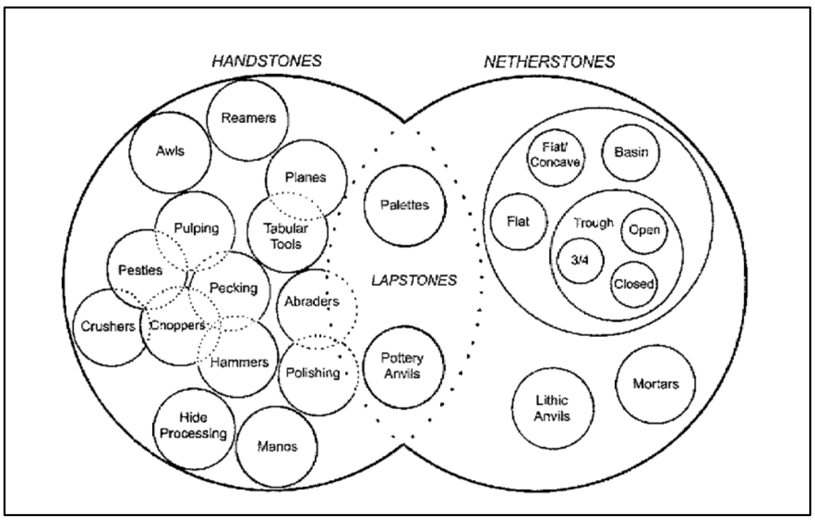


Figure 9.1: Diagram showing handstones, netherstones, and lapstones (From Adams 2002: Figure 4.6).

9.2 Handstones (N=33)

Handstones are defined as any hand-held, ground stone artifacts that have a utilized surface. Utilization on this class varied but consists of use wear from one or a combination of the following strokes: chopping, pecking, grinding, rocking, crushing, cutting, scraping, shaving/slicing, stirring, pounding, and rocking or circular abrasion. All handstones were subdivided into *light use* or *formed handstones* categories. Light use handstones are any ground stone artifacts that had one or more utilized surfaces but retained their apparent natural form. Formed handstones were specimens in which the original shape and form of the stone were heavily modified. Handstone size is further categorized on whether the specimen is a pebble (15 cm or smaller in width and length) or cobble (15 cm or larger in width and length).

9.2-1 Light Use Handstones (n=25)

Light use handstones are the largest (n=25) class of ground stone from Skiles Shelter. Sixteen (64%) of the light use handstones are relatively flat; river rounded pebbles – similar in size and shape as painted pebbles (Mock 2011); eight (32%) of the light use handstones are cobbles. The remaining light use handstone is a broken limestone fossil with a light sheen and black residue on one surface.

Regarding the pebble light use handstones (n=16), nine of the specimens (56%) exhibit light usewear and seven(43%) have moderate usewear. Twelve (75%) of the sixteen pebbles have use wear on two or more surfaces. Pecking and reciprocal usewear is the most common strokes identified on the light use pebbles – many of which have a combination of these strokes (Figure 9.3, 9.4). Polish was observed on eleven (68%) of the pebbles. Four (25%) of the pebbles were noted as having residue adhering to one or more surfaces, and one of the pebbles has unidentified plant epidermis fragments embedded in its pecking marks (FN20100.3). Thirteen (81%) of the pebbles are limestone, and three (18%) were classified as chert/unidentified siliceous stone.

Light-Use Handstones: (Top Left) FN20063.26, FN20084.24, FN25402, FN20073.7, FN20100.3 (bottom left) FN20073.8, FN20016.6, FN20018.14, FN20023.7, FN20056.5, FN20029.15

Figure 9.2: Examples of pebble light-use handstones from Skiles Shelter. This figure only shows one utilized face of the light-use handstones examples; some of the specimens above have more than one used surface.

Of the eight cobble light use handstones, only one specimen is intact. Four (50%) of the cobbles have usewear on two or more surfaces. Reciprocal use wear is the most common stroke (37%; n=3) identified on the cobbles. Cobbles with pecking (n=1) and polish (n=1) were not common. Four (50%)of the cobbles are limestone; two (25%) are unidentified igneous rock, and one is unidentified metamorphic rock. Descriptive statistics for all the intact light use handstones (n=11) from Skiles Shelter can be found in Table 9.2.

Table 9.2.: Complete Light Use Handstone descriptive statistics (n=11). All measurements are in mm.

	Length	Width	Thickness
Minimum	16	9	4
Maximum	145	127	26
Range	129	118	22
Mean	80.5	68	13

FN20016.6: Light use handstone with battering and reciprocal usewear on end of pebble.

FN20003.3: Light use handstone with battering on end of pebble.

FN20029.16: Light use handstone with battering and reciprocal usewear on end of pebble.

FN20100.3: Light use handstone with battering on end of pebble.

FN20073.7: Light use handstone with battering on end of pebble.

FN20029.17: Light use handstone with battering and reciprocal usewear on the face of pebble.

Figure 9.3: Examples of usewear on Skiles Shelter's pebble light use handstones. Scale in centimeters.

FN20105.14: Light use handstone with battering and reciprocal usewear on the face of pebble.

FN20029.16: Light use handstone with battering (not visible in photo) and unidentified white residue.

FN20023.7: Light use handstone with reciprocal usewear and green residue.

FN20063.26: Light use handstone with reciprocal usewear on end of pebble.

FN20063.32: Possible handstone with red/white residue adhering to the surface of pebble.

FN20112.3: Possible handstone with orange residue adhering to the surface of pebble.

Figure 9.4: Examples of usewear on Skiles Shelter's light use pebble handstones and possible handstones.

9.2-2 Formed Handstones (n=8)

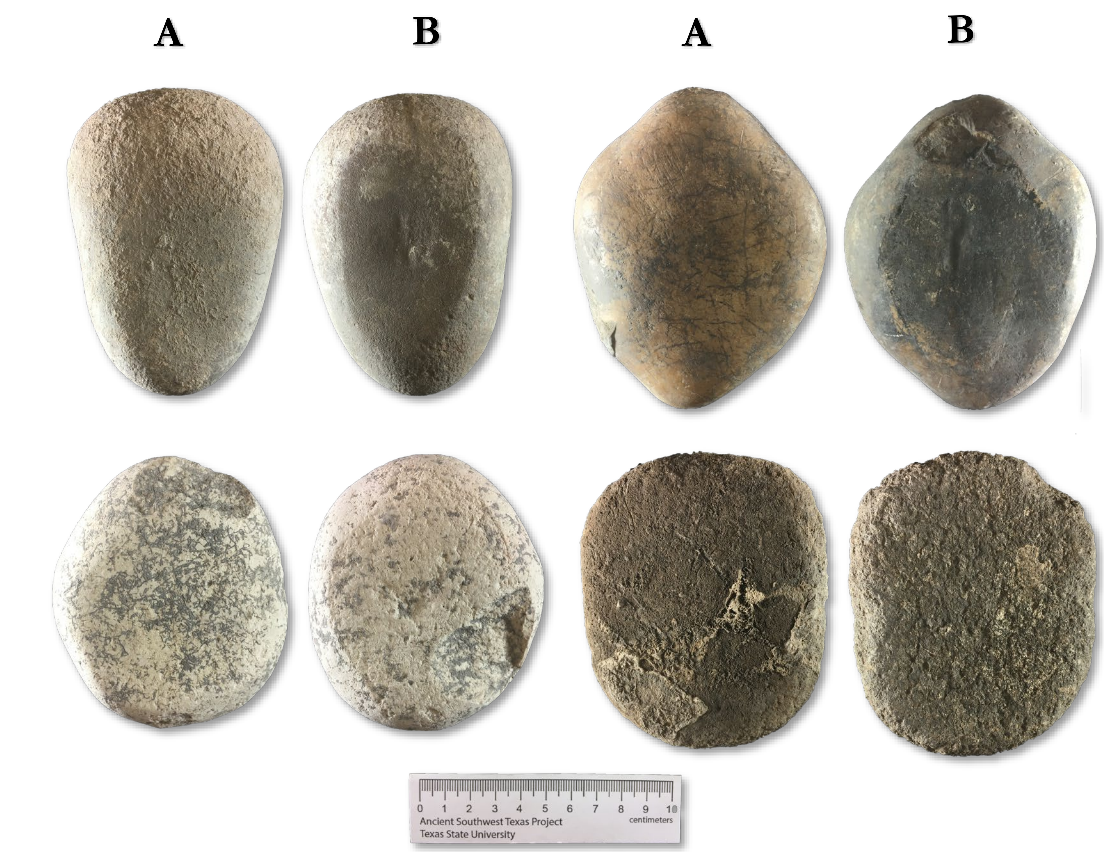
Eight formed handstones were identified in the ground stone assemblage. These specimens were modified from limestone river pebbles (n=1), unidentified mineral pigment (n=1), and cobbles of basalt, limestone, or unidentified sedimentary rock (n =6). Twelve of the eight formed handstones are intact (Table 9.3). All but one of the formed handstones exhibit heavy use wear on two or more surfaces- the remaining handstone in this class has concretion covering one of the surfaces and could not be fully evauluated. Convex and flat surface configurations are the most common modifications to this class (Appendix D). Five (62%) of the formed handstones have multiple stroke patterns (Appendix D). Additionally, pecking (n=3), polish (n=3), and residue (n=2) was observed on select specimens in this class. Three of the seven formed handstones from Skiles Shelter exhibit a flat surface with a pecked center and rounded edges from possible rocking motions (Figure 9.5).

Table 9.3: Complete Formed Handstones descriptive statistics (n=6). All measurements are in mm.

	Length	Width	Thickness
Minimum	31	29	6
Maximum	109	90	49
Range	78	61	43
Mean	84	66	29

9.3 Possible Handstones (N=22)

Possible handstones are defined as any rock or cobble that have no visible signs of surface modification, but have residues, polish/possible polish, or were found in association with a cultural feature. Twenty-two possible handstones were identified and seven of the possible handstones are intact (Table 9.4). Nineteen (86%) of the possible handstones are relatively flat, river rounded pebbles (similar to those in the light use handstone class). Other possible handstones include limestone cobbles (n=2), and limestone fossils (n=1). Polish was noted on six of the possible handstones. Residue or plant epidermis was noted on ten of the possible handstones.



Formed Handstones: (top left) FN20057.11, FN20035.6, (bottom left) FN20107.11, FN20028.6

Figure 9.5: Examples of Formed Handstones from Skiles Shelter. **A** and **B** denote the front and back of handstones. All specimens above were considered intact.

Table 9.4: Complete Possible Handstones descriptive statistics (n=11). All measurements are in mm.

	Length	Width	Thickness
Minimum	26	16	6
Maximum	132	61	28
Range	106	45	22
Mean	74	38	15

9.4 Manuports (N=26)

A manuport is defined as any stone object that have no visible signs of modification but is thought to have been carried into the site by humans. Of the manuports from Skiles Shelter, seventeen (65%) are river pebbles (limestone, chert/unidentified silex, and unidentified sedimentary material). The remaining nine manuports (35%) are cobbles (limestone, basalt, quartzite, and unidentified sedimentary material). Only seven (26%) of the twenty-six manuports are intact (Table 9.5).

Table 9.5: Complete Manuports descriptive statistics (n=7). All measurements are in mm.

	Length	Width	Thickness
Minimum	21	18	12
Maximum	80	47	30
Range	59	29	18
Mean	55	34	15

9.5 Paraphernalia (N=7)

Adams (2002:196) defines paraphernalia as "personal and group ritual equipment, gaming devices, weights, ornaments, representations (morphic, geometric, and abstract), and items whose specific functions are unknown." Lithic paraphernalia from Skiles Shelter includes a painted pebble, four incised stones, one painted stone with scratch marks. Moreover, one shell pendant was lumped with the paraphernalia out of convenience. The painted pebble from Skiles Shelter (Figure 9.6) is broken from a radial fracture. Both faces of the pebble exhibit black geometric shapes; the paint on one face is faded. The designs on this pebble look similar to the Late Prehistoric types that have been defined by Mock (2011). The painted pebble was recovered on the burned rock talus slope of the site during the 2013 Rodriguez excavation. It was found approximately 8 meters from where the western wall of

Skiles Shelter intersects with the burned rock midden and approximately 6 cm below the surface of the midden.

All three of the incised stones from Skiles Shelter are broken. Two of the incised stones have cross-hatch engravings on one of their surfaces (Figure 9.6). The other specimen has deep incising on both surfaces. The largest of the incised stones were found on the surface of Skiles Shelter.

The possible painted stone appeared to have either ochre or red paint on its surface with scratch marks. The shell pendant – which was originally bagged in a matrix sample from Layer 5 of Unit M and found in a ½" sieve – was the only ornamental object found during both excavations. The shell pendant has carved horizontal lines on its top and bottom. A series of vertical and diagonal lines (in no apparent organization) run across both the front and back of the pendant. The marginal edges of the pendant exhibit small notches. The top of the pendant has a small drilled hole.

9.6 Discussion

Four classes of non-chipped stone were recognized at Skiles Shelter. Light use handstones (n=25) were the most prominent class in the assemblage, followed by manuports (N=22) and possible handstones (N=22). Formed handstones (n=8) were the least prominent class.

The ground stone artifacts from Skiles Shelter were analyzed to address if the ground stone designs and use wear correlate with Castañeda's (2015) bedrock feature research. As discussed in Chapter 3, Castañeda (2015:69) identified six permanent bedrock feature areas and one portable limestone feature within Skiles Shelter. The 126 bedrock features in Skiles

Shelter ranged from 0.2 – 18.6 cm in depth; the maximum length measurements ranged from 2.9 – 36.6 cm, and the maximum width measurements ranged from 2.8 – 19.8 cm.

Painted Pebble: FN25045

Incised Stones: No FN (recovered from top surface of site)

Incised Stones: (top) FN20098.1, (bottom) 20081.11

Shell Pendant: FN20099.6

Figure 9.6: Examples of paraphernalia from Skiles Shelter. **A** and **B** denote the front and back of specimens.

The minimum measurements (1.6 cm length-x-0.9 cm width-x- 0.6 cm thickness) on the smallest intact handstone from Skiles Shelter fits within the length and width minimum measurements (2.98 cm length-x-2.8 cm width-x-0.2 cm thickness) of the smallest bedrock feature recorded in Skiles Shelter. The measurements of the largest intact formed handstone (10.8 cm length-x-8.9 cm width-x-2.7 cm thickness) is close to the mean measurements of the bedrock features (13.76 cm length-x-10.36 cm width-x-2.55 cm thickness) but falls short of the maximum measurement of the largest bedrock feature (36.57 cm length-x-19.78 cm width-x-18.59 cm thickness).

Out of all the complete ground stone artifacts in the Skiles Shelter assemblage, a light-use handstone (FN20089.25) exhibits the greatest length and width measurements (14.5 cm length-x-12.7 cm width -x-2.3 cm thickness). The length of this specimen, however, falls short of the maximum bedrock feature depth from Skiles Shelter.

The deepest mortars at Skiles Shelter are an anomaly. Prewitt (1981) has found evidence of wooden mortars being used in the Lower Pecos region, and Castañeda (2015) notes how both stone pestles and wooden mortars have been found in the region – yet, occurrence in archaeological deposits are rare.

Adams (2002:103) notes how manos (handstones) function more efficiently when they conform to the size and shape of a metate (netherstone). Further, the wear surfaces between handstone and lapstone implements should reflect this relationship. Due to the extensive surface wear and rounded/ovoid shape of the formed handstones from Skiles Shelter, I infer that they were frequently used against the bedrock features in the site. In some instances, the formed handstones appear to have been used as hammerstones as well. I also infer that some light-use handstones were used against the bedrock features, but not to the same extent as the formed handstones, and perhaps for different tasks.

Some general observations can be noted from this study. First, there is a larger number of light-use handstones, possible handstones, and manuports than formed handstones from Skiles Shelter. Significant maintenance investments were required to shape a formed handstone, and these items may have been heavily curated – that is transported and reused from site to site by its user(s). For example, Mock (2013:235) notes how at Fate Bell Shelter, a mano was found wrapped in a net bag possibly indicating its transportation. I infer that the formed handstones from Skiles Shelter may have been more "personal gear" in the Lower Pecos, carried by individuals in anticipation of future activities (Binford 1983:276, 279).

On the other hand, Light-Use Handstones were likely "situational gear" that was gathered, equipped, and stocked for a specific activity (Binford 1983). It appears that many of the light use handstones were multipurpose in function and used for percussion and abrasive activities. The abundance of blank pebbles in the canyon bottom can be attributed to the high number of pebble-like handstones and manuports in Skiles Shelter.

10. THE EARLY ARCHAIC TO LATE PREHISTORIC USE OF SKILES SHELTER

Thus far, this thesis has examined the stratigraphy, features, radiocarbon dating, site formation processes, burned rock midden, and lithic and ground stone assemblages from Skiles Shelter. This chapter compiles critical evidence presented in previous chapters to infer the Early Archaic through Late Prehistoric use of Skiles Shelter.

10.1 Archaic Use of Skiles Shelter

Skiles Shelter appears to have been first occupied during the Early Archaic period. The Early Archaic use of the site is signaled by the radiocarbon date (7387 median cal. BP) recovered from Feature 6 – a conglomeration of remnant earth ovens (as discussed in Chapter 5). Over time oven cooking debris would have slowly built up and created the lower portion of the burned rock midden at the mouth of the site. Lechuguilla leaf fragments, as well as setaria and hackberry seeds were found around the feature providing some indication of subsistence choices. Tools collected near Feature 6 included one thin uniface, two manuports, a possible handstone, and two bifacial tools. Two points (Early Archaic Triangular and Bandy) were also recovered from Skiles deposits but were not associated with the feature. At Kelley Cave, which is directly adjacent and certainly used in conjunction with Skiles Shelter, forms of hot rock cooking and a possible underground storage feature were present among the Early Archaic deposits. Rodriguez (2015:179) notes that a wide variety of seeds were identified in the lower deposits, as well as the charred remains of desert-succulent leaves and a variety of animal species.

A second radiocarbon assay from Feature 6 (3729 median cal. BP) and Middle Archaic projectile point types (n=14) indicate that Skiles Shelter was used during the Middle

Archaic period for the same purposes mentioned above. Earth oven construction, reuse, cleanout, and other hot-rock cooking activities would have mixed and disturbed earlier deposits – such as the case with Feature 6.

The Late Archaic use of Skiles Shelter is denoted by temporally related projectile point types (n=12) and earth oven construction and cleanout activities that would have contributed to the growth of the burned rock midden. The Pecos River style rock art along the back wall of Skiles Shelter was painted sometime during the Middle to Late Archaic periods and the creation and use of the bedrock mortars and groove marks on the site's tufa were likely utilized. At Kelley Cave, hot rock cooking features, were also identified among the Middle Archaic deposits. Rodriguez (2015:183) inferred that an increased use of red ochre and pigment represents the exploitation of upland and immediate canyon resources at both sites.

10.2 Late Prehistoric Use of Skiles Shelter

Significant activity was taking place at Skiles Shelter during the Late Prehistoric period -- as indicated by fifteen radiocarbon assays (984-518 median cal. BP) and seventeen arrow points (see Chapter 8). Six of these dates were recovered from Features 3, 4, and 5, which are characterized as remnant earth oven heating elements and a hearth feature (Chapter 5). The lowest Late Prehistoric radiocarbon assay (D-AMS 5255) was recovered over a meter in depth from the top surface of the site (see Chapter 5: Table 5.11 and Figure 21). Its elevation is lower than the oldest assay from Feature 6. This area was likely dug into, cleaned out, and reused for hot-rock cooking as Skiles Shelter was revisited. Earth oven discard was tossed toward the mouth of the site, as well as the west and east walls, covering older cooking features and creating a depression near the back of the site.

Sometime in the 14th century, Eagle Nest Canyon experienced a massive flood that capped the large oven pit in the back of Skiles Shelter with alluvium. Parts of the midden, as well as most of the plant refuse from earlier cooking events may have washed away during this event, leaving the site barren of the dense fiber layers found in the drier deposits of Kelly Cave and Eagle Cave. Moreover, it is reasonable to believe that addtitional scrubbing of Skiles Shelter's deposits occurred during earlier undocumented flood events.

Feature 4 provides evidence of Skiles Shelter's use after the 14th century flood and provides the most robust evidence of plant subsistence at the site (Chapter 5). Similar fiber layers were observed by Rodriguez (2015) in the surface deposits of Units A and C. It is uncertain whether these burnt fiber layers were hearth-like cooking features or plant detritus from other earth oven cooking taking place elsewhere in the site.

Feature 5 offers another example of hot rock cooking activity during the Late Prehistoric period. Flood alluvium was identified underneath Feature 5, however, returned radiocarbon assays from this feature date prior to the 14th century. This implies that the alluvium in F5 was transported into the site by humans, or the alluvium is from a separate flood event, unrelated to the alluvium below Feature 4. At Kelley Cave, a massive oven/trash pit filled with dense, fibrous deposits dated to the Late Prehistoric period (see Feature 4 in Rodriguez 2015). This pit was capped by a thin flood deposit – thought to be the same 14TH century flood that covered Skiles' deposits.

Turpin (1991) has divided the Late Prehistoric period into two phases: *Flecha* (1000 – 450 RCYBP) and *Infierno* (450-250 RCYBP). Skiles Shelter appears to have been occupied only during the *Flecha* phase, and the latest radiocarbon assay from Skiles Shelter (518 median cal. BP) falls close to the tail end of this cultural period. There is no evidence of site use during the protohistoric *Infierno* phase. The abandonment of Skiles Shelter coincides with the latest date from Nielsen's (2017) testing of the UT north unit in Eagle Cave (519 median cal. BP).

The use of Skiles Shelter and other rockshelters in Eagle Nest Canyon during the Late Prehistoric period is noteworthy for a few reasons. First, the *Flecha* and the subsequent *Infierno* phase are poorly understood. As of 2002, Late Prehistoric and Historic sites represented less than 8% of the total number of sites in counties encompassed by the Lower Pecos region (Kenmotsu and Wade 2002:123). In Val Verde County, only 7.2 % of the sites contain materials that date between AD 1200 - 1880. Kenmotsu and Wade (2002:123) do note that these results are possibly biased due to the lack of controlled subsurface investigation at most sites.

Second, based on the current radiocarbon dates from sites within Eagle Nest Canyon, it appears that the use of rockshelters within Eagle Nest Canyon are abandoned by the *Infierno* phase and earth oven construction appears to shift to the uplands and canyon edge above ENC. Basham (2015) identified six earth oven heating element features that date to the *Infierno* phase in his research; he also found an isolated metal arrowhead (historic period) near the canyon edge. The abandonment of rockshelters during the Infierno phase and an increase in the use of upland sites may signal a new population of people entering the Lower Pecos region (Turpin 2004). These people possibly used the canyon edge for plant baking due to the greater availability of wood and plant resources (Basham 2015:158).

The 2013 and 2014 Skiles Shelter excavations, as well as the excavations of other rockshelters within Eagle Nest Canyon, greatly contribute to our knowledge of rockshelter use during the early half of the Late Prehistoric period. The archaeological data from Skiles Shelter reveals that rockshelters in the Lower Pecos continued to be choice locations for residences and earth oven facilities. Additionally, Skiles Shelter is an example of a well-dated, relatively intact, stratified site that correlates with the proposed Late Prehistoric dates proposed by Turpin (2004) and others.

10.3 Skiles Shelter – A Long-Term Earth Oven Facility

To restate a term used throughout this thesis, an **earth oven facility** is a locale that was intermittently, but continuously, reused for earth oven construction (Black and Thoms 2014:213). Early Archaic to Late Prehistoric radiocarbon dates (N=15) and temporally diagnostic projectile points recovered from Skiles Shelter's deposits suggest the site has been used as an earth oven facility over several millennia (Koenig et al. 2017:49). Further, the 2014 excavation revealed that this site has been periodically remodeled from cultural and natural factors. The morphology and mixing of the sites deposits is argued to have been primarily created from earth oven construction activities, such as pit digging, and oven refuse and FCR discard events.

Two broad earth oven facility episodes are recognized at Skiles Shelter. *Earth Oven Facility 1 (EOF-1)* is the earliest example of earth oven baking at the site (Figure 10.1). This episode sits directly above the lower limestone roof spall deposits and incorporates the stratums within the Earth Oven Construction 1 (EOC 1) and Earth Oven Discard 1 (EOD 1) depositional units (see Chapter 5: Table 5.1). Based on the radiocarbon dates from Feature 6 – the lowest remnant heating element identified at the site – I reason that during the Early to Middle Archaic periods, the strata in Earth Oven Facility 1 formed.

Earth Oven Facility 2 (EOF-2) is above EOF-1 and incorporates the Earth Oven Construction (EOC) 2 and 3 and Earth Oven Discard (EOD) 3 depositional units (Chapter 5: Table 5.1). Based on the thirteen Late Prehistoric radiocarbon dates from these deposits, it is assumed that this episode was created during the Late Archaic to Late Prehistoric periods, and the central pit area in EOF-2, was capped with flood alluvium in the 14^{th} century .

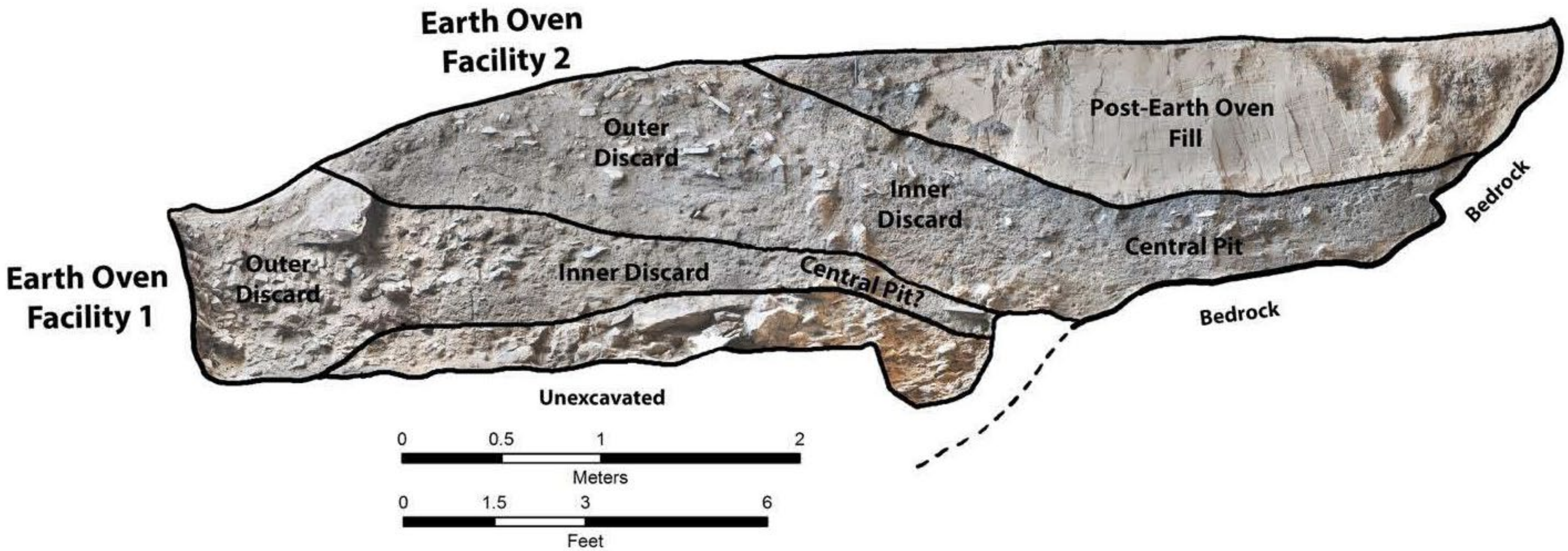


Figure 10.1: Profile Section 3 showing the hypothesized earth oven facility parts in Skiles Shelter. Figure from Koenig et al. 2017.

A basic comparison of the major artifact types recovered from the PS03 excavation units (M, F, AB, E, and H) indicates that EOF-2 has, in many cases, a greater frequency of artifacts than EOF-1 (Figure 10.2). This data could indicate the following, (1) the higher frequency of artifacts in EOF-1 infers that Skiles Shelter's use was intensified during the Late Archaic to Late Prehistoric periods, or (2) the sample is biased to the limited excavations and sampling of the lower deposits in Skiles Shelter's talus slope. In any case, attempting to understand temporal variations in artifact types from earth oven facility settings can be extremely challenging and unreliable, as Chapter 6.2 has pointed out.

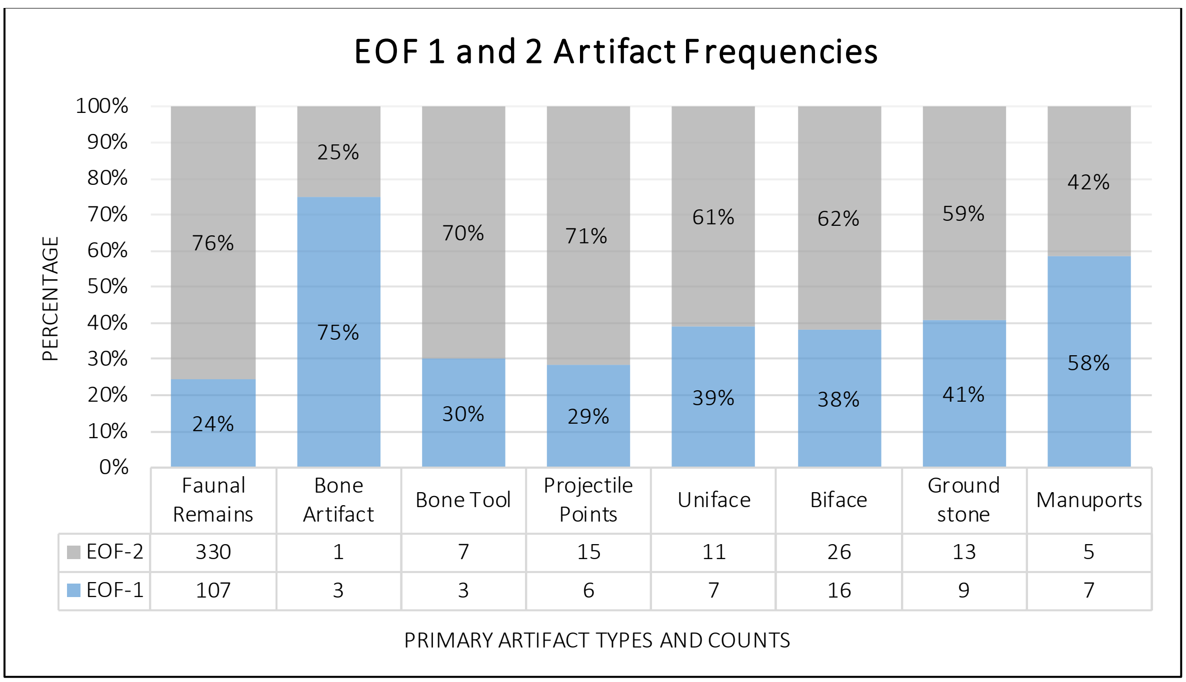


Figure 10.2: Artifact frequency sample from Earth Oven Facilities 1 and 2. The artifact counts are from the PS03 Units M, F, AB, E, and H.

11. EXPLORING GENDER IN THE LOWER PECOS CANYONLANDS

Discussions of gender in any archaeological context requires the consideration of multiple lines of evidence such as depictions of humans in representational art, mortuary arrangements, ethnology, artifacts, and use of space (Nelson 2004: 42). This chapter reviews evidence from across the region that can aid in engendering Lower Pecos archaeology. I use this review to explore the gendered use of Skiles Shelter.

11.1 Representational Art

One of the ways that gender can be represented at archaeological sites is in the form of visual culture (Boyd 2013); these being figurines, murals, rock art, painted pottery and objects, and sculpture (Brumfiel 2006:40). At sites with visual culture, Hays-Gilpen (2004:15) and Nelson (2004:4) suggest identifying the sex of the figures, or in some cases, various aspects of their clothing. The sex or gender of representational art forms is not always identifiable, and it is important to consider that prehistoric forms of art often held intrinsic gender assignments to their creators (Nelson 2004:17). If gendered depictions are identifiable in archaeological contexts, it is possible to correlate these images with other rock art panels, artifacts, sites, or landscapes. Gendered depictions in representational art should be tested against other lines of evidence for more convincing and secure arguments (Nelson 2004: 42; Brumfiel 2006:41).

11.1-1 Rock Art

The visual culture of the Lower Pecos Canyonlands (painted and petroglyph rock art, painted and etched pebbles, and clay figurines) have invoked various discussions of gender and identifications of sexual characteristics (Turpin 1984a, 1986, 1997, 2005, Turpin and Eling 2003; Turpin et al. 1996; Bass 1989, 1994, Mock 1987, 2011, 2013; Shafer 1975; Shafer and Speck 1974; Boyd et al. 2013, Boyd 2013, Boyd and Cox 2016, Conolly 2011). Painted rock art is the most common form of visual culture in the region, and three of styles of rock art (Pecos River, Red Linear, and Red Monochrome) portray gendered imagery and depict probable sex markers.

The predominant Pecos River style, which dates from the Middle to Late Archaic Periods, includes anthropomorphic, zoomorphic, geometric imagery, and enigmatic figures (Boyd and Cox 2016:17,19). Primary or secondary sexual characteristics of Pecos River figures have been unidentifiable (Bass 1994:70). Yet, the combination of colors (such as red and black) on certain pictographs at the site may represent a duel cosmological opposition that takes into consideration masculinity and femininity (Boyd and Cox 2016:52). Additionally, some figures appear to be analogous to female and male deities in Huichol and Nahua belief systems. Bass (1994) claims that the Pecos River style pictographs could have been produced by male or female artists.

The Red Linear style, which is known to predate or be contemporary with Pecos River style (Boyd et al. 2013). are represented in a ritual, reproductive, combative, or hunting activities (Turpin 1984a:195). In contrast to the Pecos River style, many of the Red Linear figures can be sex distinguished by their genitalia (Boyd 2013:188; Turpin 1984a:184). A sample of Red Linear pictographs from 12 sites in the Lower Pecos recorded sex or sexless characteristics on 217 of the figures. Sixty percent of the figures in the sample were recorded as male, eight percent female, and thirty one percent genderless (Turpin 1984a). Lewis Canyon – an extensive Archaic period petroglyph site along the Pecos River – presumably contains both male and female sex markers (Turpin and Bass 1997, 2005)

Male figures are portrayed with erect phalli and some with phallus attachments (Boyd 2013:188; Boyd et al. 2013:465). Females have a loop drawn on their pelvic area, and sometimes have two lines at the hip, possibly depicting a skirt. Breasts and distended bellies have been identified on some figures as well, and both male and female figures have been portrayed in copulation scenes.

Paraphernalia such as atlatls, curved sticks, and short bars are associated with the both Red Linear and Pecos River Style figures (Boyd et al. 2013:465). Although identified with males, atlatls and curved sticks have not been identified with any female figures. Based on the superpositioning and blurring of attributes between Pecos River style and Red Linear, Boyd et al. (2013:480) propose that stylistic differences may be functional or gendered related.

Turpin (1984a) who suspected Red Linear and Pecos River style are from different cultural systems, argued that the placement of Red Linear rock art in certain rockshelters might have signified its gendered use. Turpin (1984a:195) noted how "[Red Linear] pictographs in the large habitation sites, with their greater representation of women and emphasis on apparently organized social activities, are more public." Depictions such as hunting and warfare in smaller localities could have been intended for a more secluded male audience.

The Red Monochrome style is dated to the Late Prehistoric period and "characterized by life-size images of humans and animals painted in varying shades of red" (Boyd 2013:190; Turpin 1986). This style is much more realistic than the Red Linear or Pecos River style, and gender markers have been identified among some of the figures. Male figures are marked by their genitalia and figures presumed to be female have rounded bulges or "hair whorls" on both sides of their head; one female figure appears to wear a dress.

The presence of bow and arrow imagery in association with the Red Monochrome pictographs has temporally dated this style to the Late Prehistoric period. Further, Boyd

(2013:192) notes how small cupules are frequently found at sites with Red Monochrome paintings. In certain ethnographic instances, cupules have been documented as being used for fertility and rain making rites. Cupules are discussed below in section 11.1-4.

11.1-2 Painted and Etched Pebbles

Painted and etched pebbles from the Lower Pecos Canyonlands represent one of the longest traditions of portable rock art in North America (Mock 2013:223). Based on observed patterns in the painted imagery, four styles of painted pebbles are recognized. Each style shares few similarities with the pictograph rock art found in rockshelters. According to Mock (1987, 2011, 2013), consistent female themes and metaphorical imagery are found in each of the painted pebble styles. The earliest style of painted pebbles dates to the Early Archaic period. This style commonly shares patterns of orb spider web iconography, "known for its association with creation, healing, and female sexuality, and birth among native peoples in the Americas" (Mock 2013: 228). This association is extended to the Huichol of northern Mexico, where spider attributes are linked to birthing and the human soul (2013:229). Mock argues that the orb spider web and weaving are metaphorically interrelated and represent women.

Pebbles that date to the Middle Archaic period have continuities in the "core weaving element," but incorporate new motifs such as butterflies, birds, and insects (Mock 2013:229, 231). Each of these symbols has gendered roles in the mythology of Native American cultures, including the Huichol. Certain symbols on these pebbles, such as the crescent, are believed by Mock to be related to the female vulva. The largest group of painted pebbles are Late Archaic in age (Mock 2013:231). In this style, spider web, butterfly, bird, and insect imagery are replaced by more realistic attributes similar to components of the female form (Mock 2013:232). Some incised pebbles recovered from northern Mexico share the same butterfly-vulva design patterns, which Turpin and Eling (2003) and Turpin et al. (1996) speculate were used for puberty or fertility rites. Painted pebble imagery from the Late Prehistoric period is smaller in numbers and are characterized by a black cap, which Mock (2013:232) considers to be hair. Some of the pebbles in this style are noted as having female characteristics such as painted eyes, mouths, and vulvas.

11.1-3 Clay Figurines

Figurines are generally small sculpted objects, two or three-dimensional in shape, with indeterminate, human, or zoomorphic characteristics (Insoll 2017:4). Figurines have been made from various materials such as bone, wood, human hair, cave stalactites, steatite, chalk, marble, and clay, and have been found in archaeological contexts all around the world (2017:7). Insoll (2017:8) notes how some figurines provided a way to represent human forms, gender, sex, and age. Moreover, the high occurrence of fragmented figurines can attest to their power and agency within different cultural contexts (2017:10).

Although rare, clay figurines have been found in the same Lower Pecos rockshelter midden deposits as painted pebbles (Shafer 1975). In general, the clay figurines appear to be unfired, hand-shaped and made from silty clay with little to no natural temper. Many of the figurines have human-like attributes, and others are fragmented and exhibit geometric and unknown shapes. A small number of the clay figurines have been noted as exhibiting appendages that are thought to represent female breasts (Nunley et al. 1965; Greer 1966; Shafer and Speck 1974; Shafer 1975). One female-like figure from Coontail Spin rockshelter exhibits zig-zag and parallel incised lines across the body of the figurine (Shafer 1975:150; Nunley et al. 1965). Shafer (1975) was the first to compile data on the clay figurines in the Lower Pecos, where he discussed their context, attributes, composition, and possible function. Aside from a few papers reporting the recovery of new clay artifacts and figurines in the Lower Pecos (Chandler et al. 1994; Rodriguez 2015), there has been no continued discussion on the function and discard patterns of these enigmatic objects.

11.1-4 Cupule and Groove Marks

In addition to painted, petroglyph, and mobile forms of rock art, cupules and grooves are another style of the Lower Pecos visual culture. Cupules are typically small, rounded human-made depressions on the face of a rock surface, and grooves are deep and narrow incised lines that sometimes form a "V" or "W" (Conolly 2011:3). Cupule and groove marks have been found in archaeological contexts all around the world and are often considered to be fertility shrines. The best ethnographic example of gender-related cupule and groove mark use in North America is among the Pomo of California, who used the pit and groove rocks as "baby rocks" to cure sterility (Hays-Gilpin 2004:80).

Connolly (2011) visited ten sites (including Skiles Shelter) in the Lower Pecos with cupule and groove marks to understand the function of this rock art form and to test if they were tied to fertility rituals. Conolly speculated that the cupule and groove marks are not tied to food production activities, but instead part of ritual activities. Using previous ethnographic examples as evidence, she hypothesizes that the groove marks are linked to fertility rituals.

11.2 Mortuary Evidence

Using burial data to understand gender is perhaps the most direct way to observe the gendered behavior of the past, and the methods used in determining the sex of human skeletal remains are now firmly established in the field of bioarchaeology. Not only can certain patterns of work be identified on bones, but grave goods associated with burials can reveal behavioral patterns and gender ideologies (Brumfiel 2006: 37); past options may have existed, however, for one to accept a gender outside of the biological sex that is recognized archaeologically (Brumfiel 2006: 37; Whelan 1995: 56). Alterations on skeletal joints, teeth, and the overall bone chemistry of an individual can aid in understanding the division of labor, subsistence activities, warfare, and activity patterns between men and women. Burial goods can reveal statistical patterns in mortuary data – an approach that can highlight task-specific artifacts and the gendered division of labor (Wheelen 1995: 57).

Turpin et al. (1986) compiled a list of the known burials found in the Lower Pecos Canyonlands. Only 37 of the individuals in their sample were sexed, and of those, 19 are male, and 18 are female (1986:310). In terms of burial goods, the mortuary treatment of LPC burials appears egalitarian, and men, women, and children were found buried in similar ways and with similar artifacts. For example, groundstone implements (manos and metates) that are typically ethnographically associated with women, were identified in the graves of men, women, and children (Castañeda 2015:292). In certain cases, some female and male burials appear to have had more elaborate grave goods (Maslowski 1978:331; Turpin 1986:310)

Greer (1963:234) observed how the practice of covering burials with manos or metates is not locally specific to the Lower Pecos, and evidence of this custom has been identified among central Texas burials. It is hard to say what manos metates signified to the individuals they were buried with, but what it implies is that the gendered use of certain tools related to food processing are flexible and not ascribed to any one sex. Additionally, no bioarcheological studies have compared evidence of work-related arthritis among male and female burials.

11.3 Ethnology

Ethnological sources (ethnoarchaeology, ethnohistory, and ethnography) have been commonly used to examine gender in archaeology. These records must be used with extreme caution due to the androcentric and ethnocentric biases of their western authors (Conkey and Gero 1992:13; Conkey and Spector 1984; Brumfiel 2006: 35). Without a strong means of inference, archaeologists should treat all behavioral patterns codified in this literature set as untested hypotheses. If applied uncritically to the archaeological record, they run the risk of reproducing what is ethnographically perceived (Wobst 1978: 303). It is possible to not only erase gender systems in the past but promote essentialist viewpoints if these literary sources are not used judiciously (Brumfiel 2006:35).

11.3-1 Ethnographies and Ethnohistory

Ethnographic literature can provide descriptive information on gender, subsistence, and the cooking practices of foraging societies worldwide (Kelley 1995). The most comprehensive review of Lower Pecos ethnohistory has been compiled by Nancy Kenmotsu and Mariah Wade (2002). Their study draws upon various records and historical archaeological data to identify many of the small bands that had an affiliation with the Lower Pecos region. Although a useful source for referencing historical about the different indigenous groups who used the Lower Pecos area, little is mentioned about gender and cooking practices in their report.

Ethnographic sources from the American Southwest and northern Mexico also detail information regarding cooking, gendered division of labor, and food processing (Lumholtz 1903; Castetter and Opler 1936; Pennington 1963). Among the 185 cultural groups in the Standard Cross-Cultural Sample (SCCS) – a data set containing pre-coded information on cultural societies worldwide – women are noted as the primary laborers of cooking tasks (Murdock and Provost 1973). These numbers change after separating the 185 groups into their dominant subsistence economies. When only selecting the groups from the SCCS that were coded as practicing either hunting or gathering, primary female participation in cooking tasks changes significantly from 91.6% to 70.4%.

Shafer (2013:98) argues that the sexual division of labor among Lower Pecos people appears to be typical of what is perceived about hunter-gatherer groups: men hunted, trapped, and engaged in conflict, and women cared for children, cooked/prepared food and gathered. Shafer (2013:98) notes that men, women, and children would have participated in foraging. Cooking and food preparation were predominantly female tasks, but likely involved the help of men. Besides hunting and fishing, Shafer (2013:98) projects that men and women generally participated in the same activities – some more predominately than others.

11.4 Artifacts and Spaces

Gender can be explored through the types and distributions of artifacts in certain areas of archaeological sites. Brumfiel (2006:42, 43) recommends this approach for examining changes in the workload and organization of labor at a site over time, or the social power of men or women in different contexts. For example, in some instances,

> "The technical properties of artifacts can be used to examine the gendered dimensions of technological innovation…[and] artifact decoration may reflect the negotiation of gender status" [Brumfiel 2006:42].

If used cautiously, valuable information can be obtained from gender artifact studies. Yet, linking the location of artifacts in spaces and the representation of objects with certain sexes does not make it safe to assume that spaces or tools were strictly used by women or men (Brumfiel 2006:45). Studies attempting to do so should incorporate multiple lines of evidence. No Lower Pecos research has critically addressed the gendered production of tools.

The use of rockshelters as a venue for human and gendered activities is another interesting topic worth mentioning. There is ample evidence suggesting that many caves and rockshelters around the world were ideologically important spaces in prehistory (Moyes 2012). Moyes and Brady (2012:151) comment on how caves are intertwined in the cosmology and creation stories of indigenous groups of North America and Mesoamerica. Specifically, Mesoamerican caves were origins for human creation, places where rain and water originate, entrances to the underworld, territorial markers for ethnic identity, and venues for domestic and ritual activity.

Broken painted pebbles and figurines have been recovered from Lower Pecos rockshelter burned rock middens (Davenport 1938; Ross 1965; Shafer 1975). In some instances, the ritual breakage of artifacts has been identified in caves and interpreted as gifts for earth or underworld deities (Moyes and Brady 2012:158). Biel (as cited in Bailey 2017: 828) argues that the transformation of an object from whole to broken through purposeful destruction was a communicative act. Baily (2017) adds that an intact figurine carries a completely different meaning than one that is broken. After breaking a figurine, the identity or gender status of a figurine may change.

11.5 Food Symbolism and Gender

Hastorf (1991: 133, 135) notes how food and eating were central to maintaining gender relations in prehistoric residences and remarks how food symbolism – the investigation of specific foods, their meanings, and their uses over time – is another way to explore gender at archaeological sites. Coprolite studies reveal that Lower Pecos populations primarily exploited prickly pear tunas when seasonally available; sotol and lechuguilla (agave) during cooler seasons, and nopales as an intermediate subsistence stress food (Riley 2010:134). All of these food sources have been identified in Lower Pecos rockshelter burned rock middens and in the features at Skiles Shelter.

Of these plants, agave is known to have carried religious, subsistence, and gendered ideology in cultural regions of the southwest and Mesoamerica. The Maya, Huastecs, and Aztecs of ancient Mexico not only understood the utility of agave, but they considered the *Agave americana* (maguey) to be one of their most sacred and important plants (Radding 2011: 90). This importance can be seen in many Aztec codices that depict images of the cultivation, processing, spinning, weaving, and ritual use of the maguey plant. Moreover, the female deity Mayahuel was associated with maguey during the Postclassic era of pre-Columbian Mesoamerica. Radding details the mythical personification of Mayahuel

> "Mayahuel was transformed into the agave plant after her abduction by the wind god Ehecatl, leading to her violent death. She carried fiber rope, symbolizing her creative skills, and bird-like creatures or human infants suckled at her breast, perhaps alluding to the winged creatures who feed on the nectar of agave flowers. Mayahuel also figures as the mother of Centeotl, a youthful maize deity, thus placing the family of agaves midway between the vegetation of the monte and the domesticated crops of Mesoamerica." (Radding 2011:90)

Representations of Mayahuel were prominent in the art and architecture of the Aztecs (Radding 2011). Many depictions show the deity emerging as a maguey plant out of a turtle/snake anthropomorphic figure. Mayahuel often has a ritual bowl in her left hand and bloodletting devices in her right hand; other images portray Mayahuel breastfeeding an infant. Additionally, the juices (aguamiel) of the maguey were thought to represent the blood of Mayahuel, and her mythical powers were often attributed to fertility and the arts of weaving.

Mayahuel was married to the deity Patecatl, who is credited to have infused the blood of Mayahuel to create pulque – a drink that has deep religious ties to social life and nobility in Mesoamerica. The drink was served at religious festivals such as weddings, fertility rites, and agricultural ceremonies (Cartwright 2016). Moreover, evidence of the ritual use of the maguey plant and pulque can be found in Late Classic Huasteca iconography (Henderson 2008:58). Scenes from the site of El Tajin portray depictions of the flowering *Agave americana* (maguey) in association with the ballgame, decapitation, and disembowelment. Parallels to Mesoamerican art and ideology are believed to have been found in Lower Pecos rock art as well (Boyd and Cox 2016), and Henderson (2008:72) proposes that further investigation of agave in different cultures may reveal aspects of other pre-Columbian belief systems.

The importance of agave and its associated symbology and gendered connotations can be found in the American southwest. Castetter and Opler (1936:35) mention how each year, around late May to early June, expeditions by Apache women were made to collect mezcal agave when it bloomed. The Apache believed that a flowering agave was the most palatable and embodied a "woman" plant; before the mezcal bloomed, it was designated as a "man" because of its bitterness.

Castetter et al. (1938:29) detail the ritual nature in which agave was roasted among the Mescalero Apache. After the plants were collected, an earth oven pit 10 to 12 feet in diameter and four feet deep was dug and lined with rocks. A member of the group then made a cross with black ashes among the largest flat stone, and more rocks and firewood were piled into the pit. Before dawn, the pit was set on fire, and around noon the oven was ready for the placement of food. The largest of the harvested mescal crowns was chosen, and a cross of cat-tail pollen was applied to the crown in the directional order of east to west and from north to south; following this, the group prayed.

The crown with the pollen-cross was then extended four times over the hot pit before it, and the uncooked mezcal was thrown into the oven. The youngest present child of the group threw four stones into the burning coals from the east side of the pit – the number four is significant in apache cosmology and represents the four cardinal directions: east = black, south = blue, west = yellow, and north = white (Lamphere 1983: 747). Last, the oven was then sealed and left alone to bake for the rest of the day. The cooking of A*gave lechuguilla* and other plants in the Lower Pecos diet could have carried similar gendered meanings and religious importance.

Michael Dietler (2001:67) argues that when cooking and feeding are used to improve social relations between a family or group, it becomes a feast. The use of ritual activity in order to create social transactions between people is what distinguishes feasts from daily meals (Dietler and Hayden 2001: 3). Dietler (2001:67) notes that ritual activity in feasts does not strictly adhere to examples of elaborate ceremonies. Feasts among hunter-gather groups can serve as meaningful examples of social interaction, and the food is the most central factor in these events.

Halstorf (2012: 67) considers food to be the ultimate *Habitus*; that is, people need food to survive, and the storage, preparation, and cooking of food are at the heart of daily life. Because of human's dependency on food, hidden ideological meaning might have been imposed on the most mundane of cooking-related tasks. Cooking and food processing in hunter gatherer groups, who often had no food surplus, likely incorporated the participation of all genders depending on their cultural context.

11.6 Discussion

Recognizing gender in the archaeology of the Lower Pecos Canyonlands (LPC) is complicated and blurred with many layers of meaning and archaeological interpretation. Further, there is little compelling evidence from which to make arguments on the gendered use of rockshelters. Four things are clear from this review:

(1) Male and female sexual characteristics can be identified in some aspects of the Lower Pecos visual culture; however, other genders are not apparent. No pictographs with sexual markers are engaged in cooking activities.

(2) Based on burial goods, the mortuary treatment of men, women, and children appear to be egalitarian.

(3) Ethnographic and iconographic evidence from Mesoamerica and the Southwest indicate that agave and earth oven baking held gendered connotations and served a prominent role in certain belief systems.

(4) No research has critically addressed the gendered production of tools or use of space at Lower Pecos rockshelters

Rockshelters in the Lower Pecos were important places. The prehistoric people who used this landscape (and Skiles Shelter) had perceptions of gender different from our own. These perceptions were molded from their environment, culture, religion, and cosmological understanding of the universe. Some cultural ideas about gender would have stayed the same, and some transformed as people gradually adapted to changing landscapes and learned new things about the world outside of their familiar locality.

Carrying out earth oven cooking within rockshelters was likely cooperative, symbolic and deeply intertwined in the cosmology and lifeways of past populations. The frequency of burned rock middens and desert succulent remains within Lower Pecos rockshelters visibly attests to the importance of this cooking technology and food source. The finding of intentionally broken artifacts within rockshelter burned rock middens (such as painted and engraved pebbles and clay figurines), and the presence of painted/petroglyph rock art in these sites adds to their importance.

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12. CONCLUSION

This chapter serves as a conclusion and summary of the previously discussed chapters in this thesis. First, a combined thirty-five stratums were recorded in Profile Sections 1-4. The strata were further grouped into seven depositional unit types (1) top surface deposits, (2) flood deposits, (3) earth oven construction deposits 1-3, (4) earth oven discard deposits 1 and 2, (5) upper limestone roof spall deposits and (6) limestone roof spall deposits. The characteristics of the strata in conjunction with radiocarbon dates and relative dating from projectile points imply that Skiles' deposits formed over five temporal events: (1) Late Pleistocene and Holocene spalling, (2) Early to Middle Archaic earth oven construction, (3) Late Archaic to Late Prehistoric earth oven construction, (4) Late Prehistoric flooding, and (5) modern disturbances.

Second, all but one of Skiles Shelter's features (a basin-shaped hearth) are the remnants of earth oven heating elements. Radiocarbon assays from the oldest feature (Feature 6) returned Early and Middle Archaic radiocarbon dates. The remaining features dated to the Late Prehistoric period. Macrobotanical remains from the features indicate that, among other plant types, lechuguilla, hackberry, and various grass seeds were main subsistence staples at the site. Faunal results from the features show that Feature 1 had the largest Minimum Number of Individuals (MNI) and Features 2 and 5 had the least MNI counts. Different species of Deer and Rabbit were the most commonly identified mammal remains from the features. Avian, fish, rodent, and turtle species were also identified but almost exclusively found in Feature 1.

Skiles Shelter's burned rock midden was quantified to determine the intensity and amount of earth oven construction taking place at the site over time The quantification results revealed that Skiles Shelter's BRM weighs approximately 75,000 kg. The BRM is estimated to have formed from the construction of roughly 2,300 earth oven events. If the site was utilized on an annual basis over its dated 6,869 years, then less than one earth oven per year (.3) was constructed at the site. All but two of the radiocarbon dates from Skiles Shelter show that the site was occupied more intensively during the Late Prehistoric period. Skiles Shelter represents a case for Lower Pecos rockshelters where the intensification of hot-rock cooking is highly visible during the Late Prehistoric period.

The unifacial and bifacial tools from Skiles Shelter were examined and grouped into morphological classes. Seven classes of unifacial tools are present in the assemblage: thick unifaces, thin unifaces, edge-modified flakes, denticulates, retouched blades, sequent flake tools, and multiple tools. Edge-modified flakes (N=42) are the most prominent unifacial class in the assemblage. For bifaces, twelve morphological classes are present. Class G (indeterminate; N=37) and Class I (appendages; N=40) are the most prominent biface classes in the assemblage.

The lithic analyses addressed if any tools were used for plant processing activities. I argue that Skiles Shelter's unifacial tools are similar to those from Hinds Cave. The presence of epidermis or plant fibers on tools from each unifacial class infer use for plant processing activities. Additionally, based on the tools from Hinds Cave, Skiles' unifacial and bifacial tools were likely used for a variety of plant and animal processing and non-cooking activities. Most of the unifacial tool classes have moderate amounts of reduction, suggesting they were used on more than one occasion and were not immediately discarded.

Ground stone and non-ground stone artifacts were counted, weighed, and classified as light use handstones, formed handstones, possible handstones, and manuports. Light use handstones (n=25) were the most prominent type, followed by manuports (N=26). The ground stone analysis addressed if the ground stone designs and use wear correlate with Castañeda's (2015) bedrock feature research.

The results of the ground stone analysis show that the minimum width and length measurements on the smallest intact handstone from Skiles Shelter correlates with the minimum measurements of the smallest bedrock feature in the site. The measurements of the largest intact formed handstone is close to the mean measurements of all the bedrock features from Skiles Shelter but falls short of the maximum measurement of the largest bedrock feature.

I argue that due to the extensive surface wear and rounded/ovoid shape of the formed handstones, they were frequently used against the bedrock features in Skiles Shelter; I infer that light-use handstones were used against the bedrock features as well, but not as intensively and possibly for different tasks. None of the ground stone artifacts have a length matching the deepest bedrock feature from the site. The deepest mortars at Skiles Shelter may have been used with other pestle-like objects (wood or stone) that were not found during the excavations.

Last, evidence of gender in Lower Pecos was investigated through a combination of ethnohistory and ethnographies, depictions of humans in visual art forms, mortuary arrangements, artifacts, the use of space, and food. I found that gender in the Lower Pecos Canyonlands (LPC) can be identified in the archaeological record but is limited to the sexual identification of men and women. Likewise, inferring how cooking was carried out according to gender is blurred with many layers of meaning. Based on the importance of caves, cooking, and agave in surrounding cultural contexts, I argue that the baking of plants in rockshelters may symbolize an important social event that incorporated the participation of all people at Skiles Shelter.

12.1 Future Research

There are many avenues for future research at Skiles Shelter. First, the geoarchaeology of the site can be better addressed on a microscopic level using the micromorph samples from PS03 (see Chapter 5: Figure 5.4). Geoarchaeological studies at the site would benefit from a comparison to the recent work of Pagano (2019) at Sayles Adobe – a flood terrace and non-rockshelter earth oven facility that is directly below Skiles Shelter . Second, only a small sample of the site's macrobotanical remains were analyzed for this thesis. A larger sample of macrobotanical remains – perhaps from earth oven construction and earth oven cleanout areas – would help to better understand subsistence choices at the site. Third, to establish a more well-rounded understanding of the lithic technology at the site, the debitage, projectile points, and cores from Skiles Shelter need to be analyzed. Additionally, use wear studies on unifacial and bifacial tools from the site may provide valuable insight on their function. Last, a large, analyzed sample of faunal remains and tools (see Appendix E) from the site were not discussed in this thesis and will be the subject of future publication by this author.

APPENDIX SECTION

APPENDIX A

This appendix presents the Ancient Southwest Texas (ASWT) field forms used during the 2014 Skiles Shelter excavation.

Eagle Nest Canyon Expedition 2014: **Unit-Layer Form**

ASWT
Texas State University

Site: ______________________________

Excavation Area: ______________________

Excav. Unit: ____________ **Layer:** ________

Strats: ______________________________

Field Number: __________________

Recorder 1: ______________

Recorder 2: ______________

Date Started: ______________

Date Completed: ____________

QAQC: Yes No Initials:

Layer Measurements

Mapping Datum: ______________

Datum Elevation: ______________

Opening Elevations

NW______ NE______

Cntr______

SW______ SE______

Closing Elevations

NW______ NE______

Cntr______

SW______ SE______

Opening Dimensions

North______ East______

South______ West______

Closing Dimensions

North______ East______

South______ West______

Opening SfM Model

Camera: ________________

SfM Photo Range: ________________

4 Required GCPs

1st GCP: ________________

2nd GCP: ________________

3rd GCP: ________________

4th GCP: ________________

Optional GCPs

5th GCP: ________________

6th GCP: ________________

7th GCP: ________________

Excavation Tools (check all that apply):

Trowels Brushes

Ice Picks Splints

Shovels Picks

Garden Claw

Other

Screen Size(s) used: **1/8”** **1/4”** **1/2”** **1”**

What to collect from 1/4”, 1/2”, and 1” screens:

No Snails

No Charcoal unless it appears to be an artifact

No fragments of mussel shell—only umbos or visibly modified pieces

Collect all un-charred botanicals

Collect all faunal

Collect all lithics

Count and weigh FCR and unburned rock >1”, but discard once finished

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Unit-Layer Form

Describe excavation methods, sequence, and problems. If this form is for a column unit, describe which side of the column was bulk collected versus screened (also provide a sketch on the last page): ______________________________________

Describe any visible stratification (including intrusions): ______________________________________

Other Remarks: ______________________________________

Associated Features FN#s: ______________________________________

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Unit-Layer Form

General Collection

Artifact Type	Present	
	Yes	No
Debitage		
Chipped-Stone Tools		
Non-Chipped Stone Tools		
Faunal Remains		
Botanical Remains		
Bone Tools		
Wood Tools		
Fiber Artifacts		
1/8" Screen Material		
Other		

Point-Provenienced Artifacts

Artifact Type	FN#

Special Samples

Matrix Samples

Present: Yes No # Bags Collected: __________

FN#s: ____

Notes: ______________________________
____
____
____
____

Charcoal Samples

Present: Yes No # Bags Collected: __________

FN#s: ____

Notes: ______________________________
____
____
____
____

Other Samples

Present: Yes No # Bags Collected: __________

FN#s: ____

Notes Describe “Other”: _______________
____
____
____
____

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Unit-Layer Form

FCR Data

	<7.5 cm	7.5 - 11 cm		11 - 15 cm		15> cm	
	Mass (kg)	Count	Mass (kg)	Count	Mass (kg)	Count	Mass (kg)
Pitted Limestone							
Round Limestone							
Spall Limestone							
Other Limestone							
Igneous or Metamorphic							

Unburned Limestone Data

	<7.5 cm	7.5 - 11 cm		11 - 15 cm		15> cm	
	Mass (kg)	Count	Mass (kg)	Count	Mass (kg)	Count	Mass (kg)
Pitted Limestone							
Round Limestone							
Spall Limestone							
Other Limestone							

Camera: ______________________

Rock Sort Photos taken? **Yes** **No** **Photo Range:** ___________________________

Rock Sort Notes: ____

____

____

____

____

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____

____

Page 4 of 5

Unit-Layer Form

Site: ________________ Excav Area: ____________________ Unit: _______________ Layer: ______________

Date: _____________________ Scale: ____________________________ Recorder: ________________________

Page 5 of 5

Eagle Nest Canyon Expedition 2014: **Strat Form**

Site: Skiles Shelter - 41VV0165

Excavation Area: ______________________

Excav. Unit: ____________ Layer: __________

Section: ____________________________

Strat: ______________

Field Number: ____________________

ASWT

Texas State University

Recorder 1: ______________

Recorder 2: ______________

Date Started: ______________

Date Completed: ____________

QAQC: Yes ◯ No ◯ Initials:

General Strat Observations

Layer Type: Horizontal Strat ______ Initial Observation?: Yes ◯ No ◯

Elevation of uppermost portion of strat: ______________________

Elevation of lowermost portion of strat: ______________________

Max Thickness of Strat: ______________________

Briefly characterize strat (e.g., thin sandy deposit sloping down toward the dripline):

Does Strat appear to continue beyond the section? Yes ◯ No ◯ Unknown ◯

If "Yes," is the strat present in other sections? Yes ◯ No ◯ Unknown ◯

Munsell Color: Wet ____________ Dry ______________

Page 1 of 3

Strat Form

Stratigraphic Observations

List any Strats directly overlaying and contacting the current Strat in this exposure:

____

List any Strats intruding into the current Strat in this exposure:

____

List any Strats originating from the current Strat in this exposure:

____

List any Strats directly underlying and contacting the current Strat in this exposure:

____

Strat Description

How distinct is the lower strat boundary? Very Abrupt ☐ Abrupt ☐ Clear ☐ Gradual ☐ Diffuse ☐ Unobserved ☐

What is the topography of the lower strat boundary? Smooth ☐ Wavy ☐ Irregular ☐ Broken ☐ Sloping ☐ Unobserved ☐

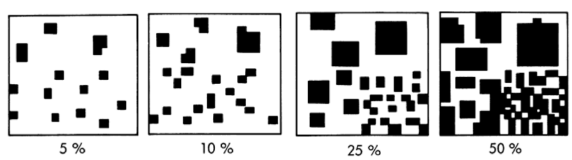
Matrix Texture (circle all that apply): Sand ☐ Sandy-Loam ☐ Loam ☐ Silt Loam ☐ Clay Loam ☐ Clay ☐

Matrix Consistency (circle all that apply): Extremely Firm ☐ Firm ☐ Friable ☐ Loose ☐

Matrix Mixing: (Homogenous) 1 ○ 2 ○ 3 ○ 4 ○ 5 (Heterogenous) ○

Matrix Coarse Fragments %: ____________

(% FCR, Spalls, Pebbles, etc.)



Matrix Coarse Fragment Shape (circle all that apply): Angular ☐ Sub Angular ☐ Sub Round ☐ Round ☐

Cultural Matrix Inclusions (circle all that apply): FCR ☐ Charcoal ☐ Lithics ☐ Fiber ☐ Animal Bone ☐ Mussel Shell ☐ Snail Shell ☐ Other ☐

Natural Matrix Inclusions (circle all that apply): Spalls ☐ Roots ☐ Insect/Worm Burrows ☐ Animal Burrows ☐ Dung ☐ $CaCO_3$ ☐ Other ☐

Describe inclusions (e.g., for burrows describe size, frequency, and orientation):

Strat Form

Strat Description Continued

Describe the matrix: ____

Additional Strat Notes: ____

Page 3 of 3

Eagle Nest Canyon Expedition 2014: **Feature Form**

Site: ______________________________

Excavation Area: ______________________

Excav. Unit: ____________ Layer: ________

Section: ____________________________

Feature: ______________

Field Number: ____________________

ASWT
Texas State University

Recorder 1: ________________

Recorder 2: ________________

Date Started: ________________

Date Completed: ______________

QAQC: Yes ◯ No ◯ Initials:

General Feature Observations

Feature Description: ____

Strats Included in Feature:

Page 1 of 3

Feature Form

F_______ page 2 of 3

Feature Dimensions: Length ________________ Width __________________

Depth _________________ Height __________________

Impacts/Level of Disturbance:

Associated Artifacts: ____

Additional Feature Notes (include any special samples taken, additional forms completed, etc.):

SfM Data

SfM Photo Ranges: ______________________

4 Required GCPs

1st GCP: ______________________

2nd GCP: ______________________

3rd GCP: ______________________

4th GCP: ______________________

2 Optional GCPs

5th GCP: ______________________

6th GCP: ______________________

Additional Feature Photos:

Feature Form F_______ page 3 of 3

Site: _________________ Excav Area: ____________________ Feature: ______________

Date: ______________________ Scale: _____________________________ Recorder: _________________________

Eagle Nest Canyon Expedition 2014: **Profile Section Form**

Site: ______________________________________

ASWT
Texas State University

Excav. Area: ______________ Excav. Unit ________

Field Number: ____________________________

Recorder 1: _________________

Profile Section: ___________________________

Recorder 2: _________________

Date Started: _____________ Date Completed: ____________ QAQC: Yes No Initials:

Profile Measurements

Starting Dimensions

Top _______ Bottom ______

Left _______ Right ________

Closing Dimensions

Top _______ Bottom ______

Left _______ Right ________

Screen every 4th bucket of fill

Screen Size(s) used: **1/4”** **1/2”** **1”**

What to collect from screen:

No Snails

No Charcoal unless it appears to be an artifact

Good examples of botanicals

Diagnostic Bones

Wood, shell, fiber, and bone artifacts

Manuports

Collect complete stone tools and all projectile points

SfM Data

SfM Photo Ranges: ____________ __________________

____

____

____

4 Required GCPs

1st GCP: ____________________

2nd GCP: ____________________

3rd GCP: ____________________

4th GCP: ____________________

Optional GCPs

____

____

____

List the Strats Recorded in this Profile Section:____

____

____

____

____

____

____

____

____

____

Page 1 of 4

Profile Section Form

Describe the "excavation" methods (e.g., how you cleaned away the loose fill), sequence, and problems: ____

Describe the profile: ____

Describe the sampling strategy, sequence, and problems: ____

Special Samples

Charcoal Collected: Yes No FN#s: ______________________

Spot Sam. Collected: Yes No FN#s: ______________________

Phosphate Collected: Yes No FN#s: ______________________

MagSuscept Collected: Yes No FN#s: ______________________

Bugs Collected: Yes No FN#s: ______________________

OSL Collected: Yes No FN#s: ______________________

Other Collected: Yes No FN#s: ______________________

Sample Notes (if "other," please describe): ____

Page 2 of 4

Profile Section Form

General Collection

Artifact Type	Present	
	Yes	No
Debitage		
Chipped-Stone Tools		
Non-Chipped Stone Tools		
Faunal Remains		
Botanical Remains		
Bone Tools		
Wood Tools		
Fiber Artifacts		
1/8" Screen Material		
Other		

Point-Provenienced Artifacts

Artifact Type	FN#

Artifact Notes (if "other," please describe):
____
____
____

Additional Notes:
____
____
____
____
____
____
____
____
____
____
____
____
____
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____
____

Profile Section Form

Site: ________________ Excav Area: ___________________ Profile Section: ______________

Date: ____________________ Scale: ___________________________ Recorder: _______________________

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APPENDIX B

This appendix presents all samples and artifacts recovered from Skiles Shelter's features during 2014 excavation. A star (*) symbol next to field number (FN) specifies it the sample or artifact(s) came from a matrix sample. A cross (†) next to 14c sample indicates if sample was included in radiocarbon analysis.

Feature 1

F1 Artifact Field Numbers (FN)	Artifacts:	FN20035, FN20044.15, FN20052.4, FN20037, FN20036.14, FN20045.16, FN20051.3

Feature 2

F2 Artifact and Sample Field Numbers (FN)	Botanical Remains:	FN20050
	Micromorph. Samples:	FN20053
	Faunal Samples:	FN20050
	Artifacts:	FN20027.3

Feature 3

F 3 Artifact and Sample Field Numbers (FN)	Debitage:	FN20060, *FN20061, *FN20154
	Botanical Remains:	*FN20148, *FN20154
	Micromorph. Samples:	FN20371
	Faunal Samples:	FN20060, *FN20061 (2 Bags), *FN20154
	14c Samples:	†*FN20148,†*FN20153
	Charcoal-Spot Samples:	FN20148, FN20154, †FN20152
	Spot Samples:	FN20150, FN20152, FN20153
	Residue Rocks:	FN20147
	Matrix Samples:	FN20061 (6 Bags/8.4 L), FN20148 (1 L), FN20151 (.65 L), FN20154 (.55 L)
	Artifacts:	FN20145.1,

Feature 4

F4 Artifact and Sample Field Numbers (FN)		
	Botanical Remains:	FN20070.9 (.8 L)
	Faunal Samples:	*FN20070
	14c Samples:	†*FN20070

Feature 5

F5 Artifact and Sample Field Numbers (FN)		
	Debitage:	FN20086, *FN20090
	Botanical Remains:	FN20086, *FN20154
	Micromorph. Samples:	FN20338, FN20339
	Faunal Samples:	FN20086, *FN20090, *FN20094
	14c Samples:	†*FN20094
	Charcoal-Spot Samples:	FN20095, FN20096, †FN20092
	Spot Samples:	FN20163
	Residue Rocks:	FN20159, FN20160, FN20161, FN20162
	Matrix Samples:	FN20090 (7 Bags/6.6 L), *FN20094(4 bags/4 L)
	Artifacts:	FN20145

Feature 6

F6 Artifact and Sample Field Numbers (FN)	Debitage:	*FN20129
	Botanical Remains:	*FN20129.3
	Faunal Samples:	
	14c Samples:	†*FN20129.3, †*FN20130
	Spot Samples:	FN20128; FN20130
	Matrix Samples:	FN20129.1-4 (4 bags/3.6 L), FN20134.5-7(3 bags/2.8 L), FN20136.8 (1 bag/.75 L), FN20138.9-11 (3 bags/3.1 L)
	Artifacts:	FN20135.12

APPENDIX C

This appendix presents the unifacial and bifacial coding terminology as well as additional supplementary tables from the Skiles Shelter lithic analysis.

UNIFACIAL TOOL CODING TERMINOLOGY AND SUPPLEMENTARY TABLES

1. **Portion**: Refers to the intact portion of the uniface.

   Codes: complete, distal, distal-medial, medial, proximal-medial, proximal, lateral edge(s) missing, fragment, barb/shoulder, ear/tang, stem, indeterminate

2. **Edge Angle:** The angle of the modified edge. Recorded as greater than 45° or less than 45°. If more than two edges are present, the predominant edge was noted. If edges varied significantly, both angles were noted

   Codes: > 45°, < 45°

3. **Cortex Amount:** Cortex was noted as being primary, secondary, or tertiary. Primary cortex was noted if the entire dorsal face still retained cortex. Secondary cortex was noted if traces of cortex was visible on the platform of dorsal surface of the tool. Tertiary cortex was noted if no cortex remained on the tool.

   Codes: primary, secondary, tertiary

4. **Retouch Morphology:** Retouch morphology describes the flaking characteristics of the modified segments of the tool.

   > "Regular retouch is defined as edge flaking that has similar macroscopic size, shape, and distribution across a flake margin. Irregular retouch lacks demonstrable regularity in flake scar size, shape, or distribution. Continuous retouch is defined as contiguous serial flaking along flake margins with overlapping regular negative flake scars. Continuous modification may reflect intentional human modification (either sharpening or dulling) of the flake margin, or accretional edge modification acquired through tool utilization, or unidentified post depositional damage. Discontinuous retouch is defined as noncontiguous areas of edge flaking that do not significantly overlap and may be random single flake detachments or trivial areas of edge modification not longer than 4 mm….invasive retouch is intentional modification that intrudes more than 1 cm into the flake body. Noninvasive retouch intrudes less than 1 cm into the flake body and may or may not be intentional" (Prilliman and Bousman 1998:599).

   Codes: regular, irregular, continuous, discontinuous, invasive, noninvasive

5. **Location of Modified Edge Segments**: Describes the location of the modified unifacial segments in relation to the platform (positioned distally) for both dorsal and ventral surfaces. This field was left blank if the tool could not be oriented.

Codes: left, right, distal, proximal, all, none

6. **Number of Modified Segments**: A count of the number of modified segments on the tool.

7. **Edge Modification Thickness:** The edge modification thickness on the tool. On tools with more than one modified edge, the thickness of the most utilized segment was noted.

   Codes: 0-2 mm, 2-9 mm, 9 mm or >

   .

Table C.1: Unifacial tool counts by Class and excavation unit.

Row Labels	Denticulate	Edge-Modified Flake	Multiple Tool	Retouched Blade	Sequent Flake Tool	Thick Uniface	Thin Uniface	Total
A		1	1					2
B	1	1			1		1	4
C		1						1
D		2		2	3	2	1	10
E		2					2	4
F		2						2
G	3	4			1	1	2	11
H		4	1			1		6
I			1					1
J		4	1					5
L		3	1					4
M		4						4
N		2	1		1		1	5
O		3						3
P		9	3	1		1	1	15
Total	**4**	**42**	**9**	**3**	**6**	**5**	**8**	**77**

Table C.2: Skiles Shelter unifacial tool density by unit and volume excavated.

Unit	Weight	Volume Excavated	Unifacial Tool Density (g/m3)
AB	75.39	2.76	222.
C	7.86	0.31	25.35
D	123.6	1.19	103.9
E	97.03	2.27	42.7
F	30.57	1.02	30.0
G	189.26	2.28	83.0
H	122.37	1.18	103.7
I	15.3	0.42	36.4
J	58.83	0.54	108.9
K	0	0.17	0.0
L	30.1	0.29	103.8
M	77.95	1.25	62.4
N	203.03	0.68	298.6
O	78.04	1.07	72.9
P	184.59	0.83	222.4

Table C.3: Skiles Shelter unifacial tool coding results for the weight, portion, material type, flake type, length, width, thickness, and circumference fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Weight	Portion	Material Type	Flake Type	Length(mm)	Width(mm)	Thickness(mm)	Circumference (mm)
A	8	25013	25013-25	n/a	6.32	complete	chert	normal	38.8	25.5	8.08	105
A	8	25013	25013-22	n/a	18.11	lateral edge(s) missing	unidentified sedimentary	normal	--	--	--	--
B	3	20040	5	n/a	2.4	complete	chert	sequent	23.7	29.2	6	80
B	1	25021	--	n/a	38.67	complete	chert	indeterminate	90.14	39.6	10.3	225
B	12	25031	--	n/a	6.02	distal	chert	indeterminate	--	--	--	--
B	13	25032	--	n/a	3.87	indeterminate	chert	indeterminate	--	--	--	--
C	2	25035	25035-1	--	7.86	indeterminate	unidentified sedimentary	indeterminate	--	--	--	--
D	1	20000	12	n/a	18.7	distal-medial	chert	normal	--	--	--	--
D	2	20011	2	n/a	2.5	complete	chert	biface thinning flake	31.4	27.2	4.6	91
D	2	20011	4	n/a	4.6	complete	chert	indeterminate	44.3	27.5	6.8	120
D	2	20011	5	n/a	12.7	complete	chert	normal	63.5	32.3	10	160
D	4	20018	15	n/a	18.3	complete	chert	normal	61.3	53	13	180
D	4	20018	7	n/a	14.9	complete	chert	sequent	47.4	34.7	12.1	138
D	4	20018	17	n/a	15.7	distal-medial	chert	sequent	--	--	--	--
D	4	20018	18	n/a	13.7	lateral edge(s) missing	chert	indeterminate	--	--	--	--
D	3	20015	4	n/a	19.9	distal-medial	chert	normal	--	--	--	--
D	3	20015	5	n/a	2.6	complete	chert	normal	46.6	15.6	6.7	110
E	1	20003	1	n/a	12.7	complete	chert	normal	54.5	49.4	8.8	163
E	3	20020	2	n/a	19.5	distal-medial	chert	normal	--	--	--	--
E	6	20056	8	n/a	54.22	complete	chert	normal	64.1	48.1	20.3	177
E	6	20056	3	n/a	10.61	indeterminate	chert	normal	--	--	--	--
F	3	20023	4	n/a	10.5	distal-medial	chert	normal	--	--	--	--
F	3	20023	8	n/a	20.07	lateral edge(s) missing	chert	normal	--	--	--	--

Table C.3 (cont.): Skiles Shelter unifacial tool coding results for the weight, portion, material type, flake type, length, width, thickness, and circumference fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Weight	Portion	Material Type	Flake Type	Length(mm)	Width(mm)	Thickness(mm)	Circumference (mm)
G	1	20029	11	n/a	23.5	proximal-medial	chert	normal	--	--	--	--
G	1	20029	12	n/a	21.2	complete	chert	normal	61.6	42.2	11.8	177
G	1	20029	14	n/a	15.9	complete	chert	normal	42.5	35.8	14	138
G	1	20029	9	n/a	24.2	complete	chert	sequent	42.6	64.1	10.4	180
G	1	20029	10	n/a	19.8	complete	chert	indeterminate	42	38.1	16.8	135
G	2	20032	5	n/a	4.3	lateral edge(s) missing	chert	normal	--	--	--	--
G	2	20031	3	n/a	2.1	fragment	chert	indeterminate	--	--	--	--
G	2	20031	4	n/a	16.2	complete	chert	normal	37.3	44	13.6	132
G	3	20034	9	n/a	11.7	distal	chert	indeterminate	--	--	--	--
G	3	20034	8	n/a	15.6	complete	chert	normal	38	42	13.3	128
G	5	20062	1	n/a	34.76	complete	chert	normal	56.8	31.3	13.3	157
H	1	20030	2	n/a	2.1	distal	chert	indeterminate	--	--	--	--
H	3	20033	4	n/a	17.75	indeterminate	chert	indeterminate	--	--	--	--
H	4	20054	5	n/a	4.5	fragment	chert	indeterminate	--	--	--	--
H	3	20033	3	n/a	33.39	complete	chert	normal	38.2	47.1	18.9	135
H	3	20033	15	n/a	42.83	distal-medial	chert	indeterminate	--	--	--	--
H	4	20054	10	1142	21.8	complete	basalt	indeterminate	89.9	72.2	26.8	270
I	1	20059	3	n/a	15.3	complete	chert	normal	40.2	32.6	15	115
J	1	20063	16	n/a	2.27	fragment	chert	indeterminate	--	--	--	--
J	1	20063	6	n/a	21.14	complete	chert	normal	51.64	33.42	14.31	135
J	1	20063	17	n/a	2.68	fragment	chert	indeterminate	--	--	--	--
J	1	20063	19	n/a	23.43	indeterminate	chert	normal	--	--	--	--
J	1	20063	18	n/a	9.31	indeterminate	chert	indeterminate	--	--	--	--
L	1	20066	5	n/a	3.9	fragment	chert	indeterminate	--	--	--	--
L	1	20066	6	n/a	19.1	complete	chert	normal	41.7	56.3	9.4	158

Table C.3 (cont.): Skiles Shelter unifacial tool coding results for the weight, portion, material type, flake type, length, width, thickness, and circumference fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Weight	Portion	Material Type	Flake Type	Length(mm)	Width(mm)	Thickness(mm)	Circumference (mm)
L	1	20066	9	n/a	3.5	fragment	chert	indeterminate	--	--	--	--
L	1	20066	7	n/a	3.6	medial	chert	indeterminate	--	--	--	--
M	4	20082	7	n/a	10.95	distal-medial	chert	normal	--	--	--	--
M	1	20068	4	n/a	5.38	indeterminate	chert	indeterminate	--	--	--	--
M	1	20068	3	n/a	14.06	complete	chert	normal	45.5	30	13.6	128
M	6	20100	2	n/a	47.56	complete	basalt	normal	54.2	48.2	22	160
N	2	20073	4	n/a	32.65	complete	chert	sequent	44.29	52.89	12.48	155
N	2	20073	6	n/a	9.71	distal-medial	chert	normal	--	--	--	--
N	2	20073	1	n/a	61.83	lateral edge(s) missing	chert	normal	--	--	--	--
N	2	20073	3	n/a	46.71	complete	chert	normal	48.2	59.3	15.9	170
N	2	20073	5	n/a	52.13	complete	chert	sequent	42.5	81.4	11.3	215
O	2	20078	2	n/a	24.68	distal	chert	indeterminate	--	--	--	--
O	2	20078	3	n/a	10.36	proximal	chert	indeterminate	--	--	--	--
O	7	20135	12	1288	43	distal	chert	normal	--	--	--	--
P	2	20107	5	n/a	3.29	complete	chert	normal	32.33	30.25	5.88	100
P	5	20121	4	n/a	10.6	complete	chert	normal	41.38	22.75	11.22	110
P	1	20105	10	n/a	29.15	distal-medial	chert	normal	--	--	--	--
P	1	20105	8	n/a	3.36	lateral edge(s) missing	chert	indeterminate	--	--	--	--
P	4	20116	4	n/a	4.62	complete	chert	normal	32.58	25.6	6.07	100
P	5	20121	15	n/a	4.64	complete	chert	indeterminate	18.23	30.2	8.45	77
P	6	20132	4	n/a	13.1	complete	chert	normal	34.24	33.2	10.4	110
P	7	20132	5	n/a	1.82	complete	chert	normal	46.6	13.95	3.68	110
P	6	20132	3	n/a	11.5	proximal	chert	indeterminate	--	--	--	--
P	1	20106	9	n/a	22.45	proximal-medial	chert	normal	--	--	--	--
P	1	20105	11	n/a	19.7	complete	chert	indeterminate	41.26	64.41	11.78	165

Table C.3 (cont.): Skiles Shelter unifacial tool coding results for the weight, portion, material type, flake type, length, width, thickness, and circumference fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Weight	Portion	Material Type	Flake Type	Length(mm)	Width(mm)	Thickness(mm)	Circumference (mm)
P	2	20107	4	n/a	15.03	complete	chert	normal	36.5	33.6	14.35	115
P	2	20107	6	n/a	1.5	indeterminate	unidentified sedimentary	indeterminate	--	--	--	--
P	5	20121	17	n/a	28.63	complete	chert	normal	67.31	33.82	16.36	170
P	5	20121	14	n/a	37.65	complete	chert	normal	51.39	46.63	14.52	167

Table C.4: Skiles Shelter unifacial tool coding results for the TEM, PEM, TEM:PEM, edge-angle, artifact form, multiple tool type, cortex, retouch morphology, modified edge segment (dorsal), and modified edge segment (ventral) fields.

Unit	Layer	FN	Specimen Number	TDS Shot	TEM (mm)	PEM (mm)	TEM:PEM (mm)	Edge Angle	Artifact Form	Multiple tool Type	Cortex	Retouch Morphology	Modified Edge Seg. (dorsal)	Modified Edge Seg. (ventral)
A	8	25013	25013-25	n/a	60	95	0.63	shallow	edge-modified flake	--	none	irregular	left, right	distal
A	8	25013	25013-22	n/a	--	--	--	steep	multiple tool	Thin Uniface, Denticulate	none	regular, continuous	proximal, distal	none
B	3	20040	5	n/a	31	72	0.43	steep	sequent flake tool	--	secondary	regular	none	left, distal
B	1	25021	--	n/a	180	200	0.9	shallow	thin uniface	--	secondary	regular, continuous	left, right, distal	right
B	12	25031	--	n/a	--	--	--	shallow	edge-modified flake	--	secondary	regular, continuous	left	--
B	13	25032	--	n/a	--	--	--	steep	denticulate	--	none	regular, continuous	n/a	--
C	2	25035	25035-1	--	--	--	--	steep	edge-modified flake	--	none	regular, continuous	n/a	n/a
D	1	20000	12	n/a	--	--	--	steep	thick uniface	--	secondary	regular, continuous	distal	left
D	2	20011	2	n/a	13	88	0.48	shallow	edge-modified flake	--	secondary	regular, continuous	left, right	left

Table C.4(cont.): Skiles Shelter unifacial tool coding results for the TEM, PEM, TEM:PEM, edge-angle, artifact form, multiple tool type, cortex, retouch morphology, modified edge segment (dorsal), and modified edge segment (ventral) fields.

Unit	Layer	FN	Specimen Number	TDS Shot	TEM (mm)	PEM (mm)	TEM:PEM (mm)	Edge Angle (45)	Artifact Form	Multiple tool Type	Cortex	Retouch Morphology	Modified Edge Seg. (dorsal)	Modified Edge Seg. (ventral)
D	2	20011	4	n/a	20	102	0.19	shallow	retouched blade	--	none	regular, continuous	distal	none
D	2	20011	5	n/a	45	145	0.31	shallow	sequent flake tool	--	secondary	irregular, continuous	left	none
D	4	20018	15	n/a	35	170	0.21	shallow	thin uniface	--	none	regular, continuous	right	none
D	4	20018	7	n/a	80	138	0.58	steep	sequent flake tool	--	primary	regular, continuous	proximal, distal	none
D	4	20018	17	n/a	--	--	--	steep	sequent flake tool	--	secondary	regular, continuous	right	none
D	4	20018	18	n/a	--	--	--	steep	thick uniface	--	secondary	regular, continuous	right	none
D	3	20015	4	n/a	--	--	--	steep	edge-modified flake	--	secondary	discontinuous	none	left
D	3	20015	5	n/a	25	90	0.27	shallow	retouched blade	--	none	regular, continuous	left	none
E	1	20003	1	n/a	79	156	0.63	shallow	thin uniface	--	none	regular, continuous	left, right , distal	none
E	3	20020	2	n/a	--	--	--	shallow	edge-modified flake	--	secondary	regular, continuous	left	left
E	6	20056	8	n/a	65	155	0.41	shallow	edge-modified flake	--	primary	regular, continuous	right , distal, left	none
E	6	20056	3	n/a	--	--	--	steep	thin uniface	--	none	regular, continuous	--	--
F	3	20023	4	n/a	--	--	--	shallow	edge-modified flake	--	secondary	regular, continuous	right	none
F	3	20023	8	n/a	--	--	--	shallow	edge-modified flake	--	secondary	regular, continuous	none	distal
G	1	20029	11	n/a	--	--	--	shallow	edge-modified flake	--	secondary	regular, continuous	right	none

Table C.4(cont.): Skiles Shelter unifacial tool coding results for the TEM, PEM, TEM:PEM, edge-angle, artifact form, multiple tool type, cortex, retouch morphology, modified edge segment (dorsal), and modified edge segment (ventral) fields.

Unit	Layer	FN	Specimen Number	TDS Shot	TEM (mm)	PEM (mm)	TEM:PEM (mm)	Edge Angle (45)	Artifact Form	Multiple tool Type	Cortex	Retouch Morphology	Modified Edge Seg. (dorsal)	Modified Edge Seg. (ventral)
G	1	20029	12	n/a	55	145	0.37	steep	denticulate	--	secondary	regular, continuous	right	none
G	1	20029	14	n/a	39	113	0.34	steep	edge-modified flake	--	primary	regular, continuous	distal	none
G	1	20029	9	n/a	55	160	0.34	steep	sequent flake tool	--	none	regular, continuous	distal	none
G	1	20029	10	n/a	55	135	0.41	steep	thick uniface	--	secondary	regular, continuous	left	none
G	2	20032	5	n/a	--	--	--	shallow	edge-modified flake	--	secondary	regular, continuous	right	distal
G	2	20031	3	n/a	--	--	--	steep	denticulate	--	primary	regular, continuous	--	--
G	2	20031	4	n/a	48	107	0.44	steep	thin uniface	--	primary	regular, continuous	distal	none
G	3	20034	9	n/a	--	--	--	steep	denticulate	--	none	irregular, discontinuous	distal	none
G	3	20034	8	n/a	40	128	0.31	shallow	edge-modified flake	--	secondary	irregular, discontinuous	distal, right	none
G	5	20062	1	n/a	122	157	0.77	steep	thin uniface	--	primary	regular, continuous	left, right , distal, proximal	none
H	1	20030	2	n/a	--	--	--	shallow	edge-modified flake	--	primary	regular, continuous	left	none
H	3	20033	4	n/a	--	--	--	shallow	edge-modified flake	--	primary	irregular, discontinuous	--	--
H	4	20054	5	n/a	--	--	--	shallow	edge-modified flake	--	none	regular, continuous	--	--
H	3	20033	3	n/a	30	130	0.23	steep	edge-modified flake	--	primary	irregular, discontinuous	distal	none

Table C.4(cont.): Skiles Shelter unifacial tool coding results for the TEM, PEM, TEM:PEM, edge-angle, artifact form, multiple tool type, cortex, retouch morphology, modified edge segment (dorsal), and modified edge segment (ventral) fields.

Unit	Layer	FN	Specimen Number	TDS Shot	TEM (mm)	PEM (mm)	TEM:PEM (mm)	Edge Angle (45)	Artifact Form	Multiple tool Type	Cortex	Retouch Morphology	Modified Edge Seg. (dorsal)	Modified Edge Seg. (ventral)
H	3	20033	15	n/a	--	--	--	steep	multiple tool	Thick Uniface, Denticulate	primary	irregular, continuous	left, proximal, right	none
H	4	20054	10	1142	65	270	0.24	steep	thick uniface	--	primary	regular	right	none
I	1	20059	3	n/a	62	110	0.56	steep	multiple tool	EMF, Denticulate	secondary	irregular, discontinuous	none	left, right , distal
J	1	20063	16	n/a	--	--	--	shallow	edge-modified flake	--	none	regular, continuous	--	--
J	1	20063	6	n/a	115	115	1	steep	edge-modified flake	--	none	irregular, continuous	left, right , distal	--
J	1	20063	17	n/a	--	--	--	steep	edge-modified flake	--	none	regular, continuous	--	--
J	1	20063	19	n/a	--	--	--	steep	edge-modified flake	--	none	irregular, continuous	--	--
J	1	20063	18	n/a	--	--	--	steep	multiple tool	EMF, Notch, Burin	none	irregular, discontinuous	--	--
L	1	20066	5	n/a	--	--	--	shallow	edge-modified flake	--	primary	irregular, discontinuous	--	--
L	1	20066	6	n/a	80	128	0.62	shallow	multiple tool	EMF, Notch	primary	irregular, continuous	right , distal	none
L	1	20066	9	n/a	--	--	--	steep	edge-modified flake	--	none	regular, continuous	--	--
L	1	20066	7	n/a	--	--	--	steep	edge-modified flake	--	none	regular, continuous	left, right	--
M	4	20082	7	n/a	--	--	--	shallow	edge-modified flake	--	primary	irregular, continuous	right	none

Table C.4(cont.): Skiles Shelter unifacial tool coding results for the TEM, PEM, TEM:PEM, edge-angle, artifact form, multiple tool type, cortex, retouch morphology, modified edge segment (dorsal), and modified edge segment (ventral) fields.

Unit	Layer	FN	Specimen Number	TDS Shot	TEM (mm)	PEM (mm)	TEM:PEM (mm)	Edge Angle	Artifact Form	Multiple tool Type	Cortex	Retouch Morphology	Modified Edge Seg. (dorsal)	Modified Edge Seg. (ventral)
M	1	20068	4	n/a	--	--	--	shallow	edge-modified flake	--	secondary	irregular, continuous	--	--
M	1	20068	3	n/a	43	127	0.36	steep	edge-modified flake	--	secondary	regular, continuous	none	left
M	6	20100	2	n/a	38	110	0.34	steep	edge-modified flake	--	none	regular, continuous	left	none
N	2	20073	4	n/a	80	152	0.52	shallow	sequent flake tool	--	secondary	irregular, continuous	distal	--
N	2	20073	6	n/a	--	--	--	shallow	edge-modified flake	--	none	regular, continuous	none	right
N	2	20073	1	n/a	--	--	--	shallow	thin uniface	--	none	regular, continuous	left, right , distal	--
N	2	20073	3	n/a	34	155	0.22	steep	edge-modified flake	--	primary	irregular, continuous	right	right
N	2	20073	5	n/a	120	214	0.56	steep	multiple tool	Sequent, Denticulate	none	regular, continuous	distal, right	none
O	2	20078	2	n/a				shallow	edge-modified flake		secondary	irregular, continuous	left	
O	2	20078	3	n/a	--	--	--	shallow	edge-modified flake	--	none	irregular, discontinuous	left, right , distal	left, right , distal
O	7	20135	12	1288	--	--	--	shallow	edge-modified flake	--	none	regular, discontinuous	left	right
P	2	20107	5	n/a	15	85	0.17	shallow	edge-modified flake	--	none	irregular, discontinuous	right	--
P	5	20121	4	n/a	40	90	0.44	shallow	edge-modified flake	--	secondary	irregular, continuous	right, distal	--

Table C.4(cont.): Skiles Shelter unifacial tool coding results for the TEM, PEM, TEM:PEM, edge-angle, artifact form, multiple tool type, cortex, retouch morphology, modified edge segment (dorsal), and modified edge segment (ventral) fields.

Unit	Layer	FN	Specimen Number	TDS Shot	TEM (mm)	PEM (mm)	TEM:PEM (mm)	Edge Angle	Artifact Form	Multiple tool Type	Cortex	Retouch Morphology	Modified Edge Seg. (dorsal)	Modified Edge Seg. (ventral)
P	1	20105	10	n/a	--	--	--	shallow	thin uniface	--	secondary	regular, continuous	distal, right	--
P	1	20105	8	n/a	--	--	--	shallow	edge-modified flake	--	secondary	regular, continuous	right	--
P	4	20116	4	n/a	30	80	0.37	shallow	multiple tool	EMF, Notch, Burin	secondary	irregular, discontinuous	--	right
P	5	20121	15	n/a	10	50	0.2	shallow	edge-modified flake	--	secondary	non-invasive	right	--
P	6	20132	4	n/a	50	95	0.52	shallow	edge-modified flake	--	none	irregular, discontinuous	left, right	left
P	7	20132	5	n/a	10	110	0.09	shallow	retouched blade	--	secondary	regular	distal	--
P	6	20132	3	n/a				shallow	multiple tool	EMF, Denticulate	none	irregular, continuous	left right	--
P	1	20106	9	n/a				steep	thick uniface	--	primary	regular, continuous	left	
P	1	20105	11	n/a	123	165	0.75	steep	multiple tool	EMF, Burin	none	irregular, continuous	left, right	right , distal
P	2	20107	4	n/a	22	70	0.31	steep	edge-modified flake	--	secondary	regular, discontinuous	right	--
P	2	20107	6	n/a	--	--	--	steep	edge-modified flake	--	none	regular, continuous	--	--
P	5	20121	17	n/a	40	90	0.44	steep	edge-modified flake	--	secondary	irregular, discontinuous	left	right
P	5	20121	14	n/a	95	167	0.56	steep	edge-modified flake	--	primary	irregular	left, right	--

Table C.5: Skiles Shelter unifacial tool coding results for the edge-modification thickness, epidermis, epidermis description, and description fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Edge Modification Thickness (mm)	Epidermis y/n	Epidermis Description	Description
A	8	25013	25013-25	n/a	2-9 mm	n	--	--
A	8	25013	25013-22	n/a	≥ 10 mm	n	--	similar to a scraper; combination of thin uniface and denticulate
B	3	20040	5	n/a	2-9 mm	y	epidermis fragments identified on the dorsal distal edge and ventral edge	--
B	1	25021		n/a	≥ 10 mm	n	--	one minimally bifacially worked edge; this specimen is like a knife
B	12	25031		n/a	2-9 mm	n	--	uniface fragment
B	13	25032		n/a	2-9 mm	n	--	uniface fragment; hard to determine flake margins; specimen is like a denticulate
C	2	25035	25035-1		2-9 mm	n	--	--
D	1	20000	12	n/a	≥ 10 mm	n	--	possible blood/pigment observed in residue adhering to the dorsal right marginal edge
D	2	20011	2	n/a	0-1	n	few fiber strands identified on dorsal marginal edge	Residue identified on dorsal right marginal edge under magnification
D	2	20011	4	n/a	≥ 10 mm	n	fiber strands identified on dorsal left marginal edge	Residue adhering to dorsal to left marginal edge and ventral right edge
D	2	20011	5	n/a	2-9 mm	n	--	Take photo
D	4	20018	15	n/a	2-9 mm	n	--	Residue identified near bulb of percussion
D	4	20018	7	n/a	≥ 10 mm	n	small fiber strand on dorsal modified edge	flakey white substance adhering to dorsal modified edge
D	4	20018	17	n/a	≥ 10 mm	n	--	--
D	4	20018	18	n/a	≥ 10 mm	n	--	cannot determine orientation; one side appears to have heavy polish or residue; one small notch with polish
D	3	20015	4	n/a	≥ 10 mm	n	--	crude flaking on all sides of uniface - not regular enough to be a thin uniface; this specimen was originally noted as biface
D	3	20015	5	n/a	0-1	y	Fiber epidermis of dorsal surface near the lower right edge; plant material appears to be all over distal edge and stuffed in cracks near distal end	Residue identified on distal end under magnification
E	1	20003	1	n/a	2-9 mm	n	--	specimen was broken post modification

Table C.5(cont.): Skiles Shelter unifacial tool coding results for the edge-modification thickness, epidermis, epidermis description, and description fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Edge Modification Thickness (mm)	Epidermis y/n	Epidermis Description	Description
E	3	20020	2	n/a	2-9 mm	y	fiber strand and possible epidermis fragment on dorsal left marginal edge	Residue identified on dorsal left marginal edge under magnification
E	6	20056	8	n/a	≥ 10 mm	y	--	--
E	6	20056	3	n/a	0-1	y	epidermis fragments and fibers identified on both dorsal and ventral surfaces	fatty like residue adhering to parts of the tool; tool appears to have been hafted
F	3	20023	4	n/a	2-9 mm	n	--	Residue identified on dorsal right marginal edge under magnification
F	3	20023	8	n/a	2-9 mm	n	--	polish on both distal and ventral lateral sides - heavier on ventral. Polish extends further than TEM; tool was broken post use and modification.
G	1	20029	11	n/a	2-9 mm	n	--	Residue identified on dorsal center under magnification
G	1	20029	12	n/a	≥ 10 mm	n	--	edge modified flake with small notch (5cm) on right dorsal surface; take photo
G	1	20029	14	n/a	≥ 10 mm	n	--	medial fragment was possibly part of a drill
G	1	20029	9	n/a	≥ 10 mm	n	--	this tool could be a thinning flake from a uniface; formerly classified as a thin uniface
G	1	20029	10	n/a	≥ 10 mm	n	--	specimen is heavily thermally altered; measurements are taken from its current form.
G	2	20032	5	n/a	2-9 mm	y	burned epidermis on ventral side	Residue identified on dorsal left marginal edge and ventral right marginal edge under magnification
G	2	20031	3	n/a	2-9 mm	n	--	residue adhering to ventral side
G	2	20031	4	n/a	≥ 10 mm	y	lots of epidermis fragments on ventral side of tool	both dorsal and ventral surfaces exhibit unifacial edge modification on one edge; not extensive enough to categorize as thick uniface
G	3	20034	9	n/a	≥ 10 mm	y	epidermis fragments on dorsal blade/ possible blood on upper ventral edge near platform	most polish on distal surface; specimen possible hafted; take photo
G	3	20034	8	n/a	2-9 mm	y	burned epidermis on dorsal and ventral sides	--
G	5	20062	1	n/a	≥ 10 mm	y	epidermis identified on dorsal surface	material looks like basalt, but could be a course chert

Table C.5(cont.): Skiles Shelter unifacial tool coding results for the edge-modification thickness, epidermis, epidermis description, and description fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Weight	Edge Modification Thickness (mm)	Epidermis y/n	Epidermis Description	Description
H	1	20030	2	n/a	2.1	0-1	y	many fiber strands on both dorsal and ventral marginal edges; epidermis identified on ventral surface under platform	Residue identified on dorsal left marginal edge under magnification
H	3	20033	4	n/a	17.75	2-9 mm	n	--	--
H	4	20054	5	n/a	4.5	2-9 mm	n	--	no bulb of percussion; platform was determined to be edge with cortex
H	3	20033	3	n/a	33.39	0-1	y	epidermis fragments on broken end of tool	--
H	3	20033	15	n/a	42.83	≥ 10 mm	y	epidermis fragments identified on dorsal modified edge and body	--
H	4	20054	10	1142	21.8	≥ 10 mm	y	small epidermis fragments and fibers identified on dorsal surface	--
I	1	20059	3	n/a	15.3	2-9 mm	y	epidermis identified on dorsal surface;	specimen is made from coarse grained chert; the material almost appears to be basalt; denticulate and edge modified flake
J	1	20063	16	n/a	2.27	2-9 mm	n	--	--
J	1	20063	6	n/a	21.14	≥ 10 mm	n	--	--
J	1	20063	17	n/a	2.68	2-9 mm	n	--	--
J	1	20063	19	n/a	23.43	2-9 mm	n	--	defined as multiple tool due to the burin on left dorsal marginal edge; residue adhering to the left marginal edge.
J	1	20063	18	n/a	9.31	2-9 mm	n	--	EMF, Notch, and burin
L	1	20066	5	n/a	3.9	2-9 mm	n	--	characteristic of a scraper
L	1	20066	6	n/a	19.1	2-9 mm	y	large epidermis strands on dorsal distal modified edge	take photo; edge modified flake and notch?
L	1	20066	9	n/a	3.5	0-1	n	--	--
L	1	20066	7	n/a	3.6	2-9 mm	n	--	--
M	4	20082	7	n/a	10.95	≥ 10 mm	y	white residue; fat? unburned epidermis identified on the dorsal distal surface	tool exhibits characteristics of both a denticulate (left edge) and regular, continuous retouch (right); possibly used as a scraper

Table C.5(cont.): Skiles Shelter unifacial tool coding results for the edge-modification thickness, epidermis, epidermis description, and description fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Weight	Edge Modification Thickness (mm)	Epidermis y/n	Epidermis Description	Description
M	1	20068	4	n/a	5.38	2-9 mm	n	--	--
M	1	20068	3	n/a	14.06	2-9 mm	n	--	some midden matrix adhering to tool
M	6	20100	2	n/a	47.56	2-9 mm	n	--	--
N	2	20073	4	n/a	32.65	≥ 10 mm	n	--	--
N	2	20073	6	n/a	9.71	0-1	n	--	dorsal distal and left marginal edge has residue, dorsal distal and right marginal edge has residue
N	2	20073	1	n/a	61.83	≥ 10 mm	y	lots of midden like material adhering to both surfaces; some unburned epidermis identified on dorsal right modified edge	characteristic of a scraper; take photo
N	2	20073	3	n/a	46.71	≥ 10 mm	n	--	edge modified flake with small notch and burin in the ventral left marginal corner
N	2	20073	5	n/a	52.13	≥ 10 mm	n	--	primary flake of course chert; modification appears to be investigative and I'm unsure if this was used as a tool; sequent flake
O	2	20078	2	n/a	24.68	2-9 mm	n	--	
O	2	20078	3	n/a	10.36	≥ 10 mm	n	--	some of the modification may be from non-cultural processes
O	7	20135	12	1288	43	2-9 mm	y	large fiber strands and epidermis fragments on ventral right marginal edge	Residue on ventral distal edge; tool was possibly hafted
P	2	20107	5	n/a	3.29	2-9 mm	y	fiber strand identified on dorsal, lower right edge; possible epidermis on lower right blade face; charred seed on modified edge?	--
P	5	20121	4	n/a	10.6	≥ 10 mm	y	animal product or plant residue identified near platform	characteristic of a chopper; battering on worked edge; tool possibly a core turned into a tool; take photo
P	1	20105	10	n/a	29.15	≥ 10 mm	n	--	slight residue sheen observed on ventral surface
P	1	20105	8	n/a	3.36	2-9 mm	n	--	possible scraper

Table C.5(cont.): Skiles Shelter unifacial tool coding results for the edge-modification thickness, epidermis, epidermis description, and description fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Weight	Edge Modification Thickness (mm)	Epidermis y/n	Epidermis Description	Description
P	4	20116	4	n/a	4.62	2-9 mm	n	--	polish present; unsure what edge of the tool the polish is on; edge modified flake and notch
P	5	20121	15	n/a	4.64	2-9 mm	n	--	Slight residue observed on less modified side
P	6	20132	4	n/a	13.1	2-9 mm	n	--	tool exhibits characteristics of both a denticulate (left edge) and an edge modified flake
P	7	20132	5	n/a	1.82	2-9 mm	n	--	--
P	6	20132	3	n/a	11.5	2-9 mm	n	--	characteristic of a scraper; take photo; possibly hafted; residue adhering ventral side
P	1	20106	9	n/a		≥ 10 mm	y	small epidermis fragment on the ventral side	flake scars are present on the dorsal surface of the tool; however, it is unknown if this was due to edge modification
P	1	20105	11	n/a	19.7	≥ 10 mm	n	--	midden matrix adhering to tool; edge modified flake and burin
P	2	20107	4	n/a	15.03	2-9 mm	n	--	--
P	2	20107	6	n/a	1.5	2-9 mm	n	--	heavy plant residue on platform and upper part of tool; looks like prickly pear?
P	5	20121	17	n/a	28.63	2-9 mm		--	--
P	5	20121	14	n/a	37.65	≥ 10 mm	n	--	possible denticulate notching on lower right dorsal corner of mod. Flake

BIFACIAL TOOL CODING TERMINOLOGY AND SUPPLEMENTARY TABLES

1. **Presence or Absence of Cortex:** Cortex was noted as being present or absent.

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2. **Codes:** present, absent

3. **Outline Form:**
   The outline form specifies the shape of the biface. Forms included ovate, bi-pointed, lanceolate, triangular, sub-triangular, discoidal, asymmetrical, and constricted. Outline form was only collected on intact bifaces.

   Codes: ovate, bi-pointed, lanceolate, triangular, sub-triangular, discoidal, asymmetrical, and constricted

4. **Condition:** This field noted if the biface was complete or broken.

   Codes: complete, broken

5. **Fracture Type:** This field described the fracture(s) present on each biface Bend breaks typically appear as a clean snap or hinge at various locations on the biface. Perverse breaks appear as a “helical, spiral or twisting break initiated at the edge of an objective piece” (Crabtree 1972:82). Overshot breaks occur from the overshot flaking technique – a process used to remove large sections of cortex and thin the biface from margin to margin; failure in properly executing this technique can result in the removal of either the distal or proximal ends and/or lateral edges of the biface (see Figure 8.24). Thermal breaks occur after exposure to intense heat, and fractures typically include crazing, pot lidding, and sinuous or curved break facets (Dial et al. 1996:317). Edge-collapse damage describes crushing or removal of one or more of the lateral edges of the biface. Radial breaks occur when the biface is impacted on or near its center, often, fracturing the tool into wedge shaped pieces. Multi-hinge breaks occur when there is multiple right angle, rounded or blunt, fractures at the termination point. Longitudinal overshot breaks are the same as overshot shot breaks, except the breaks occurs from the flake travelling longitudinally across the biface. Last, burin-like breaks are fractures along one or more of the marginal edges that indicate burin manufacturing.

   Codes: bend, perverse, overshot, burin-like, thermal, multi-hinge, edge-collapse, radial, impact, edge bite.

6. **Portion:** This field described the intact portion of the bifaces.

   Codes: complete, distal, distal-medial, medial, proximal-medial, proximal, lateral edge(s) missing, fragment, barb/shoulder, ear/tang, stem, indeterminate

Table C.6: Distribution of bifacial tool classes by excavation unit.

Unit	A	B	C3	D	D	E	F	G	H	I	Stage 1	Stage 2	Stage 3	Row Total:
AB					1			4				2	2	9
C			2	1						2			1	6
D	1	1					1	3	1	2	1	3	4	17
E							1	3	1	11				16
F										3		1		4
G	1							1		5		1		8
H					1			10	1	5		1	3	21
I								2		3	2		1	8
J	1	2	1					2	2	1		1	1	11
K			1					1				1		3
L								2		2				4
M	1							2	1			1		5
N					1									1
O								1				1		2
P	2					1		6		6		2	1	18
Grand Total:	**6**	**3**	**4**	**1**	**3**	**1**	**2**	**37**	**6**	**40**	**3**	**14**	**13**	**133**

Table C.7: Skiles Shelter bifacial tool density by unit and volume excavated.

Unit	Biface Weight	Volume Excavated	Biface Density
AB	90.02	2.76	32.7
C	164.14	0.31	529.5
D	117.8	1.19	98.99
E	46.35	2.27	20.42
F	23.28	1.02	22.82
G	19.9	2.28	8.73
H	112.47	1.18	95.31
I	143.78	0.42	342.33
J	252.27	0.54	467.17
K	69.79	0.17	410.53
L	25.3	0.29	87.24
M	38.16	1.25	30.53
N	20.51	0.68	30.16
O	11.5	1.07	10.75
P	163.64	0.83	197.16

Table C.8: Skiles Shelter bifacial tool coding results. Table C.8 presents the portion, material type, cortex, length, width, thickness, weight, and outline form

Unit	Layer	FN	Specimen Number	TDS Shot	Portion	Material Type	Cortex	Length	Width	Thickness (mm)	Weight (g)	Outline Form
A	8	25013	25013-23	n/a	proximal, lateral edges missing	chert	present	--	--	13.6	20.97	--
A	8	25013	25013-24	n/a	distal-medial	chert	absent	--	--	7.28	4.59	--
A	9	25015	25015-1	n/a	indeterminate	chert	absent	--	--	2.7	0.48	--
A	9	25015	25015-2	n/a	indeterminate	chert	absent	--	--	6.2	2.57	--
A	13	25019	blank	n/a	distal	chert	present	--	--	4.1	1.07	--
AB	L5	20065	1	n/a	lateral edges missing	chert	absent	--	--	6.28	5.3	--
B	9	25028	--	n/a	complete	chert	absent	71.6	38.4	18.5	49.58	triangular
B	9	25028	--	n/a	medial	chert	absent	--	--	7.3	3.8	--
B	11	25030	--	n/a	distal	chert	absent	--	--	6.15	1.66	--
C	1	25033	25033-1	n/a	complete	chert	absent	63.9	41.9	23.6	45.89	asymmetrical
C	1	25033	25033-2	n/a	complete	chert	absent	49.7	45.5	13.16	28.64	discoidal
C	3	25036	25036-1	n/a	indeterminate	chert	present	--	--	14.6	17.11	--
C	3	25036	25036-2	n/a	medial	chert	absent	--	--	7.6	3.63	--
C	3	25036	25036-3	n/a	fragment	chert	absent	--	--	4.2	1.77	--
C	3	25036	25036-4	n/a	distal-medial	chert	present	--	--	16.8	67.1	--
D	L0	20000	4	--	medial	basalt	absent	--	--	11.35	7.4	--
D	L1	20000	5	--	distal-medial	chert	absent	--	--	5.59	1.3	--
D	L1	20000	6	--	proximal-medial	chert	absent	--	--	16.71	20	--
D	L1	20000	7	--	proximal-medial	chert	absent	--	--	5.66	4	--
D	L1	20000	8	--	indeterminate	chert	absent	--	--	3.26	0.1	--
D	L1	20000	9	--	medial	chert	absent	--	--	3.03	0.4	--
D	L1	20000	11	--	distal-medial	chert	absent	--	--	2.45	0.4	--
D	L1	20000	13	--	distal	chert	absent	--	--	2.23	0.1	--
D	L1	20000	16	--	medial	chert	absent	--	--	6.71	4.1	--
D	L2	20012	7	1039	complete	chert	absent	52.86	35.84	10.6	19.8	subtriangular

Table C.8(cont.): Skiles Shelter bifacial tool coding results. Table C.8 presents the portion, material type, cortex, length, width, thickness, weight, and outline form

Unit	Layer	FN	Specimen Number	TDS Shot	Portion	Material Type	Cortex	Length	Width	Thickness	Weight (g)	Outline Form
D	L3	20015	1	--	distal	chert	absent	--	--	3.18	0.9	--
D	L3	20015	2	--	medial	chert	absent	--	--	4.45	1	--
D	L4	20018	2	--	proximal-medial	chert	present	--	--	9.11	6.4	--
D	L4	20018	3	--	proximal	chert	absent	--	--	10.15	10.6	--
D	L4	20018	4	--	proximal-medial	chert	absent	--	--	13.07	18.8	--
D	L4	20018	5	--	complete	chert	absent	50.03	41.87	16.96	21.8	subtriangular
D	L4	20018	6	--	fragment	chert	absent	--	--	6.39	0.7	--
E	L2	20016	4	--	proximal	chert	absent	--	--	8.87	5.3	--
E	L2	20016	5	--	proximal-medial	chert	absent	--	--	11.85	10.4	--
E	L2	20016	8	--	proximal	chert	absent	--	--	7.07	2.1	--
E	L2	20016	9	--	complete	chert	absent	26.67	17.44	5.38	1.7	asymmetrical
E	L2	20016	10	--	indeterminate	chert	absent	--	--	5.22	0.8	--
E	L3	20020	4	--	ear/tang	chert	absent	--	--	3.23	0.4	--
E	L3	20020	5	--	distal	chert	absent	--	--	3.57	1.3	--
E	L4	20027	2	--	indeterminate	chert	absent	--	--	4.12	0.3	--
E	L4	20027	4	--	fragment	chert	absent	--	--	10.54	5.7	--
E	L4	20027	5	--	distal	chert	absent	--	--	3.04	0.4	--
E	L5	20042	2	--	indeterminate	chert	absent	--	--	2.25	0.34	--
E	L5	20042	3	--	distal	chert	absent	--	--	2.62	0.53	--
E	L5	20042	4	--	indeterminate	chert	absent	--	--	3.09	0.34	--
E	L5	20042	5	--	medial	quartzite	absent	--	--	5.07	2.04	--
E	L6	20056	1	--	proximal-medial	chert	absent	--	--	9.33	13.1	--
E	L6	20056	2	--	indeterminate	chert	absent	--	--	4.83	1.6	--
F	L3	20023	2	--	distal	chert	absent	--	--	1.63	0.2	--
F	L3	20023	3	--	distal	chert	absent	--	--	2.44	0.3	--
F	L3	20025	9	1060	stem	chert	absent	--	--	5.62	1.8	--

Table C.8(cont.): Skiles Shelter bifacial tool coding results. Table C.8 presents the portion, material type, cortex, length, width, thickness, weight, and outline form

Unit	Layer	FN	Specimen Number	TDS Shot	Portion	Material Type	Cortex	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)	Outline Form
F	--	20175		1328	distal-medial	chert	present	--	--	15.76	20.98	--
G	L1	20029	6	--	indeterminate	chert	absent	--	--	3.75	0.3	--
G	L1	20029	7	--	distal-medial	chert	absent	--	--	8.1	3.3	--
G	L2	20031	2	--	stem	chert	absent	--	--	4.73	0.6	--
G	L3	20034	7	--	fragment	chert	absent	--	--	12.97	7.6	--
G	L3	20034	10	--	fragment	chert	absent	--	--	4.51	0.6	--
G	L3	20034	11	--	distal	chert	absent	--	--	10.05	5.3	--
G	L3	20034	12	--	distal	chert	absent	--	--	3.57	0.7	--
G	L3	20034	13	--	medial	chert	absent	--	--	5.66	1.5	--
H	L1	20030	3	--	lateral edges missing	chert	absent	--	--	7.34	4.9	--
H	L1	20030	4	--	medial	chert	absent	--	--	6.52	4.6	--
H	L1	20030	5	--	indeterminate	chert	absent	--	--	5.84	1.5	--
H	L1	20030	6	--	indeterminate	chert	absent	--	--	5.33	0.9	--
H	L1	20030	7	--	proximal-medial	chert	absent	--	--	9.1	8.9	--
H	L1	20030	8	--	stem	chert	absent	--	--	5.31	1	--
H	L1	20030	10	--	proximal	chert	present	--	--	5.46	1	--
H	L1	20030	11	--	distal	chert	absent	--	--	13.4	5.8	--
H	L2	20032	1	--	distal	chert	absent	--	--	5.11	2.2	--
H	L2	20032	2	--	distal-medial	chert	absent	--	--	10.16	10.5	--
H	L2	20032	3	--	distal	chert	absent	--	--	4.6	0.6	--
H	L3	20033	5	--	complete	chert	absent	53.79	28.63	17.6	21.67	subtriangular
H	L3	20033	6	--	indeterminate	chert	absent	--	--	11.11	7.05	--
H	L3	20033	16	--	proximal	quartzite	absent	--	--	5.52	4.9	--
H	L3	20033	17	--	fragment	chert	absent	--	--	6.2	3.33	--
H	L3	20033	18	--	proximal	chert	absent	--	--	7.5	12.88	--

Table C.8(cont.): Skiles Shelter bifacial tool coding results. Table C.8 presents the portion, material type, cortex, length, width, thickness, weight, and outline form

Unit	Layer	FN	Specimen Number	TDS Shot	Portion	Material Type	Cortex (mm)	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)	Outline Form
H	L3	20033	7,8	--	proximal	chert	absent	--	--	10.97	14.34	--
H	L4	20054	02	--	distal	chert	absent	--	--	3.77	0.7	--
H	L4	20054	03	--	fragment	chert	absent	--	--	4.16	0.5	--
H	L4	20054	04	--	distal-medial	chert	absent	--	--	5.36	3	--
H	L5	20072	02	--	fragment	chert	absent	--	--	16.35	2.2	--
I	L1	20059	11	--	distal	chert	absent	--	--	6.36	8.09	--
I	L1	20059	12	--	distal-medial	chert	absent	--	--	5.82	3.79	--
I	L1	20059	02	--	distal-medial	chert	absent	--	--	19.53	50.5	--
I	L1	20059	05	--	distal	chert	absent	--	--	10.34	4.1	--
I	L1	20059	06	--	lateral edges missing	chert	absent	--	--	11.06	10.5	--
I	L1	20059	07	--	medial	chert	absent	--	--	13.13	16.4	--
I	L1	20059	08	--	lateral edges missing	chert	present	--	--	16.88	35.6	--
I	L1	20059	09	--	indeterminate	chert	absent	--	--	13	14.8	--
J	L1	20063	10	--	proximal-medial	chert	absent	--	--	8.19	10.76	--
J	L1	20063	11	--	indeterminate	chert	absent	--	--	9.47	7.22	--
J	L1	20063	12	--	distal	chert	present	--	--	8.31	5.78	--
J	L1	20063	13	--	distal-medial	chert	present	--	--	3.75	1.38	--
J	L1	20063	14	--	distal	chert	absent	--	--	5.22	2.08	--
J	L1	20063	15	--	complete	chert	absent	76.45	39.06	11.8	38.6	constricted, asymmetrical
J	L1	20063	04	--	complete	chert	absent	94.19	55.47	24.4	92.92	subtriangular
J	L1	20063	05	--	complete	chert	absent	53.15	45	19.98	46.82	asymmetrical
J	L1	20063	07	--	indeterminate	chert	present	--	--	16.01	18.1	--
J	L1	20063	08	--	complete	chert	absent	56.53	40.8	8.89	14.69	asymmetrical
J	L1	20063	09	--	complete	chert	present	46.57	39.83	8.75	13.92	triangular
K	L1	20064	03	--	distal	chert	present	--	--	9.2	9.85	--

Table C.8(cont.): Skiles Shelter bifacial tool coding results. Table C.8 presents the portion, material type, cortex, length, width, thickness, weight, and outline form												
Unit	Layer	FN	Specimen Number	TDS Shot	Portion	Material Type	Cortex	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)	Outline Form
K	L1	20064	04	--	proximal-medial	chert	present	--	--	5.71	10.07	--
K	L1	20064	06	--	lateral edges missing	chert	present	--	--	10.02	49.87	--
L	L1	20066	01	--	distal	chert	absent	--	--	3.48	1.1	--
L	L1	20066	02	--	indeterminate	chert	absent	--	--	5.12	2.6	--
L	L1	20066	03	--	indeterminate	chert	absent	--	--	11.15	11.8	--
L	L1	20066	04	--	distal	chert	absent	--	--	7.65	9.8	--
M	L1	20068	05	--	lateral edges missing, proximal-medial	chert	absent	--	--	6.09	3.9	--
M	L4	20082	01	--	distal	chert	absent	--	--	2.26	0.46	--
M	L4	20082	05	--	lateral edges missing	chert	present	--	--	10.28	25.91	--
M	L4	20082	06	--	distal-medial	chert	absent	--	--	3.76	3.8	--
M	L6	20100	01	--	distal	chert	absent	--	--	8.74	4.09	--
N	L2	20073	02	--	complete	chert	present	53.75	30.46	12.53	20.51	asymmetrical
O	L7	20117	02	--	fragment	chert	absent	--	--	6.72	2.8	--
O	L7	20125	08	1280	distal-medial, lateral edges missing	chert	absent	--	--	8.07	8.7	--
P	L1	20105	03	--	indeterminate	chert	absent	--	--	4.39	2.26	--
P	L1	20105	04	--	distal	chert	absent	--	--	3.34	1.19	--
P	L1	20105	05	--	fragment	chert	absent	--	--	6.09	2.63	--
P	L1	20105	06	--	medial	chert	absent	--	--	7.72	9.84	--
P	L1	20105	07	--	proximal-medial	chert	absent	--	--	9.5	10.87	--
P	L2	20107	01	--	indeterminate	chert	absent	--	--	3.25	1.16	--
P	L2	20107	02	--	distal	chert	absent	--	--	3.59	1.75	--
P	L3	20112	01	--	indeterminate	chert	absent	--	--	8.95	11.2	--
P	L4	20116	01	--	lateral edges missing	chert	absent	--	--	13.78	15.7	--
P	L4	20116	02	--	distal-medial	quartzite	absent	--	--	9.81	23.4	--

Table C.8(cont.): Skiles Shelter bifacial tool coding results. Table C.8 presents the portion, material type, cortex, length, width, thickness, weight, and outline form												
Unit	Layer	FN	Specimen Number	TDS Shot	Portion	Material Type	Cortex (mm)	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)	Outline Form
P	L4	20116	03	--	indeterminate	chert	present	--	--	19.09	18.08	--
P	L5	20121	10	--	indeterminate	chert	absent	--	--	6.25	4.53	--
P	L5	20121	11	--	distal-medial, lateral edges missing	chert	present	--	--	14.23	35.09	--
P	L5	20121	12	--	indeterminate	chert	absent	--	--	3.76	1.33	--
P	L5	20121	13	--	indeterminate	chert	absent	--	--	6.4	2.71	--
P	L5	20121	02	--	distal	chert	absent	--	--	4.12	1.7	--
P	L5	20121	03	--	complete	chert	absent	42.69	23.74	6.26	6	--
P	L6	20132	02	--	distal-medial	chert	absent	--	--	9.72	14.2	--

Table C.9: Skiles Shelter bifacial tool coding results. Table C.9 presents the shape, fracture type, condition, class, Class H- type, epidermis, epidermis notes, and notes fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Shape (if broken)	Fracture Type	Condition	Class	Class H type	Epidermis	Epidermis Notes	Notes
A	8	25013	25013-23	--	indeterminate	edge collapse	broken	D	--	--	--	none
A	8	25013	25013-24	--	rounded end w./ convex sides	bend	broken	Stage 3	--	--	--	possible distal end of projectile point; possible blood staining on one surface?
A	9	25015	25015-1	--	pointed end w./ asymmetrical sides	bend	broken	G	--	--	--	none
A	9	25015	25015-2	--	rounded end	bend	broken	G	--	--	--	none
A	13	25019	blank	--	pointed end	bend	broken	G	--	--	--	possible distal tip of a drill of projectile
AB	L5	20065	--	--	straight end w./ convex sides	bend	broken	Stage 2	--	--	--	biface is vertically fractured

Table C.9(cont.): Skiles Shelter bifacial tool coding results. Table C.9 presents the shape, fracture type, condition, class, Class H- type, epidermis, epidermis notes, and notes fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Shape (if broken)	Fracture Type	Condition	Class	Class H type	Epidermis	Epidermis Notes	Notes
B	9	25028	--	--	--	--	complete	Stage 2	--	--	--	this artifact was collected for residue studies and was not touched during handling
B	9	25028	--	--	asymmetrical sides	bend, spiral	broken	Stage 3	--	--	--	--
B	11	25030	--	--	pointed end	radial	broken	G	--	--	--	--
C	1	25033	25033-1	--	--	--	complete	D	--	--	--	thick turtle back biface, some residue appears to be present on surfaces
C	1	25033	25033-2	--	--	--	complete	C	--	--	--	round biface that that has light working on the less utilized surface; could also be classified as a uniface
C	3	25036	25036-1	--	indeterminate	thermal	broken	I	--	--	--	biface heavily heat fractured; difficult to determine shape
C	3	25036	25036-2	--	convex sides	bend	broken	Stage 3	--	--	--	--
C	3	25036	25036-3	--	indeterminate	radial	broken	I	--	--	--	--
C	3	25036	25036-4	--	rectangular	bend	broken	C	--	--	--	--
D	L0	20000	4	--	medial fragment w./ convex sides	bend, perverse	broken	Stage 1	--	--	--	--
D	L1	20000	5	--	pointed end w./ asymmetrical sides	bend, burin-like	broken	Stage 3	--	--	--	--
D	L1	20000	6	--	pointed end w./ asymmetrical sides	bend	broken	H	Stage 2, Notching	yes	epidermis fragments identified on ventral surface	biface was possibly hafted near base due to residue lines on dorsal and ventral surfaces

Table C.9(cont.): Skiles Shelter bifacial tool coding results. Table C.9 presents the shape, fracture type, condition, class, Class H- type, epidermis, epidermis notes, and notes fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Shape (if broken)	Fracture Type	Condition	Class	Class H type	Epidermis	Epidermis Notes	Notes
D	L1	20000	7	--	rounded end w./ asymmetrical sides	perverse	broken	A	--	yes	possible epidermis fragment identified on one blade surface	biface has broken tip; possible residue along edges of biface -- possible blood on face?
D	L1	20000	8	--	rounded end w./ asymmetrical sides	bend	broken	I	--	--	none	piece is either a base, ear tang, or distal tip of biface
D	L1	20000	9	--	medial fragment w./ triangular sides	bend, perverse	broken	Stage 3	--	--	none	biface is most likely a broken projectile; one marginal edge shows slight side notching
D	L1	20000	11	--	pointed end w./ asymmetrical sides	bend	broken	G	--	--	none	biface is likely a broken projectile tip
D	L1	20000	13	--	pointed end	bend	broken	G	--	--	none	biface is likely a broken projectile tip
D	L1	20000	16	--	stemmed end w./ convex sides	perverse	broken	Stage 3	--	--	none	none
D	L2	20012	7	1039	--	--	complete	F	--	--	none	resin or polish adhering to the ventral side of biface; possibly hafted
D	L3	20015	1	--	pointed end w./ asymmetrical sides	bend	broken	G	--	--	none	beveled flaking
D	L3	20015	2	--	medial fragment w./ convex sides	bend, perverse	broken	Stage 3	--	--	none	biface is likely a broken projectile; residue adhering to one of the lateral edges
D	L4	20018	2	--	rounded end w./ asymmetrical sides	bend	broken	Stage 2	--	--	none	small amount of residue adhering to top right lateral edge corner
D	L4	20018	3	--	rounded end	perverse	broken	Stage 2	--	yes	many epidermis fragments on one surface of biface	biface has waxy surface; white residue adhering to both dorsal and ventral sides of upper corner near break

Table C.9(cont.): Skiles Shelter bifacial tool coding results. Table C.9 presents the shape, fracture type, condition, class, Class H- type, epidermis, epidermis notes, and notes fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Shape (if broken)	Fracture Type	Condition	Class	Class H type	Epidermis	Epidermis Notes	Notes
D	L4	20018	4	--	rounded end w./ asymmetrical sides	bend	broken	Stage 2	--	--	none	midden still adhering to areas of biface
D	L4	20018	5	--	--	--	complete	B	--	--	none	biface has cracking from exposure to heat; midden dirt adhering to parts of biface
D	L4	20018	6	--	indeterminate	radial	broken	I	--	--	none	biface is a wedge-shaped fragment, possibly due to a radial fracture
E	L2	20016	4	--	straight end	perverse	broken	G	--	--	none	none
E	L2	20016	5	--	rounded end w./ convex sides	bend	broken	F	--	--	none	resin adhering to ventral and dorsal surfaces; possibly hafted
E	L2	20016	8	--	straight end	bend	broken	I	--	--	none	midden still adhering to areas of biface
E	L2	20016	9	--	--	--	complete	I	--	--	none	light residue adhering to both sides of biface
E	L2	20016	10	--	indeterminate	bend, perverse	broken	I	--	--	none	light residue and midden matrix adhering to surfaces of biface
E	L3	20020	4	--	rounded end w./ asymmetrical sides	bend	broken	I	--	--	none	light, greasy residue on surfaces
E	L3	20020	5	--	pointed end	radial	broken	G	--	yes	possible charred epidermis fragment adhering to one lateral edge	light, greasy residue on one surface; midden matrix adhering to surfaces of biface
E	L4	20027	2	--	pointed end w./ asymmetrical sides	bend	broken	I	--	--	fibers identified on one surface	heavy reddish/brown residue on one surface with plant fibers
E	L4	20027	4	--	indeterminate	radial	broken	I	--	--	none	midden still adhering to areas of biface

Table C.9(cont.): Skiles Shelter bifacial tool coding results. Table C.9 presents the shape, fracture type, condition, class, Class H- type, epidermis, epidermis notes, and notes fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Shape (if broken)	Fracture Type	Condition	Class	Class H type	Epidermis	Epidermis Notes	Notes
E	L4	20027	5	--	pointed end w./ asymmetrical sides	bend	broken	G	--	--	none	light, greasy residue on edges; midden matrix adhering to surfaces of biface
E	L5	20042	2	--	pointed end w./ asymmetrical sides	perverse	broken	I	--	yes	one fiber identified on distal tip of biface	biface is either the distal tip or barb of a projectile
E	L5	20042	3	--	pointed end	perverse	broken	I	--	--	none	biface is likely the distal tip of projectile; greasy residue adhering to one lateral edge of biface
E	L5	20042	4	--	pointed end w./ asymmetrical sides	bend	broken	I	--	--	none	biface likely the distal tip or barb of a projectile
E	L5	20042	5	--	indeterminate	radial	broken	I	--	--	none	one side has residue; possibly from midden
E	L6	20056	1	--	rounded end w./ convex sides	bend	broken	H	F, Notching	--	none	biface can be classified as form F due to natural backing, however, a notch is also visible on the left side of biface; greasy residue visible along the lateral edge with notching
E	L6	20056	2	--	pointed end w./ asymmetrical sides	bend	broken	I	--	--	none	biface is likely the distal tip or barb of projectile
F	L3	20023	2	--	pointed end	bend	broken	I	--	--	none	biface is likely the distal tip of projectile
F	L3	20023	3	--	pointed end	perverse	broken	I	--	--	none	biface is likely the distal tip of projectile
F	L3	20025	9	1060	stemmed	perverse	broken	I	--	--	none	biface stem; greasy residue on one surface of biface

Table C.9(cont.): Skiles Shelter bifacial tool coding results. Table C.9 presents the shape, fracture type, condition, class, Class H- type, epidermis, epidermis notes, and notes fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Shape (if broken)	Fracture Type	Condition	Class	Class H type	Epidermis	Epidermis Notes	Notes
F	--	20175	--	1328	pointed end	bend, edge collapse	broken	Stage 2	--	yes	fiber strands identified on edge of biface	biface edge has light, greasy residue on surface
G	L1	20029	6	--	pointed end	bend	broken	I	--	yes	none	biface is most likely the ear/tang of projectile
G	L1	20029	7	--	pointed end w./ convex sides	bend	broken	Stage 2	--	--	none	none
G	L2	20031	2	--	stemmed	perverse	broken	I	--	--	none	light, greasy reside adhering to surface
G	L3	20034	7	--	indeterminate	thermal, bend	broken	I	--	--	none	biface is heavily fractured; hard to discern attributes
G	L3	20034	10	--	indeterminate	radial	broken	I	--	--	none	biface heavily fractured; some midden attached to surface of biface; intact lateral margin shows signs of bifacial working
G	L3	20034	11	--	rounded end	bend	broken	I	--	--	none	midden still adhering to areas of biface
G	L3	20034	12	--	pointed end	bend	broken	G	--	--	none	biface likely the distal tip of projectile; midden still adhering to areas of biface
G	L3	20034	13	--	medial fragment w./ asymmetrical sides	bend	broken	A	--	yes	burnt epidermis identified	greasy residue adhering to both sides of biface
H	L1	20030	3	--	pointed end w./ convex sides	edge collapse	broken	Stage 3	--	--	none	greasy residue adhering to both sides of biface
H	L1	20030	4	--	medial fragment w./ convex sides	bend	broken	Stage 3	--	--	none	greasy residue adhering to both sides of biface
H	L1	20030	5	--	pointed end w./ asymmetrical sides	bend	broken	G	--	--	none	biface is likely the distal tip or barb/corner of projectile; hafting notching is visible on both lateral edges

Table C.9(cont.): Skiles Shelter bifacial tool coding results. Table C.9 presents the shape, fracture type, condition, class, Class H- type, epidermis, epidermis notes, and notes fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Shape (if broken)	Fracture Type	Condition	Class	Class H type	Epidermis	Epidermis Notes	Notes
H	L1	20030	6	--	indeterminate	bend	broken	I	--	--	none	light, greasy residue adhering to both sides of biface
H	L1	20030	7	--	rounded end w./ asymmetrical sides	longitudinal overshot	broken	H	A, Notching	--	none	light, greasy residue adhering to both sides of biface; multiple tool -- one lateral edge appears to be notched
H	L1	20030	8	--	stemmed	bend	broken	G	--	--	none	none
H	L1	20030	10	--	rounded end	bend	broken	G	--	--	none	fragment appears to be the broken base of a biface
H	L1	20030	11	--	rounded end	thermal	broken	G	--	--	none	biface fragment. Appears to be heavily burnt
H	L2	20032	1	--	pointed end	radial, thermal	broken	G	--	--	none	light, greasy residue adhering to both sides of biface; biface most likely the distal tip of a projectile
H	L2	20032	2	--	rounded end w./ convex sides	perverse, burin-like	broken	Stage 2	--	--	none	light, greasy residue adhering to both sides of biface
H	L2	20032	3	--	pointed end	bend	broken	G	--	--	none	biface likely the distal tip of projectile; midden still adhering to areas of biface
H	L3	20033	5	--	--	--	complete	D	--	--	none	biface is "turtle back" shaped; the proximal end is beveled; midden matrix still adhering to the biface
H	L3	20033	6	--	rounded end	perverse	broken	I	--	--	none	biface is either the distal or proximal end; hard to determine attributes -- labeled indeterminate
H	L3	20033	16	--	stemmed	bend	broken	G	--	--	none	none
H	L3	20033	17	--	indeterminate	radial	broken	I	--	--	none	none
H	L3	20033	18	--	straight end	bend	broken	G	--	--	none	off white reside adhering to both sides of biface

Table C.9(cont.): Skiles Shelter bifacial tool coding results. Table C.9 presents the shape, fracture type, condition, class, Class H- type, epidermis, epidermis notes, and notes fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Shape (if broken)	Fracture Type	Condition	Class	Class H type	Epidermis	Epidermis Notes	Notes
H	L3	20033	7,8	--	rounded end	bend	broken	G	--	--	--	--
H	L4	20054	02	--	pointed end	bend, longitudinal overshot	broken	G	--	--	--	biface is likely the distal tip of projectile
H	L4	20054	03	--	indeterminate	bend, radial	broken	I	--	--	--	biface fragment is thin and has fine bifacial working on lateral edge
H	L4	20054	04	--	pointed end w./ convex sides	perverse, burin-like	broken	Stage 3	--	--	--	--
H	L5	20072	02	--	indeterminate	bend, radial	broken	I	--	--	--	--
I	L1	20059	11	--	pointed end	bend, radial, edge collapse	broken	G	--	--	--	triangular shaped fracture on biface – possibly from a radial impact
I	L1	20059	12	--	pointed end	bend	broken	Stage 3	--	--	--	biface has broken base but was possibly used a projectile
I	L1	20059	02	--	medial fragment w./ convex sides	bend, edge collapse	broken	Stage 1	--	--	--	--
I	L1	20059	05	--	pointed end	radial	broken	G	--	--	--	--
I	L1	20059	06	--	indeterminate	bend	broken	I	--	--	--	biface was possibly subtriangular in shape
I	L1	20059	07	--	medial fragment w./ asymmetrical sides	bend	broken	I	--	--	--	--
I	L1	20059	08	--	rounded end w./ asymmetrical sides	edge collapse	broken	Stage 1	--	--	--	this biface was likely used as a core
I	L1	20059	09	--	rounded end	multi-hinge	broken	I	--	--	--	hard to determine if this biface is a distal end or lateral edge
J	L1	20063	10	--	rounded end w./ convex sides	perverse	broken	Stage 2	--	--	--	--

Table C.9(cont.): Skiles Shelter bifacial tool coding results. Table C.9 presents the shape, fracture type, condition, class, Class H- type, epidermis, epidermis notes, and notes fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Shape (if broken)	Fracture Type	Condition	Class	Class H type	Epidermis	Epidermis Notes	Notes
J	L1	20063	11	--	pointed end w./ asymmetrical sides	bend	broken	H	G, Notching	--	none	this biface would have been assigned to Class G, however, a notch was identified on one of the lateral edges thus this tool is classified as multipurpose
J	L1	20063	12	--	pointed end	perverse	broken	G	--	--	none	thickness of biface expands from tip
J	L1	20063	13	--	medial fragment w./ triangular sides	bend, perverse	broken	Stage 3	--	--	none	biface appears to be a broken projectile with the distal tip and ear missing
J	L1	20063	14	--	pointed end	bend	broken	G	--	--	none	biface appears to be the distal end of projectile
J	L1	20063	15	--	--	--	complete	H	B, Notching	--	none	biface has notching, worked edges, and scraper like end
J	L1	20063	04	--	--	--	complete	B	--	yes	epidermis identified on distal edge	biface has steep proximal edge; possibly hafted
J	L1	20063	05	--	--	--	complete	B	--	--	none	biface has characteristics of a Stage 1 biface, but has two steep edges
J	L1	20063	07	--	rounded end	bend	broken	I	--	--	none	hard to determine if this biface is a distal or proximal end of biface
P	L5	20121	03	--	--	--	complete	A	--	--	none	possible blood residue near tip of biface
J	L1	20063	09	--	--	--	complete	C	--	--	none	none
K	L1	20064	03	--	pointed end w./ convex sides	bend	broken	G	--	--	none	biface appears to be heat treated; possible greasy residue adhering to surface

Table C.9(cont.): Skiles Shelter bifacial tool coding results. Table C.9 presents the shape, fracture type, condition, class, Class H- type, epidermis, epidermis notes, and notes fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Shape (if broken)	Fracture Type	Condition	Class	Class H type	Epidermis	Epidermis Notes	Notes
K	L1	20064	04	--	rounded end w./ triangular sides	bend	broken	Stage 2	--	--	none	none
K	L1	20064	06	--	indeterminate	bend	broken	C	--	--	none	biface resembles a uniface
L	L1	20066	01	--	pointed end	bend	broken	G	--	--	none	biface is likely the distal tip of projectile
L	L1	20066	02	--	indeterminate	bend	broken	I	--	--	none	biface still has platform and retouch on both sides of lateral edge; hard to discern orientation
L	L1	20066	03	--	pointed end	bend	broken	I	--	--	none	biface fragment has steep edges and could also represent a "Form B" biface
L	L1	20066	04	--	rounded end	bend	broken	G	--	--	none	none
M	L1	20068	05	--	rounded end	bend, edge collapse	broken	Stage 2	--	--	none	none
M	L4	20082	01	--	pointed end	bend	broken	G	--	--	none	biface likely the distal tip of projectile
M	L4	20082	05	--	indeterminate	bend, edge collapse	broken	H	F, C	--	none	possible residue adhering to dorsal lateral edge; this biface has natural backing and planoconvex characteristics
M	L4	20082	06	--	pointed end w./ lanceolate sides	bend	broken	A	--	--	none	biface appears to be a knife-like tool; minimal modification on ventral side
M	L6	20100	01	--	pointed end w./ asymmetrical sides	bend	broken	G	--	--	none	heavy residue adhering to one surface (possibly prickly pear?); this tool may have been used a knife
N	L2	20073	02	--	--	--	complete	D	--	--	none	none
O	L7	20117	02	--	pointed end	bend	broken	G	--	--	none	biface fragment has residue (possibly plant) adhering to broken edge

Table C.9(cont.): Skiles Shelter bifacial tool coding results. Table C.9 presents the shape, fracture type, condition, class, Class H- type, epidermis, epidermis notes, and notes fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Shape (if broken)	Fracture Type	Condition	Class	Class H type	Epidermis	Epidermis Notes	Notes
O	L7	20125	08	1280	pointed end w./ convex sides	bend	broken	Stage 2	--	--	none	heavy residue adhering to one surface (possibly prickly pear?); this tool may have been used a knife
P	L1	20105	03	--	pointed end w./ asymmetrical sides	bend	broken	G	--	--	none	biface fragment may likely represent either the distal tip or corner of biface
P	L1	20105	04	--	pointed end	bend	broken	G	--	--	none	biface may likely represent the distal tip of projectile
P	L1	20105	05	--	indeterminate	bend, radial	broken	I	--	--	none	fragment has bifacial working on one lateral edge
P	L1	20105	06	--	indeterminate	bend	broken	Stage 3	--	--	none	none
P	L1	20105	07	--	rounded end w./ convex sides	perverse	broken	Stage 2	--	--	none	distal tip of biface is missing
P	L2	20107	01	--	straight end	bend	broken	I	--	--	none	unidentifiable fragment that may be the base of a projectile
P	L2	20107	02	--	pointed end	bend	broken	G	--	--	none	finely worked biface tip; possibly the distal tip of a projectile
P	L3	20112	01	--	pointed end w./ asymmetrical sides	Multi-hinge	broken	G	--	--	none	hard to determine the original morphology of biface; midden matrix adhering to parts of the biface surface
P	L4	20116	01	--	pointed end w./ convex sides, convex end	bend, edge collapse	broken	Stage 2	--	--	none	lateral edge of biface is missing
P	L4	20116	02	--	pointed end w./ asymmetrical sides	bend	broken	A	--	--	none	midden adhering to both surfaces of biface; specimen appears to be knife like tool
P	L4	20116	03	--	rounded end	bend	broken	I	--	--	none	this biface is chunky and scraper like; similar to Stage 1 Biface
P	L5	20121	10	--	indeterminate	bend	broken	I	--	--	none	hard to discern what part of biface this piece represents

Table C.9(cont.): Skiles Shelter bifacial tool coding results. Table C.9 presents the shape, fracture type, condition, class, Class H- type, epidermis, epidermis notes, and notes fields.

Unit	Layer	FN	Specimen Number	TDS Shot	Shape (if broken)	Fracture Type	Condition	Class	Class H type	Epidermis	Epidermis Notes	Notes
P	L5	20121	11	--	rounded end	edge collapse, bend	broken	I	--	--	none	biface badly damaged and possibly heat treated; greasy residue adhering to surface
P	L5	20121	12	--	pointed end	bend	broken	G	--	--	none	biface is likely the distal tip of projectile
P	L5	20121	13	--	rounded end	bend	broken	I	--	--	none	hard to discern fragment
P	L5	20121	02	--	pointed end	bend	broken	G	--	--	none	biface is likely the distal tip of projectile
J	L1	20063	08	--	--	--	complete	A	--	--	none	biface may be an example of early Stage 1 shaping; due to its thin body and irregular shape this specimen was classified as Class A
P	L6	20132	02	--	rounded end w./ convex sides	overshot	broken	E	--	--	none	overshot flake that removed lateral edge of biface; retouching was observed on distal ventral side

APPENDIX D

This appendix presents the unifacial and ground stone coding terminology as well as the complete Skiles Shelter ground stone analysis.

GROUNDSTONE TERMINOLOGY AND SUPPLEMENTARY TABLES

**Code definitions can be found in Adams (2002).

1. **Artifact Type:** describes the type of ground stone artifact.

   Codes: handstone, netherstone, lapstone, pebble/cobble, possible handstone, manuport

2. **Natural Form:** This field is for non-formed ground stone artifacts and describes the natural form the specimen as either a pebble or cobble.

   Codes: pebble, cobble, formed

3. **Rock Type:** Type of rock that ground stone artifact was made from

4. **Condition:** Describes the intact portion of the ground stone artifact.

   Codes: whole, less than ½, more than ½, sample

5. **Number of Used Surfaces:** Describes the location and orientation of used surfaces on the ground stone artifact (Adams 2014).

   Codes: one, two opposite, two adjacent, three opposite and adjacent, four-two adjacent each side, multiple surfaces, corner, one edge, edge and corner, multiple edges, indeterminate, multiple

6. **Surface Wear:** Describes the intensity of use wear on each specimen.

   Codes: light, moderate, heavy , unused, indeterminate, not applicable, destroyed.

7. **Surface Configuration:** Describes the specimens surface shape.

   Codes: basin, convex, concave, flat all over, flat-edge to edge concave-end to end, flat- end to end, concave -edge to edge, irregular, indeterminate, natural, combination.

8. **Stroke:** Describes the type and direction of use wear on the specimen.

   Codes: chopping, reciprocal-flat, reciprocal-rocking, circular-rocking, circular-flat, combination-rocking, combination-flat, pecking, grinding and pecking, rocking, crushing, cutting, multiple, scraping, shaving/slicing, stirring, stirring and crushing, pounding, indeterminate, not applicable.

9. **Pecking:** Yes or no depending if pecking is present on the specimen.

10. **Polish:** Yes or no depending on if polish is present on the specimen.

11. **Residue/epidermis/fibers:** Yes or no depending on if residues and or epidermis is present on the specimen.

12. **Burned:** Yes or no depending on if the specimen has discoloration from burning.

Table D.1: Skiles Shelter ground stone tool coding results. Table D.1 presents the natural form, condition, rock type, length, width, and thickness.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Natural Form	Condition	Rock Type	Length (mm)	Width (mm)	Thickness (mm)
A	1327	20174	--	manuport	Cobble	less than 12	limestone	--	--	--
C		25034	--	handstone	Pebble	more than 1/2	limestone	--	--	--
D	--	20000	03	possible handstone	Pebble	whole	limestone	75.88	26.57	10.05
D	--	20000	14	handstone	Pebble	whole	unidentified silex	40.29	32.1	18.14
D	--	20000	15	manuport	Pebble	less than 12	limestone	--	--	--
D	--	20000	17	possible handstone	Pebble	less than 12	limestone	--	--	--
D	--	20018	11	possible handstone	Pebble	whole	unidentified sedimentary	71.74	16.5	10.17
D	--	20018	12	handstone	Cobble	less than 12	limestone	--	--	--
D	--	20018	13	possible handstone	Pebble	more than 1/2	limestone	--	--	--
D	--	20018	14	manuport	Pebble	less than 12	limestone	--	--	--
D	1056	20022	21	handstone	Formed	sample	unidentified sedimentary	--	--	--
E	--	20003	02	handstone	Formed	whole	other	30.71	29.08	15.92
E	--	20003	03	handstone	Pebble	less than 12	limestone	--	--	--
E	--	20016	06	handstone	Pebble	whole	chert	50.9	43.34	14.84
E	--	20016	07	manuport	Pebble	more than 1/2	limestone	--	--	--
E	--	20016	11	handstone	Pebble	less than 12	limestone	--	--	--
E	--	20027	01	possible handstone	Pebble	whole	limestone	86.44	48.73	15.23
E	1062	20028	06	handstone	Formed	whole	limestone	108.9	89.9	27.2
E	--	20042	01	possible handstone	Pebble	whole	limestone	47.44	47.45	7.85

Table D.1 (cont.): Skiles Shelter ground stone tool coding results. Table D.1 presents the natural form, condition, rock type, length, width, and thickness.

Unit	TDS #	FN	Specimen Number	Artifact Type	Natural Form	Condition	Rock Type	Length (mm)	Width (mm)	Thickness (mm)
E	--	20056	04	manuport	Pebble	whole	limestone	64.43	47.28	9.34
E	--	20056	05	handstone	Pebble	whole	limestone	20.08	16.79	3.78
E	--	20056	06	manuport	Pebble	whole	limestone	79.2	37	7.34
E	--	20056	07	possible handstone	Pebble	whole	limestone	119.88	41.7	13.7
F	--	20023	07	handstone	Pebble	whole	limestone	40.59	24.25	7.33
G	--	20029	15	handstone	Pebble	whole	unidentified silex	15.77	8.83	5.98
G	--	20029	16	handstone	Cobble	less than 12	limestone	--	--	--
G	--	20029	17	handstone	Pebble	more than 1/2	limestone	--	--	--
G	--	20034	05	possible handstone	Pebble	more than 1/2	limestone	--	--	--
G	1094	20035	06	handstone	Formed	whole	limestone	108.41	85.38	41.57
G	1121	20044	15	possible handstone	Pebble	more than 1/2	limestone	--	--	--
G	1136	20052	04	manuport	Cobble	more than 1/2	basalt	--	--	--
H	--	20030	09	manuport	Cobble	less than 12	basalt	--	--	--
H	--	20030	12	possible handstone	Pebble	conjoined fragments	limestone	--	--	--
H	--	20032	05	manuport	Pebble	whole	limestone	21.42	18.09	12.46
H	--	20033	09	possible handstone	Pebble	less than 12	limestone	--	--	--
H	--	20033	10	possible handstone	Pebble	whole	limestone	48.08	41.65	6.58
H	--	20033	11	possible handstone	Pebble	less than 12	limestone	--	--	--
H	--	20033	12	manuport	Cobble	less than 12	limestone	--	--	--

Table D.1 (cont.): Skiles Shelter ground stone tool coding results. Table D.1 presents the natural form, condition, rock type, length, width, and thickness.										
Unit	**TDS #**	**FN**	**Specimen Number**	**Artifact Type**	**Natural Form**	**Condition**	**Rock Type**	**Length (mm)**	**Width (mm)**	**Thickness (mm)**
H	--	20033	13	manuport	Pebble	whole	limestone	80.24	32.6	12.75
H	--	20054	06	possible handstone	Pebble	whole	basalt	105.03	27.48	18.48
H	--	20054	07	handstone	Cobble	less than 12	unidentified metamorphic	--	--	--
H	--	20054	08	manuport	Cobble	conjoined fragments	limestone	102.56	61.08	38.75
H	1154	20057	11	handstone	Formed	whole	basalt	105.77	74.61	49.51
I	--	20059	14	manuport		less than 12	unidentified sedimentary	--	--	--
I	--	20059	15	manuport		whole	unidentified silex	24.14	21.17	16.03
J	--	20063	26	handstone	Pebble	whole	limestone	127.97	31.22	26.08
J	--	20063	27	manuport	Pebble	less than 12	limestone	--	--	--
J	--	20063	28	manuport	Cobble	more than 1/2	quartzite	--	--	--
J	--	20063	29	possible handstone	Cobble	whole	limestone	72.87	61.5	28.39
J	--	20063	30	manuport	Cobble	more than 1/2	limestone	--	--	--
J	--	20063	32	possible handstone	Pebble	whole	limestone	25.88	19.04	14.19
J	1536	20063	--	handstone	Formed	more than 1/2	basalt	--	--	--
K	--	20064	07	possible handstone		more than 1/2	limestone	--	--	--
K	1546	20064	--	manuport	Cobble	more than 1/2	basalt	--	--	--
M	--	20082	11	handstone	Fossil	less than 12	limestone	--	--	--
M	--	20082	12	possible handstone	Cobble	less than 12	limestone	--	--	--

Table D.1 (cont.): Skiles Shelter ground stone tool coding results. Table D.1 presents the natural form, condition, rock type, length, width, and thickness.										
Unit	**TDS #**	**FN**	**Specimen Number**	**Artifact Type**	**Natural Form**	**Condition**	**Rock Type**	**Length (mm)**	**Width (mm)**	**Thickness (mm)**
M	--	20082	13	possible handstone	Pebble	more than 1/2	limestone	--	--	--
M	1233	20084	24	handstone	Pebble	whole	limestone	105.18	30.27	7.98
M	1237	20089	25	handstone	Cobble	whole	limestone	145	127	23.34
M	--	20100	03	handstone	Pebble	whole	limestone	78.5	50.75	12.76
M	--	20100	04	handstone	Formed	whole	limestone	56.79	37.61	6.52
N	--	20073	07	handstone	Pebble	whole	limestone	83.36	57.05	14.87
N	--	20073	08	handstone	Pebble	whole	limestone	67.34	41.82	13.06
O	--	20080	05	manuport	Pebble	whole	limestone	--	--	--
O	--	20080	06	possible handstone	Fossil	less than 12	limestone	--	--	--
O	--	20109	01	manuport	Pebble	less than 12	limestone	--	--	--
O	1275	20119	06	possible handstone	Pebble	whole	limestone	131.8	52.6	19.89
O	1279	20124	07	manuport	Pebble	less than 12	limestone	--	--	--
O	--	20141	01	manuport	Pebble	less than 12	limestone	--	--	--
P	--	20105	12	handstone	Cobble	less than 12	unidentified igneous	--	--	--
P	--	20105	13	manuport	Cobble	less than 12	unidentified sedimentary	--	--	--
P	--	20105	14	handstone	Pebble	less than 12	limestone	--	--	--
P	--	20105	15	handstone	Pebble	less than 12	limestone	--	--	--
P	--	20107	10	manuport	Pebble	whole	chert	61.09	46.92	30.27
P	--	20107	11	handstone	Formed	whole	limestone	93.65	81.77	32.58
P	--	20107	12	handstone	Cobble	more than 1/2	limestone	--	--	--
P	--	20112	02	manuport	Pebble	more than 1/2	limestone	--	--	--

Table D1 (cont.): Skiles Shelter ground stone tool coding results. Table D1 presents the natural form, condition, rock type, length, width, and thickness.										
Unit	**TDS #**	**FN**	**Specimen Number**	**Artifact Type**	**Natural Form**	**Condition**	**Rock Type**	**Length (mm)**	**Width (mm)**	**Thickness (mm)**
P	--	20112	03	possible handstone	Pebble	whole	limestone	34.74	30.52	25.43
P	--	20121	05	manuport	Pebble	more than 1/2	limestone	--	--	--
P	--	20121	06	handstone	Cobble	less than 12	unidentified igneous	--	--	--

Table D.2: Skiles Shelter ground stone tool coding results. Table D.2 presents the weight, shape (plan), number of used surfaces, used surfaces description, and surface wear.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Weight(g)	Shape (plan)	# Used Surfaces	Used Surfaces Description	Surface Wear
A	1327	20174	--	manuport	181.13	natural	indeterminate	--	indeterminate
C	--	25034	--	handstone	31.73	natural	two opposite	--	moderate
D	--	20000	03	possible handstone	31.81	natural	indeterminate	--	not applicable
D	--	20000	14	handstone	19.2	natural	two opposite	--	light
D	--	20000	15	manuport	19.22	broken	indeterminate	--	not applicable
D	--	20000	17	possible handstone	7.38	broken	indeterminate	--	not applicable
D	--	20018	11	possible handstone	12.3	natural	indeterminate	--	indeterminate
D	--	20018	12	handstone	48.5	broken	multiple	used on both surfaces and one edge	light
D	--	20018	13	possible handstone	57.3	broken	indeterminate	--	indeterminate
D	--	20018	14	manuport	19.2	broken	indeterminate	--	not applicable
D	1056	20022	21	handstone	5.9	broken	one	--	moderate
E	--	20003	02	handstone	17.5	round	multiple surfaces	all surfaces appear to be used	heavy
E	--	20003	03	handstone	22.6	broken	multiple	used on both surfaces and multiple edges	light

Table D.2 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.2 presents the weight, shape (plan), number of used surfaces, used surfaces description, and surface wear.									
Unit	**TDS #**	**FN #**	**Specimen Number**	**Artifact Type**	**Weight(g)**	**Shape (plan)**	**# Used Surfaces**	**Used Surfaces Description**	**Surface Wear**
E	--	20016	06	handstone	26.7	natural	multiple	used on one surface and multiple edges	moderate
E	--	20016	07	manuport	31.15	broken	indeterminate	--	indeterminate
E	--	20016	11	handstone	93.7	broken	one	--	light
E	--	20027	01	possible handstone	53	natural	indeterminate	--	indeterminate
E	1062	20028	06	handstone	435.9	ovoid	multiple	--	heavy
E	--	20042	01	possible handstone	22.62	natural	indeterminate	--	not applicable
E	--	20056	04	manuport	45	natural	indeterminate	--	not applicable
E	--	20056	05	handstone	2.1	natural	two opposite	--	light
E	--	20056	06	manuport	33.4	natural	indeterminate	--	indeterminate
E	--	20056	07	possible handstone	93.7	natural	indeterminate	--	indeterminate
F	--	20023	07	handstone	9.9	natural	multiple	both surfaces and edges appear to be used	moderate
G	--	20029	15	handstone	0.6	natural	multiple	all surfaces appear to be used	light

Table D.2 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.2 presents the weight, shape (plan), number of used surfaces, used surfaces description, and surface wear.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Weight(g)	Shape (plan)	# Used Surfaces	Used Surfaces Description	Surface Wear
G	--	20029	16	handstone	30.94	broken	two opposite	--	moderate
G	--	20029	17	handstone	45.45	broken	two opposite	--	moderate
G	--	20034	05	possible handstone	31.3	broken	indeterminate	--	indeterminate
G	1094	20035	06	handstone	558.4	natural	two opposite, multiple edges	use wear on both faces and multiple edges; heavy modification on bottom face	heavy
G	1121	20044	15	possible handstone	63.9	broken	indeterminate	--	indeterminate
G	1136	20052	04	manuport	547.4	broken	indeterminate	--	indeterminate
H	--	20030	09	manuport	177.4	broken	indeterminate	--	indeterminate
H	--	20030	12	possible handstone	142.34	broken	indeterminate	--	indeterminate
H	--	20032	05	manuport	4.3	round	indeterminate	--	indeterminate
H	--	20033	09	possible handstone	9.7	broken	one	--	light
H	--	20033	10	possible handstone	18.97	natural	indeterminate	--	indeterminate
H	--	20033	11	possible handstone	32.61	broken	indeterminate	--	indeterminate
H	--	20033	12	manuport	38.05	broken	indeterminate	--	indeterminate

Table D.2 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.2 presents the weight, shape (plan), number of used surfaces, used surfaces description, and surface wear.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Weight(g)	Shape (plan)	# Used Surfaces	Used Surfaces Description	Surface Wear
H	--	20033	13	manuport	57.79	natural	indeterminate	concretion on both surfaces--can't determine use wear	indeterminate
H	--	20054	06	possible handstone	89.5	natural	indeterminate	--	indeterminate
H	--	20054	07	handstone	171.3	broken	one	only one surface visible, others have concretion adhering to surface	moderate
H	--	20054	08	manuport	348.13	natural	indeterminate	concretion on both surfaces--can't determine use wear	indeterminate

Table D.2 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.2 presents the weight, shape (plan), number of used surfaces, used surfaces description, and surface wear.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Weight(g)	Shape (plan)	# Used Surfaces	Used Surfaces Description	Surface Wear
H	1154	20057	11	handstone	569.3	ovoid	one	--	indeterminate
I	--	20059	14	manuport	4.95	broken	indeterminate	--	indeterminate
I	--	20059	15	manuport	12.24	round	indeterminate	--	indeterminate
J	--	20063	26	handstone	150.64	natural	one	--	light
J	--	20063	27	manuport	40.65	broken	indeterminate	--	indeterminate
J	--	20063	28	manuport	323.59	broken	indeterminate	--	indeterminate
J	--	20063	29	possible handstone	181.74	ovoid	one	--	moderate
J	--	20063	30	manuport	392.75	broken	indeterminate	--	indeterminate
J	--	20063	32	possible handstone	7.88	natural	one	--	moderate
J	1536	20063	--	handstone	516.9	broken	multiple edges	Flattening on edges of specimen	moderate
K	--	20064	07	possible handstone	404.68	broken	indeterminate	--	indeterminate
K	1546	20064	--	manuport	606.9	broken	indeterminate	--	indeterminate
M	--	20082	11	handstone	57.78	broken	one	--	light
M	--	20082	12	possible handstone	62.57	broken	one	--	light

Table D.2 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.2 presents the weight, shape (plan), number of used surfaces, used surfaces description, and surface wear.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Weight(g)	Shape (plan)	# Used Surfaces	Used Surfaces Description	Surface Wear
M	--	20082	13	possible handstone	4.55	broken	one	--	light
M	1233	20084	24	handstone	33.79	natural	two opposite	--	light
M	1237	20089	25	handstone	789.5	natural	two opposite	--	light
M	--	20100	03	handstone	76.39	natural	multiple	Pecking on end and use on edges	light
M	--	20100	04	handstone	20.25	sub-triangular	two opposite	--	heavy
N	--	20073	07	handstone	92.48	natural	two opposite	--	moderate
N	--	20073	08	handstone	63.3	natural	one	--	moderate
O	--	20080	05	manuport	18.23	broken	indeterminate	--	indeterminate
O	--	20080	06	possible handstone	12.27	broken	one	--	indeterminate
O	--	20109	01	manuport	47.3	broken	indeterminate	--	indeterminate
O	1275	20119	06	possible handstone	208.42	natural	indeterminate	--	indeterminate
O	1279	20124	07	manuport	103.5	broken	indeterminate	--	indeterminate
O	--	20141	01	manuport	19.4	broken	indeterminate	--	indeterminate
P	--	20105	12	handstone	194.34	broken	two opposite	--	moderate
P	--	20105	13	manuport	141.79	broken	indeterminate	--	indeterminate
P	--	20105	14	handstone	28.07	broken	multiple surfaces	--	moderate
P	--	20105	15	handstone	30.71	broken	one	--	light
P	--	20107	10	manuport	111.81	natural	indeterminate	--	indeterminate

Table D.2 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.2 presents the weight, shape (plan), number of used surfaces, used surfaces description, and surface wear.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Weight(g)	Shape (plan)	# Used Surfaces	Used Surfaces Description	Surface Wear
P	--	20107	11	handstone	373.94	ovoid	multiple surfaces	Use on both faces and multiple edges	heavy
P	--	20107	12	handstone	395.04	broken	one	--	moderate
P	--	20112	02	manuport	60.19	broken	indeterminate	--	indeterminate
P	--	20112	03	possible handstone	36.52	natural	indeterminate	--	indeterminate
P	--	20121	05	manuport	8.7	broken	indeterminate	--	indeterminate
P	--	20121	6	handstone	219.35	broken	one	--	light

Table D.3: Skiles Shelter ground stone tool coding results. Table D.3 presents the surface configuration (formed only), surface configuration description, stroke, and multiple stroke description.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Surface Configuration (Formed Only)	Surface Configuration. Description	Stroke	multiple stroke description
A	1327	20174	--	manuport	natural	--	indeterminate	--
C	--	25034	--	handstone	natural	--	reciprocal	many small reciprocal striations
D	--	20000	03	possible handstone	natural	--	indeterminate	--
D	--	20000	14	handstone	natural	--	indeterminate	--
D	--	20000	15	manuport	natural	--	indeterminate	--
D	--	20000	17	possible handstone	natural	--	indeterminate	--
D	--	20018	11	possible handstone	natural	--	indeterminate	--
D	--	20018	12	handstone	natural	--	indeterminate	--
D	--	20018	13	possible handstone	natural	--	not applicable	--
D	--	20018	14	manuport	natural	--	indeterminate	--
D	1056	20022	21	handstone	flat all over	--	reciprocal-flat	--
E	--	20003	02	handstone	combination	top surface is concave; bottom surface is convex	combination-rocking	--
E	--	20003	03	handstone	natural	--	pecking	--
E	--	20016	06	handstone	natural	--	multiple	pecking and reciprocal
E	--	20016	07	manuport	natural	--	indeterminate	--
E	--	20016	11	handstone	natural	--	indeterminate	--

Table D.3 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.3 presents the surface configuration (formed only), surface configuration description, stroke, and multiple stroke description.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Surface Configuration (Formed Only)	Surface Configuration. Description	Stroke	multiple stroke description
E	--	20027	01	possible handstone	natural		indeterminate	--
E	1062	20028	06	handstone	combination	top surface is flat; bottom surface is convex; some edges appear to have use as well; specimen is wedge shaped in profile	multiple	rocking and reciprocal
E	--	20042	01	possible handstone	natural	--	not applicable	--
E	--	20056	04	manuport	natural	--	not applicable	--
E	--	20056	05	handstone	natural	--	circular-flat	--
E	--	20056	06	manuport	natural	--	indeterminate	--
E	--	20056	07	possible handstone	natural	--	indeterminate	--
F	--	20023	07	handstone	natural	--	combination-flat	--
G	--	20029	15	handstone	natural	--	indeterminate	--
G	--	20029	16	handstone	natural	--	multiple	pecking and circular
G	--	20029	17	handstone	natural	--	multiple	combination-reciprocal and pecking
G	--	20034	05	possible handstone	natural	--	indeterminate	--

Table D.3 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.3 presents the surface configuration (formed only), surface configuration description, stroke, and multiple stroke description.

Unit	**TDS #**	**FN #**	**Specimen Number**	**Artifact Type**	**Surface Configuration (Formed Only)**	**Surface Configuration. Description**	**Stroke**	**multiple stroke description**
G	1094	20035	06	handstone	convex, flat edge to edge	top surface and edges are natural with evidence of circular use wear; bottom face is flat and formed with evidence of pounding in its center	multiple	pounding and circular
G	1121	20044	15	possible handstone	natural	--	indeterminate	--
G	1136	20052	04	manuport	natural	--	indeterminate	--
H	--	20030	09	manuport	natural	--	indeterminate	--
H	--	20030	12	possible handstone	natural	--	indeterminate	--
H	--	20032	05	manuport	natural	--	indeterminate	--
H	--	20033	09	possible handstone	natural	--	indeterminate	--
H	--	20033	10	possible handstone	natural	--	indeterminate	--
H	--	20033	11	possible handstone	natural	--	indeterminate	--

Table D.3 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.3 presents the surface configuration (formed only), surface configuration description, stroke, and multiple stroke description.								
Unit	**TDS #**	**FN #**	**Specimen Number**	**Artifact Type**	**Surface Configuration (Formed Only)**	**Surface Configuration. Description**	**Stroke**	**multiple stroke description**
H	--	20033	12	manuport	natural	--	indeterminate	--
H	--	20033	13	manuport	natural	--	indeterminate	--
H	--	20054	06	possible handstone	natural	--	indeterminate	--
H	--	20054	07	handstone	natural	exposed surface is smooth	indeterminate	hard to determine stroke
H	--	20054	08	manuport	natural	--	indeterminate	--
H	1154	20057	11	handstone	flat all over	use wear on top surface is indeterminate due to concretion; bottom face is flat and formed with evidence of pounding in its center	multiple	pounding
I	--	20059	14	manuport	natural	--	not applicable	--
I	--	20059	15	manuport	natural	--	not applicable	--
J	--	20063	26	handstone	natural	--	indeterminate	--
J	--	20063	27	manuport	natural	--	indeterminate	--
J	--	20063	28	manuport	natural	--	indeterminate	--

Table D.3 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.3 presents the surface configuration (formed only), surface configuration description, stroke, and multiple stroke description.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Surface Configuration (Formed Only)	Surface Configuration. Description	Stroke	multiple stroke description
J	--	20063	29	possible handstone	combination	this specimen appears to have been formed; bottom surface is convex appears have been formed from a rocking motion	rocking	--
J	--	20063	30	manuport	natural	--	indeterminate	--
J	--	20063	32	possible handstone	flat - end to end	--	reciprocal-rocking	--
J	1536	20063	--	handstone	flat all over	use wear has flattened the edges; stroke hard to determine	indeterminate	--
K	--	20064	07	possible handstone	natural	--	indeterminate	--
K	1546	20064		manuport	natural	--	indeterminate	--
M	--	20082	11	handstone	natural	--	indeterminate	--
M	--	20082	12	possible handstone	natural	--	indeterminate	--

Table D.3 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.3 presents the surface configuration (formed only), surface configuration description, stroke, and multiple stroke description.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Surface Configuration (Formed Only)	Surface Configuration. Description	Stroke	multiple stroke description
M	--	20082	13	possible handstone	convex	--	indeterminate	--
M	1233	20084	24	handstone	natural	--	reciprocal-flat	--
M	1237	20089	25	handstone	natural	--	reciprocal flat	--
M	--	20100	03	handstone	natural	--	pecking	--
M	--	20100	04	handstone	irregular	surface is natural besides the flaked edge of specimen	indeterminate	--
N	--	20073	07	handstone	natural	--	multiple	pecking and reciprocal
N	--	20073	08	handstone	natural	--	reciprocal-flat	--
O	--	20080	05	manuport	natural	--	indeterminate	--
O	--	20080	06	possible handstone	natural	--	indeterminate	--
O	--	20109	01	manuport	natural	--	indeterminate	--
O	1275	20119	06	possible handstone	natural	--	indeterminate	--
O	1279	20124	07	manuport	natural	--	indeterminate	--
O	--	20141	01	manuport	natural	--	indeterminate	--
P	--	20105	12	handstone	natural	--	indeterminate	--
P	--	20105	13	manuport	natural	--	not applicable	--
P	--	20105	14	handstone	natural	--	multiple	pecking and reciprocal
P	--	20105	15	handstone	natural	--	reciprocal-flat	--
P	--	20107	10	manuport	natural	--	indeterminate	--

Table D.3 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.3 presents the surface configuration (formed only), surface configuration description, stroke, and multiple stroke description.								
Unit	**TDS #**	**FN #**	**Specimen Number**	**Artifact Type**	**Surface Configuration (Formed Only)**	**Surface Configuration. Description**	**Stroke**	**multiple stroke description**
P	--	20107	11	handstone	flat all over	flat on both faces	multiple	rocking and pounding
P	--	20107	12	handstone	natural	--	reciprocal-flat	--
P	--	20112	02	manuport	irregular	--	indeterminate	--
P	--	20112	03	possible handstone	natural	--	indeterminate	--
P	--	20121	05	manuport	irregular	--	indeterminate	--
P	--	20121	06	handstone	natural	--	reciprocal-flat	--

Table D.4: Skiles Shelter ground stone tool coding results. Table D.4 presents the pecking, polish, residues/epidermis, burned, and residues fields.									
Unit	**TDS #**	**FN #**	**Specimen Number**	**Artifact Type**	**Pecking**	**Polish**	**Residues/Epidermis**	**Burned**	**Residues**
A	1327	20174	--	manuport	n	n	n	n	organic
C	--	25034	--	handstone	y	n	n	n	none
D	--	20000	03	possible handstone	n	y	n	n	none
D	--	20000	14	handstone	y	y	y	n	organic
D	--	20000	15	manuport	n	n	n	n	none
D	--	20000	17	possible handstone	n	y	n	y	indeterminate
D	--	20018	11	possible handstone	n	n	n	n	none
D	--	20018	12	handstone	n	y	n	n	indeterminate
D	--	20018	13	possible handstone	n	n	y	n	organic
D	--	20018	14	manuport	n	n	n	n	none
D	1056	20022	21	handstone	n	y	n	n	none
E	--	20003	02	handstone	y	y	n	n	organic
E	--	20003	03	handstone	Y	y	n	y	none
E	--	20016	06	handstone	Y	y	n	n	indeterminate
E	--	20016	07	manuport	n	n	n	Y	none
E	--	20016	11	handstone	n	y	n	n	indeterminate
E	--	20027	01	possible handstone	n	n	y	y	none
E	1062	20028	06	handstone	n	n	y	y	organic
E	--	20042	01	possible handstone	n	n	n	y	none
E	--	20056	04	manuport	n	n	n	n	organic
E	--	20056	05	handstone	n	y	y	n	organic
E	--	20056	06	manuport	n	n	n	y	indeterminate
E	--	20056	07	possible handstone	y	n	y	y	organic
F	--	20023	07	handstone	n	y	y	n	organic

Table D.4 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.4 presents the pecking, polish, residues/epidermis, burned, and residues fields.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Pecking	Polish	Residues/Epidermis	Burned	Residues
G	--	20029	15	handstone	n	y	n	y	none
G	--	20029	16	handstone	y	n	n	n	none
G	--	20029	17	handstone	y	y	n	n	none
G	--	20034	05	possible handstone	n	n	n	y	organic
G	1094	20035	06	handstone	n	y	y	n	organic
G	1121	20044	15	possible handstone	n	n	y	y	organic
G	1136	20052	04	manuport	n	n	n	n	none
H	--	20030	09	manuport	n	n	n	n	none
H	--	20030	12	possible handstone	n	n	n	n	organic
H	--	20032	05	manuport	n	n	n	n	indeterminate
H	--	20033	09	possible handstone	n	y	n	n	none
H	--	20033	10	possible handstone	n	n	y	n	organic
H	--	20033	11	possible handstone	n	y	n	y	none
H	--	20033	12	manuport	n	n	y	y	indeterminate
H	--	20033	13	manuport	n	n	n	n	none
H	--	20054	06	possible handstone	n	n	y	n	organic
H	--	20054	07	handstone	n	n	n	n	none
H	--	20054	08	manuport	n	n	n	n	none
H	1154	20057	11	handstone	y	n	n	n	indeterminate

Table D.4 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.4 presents the pecking, polish, residues/epidermis, burned, and residues fields.									
Unit	**TDS #**	**FN #**	**Specimen Number**	**Artifact Type**	**Pecking**	**Polish**	**Residues/Epidermis**	**Burned**	**Residues**
I	--	20059	14	manuport	n	n	n	n	none
I	--	20059	15	manuport	n	n	n	n	none
J	--	20063	26	handstone	n	n	n	n	none
J	--	20063	27	manuport	n	n	n	n	none
J	--	20063	28	manuport	n	n	n	n	none
J	--	20063	29	possible handstone	n	n	n	n	none
J	--	20063	30	manuport	n	n	n	n	none
J	--	20063	32	possible handstone	n	n	y	n	organic
J	1536	20063	--	handstone	n	n	y	n	none
K	--	20064	07	possible handstone	n	n	n	n	none
K	1546	20064	--	manuport	n	n	n	n	none
M	--	20082	11	handstone	n	y	y	n	organic
M	--	20082	12	possible handstone	n	y	n	y	organic
M	--	20082	13	possible handstone	n	y	n	n	none
M	1233	20084	24	handstone	n	n	n	n	organic
M	1237	20089	25	handstone	n	n	n	n	organic
M	--	20100	03	handstone	y	y	y	n	organic
M	--	20100	04	handstone	n	n	n	y	organic
N	--	20073	07	handstone	y	y	n	n	organic
N	--	20073	08	handstone	n	y	y	n	organic
O	--	20080	05	manuport	n	n	n	n	organic
O	--	20080	06	possible handstone	n	n	y	n	organic
O	--	20109	01	manuport	n	n	n	n	none
O	1275	20119	06	possible handstone	n	n	n	n	none
O	1279	20124	07	manuport	n	n	y	n	none

Table D.4 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.4 presents the pecking, polish, residues/epidermis, burned, and residues fields.									
Unit	**TDS #**	**FN #**	**Specimen Number**	**Artifact Type**	**Pecking**	**Polish**	**Residues/Epidermis**	**Burned**	**Residues**
O	--	20141	01	manuport	n	n	n	n	none
P	--	20105	12	handstone	n	n	n	n	none
P	--	20105	13	manuport	n	n	n	n	none
P	--	20105	14	handstone	y	n	n	n	none
P	--	20105	15	handstone	n	n	n	n	none
P	--	20107	10	manuport	n	n	n	n	none
P	--	20107	11	handstone	y	n	n	n	organic
P	--	20107	12	handstone	n	n	n	n	none
P	--	20112	02	manuport	n	n	n	n	none
P	--	20112	03	possible handstone	n	n	y	n	organic
P	--	20121	05	manuport	n	n	n	n	none
P	--	20121	06	handstone	n	n	n	n	none

Table D.5: Skiles Shelter ground stone tool coding results. Table D.5 presents the comments field.					
Unit	**TDS #**	**FN #**	**Specimen Number**	**Artifact Type**	**Comments**
A	1327	20174		manuport	broken river pebble; plotted for residue studies -- specimen was handled with gloves and not washed -- no use wear observed, due to midden adhering to the surface
C		25034	blank	handstone	small river pebble with reciprocal multidirectional reciprocal use wear - From Dan's artifacts
D	--	20000	03	possible handstone	ovoid and thin river pebble; likely from canyon bottom; light sheen on the distal end of one face -- reason why this is labeled a possible handstone
D	--	20000	14	handstone	river polished pebble; one face has residue streaks; both faces appear to have non-natural sheen; pecking on one corner of face
D	--	20000	15	manuport	thick river pebble; possibly ovoid in shape
D	--	20000	17	possible handstone	broken river pebble with possible polish on all surfaces--hard to determine if polish is cultural or natural
D	--	20018	11	possible handstone	river pebble of unknown sedimentary material (possibly sandstone?); surfaces may have use wear but hard to see under low power microscope
D	--	20018	12	handstone	broken, rounded, limestone river cobble or fossil with very light use wear on rounded edge -- hard to determine the stroke; a light sheen was also observed on parts of the ground stone that have been used;
D	--	20018	13	possible handstone	ovoid and thin river pebble; thickness increases towards the end; hard to determine use wear, however, pebble has dark residue along one edge -- possible handstone?
D	--	20018	14	manuport	broken river pebble; no use wear observed on surface
D	1056	20022	21	handstone	Ground stone fragment made of iron or ochre? One surface has a smooth polish and reciprocal striations
E	--	20003	02	handstone	circular piece of hematite? With pecked impression on one surface and heavy polish; epidermis fragments identified on one surface
E	--	20003	03	handstone	ovoid thin river pebble; sheen observed on each face and edges -- hard to determine stroke; one face end has slight battering

Table D.5 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.5 presents the comments field.					
Unit	**TDS #**	**FN #**	**Specimen Number**	**Artifact Type**	**Comments**
E	--	20016	6	handstone	irregular shaped river pebble with striations, pecking, and polish along multiple edges
E	--	20016	07	manuport	broken river pebble; use wear is indeterminate
E	--	20016	11	handstone	broken river pebble with light polish along distal end of one face
E	--	20027	01	possible handstone	river pebble; use wear is indeterminate; midden adhering to both surfaces of the pebble, one face is completely covered -- this said, this could be a possible handstone
E	1062	20028	06	handstone	FCR with reciprocal use wear one surface near the fractured edge of artifact; it is also possible that this artifact could be a lapstone,
E	--	20042	01	possible handstone	river pebble with rough surface; possibly cultural? matrix adhering to specimen
E	--	20056	04	manuport	river pebble; use wear is indeterminate; many epidermis fragments adhering to one surface of the pebble - possible used?
E	--	20056	05	handstone	small shiny river pebble with off white residue adhering to both surfaces; scratching on both sides
E	--	20056	06	manuport	thin river pebble, hard to determine if use wear is present; appears to be burned and surface is degraded
E	--	20056	07	possible handstone	elongated and flat river pebble with chipping on one end; hard to determine if use wear due to residue and matrix adhering to specimen -- not washed for future use wear studies
F	--	20023	07	handstone	small river pebble with reciprocal multidirectional reciprocal use wear; green residue adhearing to both sides
G	--	20029	15	handstone	small orange pebble with heavy polish and burning

Table D.5 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.5 presents the comments field.					
Unit	**TDS #**	**FN #**	**Specimen Number**	**Artifact Type**	**Comments**
G	--	20029	16	handstone	broken limestone river cobble with circular use wear and possible pecking/battering where the use wear is visible. It is also possible that the battering is a result of the substance or surface this handstone was being used against,
G	--	20029	17	handstone	broken limestone pebble with pecking and multiple areas of reciprocal use wear; slight polish on one of the distal ends/edges
G	--	20034	05	possible handstone	broken limestone river cobble, heavily burned - use wear hard to determine, however black organic residue adhering to one surface
G	1094	20035	06	handstone	limestone cobble with heavy use wear visible on one surface -- use wear has transformed one surface to a flat plane; this specimen is also covered with shiny residue and black substance similar to what is found on some bone tools and the tufa mound in Skiles
G	1121	20044	15	possible handstone	large broken limestone river cobble; hard to determine use wear, however, black organic residue on one surface makes me think this specimen is a possible handstone. Specimen is also burned.
G	1136	20052	04	manuport	large broken basalt cobble; hard to determine if this cobble was used as ground stone. The broken end may have been the result of its use as a hammerstone, but this is speculative.
H	--	20030	09	manuport	no use wear identified on the thick river cobble; this specimen could have been used as a hammerstone
H	--	20030	12	possible handstone	thick limestone pebble; surfaces have midden adhering to them; hard to determine if use wear is present on the pebble; breaking patterns make me think this possible ground stone
H	--	20032	05	manuport	limestone pebble; cannot discern any use wear
H	--	20033	09	possible handstone	limestone pebble with light polishing on one surface; hard to determine use wear

Table D.5 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.5 presents the comments field.					
Unit	**TDS #**	**FN #**	**Specimen Number**	**Artifact Type**	**Comments**
H	--	20033	10	possible handstone	limestone pebble with organic residue on end; residue is orange and looks similar to what has been found on others; no use wear observed - the end may have been chipped?
H	--	20033	11	possible handstone	broken limestone pebble; light sheen on one edge -- possibly ground stone?
H	--	20033	12	manuport	hard to discern use-wear on this specimen; light grey residue adhering to edge of artifact; possible handstone
H	--	20033	13	manuport	river pebble; hard to determine use wear due to concretion adhering to surface
H	--	20054	06	possible handstone	thick and ovoid river pebble; no use wear observed; however an off-white/green residue is adhering to one of the edges -- possibly from plant processing - used as a scraping plane?
H	--	20054	07	handstone	broken river cobble with ground surface; most of this handstone is covered with concretion
H	--	20054	08	manuport	thick river cobble; concretion on surface made it hard to determine use wear
H	1154	20057	11	handstone	limestone cobble with heavy use wear visible on one surface -- use wear has transformed one surface to a flat plane; pounding in the center of the flat surface; besides pounding, use wear is hard to determine
I	--	20059	14	manuport	tip of a river pebble; hard to discern use-wear
I	--	20059	15	manuport	small rounded river pebble; hard to determine if use wear is present
J	--	20063	26	handstone	river pebble with possible use wear on one of the ends; midden matrix covers much of the pebble
J	--	20063	27	manuport	broken river pebble with concretion adhering to surface; hard to determine use wear

Table D.5 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.5 presents the comments field.					
Unit	**TDS #**	**FN #**	**Specimen Number**	**Artifact Type**	**Comments**
J	--	20063	28	manuport	broken river pebble that may have been used as hammer stone; no use wear was observed on the surfaces
J	--	20063	29	possible handstone	this pebble appears to have been used as ground stone, however the use wear is indeterminate and not visible under a low powered microscope
J	--	20063	30	manuport	broken river pebble with concretion adhering to surface; hard to determine use wear
J	--	20063	32	possible handstone	small limestone pebble with use wear creating a flat surface on face of pebble; red residue adhering to many parts of the surface
J	1536	20063		handstone	broken river cobble shot in for residue studies; handled with gloves and was not washed -- the specimen is formed but use wear is hard to determine
K	--	20064	07	possible handstone	hard to determine the use wear on surfaces, however, one face exhibits a smoother surface suggesting it was used as ground stone.
K	1546	20064		manuport	large and smooth basalt river cobble; originally point plotted for residue studies--handled with gloves and was not washed; no use wear was observed, nevertheless, this could change if specimen was washed
M	--	20082	11	handstone	this handstone is a fossil that appears to have been used as tool; no use stroke is visible, however, some sheen, a black residue, and many epidermis fragments are on the use surface
M	--	20082	12	possible handstone	appears to be a piece of FCR, however, one surface has a light sheen and smudged organics
M	--	20082	13	possible handstone	broken river pebble with polish on one surface; hard to determine use wear - possibly used reciprocally
M	1233	20084	24	handstone	elongated and flat river pebble with reciprocal use wear paralleling the long axis on both sides; light use wear was also observed along a ridge on concave end; epidermis fragment identified on surface

M	1237	20089	25	handstone	large limestone cobble with light reciprocal wear on both sides

Table D.5 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.5 presents the comments field.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Comments
M	--	20100	03	handstone	both ends of pebble exhibit use wear; one end has battering marks with epidermis fragments embedded in the battering. The other end has scraping-like marks with black and off-white residues; one edge also has signs of residue and use
M	--	20100	04	handstone	thin river pebble with worked bifacially worked marginal edge; no use wear observed; epidermis identified near distal tip of tool
N	--	20073	07	handstone	battering and reciprocal stroke marks on one face -- battering is clustered in the center and toward the end; other face handstone also has battering one end with reciprocal stroke marks; the midsection of this face has slight polish
N	--	20073	08	handstone	one face of handstone has clear reciprocal use wear strokes; patchy residue adhering to areas where use wear is most visible; other surface of handstone has greasy, sheen around corner and edges
O	--	20080	05	manuport	broken limestone river pebble; no use wear observed; epidermis identified near one end
O	--	20080	06	possible handstone	broken limestone fossil; with smooth surface and discoloration; epidermis frag identified on smooth surface
O	--	20109	01	manuport	broken/fire cracked river pebble; no use wear was observed
O	1275	20119	06	possible handstone	Large limestone pebble with no indication of use wear; specimen is burned and was found in association with Feature 6 -- this is why it was deemed a possible handstone
O	1279	20124	07	manuport	broken and burned river cobble; matrix adhering to surface therefore use wear could not be observed
O	--	20141	01	manuport	broken river pebble; no evidence of use wear
P	--	20105	12	handstone	broken igneous cobble, possibly fire cracked. Smoothed surfaces -- similar to other handstones
P	--	20105	13	manuport	broken cobble; most likely FCR

Table D.5 (Cont.) : Skiles Shelter ground stone tool coding results. Table D.5 presents the comments field.

Unit	TDS #	FN #	Specimen Number	Artifact Type	Comments
P	--	20105	14	handstone	broken limestone pebble with hatching marks (interpreted as circular) on opposite faces of pebble; pecking is also visible on ends with use wear
P	--	20105	15	handstone	broken limestone pebble with light reciprocal use wear on one face
P	--	20107	10	manuport	chert-like river pebble; no evidence of use-wear
P	--	20107	11	handstone	shaped limestone handstone with two flat surfaces and beveled edges, shaped limestone handstone with two flat surfaces and beveled edges; one surface exhibits pecked center -- similar to other handstones in collection; corners have chips possibly from use as a hammerstone?
P	--	20107	12	handstone	FCR with reciprocal use wear/ incising on one surface near the fractured edge of artifact; it is also possible that this artifact could be a lapstone,
P	--	20112	02	manuport	broken limestone pebble; possibly used as hammerstone
P	--	20112	03	possible handstone	small rounded limestone pebble with organic orange/red organic residue adhering to most of the surfaces -- this residue is similar to what is found on other specimens
P	--	20121	05	manuport	broken limestone pebble; hard to discern if use wear is present
P	--	20121	6	handstone	igneous river cobble -- possibly used as a core and defined as such -- light reciprocal use wear on one surface

APPENDIX E

This appendix presents the results of Skiles Shelter's faunal analysis. The tables in this appendix are separated by animal type. Each table lists the Number of Identified Specimens (NISP). The data in this appendix was analyzed and compiled by Chris Jurgens.

Table E.1: Distribution of avian faunal remains by excavation unit and layer. Totals represent the Number of Identified Specimens (NISP).

	Avian											
	Accipitridae	*Anatidae*	*Aves*	*Aves (large)*	*Aves (medium)*	*Aves (small)*	*cf. Aves*	*cf. Aves (medium)*	*cf. Callipepla squamata*	*Colinus virginianus or Callipepla sp.*	*Phasianidae*	**NISP Total:**
Unit B			**1**									**1**
L3			1									1
Unit D			**2**		**1**	**3**						**6**
L2					1	1						2
L4			2			2						4
Unit E		**1**		**6**	**3**	**1**		**1**		**3**		**15**
L2		1		3	2			1		3		10
L3				1								1
L6				2	1	1						4
Unit F				**2**	**4**	**1**	**3**					**10**
L2					1	1						2
L3				2	3							5
Feature 3							3					3
Unit G	**1**		**8**								**2**	**11**
L1			1									1
L2			4								2	6
L3	1											1
L5			1									1
Feature 1			2									2
Unit H			**3**									**3**
L3			3									3
Unit M				**1**								**1**
L4				1								1
Unit O				**2**					**2**			**4**
L3				2					2			4
NISP Total:	**1**	**1**	**14**	**11**	**8**	**5**	**3**	**1**	**2**	**3**	**2**	**51**

Table E.2: Distribution of canine and cat faunal remains by excavation unit and layer. Totals represent the Number of Identified Specimens (NISP).

	Canine									Cat	
	Canidae (coyote-size)	*Canidae (fox-sized)*	*Canis spp.*	*Carnivora*	*cf. Canidae (small - medium)*	*cf. Canis latrans*	*cf. Canis spp.*	*cf. Canis spp. (coyote-sized)*	*cf. Lynx rufus*	*Urocyon cinereoargenteus*	**NISP Total:**
Unit B									**2**		**2**
L3									2		2
Unit D		**1**		**2**						**2**	**5**
L2		1								2	3
L4				2							2
Unit E				**1**	**1**	**2**		**2**	**1**		**7**
L2				1					1		2
L3						2					2
L6					1			2			3
Unit F							**1**	**1**			**2**
L2							1				1
L3								1			1
Unit G				**1**							**1**
L5				1							1
Unit O	**1**		**1**								**2**
L3	1		1								2
NISP Total:	**1**	**1**	**1**	**4**	**1**	**2**	**1**	**3**	**3**	**2**	**19**

Table E.3: Distribution of deer faunal remains by excavation unit and layer. Totals represent the Number of Identified Specimens (NISP).

	Deer							
	Artiodactyla	*cf. Artiodactyla*	*cf. Odocoileus spp.*	*cf. Odocoileus virginianus*	*Odocoileus sp.*	*Odocoileus spp.*	*Odocoileus virginianus*	**NISP Total:**
Unit B	**5**							**5**
L3	5							5
Unit D	**6**				**11**			**17**
L2	1				1			2
L3	1				7			8
L4	4				3			7
Unit E	**15**		**5**	**3**	**3**	**3**	**2**	**31**
L2	13		1	1			1	16
L3				2				2
L6	2		4			3	1	10
Feature 2					3			3
Unit F	**9**		**1**			**5**		**15**
L2						2		2
L3	8					1		9
L5			1					1
Feature 3	1					2		3
Unit G	**10**				**8**			**18**
L1	2				4			6
L2	5							5
L3					4			4
Feature 1	3							3
Unit H	**2**				**1**			**3**
L3	2				1			3
Unit J	**1**							**1**
L1	1							1
Unit M	**2**							**2**
L1	2							2
Unit O	**4**	**6**	**1**					**11**
L2			1					1
L3		5						5

L4	1	1						2
L6	2							2
Feature 5	1							1
NISP Total:	**54**	**6**	**7**	**3**	**23**	**8**	**2**	**103**

Table E.4: Distribution of fish faunal remains by excavation unit and layer. Totals represent the Number of Identified Specimens (NISP).

	Fish																
	Catostomidae	*Centrarchidae*	*cf. Carpiodes spp.*	*Cyprinidae*	*Cypriniformes (large)*	*Ictaluridae*	*Ictalurus cf. furcatus*	*Ictalurus cf. punctatus*	*Ictalurus furcatus*	*Ictalurus punctatus*	*Ictalurus sp.*	*Ictalurus spp.*	*Osteichthyes*	*Osteichthyes (large)*	*Osteichthyes (medium)*	*Osteichthyes (small)*	**NISP Total:**
Unit B											**3**						**3**
L3											3						3
Unit D											**15**		**1**	**1**			**17**
L2											3		1				4
L3											3						3
L4											9			1			10
Unit E		**1**		**1**	**2**	**33**	**1**		**4**	**1**	**4**	**1**	**12**	**2**	**1**	**1**	**64**
L2		1			2	23	1						4				31
L3						10			4		4		3	2			23
L5															1		1
L6				1						1		1	5			1	9
Unit F						**1**		**1**				**1**	**1**			**1**	**5**
L2													1			1	2
L3						1		1				1					3
Unit G	**1**					**5**		**1**		**1**	**1**		**1**	**2**			**12**
L2	1										1						2
L3						5								2			7
L5										1							1
Feature 1								1					1				2
Unit O			**1**			**1**						**1**	**1**				**4**
L2						1											1
L3													1				1
L4			1									1					2
NISP Total:	**1**	**1**	**1**	**1**	**2**	**40**	**1**	**2**	**4**	**2**	**23**	**3**	**16**	**5**	**1**	**2**	**105**

Table E.5: Distribution of rabbit faunal remains by excavation unit and layer. Totals represent the Number of Identified Specimens (NISP).

	Rabbit							
	cf. Lepus californicus	*cf. Sylvilagus sp.*	*cf. Sylvilagus spp.*	*Leporidae*	*Lepus californicus*	*Sylvilagus sp.*	*Sylvilagus spp.*	**NISP Total:**
Unit B				**3**	**11**	**26**		**40**
L3				3	11	24		38
L4						2		2
Unit D				**17**	**28**	**62**		**107**
L1					1			1
L2				2	6	15		23
L3					4	13		17
L4				15	17	34		66
Unit E	**2**	**1**	**1**	**9**	**31**	**114**	**23**	**181**
L2		1		7	15	82		105
L3					4	23		27
L5						9		9
L6	2		1	2	11		23	39
Feature 2					1			1
Unit F		**2**			**8**		**59**	**69**
L2		2			2		6	10
L3					4		46	50
L5					1		4	5
L6					1		3	4
Unit G	**1**			**12**	**25**	**56**		**94**
L2					6	19		25
L3	1			10	17	30		58
L5					1			1
Feature 1				2	1	7		10
Unit H						**2**		**2**
L3						2		2
Unit I						**1**		**1**
L1						1		1
Unit O			**5**	**1**	**10**		**48**	**64**
L1					1			1
L2			2				5	7

L3			1	1	6		31	39
L4			1				3	4
L5					1		2	3
L7							5	5
L8			1				2	3
Feature 5					2			2
NISP Total:	**3**	**3**	**6**	**42**	**113**	**261**	**130**	**558**

Table E.6: Distribution of turtle and reptile faunal remains by excavation unit and layer. Totals represent the Number of Identified Specimens (NISP).

	Turtle			Reptile	
	Apalone spinifera	*Chelonia*	*Emydidae*	*Squamata*	**NISP Total:**
Unit D	**5**	**1**		**2**	**8**
L2	1	1		1	3
L4	4			1	5
Unit E	**4**			**1**	**5**
L2	4				4
L6				1	1
Unit F			**1**		**1**
L6			1		1
Unit G	**4**				**4**
L2	3				3
Feature 1	1				1
NISP Total:	**13**	**1**	**1**	**3**	**18**

Table E.7: Distribution of rodent faunal remains by excavation unit and layer. Totals represent the Number of Identified Specimens (NISP).

	Rodent																			
	cf. Cratogeomys castonops	*cf. Neotoma spp.*	*cf. Ondatra zibethicus*	*cf. Sciuridae*	*cf. Sigmodon hispidus*	*cf. Spermophilus sp.*	*Ictidomys sp.*	*Neotoma sp.*	*Neotoma spp.*	*Ondatra zibethicus*	*Otospermophilus variegatus*	*Peromyscus sp.*	*Rodentia*	*Rodentia (medium)*	*Rodentia (small - medium)*	*Rodentia (small)*	*Sciuridae*	*Sigmodon hispidus*	*Sigmodon sp.*	**NISP Total:**
Unit B							**3**	**3**								**9**		**5**		**20**
L3							3	3								9		5		20
Unit D							**2**	**1**		**1**			**9**					**13**		**26**
L2							1			1			6							8
L3							1											4		5
L4								1					3					9		13
Unit E	**2**		**1**			**1**		**4**				**1**		**2**	**4**	**1**	**1**	**4**		**21**
L2	1		1			1		2				1		1	4	1		3		15
L3								1						1						2
L5								1												1
L6	1																1	1		3
Unit F		**1**		**1**	**1**			**1**	**9**					**1**		**1**	**2**	**1**		**18**
L2								1									2	1		4
L3				1	1				9					1		1				13
L4		1																		1
Unit G							**4**	**1**		**1**	**1**		**3**				**1**	**1**	**2**	**14**
L2							1			1			2				1			5
L3							3				1								2	6
L5								1										1		2
Feature 1													1							1
Unit H																			**1**	**1**
L3																			1	1
Unit O	**2**			**1**	**2**				**6**				**1**				**2**			**14**
L2	1								2				1				2			6
L3	1			1	2				3											7
L4									1											1
NISP Total:	**4**	**1**	**1**	**2**	**3**	**1**	**9**	**10**	**15**	**2**	**1**	**1**	**13**	**3**	**4**	**11**	**6**	**24**	**3**	**114**

Table E.8: Distribution of other small mammal faunal remains by excavation unit and layer. Totals represent the Number of Identified Specimens (NISP).

	Other Small Mammal		
	Mustelidae (small)	*Procyon lotor*	**NISP Total:**
Unit B		**1**	**1**
L3		1	1
Unit E	**1**		**1**
L2	1		1
NISP Total:	**1**	**1**	**2**

Table E.9: Distribution of indeterminate faunal remains by excavation unit and layer. Totals represent the Number of Identified Specimens (NISP).

	Indeterminate				
	Large mammal	Mammalia	Medium mammal	Small mammal	**NISP Total:**
Unit B			**7**	**2**	**9**
3			7	2	9
Unit D	**20**	**75**	**41**	**1**	**137**
1			1		1
2		19	8		27
3	3		24	1	28
4	17	56	8		81
Unit E	**38**		**116**	**9**	**163**
2	22		54	4	80
3	9		6		15
4			2	1	3
5			13	4	17
6	7		40		47
Feature 2			1		1
Unit F	**11**		**17**	**35**	**63**

2	1		2	2	5
3	4		10	33	47
4	1				1
5	4		3		7
Feature 3	1		2		3
Unit G	**35**		**27**	**23**	**85**
2	4		8		12
3	27		9	22	58
5	1		8	1	10
Feature 1	3		2		5
Unit H	**4**		**13**	**5**	**22**
3	4		13	5	22
Unit I	**1**				**1**
1	1				1
Unit O	**23**		**53**	**15**	**91**
2	6		9	3	18
3	7		31	7	45
4	2		1	3	6
5	4		2		6
6	1		1		2
7	3		4	2	9
8			5		5
Unit P	**1**				**1**
1	1				1
NISP Total:	**133**	**75**	**274**	**90**	**572**

APPENDIX F

This appendix presents the full results from the macrobotanical analysis. The data in this appendix was analyzed and compiled by Kevin Hanselka.

FN	FN20070	FN20094	FN20129	20148
Specimen	9	9	3	4
Area				
Unit	M	O	O	F
Layer	1		7	
Feature	4	5	6	3
Description				
Volume (liters)	0.80	1.00	1.00	1.00

Leaf Fragments (Desert rosettes)				
Lechuguila (Agave lechuguilla)	37	2	6	19
Sotol (Dasylirion texanum)	2			
Sotol (Dasylirion texanum) marginal spine	2			
Fiber, prob. Agavaceae/Liliaceae	0.24 g			
Fiber twine? (heavily degraded)	2			
Seeds and fruits				
Amaranth seed (Amaranthus sp.)		3		
Mesquite endocarps with attached pericarp and seeds (Prosopis sp.)	12			
Mesquite seeds (Prosopis sp.)	6			
Hackberry seed (Celtis sp.)		16	4	11
Juncus sp. seed	>28			
Cheno-am seed (Chenopodium sp. OR Amaranthus sp.)	206			
Chenopodium seed (Chenopodium sp.)		2		1
Persimmon seed (Diospyros texana)	1			
Prickly pear seed (Opuntia sp.)	61	44		
Prickly pear embryo (Opuntia sp.)	10			
Purslane seed (Portulaca sp.)				1
Grass seed (Poaceae, cf. Setaria sp.)	58	118	1	
Grass seed (Poaceae, NOT Setaria sp.)	8			
Yucca seed (Yucca sp.)	25	4		
Unknown seeds	5	2		
Unidentifiable seed fragments	7			
Nut resources				
Little walnut nutshell (Juglans cf. microcarpa)	8			1
Possible Acorn nutshell (Quercus sp.)				1

Other food or cooking materials				
Drummond's onion bulb cloak fragment	12			
Miscellaneous plant parts				
*Juniper needle / leaf scale (Juniperus sp.)	9			
Dicot leaf fragment	4			
Cactus spine, prob. prickly pear	1			
*Grass stems (Poaceae)	2			
Woody thorn (shrub legume)	2			
Carbonized unknown			17	2
Wood and wood charcoal (>2 mm)	390	1555	18	318

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