Fertility symbols in rock art: Cupuls and incised grooves in the Lower Pecos, Texas

Cara D. Connolly
University of Nevada, Las Vegas

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FERTILITY SYMBOLS IN ROCK ART: CUPULS AND INCISED GROOVES IN THE LOWER PECOS, TEXAS

by

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Bachelor of Arts
University of Nevada, Las Vegas
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A thesis submitted in partial fulfillment of the requirements for the

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ABSTRACT

Fertility Symbols in Rock Art: Cupules and Incised Grooves in the Lower Pecos, Texas

by

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Rock art at archaeological sites are often dismissed as a culturally symbolic representation that cannot be objectively or scientifically analyzed or interpreted adequately. Such dismissals are detrimental to understanding all aspects of a given culture. Although uninformed interpretations of rock art panels are counterproductive, systematic recording and the testing of different hypotheses is a valid way to begin to better understand the possible range of social functions of rock art. This research examines whether indigenous women’s fertility is represented in rock art depictions, known as cupules and groove marks, in the archaeological record. Cupules are defined as a boulder or rock slab covered with small rounded depressions (cupules), usually four to six centimeters in diameter and two to three centimeters in depth. Groove marks are deeply and narrowly incised lines, usually in the shape of a “V” or “W” rarely more than a quarter-inch in depth. In this project, I systematically document and contextualize the pit and groove rock art style in the Lower Pecos, Texas. I also test whether cupules and groove marks are tied to a functional purpose with an experimental project.
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CHAPTER 1

INTRODUCTION

Rock art at archaeological sites are often dismissed as a culturally symbolic representation that cannot be objectively or scientifically analyzed or interpreted adequately. Such dismissals are detrimental to understanding all aspects of a given culture. Although uninformed interpretations of rock art panels are counterproductive, systematic recording and the testing of different hypotheses is a valid way to begin to better understand the possible range of social functions of rock art. This research examines whether indigenous women’s fertility is represented in rock art depictions in the archaeological record. In this project I systematically document and contextualize the pit and groove rock art style in the Lower Pecos, Texas. I also test whether cupules and groove marks are tied to a functional purpose with an experimental project.

Cupules and groove marks are categorized as a single rock art style traditionally named the pit and groove style; however, in most instances a boulder or rock slab contains either cupules or groove marks, but usually not both. There are some cases in which cupules and groove marks are found on the same platform, but that is quite rare. This broad categorization can be misleading, because it leads many to assume that these two designs are always found together, which is not always the case. For this reason I will not refer to this rock art style as the pit and groove style, and will instead call them cupules and groove marks/incised grooves. It is unknown if the creators of this rock art style would have considered them to serve the same function. However, ethnographic references of indigenous groups that created this rock art style often created cupules and groove marks at the same time and for the same purpose. It is also noted that this rock art
style is distributed in the same regions and in all recorded instances share the same geographic regions. So it appears to be likely that cupules and groove marks may have been used to serve the same function and were created at the same time.

My research questions focus on explanation of these enigmatic rock art forms in Southwest Texas. This project aims to complete a wide systematic comparison of these rock art forms. The goal of this research is to better explain the function of cupules and groove marks, and will test the idea that they are tied to fertility rituals as well as systematically report these forms for a wide region. The findings of this research demonstrate that cupules and groove marks are in fact part of a ritual activity; although the exact purpose of that ritual activity is still uncertain.
CHAPTER 2

RESEARCH BACKGROUND

Cupules and Groove Rock Art Style

Cupules are defined as small rounded depressions created on a boulder or rock slab, that measure about four to six centimeters in diameter and two to three centimeters in depth (Figure 1) (Heizer & Baumhoff 1962: 208). They are hemispherical percussion petroglyphs occurring on either a horizontal or vertical surface found around the world (Bednarik 2008: 70). Groove marks are deeply and narrowly incised lines, usually in the shape of a “V” or “W” (Figure 2). Many claim that the shape of the groove marks is similar to a depiction of a vulva (Hays-Gilpin 2004: 80). Cupules, along with groove marks, are among the least investigated forms of rock art, as well as the least understood (Bednarik 2008: 62). As a petroglyph, they are believed to reflect some non-utilitarian function (Bednarik 2008: 70). What this function may be is difficult to interpret, and it is unlikely that cupules and groove marks across the world serve one single definable function (Bednarik 2008: 72). Though these forms are found in many regions of the world, I am restricting this study to ten sites in the Lower Pecos, Texas.
Figure 1 Boulder with 11 cupules in Lower Pecos, TX

Figure 2 Incised groove marks in Lower Pecos, TX
cupules and groove marks are found throughout California, the Great Basin, the American Southwest, and the Chihuahua Desert (Lee 1981; Stoney 1993; Pearce & Jackson 1933). The majority of ethnographies that attribute the making of cupules and groove marks are from Northern California and in particular the Pomo, Shasta, Hupa, Tolowa, and Karok, all of the Hokan language group. Descriptions of Hokan-speakers, along with the distribution of sites containing cupules and groove marks, insinuate that the rock art style may be associated with an early distribution of Hokan-speaking people (True & Baumhoff 1981: 266). At this point petroglyphs cannot be directly dated, so there is no definite time period for this type of rock art. However, if this rock art style is in fact associated with the Hokan-speakers, then archaeologists can where Hokan people survived ethnographically the cupules should exist both early and late; however in regions from which Hokan-speakers migrated, the cupules should only be early and not late (True & Baumhoff 1981: 266). The indigenous people of the Lower Pecos, Texas were members of the Hokan-Coahuiltecan language group, which Edward Sapir has determined is part of the larger Hokan language group (Sapir 1920).

lower pecos setting

the lower pecos, texas is renowned for its abundant rock shelters, elaborate pictographs, and well preserved perishable materials and rock art (Epstein 1960: 93). The lower pecos, texas is situated near the confluence of the pecos river and the rio grande, with the northern half of the region located in texas and the southern section located in mexico (figure 3) (Boyd 2003: 9). the vegetation in the eastern section of the lower pecos consists of mesquite-blackbrush acacia, and shortgrass savanna, while the
northern section is dominated by juniper-oak, and shortgrass savanna, and the western section contains sotol-lechuguilla-creosote bush vegetation (Boyd 2003: 11). Although native people to the south and to the west did practice farming, the indigenous people of this region were hunter-gatherers. This may have been at least partially because of the
Lower Pecos having less predictable rain than those regions (Boyd 2003: 12). The sites in the Lower Pecos consist of rock shelters, burned rock middens, quarry sites, and campsites with small hearths, or concentrations of lithic debitage, or stone circles (Boyd 2003: 12-13).

Sites date from approximately 14,500 B.P to present. The earliest sites are from the Paleoindian to the late Paleoindian period (14,500-8500 B.P). Butchered bison bones were recovered in early stratigraphic layers in numerous rock shelters, occasionally with Folsom and Plainview projectile points (Boyd 2003:13-14, Turpin 1991). Towards the end of this period, subsistence, economic, and social changes began to emerge, which is seen in the artifact assemblages which became more diverse in this local region (Boyd 2003:14).

The early archaic period in this region dates 8500-6000 B.P., and is characterized by a drier climate (Bryant & Holloway 1985). The artifact assemblages from this period are much more diverse and include coiled and plaited basketry, oval unifacial tools, early corner-notched projectile points, manos, metates, and bedrock mortars (Boyd 2003: 15). Painted pebbles and clay figurines are two ritual artifacts that appear during this period (Parsons 1986, Shafer 1975).

The subsequent stage is the middle archaic period (6000-3000 B.P.). During this period, population increased, while the region became more arid. Groups relied more heavily on small animals and plant resources (Hester 1980). It is also at this time that new diagnostic tools were used: the Pandale dart point, Langtry projectile points, and Val Verde projectile points (Boyd 2003: 15). There was also a higher prevalence of earth ovens, which may have been an adaptive strategy to extract more calories in an
increasingly arid environment (Marks, Rose, and Buie 1988). The Pecos River rock art style was created in this period, and characterizes this time period (Boyd 2003: 16).

The middle archaic period is followed by the late archaic period (3000-1300 B.P.). During the early part of the late archaic period, bison returned to the area, which was due to the expansion of grasslands caused by an increase in a cooler wetter climate (Boyd 2003: 16). It has been suggested that people moved into the area from central Texas, due to the appearance of central Texas projectile point styles, the emergence of the fully developed Red Linear rock art style, and a shift from habitation in rock shelters to open habitation sites (Boyd 2003: 16). During the last thousand years of this period, the climate shifted again to become more arid, which was seen in the disappearance of grasslands and bison (Turpin 1995). At this time, the Shumla projectile point emerges, which is evidence that people of the plains of Coahuila and surrounding mountains moved into the area after the bison hunters left (Turpin 1991, 1995). Burial practices and subsistence strategies also changed and showed a higher reliance on plant remains, particularly sotol and yucca plants (Sobolik 1991).

The late prehistoric period dates 1300-500 B.P., and is characterized by the appearance of arrow points and the use of bows and arrows (Turpin 1995). The projectile point types of this period include stemmed and unstemmed Scallorn, Perdiz, Livermore, and Toyah points (Boyd 2003: 17). The Red Monochrome rock art style also dates to this period (Turpin 1991). Many of the Red Monochrome figures depict the use of bows and arrows. New tool kits were introduced in this period, which include bone tempered pottery, small end scrapers, flake knives, beveled knives, perforators, marine shell, and
mussel shell assemblages, which suggests a shift in subsistence to deer and bison hunting (Boyd 2003: 17).

The historic era begins when the Spanish explorer Cabeza de Vacain entered the area in 1590 A.D. (Boyd 2003: 17). At the time of contact the local groups were highly mobile hunter-gatherers, and there is no evidence of farming (Boyd 2003: 17). There was a heavy reliance on plant foods, especially roots, prickly pear cactus, and mesquite (Favata & Pernandez 1993).

Rock Art Styles of the Lower Pecos

Although rock art has been identified as early as 4200 years ago and into the historic period, the majority of rock art was created during the middle to late archaic periods (Boyd 2003: 18). The Pecos River Style is the oldest rock art style, and is characterized by polychrome and monochrome anthropomorphic figures accompanied by enigmatic designs (Boyd 2003: 20) (Figure 4). This style uses a number of colors in interesting combinations. A dark red was the most common color used, followed by black, light red, yellow, orange, and white (Kirkland & Newcomb 1967: 43). The red, yellow, and orange shades are made from ochres, while the black most likely from carbon, and the white from clay (Kirkland & Newcomb 1967: 42). The figures range in height from ten centimeters to eight meters tall, with varying head and body shapes, ornamentation, size, and color (Boyd 2003: 20). The anthropomorphic figures are either depicted facing forward with their arms extended outward or with their bodies in profile. The heads are either absent, square, rectangular, oval, another geometric form, or resembling an animal, such as a bird or feline (Boyd 2003: 20). Usually accompanying
these anthropomorphs are head ornamentation, paraphernalia hanging from the arms or waist, atlatls, spears, dart shafts, depictions of animals, serpentine lines, and geometric forms (Boyd 2003: 20).

Figure 4 Pecos River rock art style

The Red Linear rock art style is characterized by small red stick figures of humans and animals engaging in group activities (Boyd 2003: 20) (Figure 5). It is generally considered to date to the late archaic based on superposition, content, and two radiocarbon dates of the pictographs (Mark and Billo 2009: 205). Only two radiocarbon AMS dates are reported for this style of pictograph, they are 1280 ± 150 B.P. and 1280 ± 80 B.P. (Mark and Billo 2009: 205). The Red Linear figures most closely resemble the
human form, and individual sex can often be seen; male genitals are represented by an erect phallus, while female genitalia is represented by a circle in the genital region (Boyd 2003: 20, Kirkland & Newcomb 1967: 93). Some have claimed that sexuality is prominent and possibly the dominant theme in this style (Kirkland & Newcomb 1967: 93).

![Figure 5 Red Linear rock art style. Insert (Kirkland and Newcomb 1967: 94)](image)

The Red Monochrome rock art style is the most recent rock art style, dating to the late prehistoric period (1300-500 B.P), and is described as always being in a single color, varying from red to a few figures in yellow (Kirkland & Newcomb 1967: 81) (Figure 6). The figures are posed frontally and often associated with bows and arrows and
realistically depicted animals in profile (Boyd 2003: 20). The animals included in the
depictions are turkeys, turtles, canines, felines, rabbits, fish, and deer (Boyd 2003: 20).

Figure 6 Red Monochrome rock art style

Compared to other regions in Texas, petroglyphs are rare in the Lower Pecos
(Kirkland & Newcomb 1967: 98-99). The individual petroglyph designs seem to be
unrelated and independent of each other and are both pecked and incised (Kirkland &
Newcomb 1967: 98-99) (Figure 7). Cupules and groove marks are one of the styles of
poorly researched petroglyphs in the area.
Theoretical Foundation of the Study

In this study I explore whether the cupule and groove rock art form is associated with indigenous women’s fertility rituals. Critical to this discussion is the use of ethnographic references describing the creation of cupules and groove marks may be used to better understand the function of the symbolic forms among prehistoric people in the Lower Pecos region. In this section I will first examine the use of ethnographic analogies and how they may be of help when analyzing rock art. I will then discuss the role gendered studies and gender theories can be used when looking at possible fertility rituals. Finally, I will discuss the practice of applying theories related to rock art to this thesis.
A social system or an ideology can never be excavated by an archaeologist. A culture’s philosophy cannot be dug up or seen during a survey, but archaeologists can record material objects which functioned with these behavioral elements within a historic or prehistoric culture (Binford 1962: 218-219). One way for archaeologists to understand the behavior tied to these material objects or artifacts, is with ethnographic analogy, what Binford called middle-range theory. An analogy is more than just a formal similarity between entities, it is an inferential argument based on implied relationships between similar objects (Binford 1967: 1). One of the most important tasks of an archaeologist is to work as a cultural anthropologist to determine the contexts and uses of prehistoric artifacts (Anderson 1969: 133). The most confident interpretation of a prehistoric artifact comes from the findings of a similar if not identical tool or object used by a living people (Anderson 1969: 134). These findings prompt the proposition that behavior observed in the ethnographic situation was also present in the past when the artifacts were in use (Binford 1967: 2).

Many researchers acknowledge that a direct historical continuity between the ethnographic group and the prehistoric people whose artifacts are being studied is vitally important when conducting ethnographic analogies (Binford 1967: 2; Stiles 1977: 87). In fact, that statement is one of the two criteria Lewis Binford (1967) establishes when using analogies. One of the conditions for archaeological arguments for analogy is that there is a historical continuity between the archaeologically observed unit and the ethnographically cited society, while the other condition, in the absence of a direct historical continuity, to seek analogies in cultures which manipulate similar environments in similar ways (Binford 1967: 2-3).
In recent years the use of ethnographic references in archaeology has flourished and has been used in new and innovative ways. Ethnographies along with oral interviews with indigenous people have been used to better understand tool manufacturing, sociospatial organization of gender, ideology, and identity (Frink and Harry 2008, Brumbach and Jarvenpa 1997, Frink 2007, Bernardini 2005). Frink and Harry (2008) interviewed Tununak elders to understand the ceramic manufacturing of the seemingly inefficient Thule Eskimo cooking pot. The elders provided memories of information on the ceramic manufacturing and use, which provided an interpretation of the vessels, even though the pots were not still in use. They were able to tie ethnographic data with the social and environmental context to understand not only how native people used these pots, but why they were manufactured in such an uncommon way (Frink and Harry 2008).

Brumbach and Jarvenpa (1997) interviewed contemporary Chipewyan elders about former houses, storage facilities, and areas where certain activities were performed to learn more about the structure and sociospatial organization of gender and to determine whether men and women used space differently. They found that ethnoarchaeological research offered a guide to general processes, rather than rigid analogies, to the study of spatial organization of gendered activities (Brumbach and Jarvenpa 1997: 434).

Frink (2007) also used elder interviews to understand not only storage and its placement, but the ideology associated with it and the role women had in storage. With the aid of elder interviews, he was able to identify changes that occurred over time with storage, and understand differing tasks men and women perform, and gender relationships. He found that the meaning and value of production are not static over time,
but they change, and historical events can have variable effects on gendered groups (Frink 2007). The interviews also allowed an understanding of individual’s choices in improving opportunities and vie for political power and status building opportunities (Frink 2007).

Bernardini (2005) used Hopi traditional knowledge to emphasize studying time rather than space as the critical variable in understanding cultural identity. He challenges the concept of “culture areas” by accepting that culture boundaries in ethnographies are ambiguous. He used Hopi traditional knowledge and their units of identity to make inferences about Anasazi identities. With this knowledge, he was able to tie clan ideology to clan symbols in rock art (Bernardini 2005: 39-40).

Ethnoarchaeological research can be an important resource for archaeologists attempting to interpret the past (Frink and Harry 2008: 115). There are no ethnographic references of Texas Native Americans creating or manipulating cupules and groove marks. All ethnographic references come from other regions in the United States, some with similar environments, such as the Southern Paiute and Zuni both in a desert environment, but none with a similar way of life. This demonstrates that while these are the only published ethnographic accounts of people creating cupules and groove marks, they may not give the most accurate depiction of how the indigenous people of the Lower Pecos, Texas used this style of rock art, and more lines of reasoning are needed to properly understand this rock art style.

Gendered archaeological theory came about in response to a belief that the value of the role women have in archaeological settings has been undervalued, which has left a gap in understanding past behavior (Skibo and Schiffer 1995; Conkey and Gero 1991).
Today, gendered archaeology has made great strides to fill in that gap. The goal of gendered theory is the take up the challenge of engendering the past in explicit and theoretically informed ways (Conkey and Gero 1991: 4). Understanding gender in prehistory should not be any more difficult than understanding social organization, status, resource strength, or population increase (Skibo and Schiffer 1995: 81).

Studies that focus on gender differences recognize that gender roles and relations are constitutes and given meaning in culturally specific ways (Conkey and Gero 1991: 8). Gender is based on culturally perceived and inscribed differences and similarities between men and women (Conkey and Gero 1991: 8). It demonstrates an understanding to all dimensions of gender, including gender ideology, gender roles, gender relations, fertility issues, and cultural meaning tied to social lives of past individuals and individual agency (Conkey and Gero 1991: 14). Archaeologists not only investigate the complexities of how communities responded to and mitigated certain pressures, but also how gendered groups were affected by and participated in change, resistance, and resilience (Silliman 2001, Frink 2007: 349). In recent years, gendered theory has been seen as paradigmatic to the new openness of North American archaeology (Hegmon 2003: 218). It is now almost mainstream in many theoretical perspectives, although there are still skeptics (Hegmon 2003: 218). As our understanding of gender in the past increases, more questions are raised relevant to feminist, gender, and social theory (Hegmon 2003: 219).

Gender is an abstract concept, but the enactment of gender activities and arrangements often has material and behavioral correlates for study (Hays-Gilpin 2004: 2). There is usually specific material culture tied to each gender (Weedman 2006: 257).
Gendered theory is about finding ingenious ways to attach gender to archaeological material culture. Gender studies show women to be active producers and innovators of the material world archaeologists study (Conkey and Gero 1991: 23). Recent engendered studies inspire a lack of antagonism and even open mindedness (Hegmon 2003: 219).

Numerous publications have engendered the North American past, focusing on women and all genders, and on gender relations. Scholars have linked the archaeology of gender to new ways of knowing the past (Hegmon 2003: 218). Gendered theory is not purely about only identifying women and their roles in past societies; recent works are now able to employ other marginalized archaeological approaches, such as rock art, with gendered theory to better understand human behavior (Hays-Gilpin 2004). Hays-Gilpin (2004) combines gendered studies with rock art, to identify sex, gender, shrines, artists, life cycles, puberty rites, sacred landscape, social landscape, rituals, shamans, and fertility rituals. It has been found that in traditional societies, women, rather than men, are blamed for not bearing children, and are therefore more likely to undergo “treatment” by a variety of remedies to promote conception (Bolger 1992: 153). This research relies heavily on gendered theory. Rock art and women are rarely associated, and fertility is very rarely addressed, even though it is a critical part of human behavior. This study is testing the notion that not only are women tied to this style of rock art, but that women used and created cupules and groove marks as active agents to negotiate fertility issues.

Approaches to rock art studies have had difficulties being accepted as more than an object of study outside the domain of mainstream archaeology (Quinlan and Woody 2003: 373). Understanding the meaning behind rock art depictions has been one of the most difficult concepts to understand, because we generally see these as symbolic
depictions that we cannot fully or objectively decipher, and so past the purview of scientific archaeology. However, rock art provides one of the most important lines of evidence for ancient beliefs, because it is imbedded in the landscape, and comprises pictures of things both in the real world and in the spiritual world (Hays-Gilpin 2004: 2).

Recently, archaeologists have begun to recognize that art and artists are active agents in the negotiation of social relations and in their society (Boyd 2003: 7). Boyd (2003) suggests that art production was a mechanism for social and environmental adaptation. Rock art scholars attempt to understand the uses and meanings of rock art by employing three strategies; the concept of style, the archaeological record and taskscapes associated with it, and most importantly ethnographic analogies (Schaafsma 1980: 6-8; Ingold 1993, Whitley 1994; Slifer 2000; Hays-Gilpin 2004).

It is often believed that human behavior is patterned (Schaafsma 1980: 6). This patterning can be seen in the art of any culture group that conforms to the confines of a style or a limited range of styles (Schaafsma 1980: 6). Each rock art figure is composed of major design components and shapes. The forms used and the relationship between the placement of these forms and shapes work together to form an aesthetic expression that is an aspect of a style (Schaafsma 1980: 7). Researchers often use the concept of style to identify new categories of the rock art style that can include marginalized individuals, such as females (Namono and Eastwood 2005). Namono and Eastwood (2005) were able to identify distinguishing rock art motifs that they claimed to be part of an art style linked to the concerns of girls and women. Themes in rock art motifs often allow researchers to identify rituals and rites tied to women (Hays-Gilpin 2004). The importance in recognizing a style is that there is an assumption that every style is
particular to a period of culture, which allows rock art to be used as an archaeological tool to understand which cultural groups were present (Schaafsma 1980: 7-8). Changes in styles can also be used as an indicator of changes in social relations or subsistence (Whitley 1994). Style is also a dynamic concept. Once a style has been described and its range of distribution determined, the rock art can be understood in a wider archaeological context. This includes looking at regional variation, and explaining why this variation does or does not exist (Schaafsma 1980: 8).

A difficulty that arises with rock art study is that rock art cannot always be translated literally (Whitley 1994). There are metaphors tied to obvious depictions that were only known to the artist and perhaps the prehistoric community (Whitley 1994). The exact meaning of rock art depictions cannot be proven, it can only be assumed from the archaeological record and ethnographic sources (Whitley 1994; Slifer 2000: 17). In order to approach a social understanding of this rock art style, a study of the placement of the rock art and the taskscape need to be examined (Ingold 1993, see also Robinson 2010). Ingold cleverly imagines this as an array of related activities, and a way to describe the qualitative labor activities that take place in an environment or setting and the social interactions tied to these labor activities (Ingold 1993: 64-65). An important element of the study of tasks and task systems is the study of gender specific tasks, behaviors, and beliefs and their material/spatial dimensions (Spector 1991: 390). The act of creating rock art is a task that occurs at a site, and is considered part of a site’s taskscape. However, it must be noted that the specific task of creating rock art is one part of the entire ensemble at a site (Robinson 2010: 804).
The functions of rock art can include marking of territory, recording special events, rituals, successful hunts, battles, ensuring rain, bountiful harvests, fertility, for beauty, or to simply say “I was here” (Slifer 2000: 18). Ethnographic documentation on the use of rock art sites aid archaeologists in understanding the function of prehistoric sites by comparing past behavior associated with the making of rock art and similar styles of past rock art (Schaafsma 1980: 10). Enigmatic figures are often the most difficult to interpret. Sundstrom (2004) was faced with the challenge of interpreting petroglyph designs of abraded grooves, hoofprints and vulvaforms in the Northern Plains. Using ethnographic references of the Dakota, she identified an ideological tie of the Dakota to the buffalo, along with many rituals associated with the buffalo and women and their rituals and rites, which she was able to link to the petroglyph designs (Sundstrom 2004). Ethnographies are not only used in order to describe the actual process of creating the rock art in a specific region, but is also a way to understand the ideological beliefs of indigenous people and how this may have been acted out in the rituals associated with rock art. Rock art theory is beginning to flourish and new ideas and theories are constantly being introduced. With the use of identifying styles in rock art, determining taskscapes associated with rock art, and analyzing ethnographic resources for ideological beliefs and descriptions of rock art, rock art can be studied properly.

Cupule and Groove Rock Art Style Functional Hypotheses

There are four hypotheses that have been proposed in relation to the purpose of cupules and groove marks. The first is that they are associated with food production activities. Second is that they are used as boundary markers. The third hypothesis is that
groove marks were used to sharpen bone awls. Finally, the fourth suggests they are tied
to fertility rituals.

Some believe the common association of bedrock mortars with grooves and/or
cupules suggests that the function of the groove marks and cupules are part of a food
production practice (Fenega et. al. 1984: 56). Among indigenous groups women are the
primary users of groundstone, and milling areas are the women’s domain (Morris 1990,
Molleson 1994). Compellingly, many of the cupules and grooves are located near to or in
some instances placed on the same boulder with mortars and milling areas. This spatial
proximity suggests that cupules are related to women and their work (Ritter & Parkman

Minor (1975) however claims that cupules may have been used as territory
markers. This is based on an ethnography of the Luiseno Indians of southern California,
which states that when the people got to a new place they would sing a song to make
water come there, or scoop out a hollow in a rock with their hands to mark the land as
theirs (Du Bois 1908: 158). This hypothesis has been critiqued by numerous
archaeologists (True and Baumhoff 1981; Smith 1984), who claim cupules used as
territory markers are possible, but unlikely. First, territory markers require having more
than one cupule rock in a region to define boundaries, which is not what is seen in
recorded sites (True and Baumhoff 1981: 258). Second, it would be unnecessary to mark
a rock more than once with a significant marker, which is in contrast to cupule boulders
that contain numerous cupules spanning the rock (True and Baumhoff 1981: 258). True
and Baumhoff (1981) instead suggest that the cupules were used in ceremonies that
people had no longer remembered, and the repetition of markings may indicate continual replication of the ceremony.

Another suggestion has been that the groove marks could simply be areas where knives were sharpened. Pearce and Jackson (1933) found numerous bone implements in the midden deposit situated close to the groove marks in the Lower Pecos of Texas. They suggest the pits may have been made by rounding off the ends of bone and sticks, while the grooves were created from sharpening bone implements, such as awls or needles (Pearce and Jackson 1933: 37-38). Nonetheless, ethnographic evidence conflicts with this summation and instead suggests these carvings were deliberately placed for ritual purposes (Bertsch 1986: 204). Although no obvious artistic pattern is formed by grooves and cupules, they are deliberately placed (Feyhl 1980: 23).

Finally, the grooves and cupules may have been associated with women’s fertility rituals. Slifer has suggested that when cupules occur on a horizontal plane and thus are able to retain rain water, this may symbolically represent fertility, since rain water is a fertilizer (Slifer 2000: 75). Others claim that the presence of groove marks in the shape of vulvas indicates a fertility association, which insinuates that the cupules associated with the groove marks also share an association with women’s fecundity (Hays-Gilpin 2004: 80). Ethnographic evidence from the Pomo, Shasta, Hupa, Tolowa, Karok, Zuni, and Southern Paiute seem to support this linking of fertility with the rock art.

The most common ethnographic reference associated with groove and cupule markings comes from the Pomo of north central California. Among the Pomo, infertility can be caused by a spirit that has made itself present in the female, or by the female being frightened by a spirit at some point of time, or by the woman failing to observe a
particular taboo (Barrett 1952: 385). Sterility was cured by the magical properties of certain rocks (Barrett 1952: 385). These rocks were referred to as either baby rocks or children rocks (Figure 8) (Barrett 1952: 385; McGowan 1978:18; Loeb 1926: 247). Barrett (1952: 385) describes the rocks as a soft bluish grey stone resembling steatite, while Loeb (1926: 247) describes one of the rocks to be a dark grey granite, and the other to be red. Although the outcome of groove marks on the boulders is the same in both Barrett and Loeb’s accounts; the actual procedure of scraping the boulder is described differently.

The sterile pair went to one of these rocks and there first a prayer for fertility was made. Then, by means of a pecking stone, some small fragments were chipped from the side of one of the grooves or cuppings in its surface. These were then ground to a very fine powder which was wrapped in some green leaves and taken to some secluded spot. Here the powder was made into a paste and with it the woman’s abdomen was painted with two lines, one running from the top of the sternum to the pubes, the other transversely across the middle of the abdomen. Some of this paste was also inserted in the female. Intercourse at this time positively assured fertility, due to the magic properties of this rock (Barrett 1952: 387).

Loeb describes, “If a woman wants a child she fasts for four days, taking only a little mush after dark. On the fifth day she goes alone to the rock at daybreak, taking with her a small flint knife. She walks around the rock counter-clockwise four times. Then she stops, facing the carved surface of the rock. She raises both hands and extends them before her. […] With the flint knife she makes four motions as though to cut the rock. Then four times she really cuts it and with the dust she has ground from it marks upon her body two long lines from the lower lip to the naval, from left armpit to right, and then a circle around the point of crossing, and, to make four, a dab upon her forehead where the parting of the hair begins. She then speaks to the rock, asking for a child. […] All this must be kept secret from everyone” (Loeb 1924-26: 247).
There are a few discrepancies between these two descriptions, pertinent to this project the question of who is present during the carving of the rock. In the first instance it is both the man and woman wishing to become pregnant, and in the second case it is a secret practice performed solely by the woman without anyone’s knowledge. Other questions are whether the woman fasted, or performed certain rituals, and if so how many times. Also pertinent are what tools were used to perform the carvings, a pecking stone or a flint knife, and whether the powder was inserted into the woman. Why these certain rituals differ is unknown; however, there are many important similarities in the two ethnographies that are significant to this research. Both descriptions had either the woman or the woman and man carving into the baby/child rock and collecting the grindings. Both instances had the women turning the grindings into a paste that they
rubbed onto their bodies. The women in both ethnographies prayed to the stone and talked to it, asking to bear children. Finally, although different stone tools were used to carve into the rock, the tools were made of stone, and not of bone or wood.

In addition to Pomo fertility rites, other indigenous Northern California tribes the Shasta, Hupa, Tolowa, and Karok all shared rituals associated with weather control and rain rocks (Heizer and Braumhoff 1962: 237; Grant 1961: 31, 106). Ceremonies were performed near boulders that were called rain rocks, and pit and grooves were carved into them to catch rain (Minor 1975: 2). In this region rain is almost always considered to be a symbolic fertilizer of women (McGowan 1978: 17). This and other ethnographic connections strongly link the practice of carving rocks to women, fertility, and birth.

For example, among the Zuni Indians, if a daughter is desired a specific ritual is tied to the carving of grooves and cupules into a “mother rock”. Before the birth of the child, the husband and wife, sometimes accompanied by a doctress or female relative, visit the mother rock. The pregnant woman carves a small quantity of the rock carvings into a vase and deposits the vase into a small cavity in the rock. This is done in the hope that they will have daughter that is good, beautiful, weaves well, and is skilled in the production of pottery (Coxe Stevenson 1904: 204).

The Southern Paiute also share oral myths of canyons with groove marks that have mystical power (Martineau 1992: 81). The Little Creek Canyon is located just north of Paragoonah, Utah. At the mouth of the canyon there is a big rock with vagina symbols pecked on it and one natural-looking depression resembling one. This canyon is called Wuhump`ee Ooweng`wu, translated as “Vagina Canyon”, due to the symbols on the rocks. The tradition recalls that there are many big snakes living in the canyon. Some
were so large a person could wrap their arms around the snake’s body. One could also see their tracks on each side of the canyon. These tracks resembled a *groove* made when a big rock slides down a hill (Martineau 1992: 81-82 emphasis added). These snakes were very dangerous. Men would have to visit this canyon in the early morning when the snakes were still drowsy and weak from the coolness. The only way a man could travel in this canyon during the daytime is if they travel with a woman who is on her period. This made the snakes weak so the men could travel through the canyon unharmed.

According to the myth, the snakes no longer inhabit this canyon (Martineau 1992: 81-82).

**Research Methodology**

In order to better understand the function of cupules and incised grooves, one of the four hypotheses previously discussed were tested, and two of the hypotheses will be explored and contextualized. The hypothesis not being tested is the belief that cupules may have been used as territory markers. It is not being tested in this thesis, because it has already been sufficiently challenged and dismissed by renowned archaeologists. The hypotheses being explored include:

- Cupules and groove marks are tied to food processing
- Cupules and groove marks were a byproduct of knife sharpening
- Cupules and groove marks denote women’s fertility ritual practice

The first hypothesis being tested is that cupules and groove marks are tied to a food production activity. If this hypothesis is correct, I would expect to see this rock art style clearly associated with artifacts and features that were used in food production activities. I would also expect evidence that cupules and groove marks were created in
order to process food. To test this hypothesis this study will collect survey data from ten
cupule and groove mark sites in the Lower Pecos, Texas, and will make note of features
and artifacts clearly associated with the site and more specifically with the rock art style.
The features and artifacts associated with the site and rock art will be analyzed in the
field to determine if they were used in food processing activities, and their spatial relation
to the cupules and/or grooves will be documented (for example if they share the same
boulder).

The second hypothesis being tested was introduced by Pearce and Jackson in
1933, and claims that incised grooves were created to sharpen bone implements, such as
awls. If the incised grooves found at archaeological sites were created by sharpening
bone awls, one would expect incised grooves created during an experimental project with
bone awls to resemble archaeological groove marks. This experimental test will be
discussed in greater detail later in this thesis. Photographs of incised grooves and
measurements will be taken during the recording of the ten sites in the Lower Pecos,
Texas, which will be done in order to compare archaeological groove marks with those
created in the experimental study.

The final hypothesis being tested in this thesis is the claim that grooves and
cupules may be linked to ancient fertility rituals. This study will first examine if the
cupules and groove marks are tied to a symbolic ritual activity, and if this is the case,
then this research will investigate if that ritual activity is a fertility ritual similar to those
seen ethnographically. If cupules and groove marks were part of symbolic ritual
activities, one would expect them to be placed on areas that would be counterproductive
for any type of functional purpose and would most likely only serve a ritual type of
function. One would also expect them to be clearly associated with symbolic ritual paraphernalia, which could demonstrate that the rock art, along with the ritual paraphernalia, were used in the same symbolic ritual function, such as fertility rituals. The data required to test this hypothesis includes survey data collected at ten sites in the Lower Pecos, Texas. In order to analyze if symbolic ritual activities occurred at these sites, other features and artifacts associated with these sites were noted, to determine if they are tied to everyday activities or ritual ceremonies. General photographs of the site were taken, along with any important features, artifacts, or rock art panels to determine if any of these features or artifacts may be associated with symbolic ritual activities. Each cupule and groove mark boulder was carefully documented to determine any activities that may have been practiced in relation to the cupules and groove marks.
CHAPTER 3
FIELDWORK RESULTS

A total of ten sites were recorded in the Lower Pecos, Texas in January of 2010 with the help of the SHUMLA rock art non-profit organization. The SHUMLA staff brought me to all the sites with cupules and groove marks that they had access to and helped with the recording process. The recording of the ten sites was done to understand the relationship between the cupule and groove rock art style, the other rock art styles, the natural environment, and the associated archaeological material of these sites, which is important when trying to grasp a social understanding of a specific rock art style.

Site Descriptions

Site I, Casper Shelter is a large asymmetrical horseshoe-shaped shelter located on the Pecos River (Figure 9). The floor in this shelter is mostly sloped with some level areas. The shelter measures approximately 200ft wide, 20ft deep, and 10-15ft tall. Pecos River style rock art is present and located high on the southwest facing wall. There are numerous bedrock mortars and metates present. Some argue that the numerous boulders located in the shelter make this a poor living area. However, there is a high artifact density, numerous fire cracked rock, large talus deposit, blackened ceiling, and a shell midden, which indicates this was a full-range residential shelter. The artifacts located in the shelter consist of mussel shells and 3 manos. Unfortunately this site has been heavily looted due to its location along the highly visited Pecos River. The vegetation at this site consists of hackberry, mountain laurel, Bermuda grass, Mexican buckeye, mimosa, live oak, and persimmon. There were three boulders in this shelter that contained groove
marks. Each of these boulders is labeled F01-F03. F01 is a grey/tan limestone boulder with 18 grinding facets and approximately 17 grooves (Figure 10 & 11). Its aspect is 365 degrees and it slopes at 20 degrees. F02 is a polished black limestone boulder with 5 groove marks and no grinding facets. Its aspect is 316 degrees and slopes at 10 degrees. F03 stands approximately 5 meters tall with a relatively flat surface that slopes 30 degrees at an aspect of 338 degrees. It contains 2 groove marks on the top left section of the boulder and 1 grinding facet. This boulder is unique, because it is difficult to climb up to the top of the boulder that contains the groove marks and grinding facet.

Site II, Crab Shelter, is a large overhang near the top of a bluff overlooking the Devils River (Figure 12 & 13). The shelter overhang measures 100ft across, with a depth of 21 ft. Along the entire back wall of the overhang is a very large complex series of poorly preserved Pecos River Style rock art in red, black, and orange. There is a high prevalence of lithics and cores directly outside of the overhang above the drop into the Devils River. The floor in this shelter is steep with many slippery sections making it difficult to walk around this shelter. There are numerous grinding facets in the floor of the shelter. In front of cave are several large boulders, 9 of which contain groove marks and numerous small bedrock mortar holes. F01 is a tall thin tan limestone boulder. Two of the vertical sides of the boulder contain groove marks. There are a total of approximately 67 grooves on this boulder. 6 of the grooves form a unique design resembling two legs and an upside-down “V” with 2 lines in the center forming a vulva shape (Figure 14). F02 is a tan limestone boulder with one relatively long groove mark located vertically on the eastern side of the boulder facing F01. F03 is another tan limestone boulder with one long groove mark located vertically on its eastern most side.
Figure 9 Casper Shelter Site Map
Figure 10 Casper Shelter Feature 01 overview

Figure 11 Casper Shelter close up of the two groove marks on feature 01
Figure 12 Crab Shelter Site Map
Figure 13 Crab Shelter

Figure 14 Crab Shelter Groove Mark Design from F01
F04 is a tan limestone boulder with approximately nine vertical groove marks. Seven short yet deep grooves are lumped together on the northernmost section of the side of the boulder, and two large and extremely thick grooves are parallel to each other at the other end of that side of the boulder. F05 is a darker limestone boulder with two long yet extremely shallow and faint groove marks bisecting each other, forming an X-shape. F06 is a large tan limestone boulder, which lies horizontally at the edge of the shelter drop off (Figure 15). The top of this boulder is covered completely in groove marks. There were too many groove marks to properly document the exact number of groove marks on this boulder. There are groove marks on the underside of the boulder, along with some red pigment. F07 is a small 35cm x 17.9cm x 20.3cm portable rock, which does not match the color of the surrounding rocks and boulders. It has approximately 17 groove marks on it. F08 is a medium size tan limestone boulder with three grinding facets and approximately 62 groove marks located on it. A section of this boulder has broken off, and that broken section contains five grooves and one complete grinding facet and a partial grinding facet (Figure 16). F09 is a large tan limestone boulder measuring 2m x 1.5m at its widest points. One end of the boulder has broken off. There are a total of 22 grinding facets and at least 49 groove marks on the top of this boulder. F10 is a tan limestone boulder with approximately 8 groove marks located vertically on the boulder’s side. To conclude, there were a total of five boulders that had a high number of groove marks (F01, F06, F07, F08, and F09). It is also important to note that only two of the boulders contained grinding facets (F08 and F09). These two boulders also had a high number of groove marks on their surface. The remaining five boulders each had less than 10 groove marks, most only containing one or two groove marks. F06 also contained
groove marks on the underside of the boulder, which was not only difficult to document, but must have been extremely difficult to create.

Site III, Fate Bell Shelter, is one of the best known and most outstanding sites in the area (Figure 17). It measures 375 feet in length, 50 to 60 ft in depth, and 15-20 feet tall. It is a huge habitation rock shelter that overlooks Seminole Canyon, and contains a midden and numerous pictographs along its rear wall. The vegetation around the site consists of lechuguilla, sotol, cacti, buckeye, mountain laurel, oak, and agarita. The site was excavated in 1932 by Texas University’s J. E. Pearce and A. T. Jackson, and again by Taylor in the 1940s. According to those excavations, there were two occupational peaks. The first peak occurred between 2000-1000 BC, and the secondary peak between 200 BC-1000 AD (Pearce & Jackson 1933). The features originally found at this site include; a midden, burned rock scatter, talus deposit, hearth, lithic scatter, fiber deposit, pictograph, bedrock mortar, petroglyphs (connected lines and circles in an area of 72 sq cm on a boulder), grinding facets, ash and charcoal deposit, burials, seven earth ovens, incised grooves, and 76 possible cupules (Pearce & Jackson 1933). The pictograph rock art styles present at this site include; Lower Pecos River Style, Red Linear Style, Red Monochrome Style, and Historic American Indian Style. The Red Linear Style at this site is one of the most famous fertility depictions in North America (Figure 18). It depicts pregnant women playing flutes. The lithic types found at this site include; debitage, cores, hammerstones, modified flakes, side scrapers, gravers, burins, preforms, knives, choppers, unifaces, hand axes, and drills. There were both dart points and arrow points originally at this site at the time of the excavations. The groundstone found at this site includes; manos, metates, pestles, painted pebbles, and scratched pebble (Pearce &
In January of 2010 the site was recorded for this thesis research. It is now a heavily visited site with numerous barriers built around the rock art in order to ensure the rock art is well preserved. I was able to walk past the barriers in order to record groove marked boulders. Three boulders with groove marks were recorded. It must be noted that these boulders are not in situ, and were moved during the early excavations of this site. However, there was a site map created in 1932 by Pearce and Jackson that has the original location of two groove mark boulders. It is unclear where the third boulder’s original location was; however, the current location is unlikely to have been its original one. A new site map was not created for this thesis, due to the irrelevance of recording the location of items that were moved from their original location. Feature 01 is a medium sized boulder facing upwards with a very shiny patina covering its surface (Figure 19). This extremely high polished patina is not seen on other groove mark or cupule boulders at any other site. This patina may have been created recently due to its current location along the visitor’s path, where many visitors run their hands over the top of the boulder. However, when this boulder was excavated in 1932, it was described as “a surface boulder of hard limestone with a polished area that contains many small grooves” (Pearce & Jackson 1933: 39). There is a black-and-white picture to accompany this description; however, the picture failed to capture how polished the surface was originally. At this time it is unclear as to what created that sheen polish. Feature 02 is a small boulder with four grinding facets, one cupule, and one groove mark. It faces upwards and is directly underneath the rear wall where it curves horizontally. Feature 03 has 25 grinding facets on the boulder, along with groove marks. It is also located directly beneath the horizontal curve of the rear wall.
Figure 15 Crab Shelter F06 overview

Figure 16 Crab Shelter F08 overview
Figure 17  Fate Bell Shelter (Pearce & Jackson 1933: 28)
Figure 18 Fate Bell Shelter Red Linear Style fertility depiction. Insert (Turpin 1990: 104)

Figure 19 Fate Bell Shelter Feature 01 with sheen polish
Site IV, Kelly Shelter is a stepped habitation shelter, with a mouth measuring 65 ft, depth 30-35ft, and height 10ft-25ft (Figure 20). There are permanent springs up the canyon from the site. The site was originally trenched by Sayles & Kelley in 1932. The shelter has a midden deposit and poorly preserved black/gray, red/purple, and yellow/orange pictographs along its rear wall. The pictographs are Pecos River Style rock art. The features at this site includes, a midden, burned rock scatter, hearth, talus deposit, pictographs, burials, bedrock mortars, incised grooves, and a good vantage point. The artifacts present include, lithic scatters, painted pebbles, fiber artifacts, and quids. Bedrock mortars are present at this site (Figure 21). There were a total of two boulders with groove marks located on them. Feature 01 is a 4m x 1.15m slanted limestone boulder with a flat surface that has been broken into four pieces. In total, the boulder contains approximately 34 groove marks and four grinding facets. Feature 02 is a large boulder located on the north end of the shelter, with a sharp ridge on its top. Incised grooves are only found on the boulder’s southwest side. A shallow grinding surface is evident near the northwest side of the boulder.

Site V, Painted Shelter is a shallow rock shelter, located at ground level with a stream that runs through it (Figure 22). Flash floods occur regularly and are occasionally responsible for moving large objects, such as trees and boulders, into this site. There are two styles of pictographs present at this site; Red Monochrome and Red Linear. Among the red linear pictographs is another fertility depiction of women, some pregnant, performing a fertility dance (Figure 23). There is one tan limestone boulder (F01)
Figure 20 Kelley Shelter Overview with F01 in Foreground

Figure 21 Kelley Shelter bedrock Mortars at Kelly Shelter
Figure 22 Painted Shelter Site Map
located at the east end of the shelter and contains eleven cupules and no groove marks (Figure 24). The cupules are located on the top of the boulder and range from 4.2cm-7.6cm diameters. The cupules form a “V” shape, which may or may not be intentional.

Site VI, Panther Cave consists of a large shelter located on the Rio Grande (Figure 25). It was occupied through the Late Archaic I, Transitional Archaic, Protohistoric, and Historic American Indian. It measures approximately 180 feet across and 50 feet deep. There is an extremely complicated series of Pecos River Style pictographs along rear wall of the shelter. The features at this site consist of a midden, burned rock scatter, pictographs, bedrock mortars, and a vantage point. The artifacts present include lithic scatters and fiber deposit. There are numerous deep mortar holes located on large
boulders throughout the site. In the description of these boulders, a distinction will be made between mortar holes and grinding facets. Mortar holes are deep holes in the bedrock that have been carved into the boulder by at least 5cm. Grinding facets show obvious signs of use wear but have not been worked enough to have carved a hole in the rock. It is possible that the grinding facets were intended to become mortars, but for whatever reason were never created into mortars. Also, located on four of these bedrock mortar boulders are incised grooves. F01 has three grinding facets on one end of the boulder. There are less than ten groove marks on this boulder. F02 and F03 are almost identical and are located directly next to each other (Figure 26). Both have at least 50 grinding facets. F02 has two deep mortar holes, and F03 has eight mortar holes. Each boulder has less than 10 groove marks (Figure 27). F04 is a small boulder with eleven
grinding facets and four mortar holes. There are less than five groove marks on this boulder.
Figure 26 Panther Cave F03 (in foreground) and F02 (in background)

Figure 27 Panther Cave Incised Grooves on F02
Site VII, Skiles Shelter consists of a shallow shelter half-way up a bluff (Figure 28). The mouth is approximately 55 feet long, 15 feet deep, and 20-25 feet high. The site vegetation consists of sotol, prickly pear cactus, and mesquite. The shelter contains Pecos River Style rock art and Bold Line Geometric on its rear wall. Adjoining this room is a smaller chamber (45ft across x 15ft deep). There is a considerable amount of burned rock in front of the larger room. There are also numerous small potholes on a large boulder separating these two rooms. This site was excavated in 1949 by archaeologists from Texas A&M. The artifact density is moderate at this site and consists of a burned rock scatter, lithic scatter, and projectile points. The features at this site consist of a midden, large Talus deposit, pictographs, and a vantage point. This site dates to the archaic period and possibly the transitional late archaic to late prehistoric. The nearest water source is in the canyon below and down the canyon where it drains into the Rio Grande. This site also has very good acoustics, and noises at one end of the shelter are heard at the other end of the shelter. There are mortar holes clustered on the extreme panel left of shelter, with no rock art above it. The shelter has one large limestone boulder (F01) with mortar holes and incised grooves (Figure 29 & 30). The boulder has slick sloped surface with incised grooves; directly on top of the boulder is a grinding surface with mortar holes of varying depth (deep to shallow).
Figure 28 Site map of Skiles Shelter
Figure 29 Skiles Shelter F01

Figure 30 Skiles Shelter groove marks on F01
Site VIII, VV39 is a rock shelter located high in a bluff, directly next to a similar rock shelter named Big Satan Shelter (Figure 31). In the center of the shelter, taking up the majority of space is numerous rocks and boulders that collapsed from the ceiling of the shelter. The rocks in the roof fall are a light, almost egg shell colored, powdery limestone. Petroglyphs and incised grooves are carved onto the boulders and rocks from the ceiling collapse. A total of twenty rocks and boulders contained incised grooves. Seven of these grooves formed designs and were on the same boulder as petroglyphs (Figure 32). The most common petroglyph designs were a zig-zag shape, grid patterns, and a topedo figure (Figure 33). The others thirteen only contained incised grooves in no obvious pattern (Figure 34). No grinding features were observed at the site, and it is unknown if there is a midden at this site. Pecos River Style pictographs lined the rear shelter wall.

Site IX, VV75 consists of huge shelter similar to and located within one mile of Fate Bell Shelter along Seminole Canyon (Figure 35). It measures 250 feet across mouth, with a depth of 66 feet, and a height of 10 to 50 feet. There are numerous deep mortar holes in boulders at mouth of shelter. Pecos River Style and possible Red Linear pictographs cover the rear wall of the shelter. These pictographs have been dated to 1915 BC. The artifacts, along with the dating of the pictographs, place this site along the Middle Archaic I, Mid Archaic II, Late Archaic III, Transitional Archaic, Archaic, and possible late prehistoric temporal periods. The features at this site include a midden deposit, burned rock scatter, pictographs, grinding facets, bedrock mortars, burials, and a vantage point. The artifacts at this site include lithic scatters, side scrapers, knives, tools,
Figure 31 Big Satan Shelter on left, VV39 on right

Figure 32 VV39 Boulder with incised grooves and zig-zag petroglyph designs
Figure 33 VV39 Boulder with incised grooves and torpedo petroglyph

Figure 34 VV39 Rock with incised grooves and zig-zag petroglyph
modified flakes, and fiber deposits. Several burials, baskets, and nets were removed by looters prior to 1958. The nearest water source is the canyon floor. The vegetation at this site includes mesquite, oak, grass, cat claw, coyotillo, ocotillo, sotol, prickley pear, Mountain Laurel, persimmons, spider wart, penstemon. There are boulders located in the front of shelter, and appear to have broken off of the ceiling, and are covered with mortar holes and grooves in various designs. At least four of the mortar holes are at least as deep as an arm. There are four boulders with groove marks on their surface. F01 is a long boulder with 17 grinding facets. A few of the groove marks cut into some of the grinding facets (Figure 36), and in two instance they form two different designs, similar to what is seen in VV39 (Figure 37). Since those are the only designs located at this site, it is unclear if they are intentional petroglyph designs or simply a random assortment that possibly resembles a petroglyph design. Because of this ambiguity, they will not be considered intentional petroglyph designs. There are two mortar holes that are so deep they have broken through the 81cm thick boulder. F02 is a boulder that is partially covered by sediments in the shelter. There are some grooves that are extremely faded, eleven that appear moderately visible, and six that are the most visible (Figure 38). F03 is a long boulder in the mouth of the shelter, and is completely covered in grinding facets. There are four large and deep mortars with a depth of approximately 60cm. There are nine grooves on the top of the rock. F04 is a thin tan limestone boulder. All of the incised grooves are all vertical and resemble cat claw marks (Figure 39). The groove marks are very deeply carved.
Figure 36 VV75 incised groove designs on F01

Figure 37 VV75 Incised grooves in grinding facet on F01
Figure 38 VV75 F02 incised grooves

Figure 39 VV75 F04 incised grooves resembling cat claw marks
Site X, White Shaman Annex is located on a trail that has been improved and heads toward the White Shaman shelter, which overlooks the Pecos River (Figure 40). On the canyon wall facing south are numerous red monochrome pictographs of anthropomorphs. There are boulders, rocks, and gravel littering the floor of this site. Four boulders contain cupules and one of those boulders also contains groove marks. F01 is a small boulder with a total of five cupules. Four of the cupules are located on one side of the boulder, while the other cupule is located on another side (Figure 41). F02 is a boulder with three cupules, five groove marks, and a spot of red pigment. F03 is a large boulder with two cupules. There is a polish on the top part of this boulder where the cupules are located (Figure 42). F04 is a moderately sized boulder with the same polish as F03. Three cupules located on this boulder.
Figure 40 White Shaman Annex overview, orange flags mark boulders with cupules

Figure 41 White Shaman Annex F01 cupules
Results

In order to approach a social understanding of this rock art style, a study of the placement of the rock art and the taskscape need to be examined (Ingold 1993, see also Robinson 2010). What this research is attempting to do is understand the taskscape associated with cupules and groove marks by identifying themes in this style of rock art and themes in the sites in which they are found.

There is one significant theme seen in the cupule and groove mark style; the high prevalence of incised grooves in comparison to cupules (Table 1). This is a significant difference when compared to other regions, where cupules are generally more common. Only two of the ten sites contained cupules (Painted Shelter and White Shaman Annex). Painted Shelter was the only site recorded in this thesis to only have cupules with no
incised grooves. There are numerous explanations for this odd preference for incised grooves over cupules. The first is that the sample of sites recorded for this thesis may not have been large enough to properly document if this actually is a pattern for this region. Another explanation is that if this is a pattern for the Lower Pecos, Texas incised grooves may have had a more meaningful significance to these indigenous groups than cupules. Perhaps the meaning tied to carving grooves into the limestone was of more importance than pecking out cupules.

<table>
<thead>
<tr>
<th>Site Name/Number</th>
<th>Cupules</th>
<th>Incised Grooves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casper Shelter</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Crab Shelter</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Fate Bell</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Kelley Shelter</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Painted Shelter</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Panther Cave</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Skiles Shelter</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>VV39</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>VV75</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>White Shaman Annex</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Table 1. Presence or absence of cupules and groove marks (+ present, - absent)
Other rock art styles were seen at all ten sites (Table 2). Only two of these sites contained petroglyphs (Fate Bell Shelter and VV39). VV39 was unusual by having at least twenty one rocks and/or boulders with incised grooves. The most common rock art type in this sample is the Pecos River Style, which is to be expected, because it is the most common rock art style in the region. Eight of the ten sites had Pecos River Style elements along the rock shelter walls. As stated earlier, this is the oldest rock art style, dating to as early as the early archaic period (Boyd 2003: 20). Three of the sites containing Pecos River Style also have another rock art style painted on the rock shelter walls. These sites are Fate Bell Shelter, Skiles Shelter, and VV75. Fate Bell Shelter and VV75 contain Pecos River Style and Red Linear Style, while Skiles Shelter contains Pecos River Style and Bold Line Geometric. Only two sites do not have Pecos River Style pictographs. These sites are Painted Shelter, which has Red Monochrome and Red Linear, and White Shaman Annex, which has Red Monochrome. This is most likely due to the later temporal periods Painted Shelter and White Shaman Annex were occupied.

The important thing to note about these rock art styles are that many of these sites contain at least two different styles, which demonstrates that these sites were revisited over many years, and may have been revisited by different groups with different ideologies. Since petroglyphs are unable to be accurately dated, it is difficult to determine the time frame the cupules and incised grooves were originally created. It also appears that since these sites were revisited, it is also possible that the cupules and incised grooves were also enhanced during these visits.
<table>
<thead>
<tr>
<th>Site Name/Number</th>
<th>Petroglyphs</th>
<th>Pictographs</th>
<th>Styles of Pictographs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casper Shelter</td>
<td>-</td>
<td>+</td>
<td>Pecos River Style</td>
</tr>
<tr>
<td>Crab Shelter</td>
<td>-</td>
<td>+</td>
<td>Pecos River Style</td>
</tr>
<tr>
<td>Fate Bell</td>
<td>+</td>
<td>+</td>
<td>Pecos River Style, Red Linear, Red Monochrome, and Historic American Indian Style</td>
</tr>
<tr>
<td>Kelley Shelter</td>
<td>-</td>
<td>+</td>
<td>Pecos River Style</td>
</tr>
<tr>
<td>Painted Shelter</td>
<td>-</td>
<td>+</td>
<td>Red Monochrome, Red Linear</td>
</tr>
<tr>
<td>Panther Cave</td>
<td>-</td>
<td>+</td>
<td>Pecos River Style</td>
</tr>
<tr>
<td>Skiles Shelter</td>
<td>-</td>
<td>+</td>
<td>Pecos River Style, Bold Line Geometric</td>
</tr>
<tr>
<td>VV39</td>
<td>+</td>
<td>+</td>
<td>Pecos River Style</td>
</tr>
<tr>
<td>VV75</td>
<td>-</td>
<td>+</td>
<td>Pecos River Style, Red Linear</td>
</tr>
<tr>
<td>White Shaman Annex</td>
<td>-</td>
<td>+</td>
<td>Red Monochrome</td>
</tr>
</tbody>
</table>

Table 2. Rock art styles associated with cupules and groove marks (+ present, - absent)

An important finding is the Red Linear depictions at two of the sites (Fate Bell Shelter and Painted Shelter) that are of pregnant women engaging in some type of ritual activity (Figure 43 and 44). The depicted women are performing a fertility dance, holding on to each other’s shoulders. Fate Bell Shelter has one of the most famous fertility depictions, of two pregnant women with breasts holding phallic instruments. This insinuates that these sites have a fertility association. This is important when considering the hypothesis that cupules and groove marks are related to a ritual act, perhaps a fertility ritual. It is possible that this fertility association is shared with the cupules and groove marks at these sites.
Figure 43 Fate Bell Shelter fertility depiction. Insert (Turpin 1990: 104)

Figure 44 Painted Shelter Red Linear fertility depiction (arrow pointing at pregnant woman)
Another important finding is the strong association of middens and bedrock mortars or grinding stations at these sites (Table 3). Seven of the sites had bedrock mortars located in the sites. Six of the ten sites contained midden deposits. All of the sites that had middens also had bedrock mortars. Midden deposits and bedrock mortar stations were important areas where women spent a great deal of time preparing food, making tools, and socializing (Robinson 2010: 807). People often become attached to places through habitual reuse of areas (Robinson 2010: 807-8). Interestingly, six of the ten sites had grinding stations located on the same platform as the cupules and groove marks (Table 4). The fact that these activities are located on the same platform insinuates that they are in some way related.

The act of food grinding is a time consuming activity. In most if not all ethnographies, women are the predominate individuals processing food. It is likely that these women would return to the same locales throughout their lives and engage in social camaraderie of shared activities (Robinson 2010: 808). The buildup of the midden deposits is evidence of these individuals returning to these sites for many years. This is also evidence that the cupules and groove marks had a strong visual presence in relation to the taskscapes of the shelters, and this visual prominence would become greater as people entered and moved around the shelter (Robinson 2010: 809). The cupules and incised grooves were very much interrelated within the habitations (Robinson 2010: 809).
<table>
<thead>
<tr>
<th>Site Name/Number</th>
<th>Midden</th>
<th>Bedrock mortars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casper Shelter</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Crab Shelter VV50</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Fate Bell VV201</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Kelley Shelter VV165</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Painted Shelter</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Panther Cave V83</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Skiles Shelter VV164</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>VV39</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VV75</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>White Shaman Annex</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 3. Middens and bedrock mortars associated with sites (+ present, - absent)

<table>
<thead>
<tr>
<th>Site Name/Number</th>
<th>Bedrock Mortars</th>
<th>Grinding Stations on Rock Art Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casper Shelter</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Crab Shelter VV50</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Fate Bell VV201</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Kelley Shelter VV165</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Painted Shelter</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Panther Cave V83</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Skiles Shelter VV164</td>
<td>+</td>
<td>+</td>
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<tr>
<td>VV39</td>
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<td>-</td>
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<tr>
<td>VV75</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>White Shaman Annex</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 4. Bedrock mortars associated with cupule and groove mark platform (+ present, - absent)

The relationship of the grinding platforms, which are strongly associated with women, and cupules and groove marks insinuates that women are in some way related to this rock art style. Whether or not these women created this rock art style is unknown; however, it can be stated that women were in close relation to cupules and groove marks throughout most of their lives. Women had some type of relationship with these rock art elements, whether this relationship has a ritual connotation as opposed to a mundane everyday activity is important to understand.
I would argue that cupules and groove marks have a ritual connotation, even though they are located in areas used for everyday living activities (see Conkey 1997). As can be seen world-wide, rituals can be associated with everyday activities, and are often associated with behavior deemed unusual. An example of this can be seen among Chalcolithic groups in Cyprus, where a practice of desecration and burial of objects is practiced (Bolger 1992: 160). No answer could be given as to why these objects that required a great deal of manual labor to produce would be desecrated and buried, except for the claim that these objects were tied to an important, yet unknown, ritual act (Bolger 1992). What is still interesting about these ritual objects is that they were found in an everyday living space and were found among everyday artifacts, such as fire-cracked rocks, pebbles, and organic material (Bolger 1992: 146). Among the sites analyzed in this study, the location of the incised grooves may be an indicator of ritual activities. Many of the boulders had incised grooves in unusual areas that would not be created unless for a ritual purpose. For example, Crab Shelter had one boulder (F06) that had incised grooves on the underside of the boulder. It required the recorders to lie on our backs to observe the incised grooves, and would have been extremely difficult to carve into the underside of the boulder. Another example of an unusual location for the incised grooves was at Casper Shelter. Two incised grooves were carved on the topside of an extremely tall boulder, approximately five meters tall. It was extremely difficult to climb up the boulder to the topside to observe the groove marks. It would have been both dangerous and difficult to carve incised grooves into this boulder. This along with the evidence suggested in the following chapter demonstrates that cupules and groove marks are part of some type of ritual activity.
CHAPTER 4

EXPERIMENTAL STUDY

To test if the groove marks were used for bone awl manufacturing, I collaborated with Nathan Martinez, a lithic specialist to conduct some laboratory experiments. The materials used in this experiment consisted of two flat limestone rocks from the Edwards Plateau in the Lower Pecos, Texas (Figure 45 and 46). Rock 1 had a tan color and measured 32cm x 29cm, and 3.5-4cm thick. Rock 2 a gray color limestone, measured 38cm x 20-30cm, and 5cm thick. We used a chert nodule from Bulverde, Texas. All of the flakes and all but one of the tools (a chert biface) used were created from that nodule. A one year old deer long bone was also used to create the bone awls used in the study. The long bone was cut in half length-wise and was then cut into smaller fragments that were used to create three bone awls (Figure 47).

Methodology

Test 1:

Two bone awls were sharpened by constantly spinning the bone fragment along the rock in a spiral fashion (Figure 48). When one area that is being used to sharpen the bone fragment becomes smooth the bone fragment is moved to a new area. This method sharpened the bone fragment into an awl, but did not create any cuts into the rock; instead a sheen polish remained on the rock. In the second part of this test, a second bone fragment was scraped along the rock in one motion (front and back) in a straight line. The bone fragment was constantly having to be turned in order to ensure that all sides of the bone fragment were being sharpened. This method was not as effective as the first
method in creating a bone awl, and again no cuts were made into the rock, only a sheen polish was created.

Figure 45 First Limestone Rock
Figure 46 Second Limestone Rock

Figure 47 Deer Bone Fragments
Test 2:

We used the bone awls that were created in the first test to try to cut into the limestone in order to further sharpen the bone awls. The first bone awl was held at a 45 degree angle. It was extremely difficult to keep the bone awl moving in a straight line during this test. After sixty seconds time the side of the tip was wore down approximately 3mm. This also did not cut into the rock. In the second part of this test a stronger bone awl was used. This time the bone awl was held at a 90 degree angle while trying to carve into the limestone. After trying to carve into the limestone for one minute, the bone awl’s end was completely flattened and no longer sharp, and 1.5mm was removed. No cuts were made into the limestone, and again only a sheen polish was created.
Test 3:

In the third test, Nathan carved groove marks into the limestone with a number of chert flakes, two bifaces, one uniface, and two chert burins. Measurements were taken of groove marks with calibrated caliber. The time taken to create these groove marks was recorded. In order to test if the time taken to create a groove mark makes any significant difference, one groove marks was be created during a time span of thirty minutes.

Biface 1 was used first in the timespan of 1 minute 15 seconds. The biface was extremely difficult to maintain in a straight line and created a thick groove into the limestone. Biface 2 was carved slowly into the limestone in 1 minute 50 seconds. This groove mark was thinner than the previous biface created groove and it had a “V” cross section. The uniface was used in the timespan of 55 seconds and created a triangular shape groove mark. Two chert burins were created and subsequently used in this study. Burin 1 measured 40.7mm (length) x 17mm (width) x 3.7mm (thickness). Burin 1 was held at a 90 degree angle and carved into the limestone for 45 seconds. Burin 2 was significantly smaller than Burin 1, and measured 29.3mm (length) x 12.5mm (width) x 2.3mm (thickness). Burin 2 was held at an inclined angle and used for 40 seconds. Since Burin 2 was smaller it was easier to control and the whole hand was not used to create the groove, instead the fingers were moved in a rocking motion. With the smaller edges of both burins less amount of the limestone was cut, fewer shavings were created from the limestone. This method would not be effective for cutting deep grooves into rock surfaces, which is often what is seen archaeologically.

A total of 8 chert flakes were used to create 9 grooves. It was found that newly created thin flakes created the deepest grooves with the thinnest cross-section, which is
the most similar to archaeological groove marks (Figure 49). It is also important to note that the time taken to create the groove marks had an effect on the depth of the groove mark. One groove mark was created in a time span of 29 minutes. It took a total of two bifaces and three flakes that were constantly alternated due to the sharpness of the tools and flakes becoming dull. This was the deepest groove created in the entire experiment measuring a depth of 3-5mm (Figure 50). There are many archaeological grooves that measure a greater depth than 3-5mm, so it is hypothesized that many grooves were created over a long period of time or perhaps may have been revisited and reused. It has also been noted that once the groove has been created it is easier to carve into it and make it deeper.

Figure 49 Using Chert Flake to Carve into Limestone Rock
Test 4:

The fourth test of the experiment used the groove marks that were created in the third test with chert flakes, and carved into them with bone awls to determine if this both sharpens the bone awl, and if it created the same shape groove marks seen in the archaeological record. In the first section of this test the bone awl was held at a 20 degree angle and carved into a groove that was created by a thin chert flake in test 3 for 1 minute 15 seconds. This did sharpen the bone awl; however it left a sheen polish in the groove mark, and altered the shape of the initial groove. The shape of the groove went from being a “V” cross-section to having a curved bottom resembling a “U” cross-section. Two more bone awls were sharpened into previously chert flake created grooves. The first bone awl was sharpened for 1 minute 45 seconds and the second bone
awl was sharpened for 2 minutes 45 seconds. The same results were demonstrated with all three bone awls. Only the very tips of the bone awls were sharpened, a sheen polish was left in the grooves, and a very fine white powder was created. It is unclear if this white powder is from the limestone rock or from the bone awl. All three instances created fatter grooves with flattened out bottoms, and with vertical edges that were initially angled. This is not what is seen archaeologically (Figure 51). Archaeological groove marks demonstrate very narrow “V” shaped cross-sections with no polish seen in them. Although the polish may dissolve after a period of time, the different shapes of the grooves demonstrates that bone awls were not used in the creation of archaeological groove marks.

Figure 51 Groove Mark After Bone Awl Sharpening with Sheen Polish
<table>
<thead>
<tr>
<th>TOOLS USED</th>
<th>TEST 1</th>
<th>TEST 2</th>
<th>TEST 3</th>
<th>TEST 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BONE AWL</td>
<td>BONE AWL</td>
<td>CHERT FLAKES, 1</td>
<td>CHERT FLAKES,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CHERT BIFACE, 2</td>
<td>THEN BONE AWLS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CHERT BURINS</td>
<td></td>
</tr>
<tr>
<td>METHOD</td>
<td>SPIRAL DRILLING</td>
<td>CARVE INTO ROCK</td>
<td>CARVE INTO ROCK</td>
<td>CARVE INTO ROCK</td>
</tr>
<tr>
<td>RESULTS</td>
<td>NO CUTS INTO ROCK, SHEEN POLISH CREATED, AWL SHARPENED</td>
<td>NO CUTS IN ROCK, SHEEN POLISH CREATED, AWL NOT SHARPENED</td>
<td>ALL STONE TOOLS CREATED GROOVES IN ROCK, THIN CHERT FLAKES CREATED GROOVES MOST SIMILAR TO ARCHAEOLOGICAL GROOVES</td>
<td>AFTER USING BONE AWLS, SHAPE OF GROOVES CHANGE TO BECOME FATTER AND MORE SQUARE WITH A SHEEN POLISH DISSIMILAR TO ARCHAEOLOGICAL GROOVES</td>
</tr>
</tbody>
</table>

Table 5. Chart of the four experimental tests
Results

This experimental project demonstrates that groove marks were most likely not used as a way to sharpen bone awls. The bone fragments not only were unable to cut into the rock, but left a sheen polish on the rock, which is not seen archaeologically. It is also important to note that even when bone awls are scraped into previously created groove marks, the awls may become sharpened, but the shape of the groove mark becomes uncharacteristic of what is seen archaeologically. The stone tool section of this experiment demonstrates that chert flakes created groove marks that are most similar to those seen in the archaeological record. Based on the numerous groove marks we created, and the differences that were seen based on the time taken to create them, it appears that deeper groove marks in archaeological sites were created over a long period of time and may have been revisited and enhanced over a period of many years. Based on this experiment, it appears that the groove marks were most likely created by chert flakes, and not bone awls.
CHAPTER 5

CONCLUSION

This research has used an experimental project along with data collected from ten sites in the Lower Pecos, Texas to better understand the taskscapes associated with cupules and groove marks and the purpose of the cupules and incised grooves. There were several themes observed within the cupule and groove marks and the sites themselves that correspond with the experimental project.

Discussion of Results

The presence of multiple rock art styles at four of the recorded sites, middens at six of the sites, and deep bedrock mortars at seven of the ten sites indicate that these sites were revisited for many years, possibly centuries. The large midden deposits along with a high number of bedrock mortars and grinding facets demonstrate that people become attached to certain locales through habitual reuse of area (Robinson 2010: 807-8). This connection to the same location for many generations is also related to cupules and groove marks located in these habitations. One part of the experimental project demonstrated that twenty nine straight minutes of carving into limestone with a chert flake created a deep incised groove that is similar to those seen archaeologically. There are instances of many archaeological grooves being deeper than that one groove mark, which indicates these groove marks were possibly revisited and enhanced with each visit.

When examining the different hypotheses used to explain the function of incised grooves and cupules, the hypothesis that cupules and incised grooves are related to food production activities is in some ways accurate, because there is a shared location between
ground stone stations and cupules and incised grooves. Since women are the predominate users of ground stone, this shared location insinuates that there is a connection to cupules and groove marks and women’s work areas. It is very clear that this rock art style was constantly in the visual presence of women. However, what is not known is if women created the rock art or had a symbolic relationship to it. Whether cupules and groove marks were created as part of a food production activity is highly unlikely. It has been shown in earlier sections of this thesis that cupules and groove marks were most likely not created by an everyday functional task, but instead as part of a ritual activity.

One of the hypotheses related to cupules and groove marks claimed they were created for a functional purpose. The hypothesis that the incised grooves were created by sharpening bone awls was tested in the experimental section. Trying to create bone awls by cutting into the limestone rock proved impossible, and left only a sheen polish and no incision into the rock. It was shown that chert flakes created incised grooves most similar to those seen archaeologically. When bone awls were scraped into chert flake created grooves, the shape was altered and uncharacteristic of archaeological groove marks. This evidence suggests that bone awls are unable to create groove marks similar to those seen at the ten archaeology sites recorded in this research. This experiment disproves the hypothesis that incised grooves were created to sharpen bone awls, and instead demonstrates that they were created by chert flakes for other purposes.

This leaves the question of what that purpose or purposes may be. In some instances, the groove marks were created in inefficient locations that serve no obvious function. The location of incised grooves on the underside of a boulder and another set
of incised grooves carved on the topside of a five meter tall boulder demonstrates that these rock art carvings were not created for a simple purpose. It is common that behaviors deemed as odd or inefficient usually are often for symbolic purposes in some type of ritual. The most likely explanation for this rock art style is that they were created as part of a symbolic ritual activity.

The final hypothesis used to explain this rock art style claimed they are tied to a fertility ritual based on a number of ethnographic references. However, the only links to fertility rituals are the two Red Linear fertility depictions at Fate Bell Shelter and Painted Shelter and the possible image of a vulva found at Crab Shelter. While these two Red Linear depictions are unusual for the area, and are very clear depictions of pregnant women, the fact that these two depictions are part of the limited evidence to support this hypothesis may not be enough. Although all ethnographic references to cupules and groove marks show they were created as part of a fertility ritual, none of these are from people directly linked to groups from the Lower Pecos. Since all the ethnographic references mentioning cupules and groove marks show that this style of rock art is directly linked to some type of fertility ritual, many would assume that this would be true for all regions with this rock art style. However, at this point there is still not enough documentation for the Lower Pecos, Texas to fully support this hypothesis.

This research demonstrates that cupules and groove marks are part a ritual activity. It is also fully possible that the cupules and groove marks in this region are part of a fertility ritual; however, this cannot be stated with true certainty until more evidence is produced to better support this claim. This research is one of the first to document this rock art style in this region, and to test the differing hypotheses proposed to explain these
enigmatic petroglyphs. This research has demonstrated that they are most likely part of a symbolic ritual purpose as opposed to a functional purpose, and more research in the area would be vital to better understand exactly what that ritual practice might be.

Conclusions and Recommendations for Future Study

Many assume rock art can never be understood or interpreted in any way, which has caused rock art research to often be dismissed, since it is assumed to be based purely on speculation, not actual data. In the past few years, rock art research has added stronger methodology to better understand rock art and its possible meanings. This thesis research has used site data along with an experimental study to test different hypotheses that have been introduced to explain the function of cupules and groove marks.

Few regions outside of California have had these types of sites recorded and analyzed. This was the first research to document and analyze cupule and groove marks sites in Texas. This research not only recorded the actual rock art style, but also recorded all aspects of the sites, and used this data to systematically test the hypotheses related to the function of this rock art style. It also identified and studied the taskscapes associated with cupules and groove marks to more fully understand the social significance of these forms.

At this point, very little research has been done on the cupules and groove marks. This methodology could by applied as a basis for other studies documenting this rock art style in other regions. This research has hopefully intrigued others to want to study this unique rock art style. Once more regions have been studied, a comparison could be made to identify common themes in cupules and groove marks as an entire rock art style, or
perhaps demonstrate that no themes exist, insinuating they were created for different purposes in different regions. This type of research would be incredibly significant, and allow rock art research to continue to flourish.

This research also has the potential to aid the recording process for rock art. Currently in many states, government agency’s rock art forms ask simple questions solely about the rock art panel itself and not general site information. Many rock art forms contain more check boxes than lines to add comments. By only looking at one small aspect of a site, such as the rock art, the larger picture is getting lost. This research has demonstrated that the rock art panel is interrelated to all aspects of a site. By studying the general site information along with the themes found in particular rock art style, a more holistic understanding of the ideology of a site is explored. This should be considered in the rock art recording process, which would allow more quality research to be produced.
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