

NINE MILE CANYON ROCK ART AND COMMUNAL HUNTING

Descriptive analyses are those which utilise the figurative component of prehistoric art to directly extract information on prehistoric social activities, economy, material culture, ideology and environmental context, which is often not reflected in other types of archaeological evidence [Morwood and Smith 1996]

The above quote makes clear the potential use of rock art as a source of information about ancient societies and generally reflects our approach.¹ In this paper we focus on what might be learned about the societies whose members created the rock art rather than what may have motivated the

ancient artists to create it or what meaning(s) it may have had for those who created it or who later viewed it.

Nine Mile Canyon, located in central eastern Utah (Figure 1), has long been known for its rich and extensive corpus of rock art. This paper is a development of certain concepts presented in two previous papers about Native American (largely Fremont) rock art found in Nine Mile Canyon. Those papers focused on the topics of animal behavior and ancient hunting strategies as revealed in the rock art (Matheny et al. 1997; Matheny et al. 2004). Our data come from the

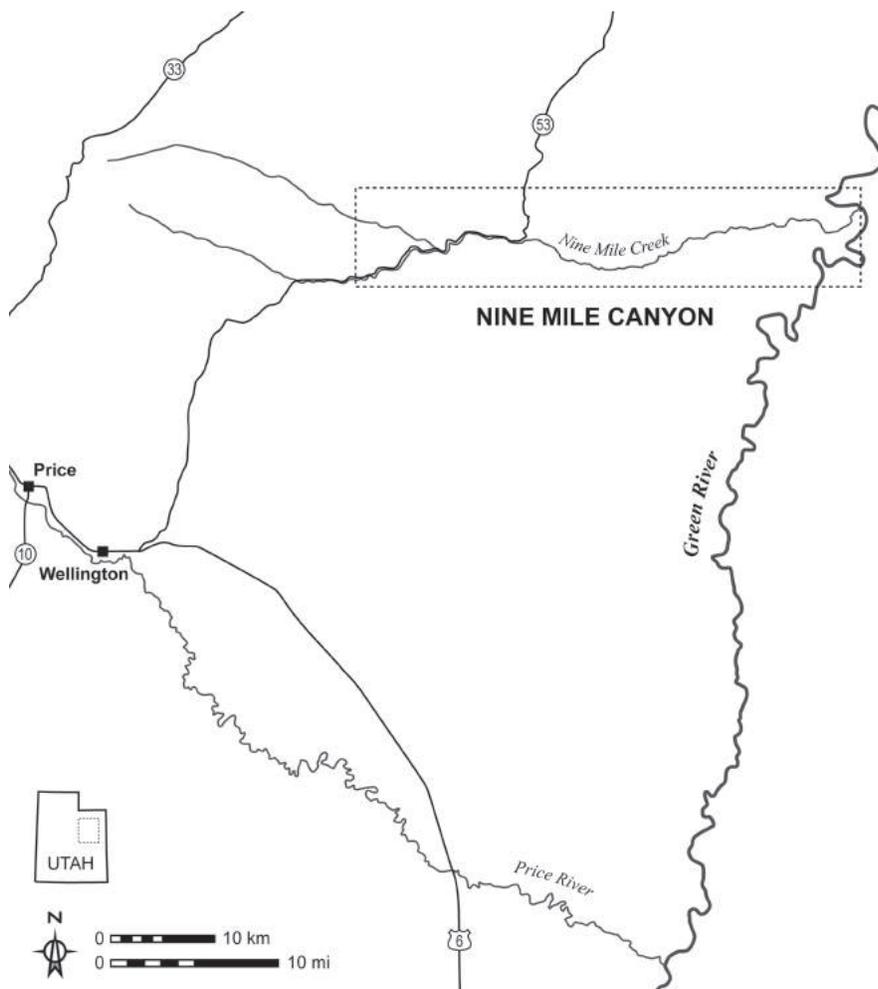


Figure 1. Map showing the location of Nine Mile Canyon and the research area.

results of a survey of the lower (eastern) portion of Nine Mile Canyon carried out by the Brigham Young University (BYU) Field School of Archaeology under the direction of Ray T. Matheny from 1989 through 1992 (reported in Spangler 1993) and survey work carried out with the Castle Valley Chapter of the Utah Statewide Archaeological Society beginning in 1989, as well as the survey of a portion of the canyon published by Hurst and Louthan (1979), excavations carried out in Nine Mile Canyon by the BYU Field School of Archaeology (reported in Thompson 1993), and, to a lesser degree, archaeological work in the canyon by other scholars. Although the inventory of rock art and other archaeological sites in the canyon is by no means complete, the surveys carried out thus far have given us some perspective on the distribution of sites and their content in a few important areas of the canyon.² Rock art depictions in the canyon span a long time frame (from at least the Archaic Period through modern times). Although rock art exists at many levels along the steep rock terraces, particularly in the mid and lower sections of Nine Mile Canyon, a number of the more complex renderings are easily visible from the canyon bottom, providing an enduring message to all who pass by them. In this paper, we concentrate on rock art themes (mainly found in Fremont and Ute/Numic period rock art) which suggest the repeated exploitation of local faunal resources by communal hunting. The rock art renditions of animals and anthropomorphs communicate information about an economic system involving the procurement of animal products which may reflect connections beyond Nine Mile Canyon.

Evidence from Nine Mile Canyon suggests that most of the Native American inhabitants who lived in the canyon and exploited its resources from the Archaic through the Historic Period were foragers (also called hunter-gatherers) and at least some, during the Fremont occupation, were farmers, although their horticultural activities may not have been associated with villages or other residences that were occupied year round. We are

interested in trying to understand the context of communal hunting as it may have occurred in Nine Mile Canyon as practiced by foragers and/or horticulturalists and whether rock art can provide insights about this.

Hunting is a basic subsistence activity that has been practiced from the earliest times until today by societies with all types of sociopolitical organizations. In looking at communal hunts³ as reflected in Nine Mile Canyon rock art, we adopt Driver's definition of communal hunting which includes the following:

- (a) Participation by more than two hunters (usually many more than this).
- (b) Active cooperation between hunters such that they work together, as opposed to passive cooperation in which hunters agree not to interfere with each other's activities.
- (c) A system of hunting that requires all hunters to participate in a previously conceived plan [Driver 1990:12].

Driver (1990) notes that it is difficult to document the presence of communal hunting in the archaeological record, however, we suggest that rock art can be helpful in this regard, showing both the kinds of large game targeted as well as hunting techniques used to obtain them.

In order for communal hunting to be a worthwhile economic activity, justifying the expenditure of the large amount of energy and other resources necessary to hunt, kill, and butcher the animals as well as transport the meat and other animal products, there must be an adequate return of animal products. To carry out a successful communal hunt, Driver (1990:13) notes that the target animals must exhibit certain characteristics, including that their location be predictable, that their behavior dictates particular hunting techniques and that their physiological conditions makes hunting them desirable. He also notes that large mammals have important seasonal variations in their "habitat, migration, population density, meat

quality, and social behavior” (Driver 1990:13). Meat quality is affected by seasonal changes experienced by animals and is linked to fat content which plies on both the nutritional value and the taste of the meat (Speth and Spielmann 1983). Seasonality, among other factors, can include migration. Reproductive behavior is often seasonal as well and results in animals being aggregated in greater numbers than at other times and in peak condition in terms of both meat and hides or coats. These factors are generally true for larger mammals living in arctic and temperate regions where animals are most often aggregated in the fall. Driver’s review of ethnographic sources shows abundant data that hunting in higher latitudes during the fall and early winter supplied animal products for winter storage (Driver 1990:29). While referencing Winterhalder (1981) that “optimal foraging theory predicts that clumped, mobile resources are most efficiently exploited by aggregated foragers,” Driver (1990:21–28) points out that this does not explain why communal hunting occurs and he explores that question using the following hypotheses:

- (a) The technology of communal hunting is more efficient (i.e., produces more meat per person or more energy per person per unit of energy expended) than the individual hunting of aggregated prey, under certain conditions;
- (b) Communal hunting produces a surplus during times of plenty, which is crucial for maintenance of human populations in “lean” periods following communal hunts; and
- (c) Communal hunting decreases search time, by concentration on dense aggregations of animals, and the decrease in search time compensates for any loss of efficiency [Driver 1990:22–23].

Our study is concerned primarily with the hunting of bighorn sheep (*Ovis canadensis* and *O. c. nelsoni*), simply because they are overwhelmingly the most frequently depicted animal in the rock art of Nine Mile Canyon. Other species portrayed in hunting scenes in the canyon include elk/deer

(usually these appear to be elk), bison, and rarely, birds. We do consider one example of an elk hunting scene in this paper. Although bighorn sheep are abundantly depicted in the rock art of Nine Mile Canyon and other areas occupied by Fremont and Ancestral Puebloan groups, their numbers were so greatly reduced during settlement by Euro-Americans that perhaps they do not come quickly to mind as a major game source. Estimates differ about the number of bighorn sheep that lived in North America in earlier times but a recent article gives an estimate of 1.5 million to 2 million two centuries ago and notes that only 28,000 remain today (Lomax 2008:22). Based on the criteria discussed above, bighorn sheep are particularly attractive hunting targets because they have highly predictable behavior on an annual basis. Their annual seasonal cycles include a segregation between ewe and ram herds for much of the year and the sheep aggregate in mixed herds of ewes, rams, and lambs born the previous spring only during the rut in the late fall or early winter at a time when the fat content of their meat is high and condition of their hides is generally at a premium (Geist 1993:125). A recent study of bighorn sheep in Glacier National Park using tracking collars which record the movements of the sheep has changed some former perspectives on bighorn behavior and confirmed others (Lomax 2008:22). The highly predictable nature of the bighorns’ habits was confirmed, showing that they seldom explore new habitats and the herd travels on paths used for generations between their ranges used for purposes such as lambing, wintering, etc. Such predictability in behavior must have been a boon to hunters who understood it well and could predict the sheep’s location from season to season.

The bighorn sheep were a high-ranked resource and, in addition to the meat and hides, they provided those who hunted them with a wealth of other resources. Bones were used for tools and bone grease was another important resource. The horns of the bighorns were used for a number of tools and weapons, including bows, sickles,

dippers and rattles. This brief discussion is merely illustrative of some of the uses of the bighorns.⁴

NINE MILE CANYON ROCK ART HUNTING SCENES⁵

Perhaps the general concept suggested by the rock art portrayals we have studied is that hunting of various animals has occurred in Nine Mile Canyon and its environs for a long period of time and it was likely carried out in both communal and individual (one to two individuals) hunts.⁶ We do not suggest, however, that the rock art depictions portray any actual hunts.

Although bighorn sheep are the most frequently portrayed animal in Nine Mile Canyon rock art, by no means are all of these depictions a part of or related to hunting scenes and this applies to depictions of other animals as well. Some scenes show only animals and many of the rock art portrayals reflect the deep knowledge of the Native American artists about the ethology of the animals.⁷

Based on the sources of information mentioned above (surveys of Nine Mile Canyon), Matheny et al. (2004:162–163) have identified a current total 163 rock art scenes that depict or suggest hunting activity, and these include sites associated with both the Fremont culture and later Ute/Numic groups, as well as some that may be associated with the earlier Archaic period. We consider these scenes as hunting or hunting-related because they include

...at least two of the following elements: anthropomorphs (who often wear a single-element headdress, a pair of bison-like horns or a headdress with fringed stick-like elements) bearing weapons (bow and arrow or atlatl) or with upraised arms, large animals (typically bighorn sheep and/or elk/deer, bison or birds (more rarely)) being confronted by anthropomorphs, nets or enclosures, dogs, and burden bearer figures [Matheny et al. 2004:162–163].

Some of these elements are specific to particular time periods or cultures (e.g. in Nine Mile Canyon, burden bearers seem to be only associated with Fremont rock art, but we realize that they have a much broader distribution culturally and geographically beyond Nine Mile). In historic period depictions, horses are often included.

Our analysis of hunting-related sites shows that they tend to cluster around the mouths of some of Nine Mile's tributary canyons. This is discussed in detail below in regard to Fremont hunting scenes.

UTE/NUMIC HUNTING AND COMMUNAL HUNTING SCENES

We will begin our discussion of Nine Mile Canyon rock art with historic period Ute/Numic hunting scenes but we should point out that issues exist in connecting these groups with past geographical areas and groups. How and if the Utes and other Numic speakers are related to earlier Fremont groups is unknown. By about A.D. 1300 the horticultural, more sedentary lifeway practiced by many Fremont groups had largely disappeared to be replaced by a foraging lifeway associated with those called Numic or Shoshonean speakers. For some years in the mid to late twentieth century there was general consensus among scholars regarding an expansion or migration of Numic-speakers eastward and northward from the southwest Great Basin beginning around A.D. 1000, gradually pushing into the eastern Great Basin and surrounding areas. Now, however, there is little consensus about this or many other questions regarding this time period.⁸

It is well documented that the Utes were hunters of mountain sheep but at the time many of the ethnographic studies were carried out this was no longer the case because the sheep had experienced a great demise. Mountain sheep hunting was largely a memory after the early 1900s; for example Smith (1974:57), writing about the

Northern Utes whom she studied in 1936 and 1937, states:

“All bands of Utes hunted mountain sheep, usually by driving the sheep toward high rocks where a hunter was waiting. Sometimes mountain sheep were surrounded by men on horseback (Unc)⁹.”

Smith (1974:54–57) in discussing communal hunts of bison, antelope and rabbits mentions that a “boss” or “chief,” who had knowledge of hunting and the country, headed the cooperative hunts. It is possible that the same organizational process applied to communal bighorn hunts as well.

Although Smith does not mention specifics as to how bighorn were butchered and transported, her description of such regarding deer may apply to bighorns as well. The deer was butchered by making a cut under the throat and continued on through the belly and “When the deer was skinned, the four legs were tied together and the carcass was laid on the hide and packed on a horse” (Smith 1974:53).

Linguist James A. Goss, during an interview about the Utes and in discussing animals hunted by them, explained that although buffalo were important to the Utes, the buffalo hadn’t entered their ceremonial life and the Utes didn’t consider it sacred as did the Plains Indians (Goss 2000). He goes on to note:

Undoubtedly the most important ritual animal for these hunting people was the big-horn sheep in the mountains of Colorado and Utah. But we’ve completely lost that because the big-horn sheep almost became extinct between the hunting pressure and the diseases that domesticated sheep brought in. So people don’t think about the big-horn sheep, but all you have to do is look around at all of the prehistoric pictographs all over Colorado and Utah and one motif that comes up more often than elk or deer or buffalo or anything like that is the big-horn sheep. That was the

spiritual chief, you might say, of the hunted animals [Goss 2000:44].

Describing fall activities among the Northern Utes, Clifford Duncan has noted:

Fall was the time when seeds had to be stored, meat had to be dried, clothing had to be made and repaired, as did utensils such as pouches and bags, baskets and water jugs. This was also the time of the great large-game hunts, including some for buffalo. Many families would get together, feasting and preparing for the hunt. The hunters would ride out to find and bring back as much meat as they could carry. When the men returned, there was another gathering, with gambling, singing, and courting. These hunts were important socially [Duncan 2000:170–171].

That the Utes traded mountain sheep skins is recorded in sources such as that of Rufus B. Sage (1982:232) who traveled through the west in the 1840s and visited Roubideau’s Fort located on the Uinta River in the Uinta Basin where he noted that trade was carried on with the Snake and Utah (Ute) Indians who lived in the area. He mentions that beaver, otter, deer, sheep, and elk skins were traded. He praised the quality of the skins, stating: “The Utahs and Snake afford some of the largest and best finished sheep and deer skins I ever beheld,-a single skin sometimes being amply sufficient for common sized pantaloons. These skins are dressed so neatly as frequently to attain a snowy whiteness, and possess the softness of velvet” (Sage 1982:232).¹⁰

Sage also noted that the skins were very abundantly produced, were obtained from the Native Americans by the traders for a trifling amount, and, when taken to Santa Fe and other towns, made a profit for the traders.

There are a number of rock art sites in Nine Mile Canyon which indicate the presence of Ute/Numic peoples in the area, reflecting several recognized styles of Ute rock art. In this article we will focus

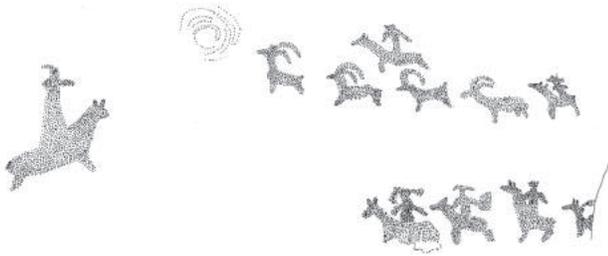


Figure 2. The scene illustrates a mounted Ute/Numic hunting party surrounding four bighorn sheep. One horseman appears to carry a shield. The head of the lone figure may not be accurate as it is somewhat obscured. Site 42Dc639 Nine Mile Canyon.



Figure 3. Four mounted Ute/Numic hunters pursue six bighorn sheep that are being driven by a dog. Wolfe Ranch, Arches National Monument.

on two sites which we suggest show communal hunts. The first site (42DC639) (Figure 2) is found on the north side of Nine Mile Canyon, not far from the mouth of North Maxie Canyon and recorded during the BYU Field School survey. It was reported by Spangler (1993:226) and illustrated by Spangler and Spangler (2003:48) and Spangler (2004:131). This panel is likely an example of what Cole (1990:225–235) has called the Early Historic Ute Indian Style (A.D. 1600 to 1830). It is an impressive panel—a hunting scene, including six mounted anthropomorphs (what is likely a seventh has broken away leaving only the front of the quadruped) and at least four bighorn sheep, as well as a spiral element.¹¹ The mounted anthropomorph (hereafter termed “hunter”) and its horse on the left side of the panel are

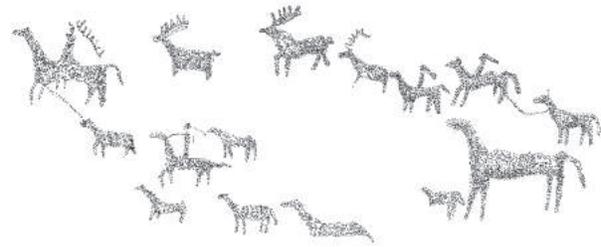


Figure 4. Four mounted Ute/Numic hunters with spare horses pursue elk in a fall hunt. Site 42Cb808 Nine Mile Canyon.

substantially larger than the other mounted hunters and horses and the large hunter wears a headdress with what appears to be two horns, like those of a bison. The larger mounted hunter faces the other mounted hunters and the bighorns. The smaller mounted hunters surround the bighorns. The hunting technique portrayed of surrounding bighorns with horses is the same as that referred to above which was reported by Smith (1974:57) and it may be that the larger mounted hunter is a portrayal of a hunt boss. The Wolfe Ranch hunting panel, located in Arches National Monument, depicts a similar scene of mounted hunters and bighorn sheep but also appears to include at least one canine (Figure 3)

The second Ute/Numic rock art example from Nine Mile Canyon that we will discuss is located on the north side of the canyon, near the mouth of Daddy Canyon where there is a clustering of rock art sites of several cultural affiliations, including some of Ute/Numic affiliation. Site 42Cb808 includes a rock art panel in the Late Historic Ute Indian Style (A.D. 1830 to 1880), which is a hunting scene, involving mounted hunters and elk (Figure 4). Although no weapons are shown, the animals are clearly being controlled by the hunters and their horses. This panel depicts four mounted hunters, at least two of which have tethered animals in trail that appear to be horses. The tethered animals may represent pack animals brought on the hunt to carry meat and other animal products. All of the hunters and quadrupeds face left. In the lead is the largest of the mounted hunters who also has the most developed features

including a trailing Plains-style headdress and feet visible beneath the torso of the horse. This figure may represent a hunt boss or other hunt authority figure. Behind the larger mounted hunter are three quadrupeds which appear to represent elk with large antlers. Two mounted hunters appear behind the elk. They also have trailing headdresses but they are not as detailed as that of the lead hunter. Another mounted hunter is depicted below the first elk. Several other quadrupeds are depicted in the lower area of the scene but they are difficult to identify. They could represent other animals in the elk herd, including females, although one of the quadrupeds appears to be a horse. Smith's (1974:54-55) informants reported hunting elk in the winter and that the hunters would surround yarded elk, frighten them and shoot them as they tried to escape.

The two examples above serve to illustrate that Native Americans, particularly Utes, hunted in Nine Mile Canyon after acquiring the horse, as well as earlier, and that the depictions are consistent with accounts of Ute hunting. Although we cannot say which Ute/Numic groups or bands were hunting in the canyon (and that could have varied over time), groups from the Uintah Basin and Utah Valley seem to be good possibilities. Clearly the acquisition of the horse provided an enhanced range of possibilities for hunting. For example, the Uintah Utes made buffalo hunting trips into Wyoming near what is now Rock Springs and Green River in times of peace with the Shoshones (Smith 1974:53). That the Utes had ongoing interest in the area of Nine Mile Canyon is apparent in the encounter that Byron Cummings of the University of Utah had with a party of Utes in the canyon in the summer of 1906 (Willey 1988:4; referenced in Spangler 1995:45). They insisted that Cummings leave the area immediately but he managed to stay the night and left the next morning.

Duncan's (2000:170–171) discussion of fall activities quoted above is important in pointing out not only the significance of communal hunting

for the purposes of gaining meat and other animal products but also the social context of these hunts which brought groups together. While encounter or individual hunting was undoubtedly important and, in some instances, may have been more efficient than communal hunting, these larger hunts could have provided an occasion for groups to gather and affirm their relationships, which was likely not a part of individual hunts. The communal hunts gave some individuals the opportunity for a temporary leadership role as hunt boss or chief and others the opportunity to demonstrate their hunting prowess. This enhancement of personal prestige was likely further bolstered by celebrations once a successful hunting party returned to camp where the adventures of the hunt would be recounted for the entire group. Knowledge of the predictability of the bighorn sheep annual cycle with the aggregation of animals in conjunction with the rut in the late fall/early winter would have been valuable in reducing the risk factors for a successful hunt.

RECENT PERSPECTIVES ON FREMONT PREHISTORY

As an introduction to the Fremont communal hunting scenes, we present a brief background discussion about Fremont studies which will necessarily give inadequate attention to many important topics. A wealth of archaeological research about what is generally called the Fremont Culture has been accumulating since the early twentieth century. The Fremont peoples inhabited the eastern Great Basin and the northern Colorado Plateau from about A.D. 400 to 1300. There has not been a great deal of consensus among scholars about the Fremont culture or Fremont complex as some have recently suggested that it be designated (Madsen and Simms 1998). Janetski and Talbot (2000a:1) have summarized the history of shifting perspectives on the Fremont from the beginnings of research to current times and note that "if a single theoretical thread can be traced through this maze

of Fremont literature, it is the notion of variability and an associated concern with definition” (Ibid:4). Current perspectives tend to focus on the micro level of behavior which emphasizes “relationships among individuals and groups of individuals” (behavioral/economic perspectives) most often closely identified with subsistence studies or the macro level of behavior related to larger scale patterns (Ibid: 6).¹² Janetski and Talbot suggest that each perspective has its strengths and that each can be applied productively to different kinds of questions. Research objectives have moved away from defining Fremont culture and from understanding variability in terms of bounded area models. Madsen (1989:67) has suggested using the term Fremont as an “umbrella” which includes diverse human behavior. Studies focusing on subsistence strategies have argued that Fremont subsistence was not limited to horticulture; for example, Madsen and Simms (1998) propose that there were a “mosaic” of subsistence behaviors that included full-time farmers, part-time farmer-foragers, full-time foragers and that there could be switching between these options during the lifetime of individuals as they pursued a variety of adaptive strategies.

In recent years research has demonstrated the existence of large, more complex Fremont sites, in comparison with those studied earlier. A general understanding about Fremont sites had been that settlements were small, consisting of several pit houses and associated structures and work areas.¹³ Extensive work at the Five Finger Ridge site (dating between A.D. 1000–1350), located in Clear Creek Canyon, resulted in the excavation of 81 structures (which included 37 pit houses and one surface house) and 33 activity areas, and it is clear that many of the households are contemporaneous during several time periods (Janetski and Talbot 2000b:251; Talbot and Janetski 2000:43; Talbot et al 2000:167). Based on their studies of social organization at the site Janetski and Talbot (2000:262) report that “a conservative conclusion here is that polities above

the supra-family level existed in Fremont society,” and they include Nawthis Village and Baker Village among other sites that may have patterns that reflect internal differentiation.¹⁴

Another important recent study by Coltrain and Leavitt (2002) reported the results of stable isotope and radiocarbon analysis of skeletal materials of the Great Salt Lake mortuary assemblage from the eastern shores of the Great Salt Lake. These results indicated that “diets varied within a single time period, over time, and by sex” . . . “suggesting that between A.D. 400-1150, populations in the Great Salt Lake Basin were faced with a fluid subsistence cost/benefit structure, consistent with the intrusion of summer moisture into an extensive wetlands bordered by grasslands suitable for farming” (Ibid: 479). There is some evidence for possible differential status in a portion of the male population who had a diet higher in maize. There is a change at about A.D. 1150 which sees an end to farming and a return to eating wild foods which, on the basis of climate studies, is suggested to have been caused by a drought or shift in the seasonality of moisture.

How does Nine Mile Canyon fit into the matrix of Fremont research? Despite its well-known reputation for archaeological remains, much of the canyon and its environs remains unknown archaeologically and there have been few excavations in the area. Spangler (2000b) has written an interesting paper which ably addresses a number of questions generated by archaeological surveys by the BYU Field School of Archaeology in lower Nine Mile Canyon, and some of the same questions could apply to the canyon generally. He (Ibid:25) suggests that there was a “Tavaputs adaptation” of Formative peoples after about A.D. 1000 including the following material culture correlates:

- (1) the construction of energy-expensive semi subterranean residential masonry architecture in economically advantageous locations along stream terraces,

- (2) the construction of elaborate surface masonry structures on pinnacles and rock outcrops hundreds of meters above the floodplain,
- (3) the paucity of significant middens, implying short-term, perhaps seasonal occupations,
- (4) the construction of large storage structures that would seem excessive for the small population suggested by the limited quantity of residential structures,
- (5) the construction of elaborately camouflaged and remotely located subterranean storage chambers, which imply both abandonment and the possibility of human predation, and
- (6) the near absence of a local ceramic tradition [Spangler 2000b:25].

Spangler is able to assign only a tenuous date for the Fremont occupation of the lower canyon of A.D. 1000 to 1300, due to the small amount of datable material recovered by the surveys and the same can be said for the middle and upper sections of the canyon as well. He lists the few available radiocarbon and tree ring dates from Nine Mile (Spangler 2000b:35, 36). A few of the radiocarbon dates are earlier than A.D. 1000 but most are later.

In addition to completing a survey of the lower end of Nine Mile Canyon from the confluence of South Franks Canyon with Nine Mile down to the confluence of Nine Mile with the Green River, the BYU Field School excavated at sites 42Cb770, 42Dc618, and 42Dc619, which are all stream terrace sites of the type referred to by Spangler. For example, Site 42Cb770 included three pit houses, and an outdoor work area and yielded three radiocarbon dates including A.D. 1028, A.D. 1028 and A.D. 1176 – median calibration (from Spangler 2000b:35, Table 3.1). Site 42Dc619 had been damaged by modern house construction but still included one partially intact pit house which yielded a date of A.D. 1176 – median calibration (Ibid). Site 42Dc618 differs from the other two in that it was an outdoor use area with a few artifacts but no associated

structures. These are the only stream terrace sites which have been excavated and they are characterized by shallow midden deposits containing few artifacts. Like other stream terrace sites they are located near access to water, arable land, and piñon-juniper resources.

There are a few other sites in mid-canyon that were excavated by Gillin (1955). Two of these, Sky House and Upper Sky House, are pinnacle sites similar to those described by Spangler for the lower canyon and the dendrochronological dates for these sites indicate they may have been constructed about A.D. 1100 and are of the same general time period as those from the stream terrace sites from the lower canyon (Spangler 2000b:29). A number of other habitation sites have been identified by surveys in various areas of the canyon but they have not been tested, and other habitation sites will likely be discovered. Spangler (Ibid) has proposed a hypothesis to account for the archaeology of the lower canyon as we now understand it, and parts of it could be extended to the other areas in the canyon as well. While future research may change some portions of the hypothesis (which is to be expected), it is an important step to understanding the past in Nine Mile Canyon.

Although rock art is abundant in Nine Mile Canyon only a few examples are found in association with architectural sites.¹⁵ Based on stylistic grounds, much of the rock art is attributed to the Fremont but no direct dating of the rock art itself has been done.

FREMONT COMMUNAL HUNTING SCENES

Based on our preliminary review of the 163 hunting and hunting-related rock art sites of which we are currently aware in the area of Nine Mile Canyon, 103 can be considered as related to communal hunting. Of those sites 27 have burden bearer figures (discussed below) and 55 show weapons (mainly bow and arrow).

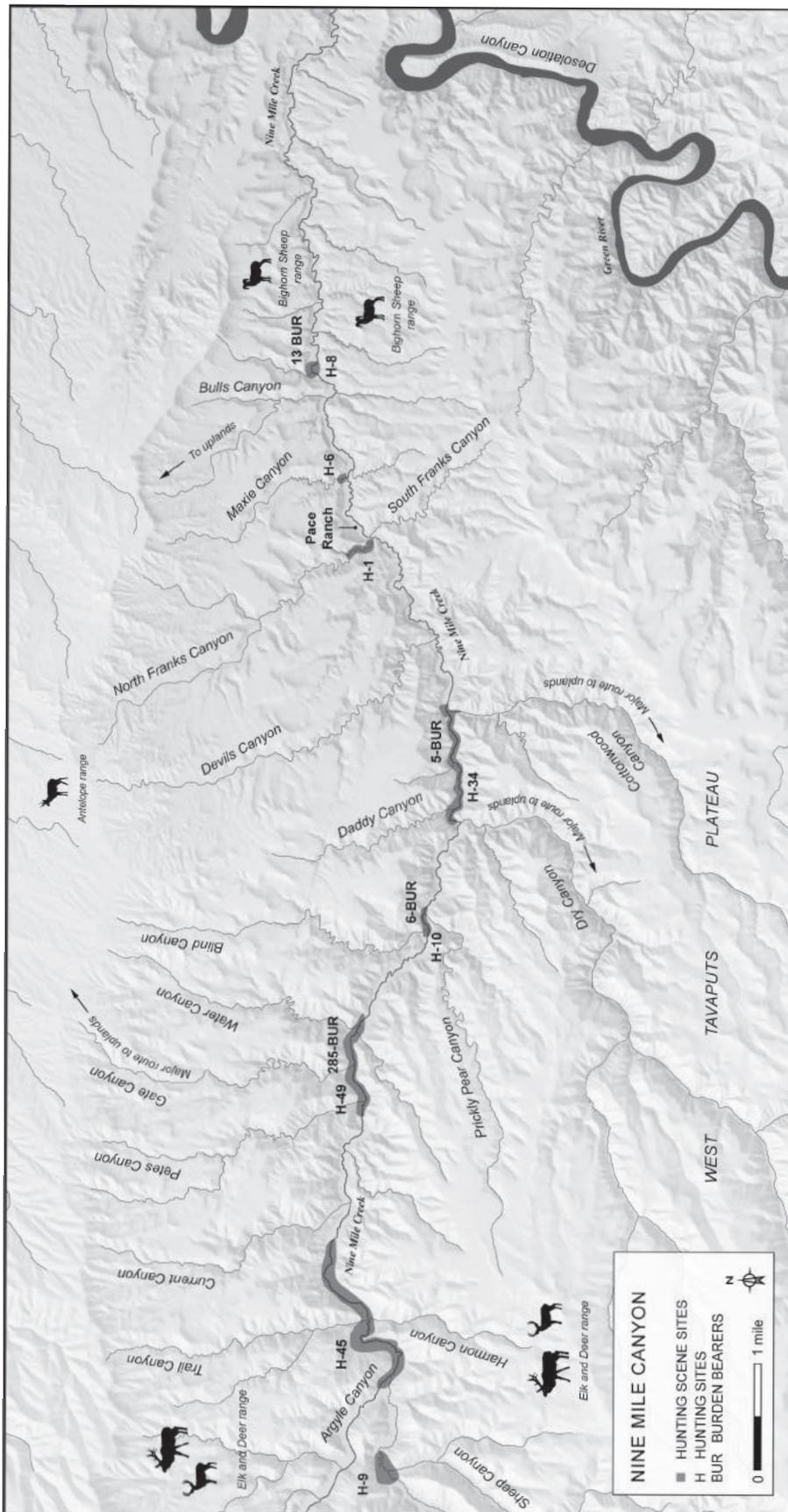


Figure 5. Map showing the incidence of hunting sites and associated images of burden bearers from Sheep Canyon to Bulls Canyon



Figure 6. The scene represents sheep being driven by drivers with outstretched arms. Drive lines to guide the sheep are shown as undulating and zigzag lines ending with the head of a bighorn. Three of the hunters are armed with bows and arrows and are directed by the larger figure. Site 42DC141 Nine Mile Canyon.

Analysis of the location of hunting and hunting-related sites shows that they tend to occur in clusters at or near the mouths of several side canyons. In our discussion below of the site clusters we have included both communal and individual hunting sites. The map (Figure 5) showing the location of these clusters reads from left to right (west to east) as follows:

- nine hunting sites are located near the mouth of Sheep Canyon;
- from the mouth of Argyle Canyon to about 1/2 mile east of Trail Canyon there are 45 hunting sites;
- 49 hunting sites (with a total of 285 burden bearer images) are found at the mouths of and between Petes, Gate, and Water Canyons;
- ten hunting sites (with a total of six burden bearer figures) are found at the mouths of Blind and Prickly Canyons;
- there are 34 hunting sites (with a total of five burden bearer figures) at the mouths of and in the areas between Daddy, Dry, and Cottonwood Canyons;
- one hunting site is found at the mouth of North Franks Canyon;



Figure 7. Bighorn sheep are being driven by a horned hunter with arms outstretched towards what may be an enclosure. The large horned figure may represent a hunt boss and five burden bearer figures are present. Site in Nine Mile Canyon.

- six hunting sites are located at the mouth of Maxie Canyon; and
- there are eight hunting sites (with a total of 13 burden bearer figures) at the mouth of Bulls Canyon.

Many rock art panels have been overdrawn in recent times or damaged to the extent that it was not possible to discern the entirety of the panel even though some elements associated with hunting scenes are present. It is very likely that many more hunting depictions exist in unsurveyed areas.

There is considerable variation among the portrayals of anthropomorphs in the hunting scenes. Some are shown awaiting or threatening animals with atlatls or bow and arrow (Figure 6). Others stand among the animals or confront them with raised arms (Figure 7). Another type of anthropomorph found in hunting scenes and associated with animals is the burden bearer or “backpacker” (Figure 8). The authors found that there were 360 burden bearer images depicted at bighorn hunting sites, and we have suggested elsewhere that they were part of a communal hunting group to transport meat and other animal products after a successful hunt (Matheny, et al. 2004:178–181). The burden bearers are rendered in various forms and some may represent those who had functions other than hunting and carrying



Figure 8. Seven burden bearers mingle with two bighorn sheep suggesting the association of their burdens with the sheep. Site 42Dc1106 Nine Mile Canyon.



Figure 9. A hunting party is ambushing six bighorn sheep that are being driven by a dog (last figure with a long tail). Five bowmen aim arrows at the sheep and two burden bearers accompany the hunting party. Site in Nine Mile Canyon.

animal products from the canyon (Schaafsma 1971:60). Most, however, are found in association with hunting-related sites.

Analysis of the panels by association with the animals hunted and the presence of burden bearers reveals the following: burden bearers are found in association with 416 bighorn sheep, 11 elk, six deer, 53 zoomorphs (unidentified or incomplete drawings), and five bison.¹⁶ If the frequency of depictions is a guide, it is clear that the main hunting quest was for the bighorn sheep, however, elk, deer, and bison also were prized catches.

Burden bearer depictions usually occur in groups and the groups are often organized with a leader portrayed larger than burden bearers that follow. The leader sometimes wields a bow and arrow, drawn and ready for action while the followers stand some distance away (Matheny et al. 2004:Fig. 6.25.). This may indicate that hunting group members played multiple roles; that is, they were burden bearers at some stages of the hunt and hunters at another stage. Some burden bearers accompany an organized hunt where a canine helps drive the animals toward hunters with bows and arrows (Figure 9).

The individual features of the burden bearers are frequently vague, however, in some renditions the

figures wear what appears to be a flat hat, whereas others appear to show a single element, perhaps a feather, on the head. Burden bearer bodies also vary but are generally triangular and some are shown with striding legs and with feet, while others are static without legs or arms depicted, but they all appear to carry a burden on their backs. There are many other locations in the Fremont area and the Southwest where burden bearer images occur but we are unaware of other areas where they occur in such numbers as they do in Nine Mile Canyon.

In an earlier paper (Matheny, et al. 2004) we devoted considerable attention to the hunting strategies portrayed in Fremont rock art and we will summarize those which likely apply to communal hunting. One of the most striking and best known rock art scenes, showing a surround or ambush of the sheep, is the so-called Cottonwood Panel or Great Hunt Panel (42Cb339) (Figure 10), located in Cottonwood Canyon, a short distance above its confluence with Nine Mile. This is what Cole (1990:188) refers to as a narrative panel where “. . . entire panels appear to be composed of intentionally grouped and thematically related elements” and that “. . . some panels have strong narrative qualities, particularly those with hunting and fertility scenes.” We have previously discussed this panel in detail (Matheny



Figure 10. *The Great Hunt or Cottonwood panel is located in Cottonwood Canyon a short distance upstream from its confluence with Nine Mile Canyon. This scene depicts a late fall or early winter scene of an organized ambush by hunters armed with bows and arrows. Site 42Cb339 Cottonwood Canyon.*

et al. 1997). It clearly shows a herd of bighorn sheep who are being confronted by hunters armed with bows and arrows. The scene reflects a late fall or early winter hunt because that is the only time, during the annual rut, when the herd of rams, ewes, and lambs range together. Rams and ewes move in separate herds during the rest of the year. This narrative scene is one of the great treasures of the Nine Mile area.

Another narrative panel portraying a confrontation with armed hunters surrounding bighorn sheep is found in Nine Mile Canyon less than a mile upstream from the confluence of Nine Mile and Cottonwood Canyons. The Sheep Hunter's House Panel (site 42Cb891) (Figure 11) is somewhat less complex than the Cottonwood Panel and it shows five hunters armed with bows and arrows confronting 17 bighorns. This appears to be another late fall/early winter scene where rams, ewes, and lambs are together.

Other strategies such as the winged drive are shown with drivers moving animals to the advantage of the armed hunters. There are also a number of portrayals showing nets assisting



Figure 11. *This scene depicts ewes, lambs and yearlings confronted by five hunters armed with bows and arrows. Site 42Cb891 Nine Mile Canyon.*

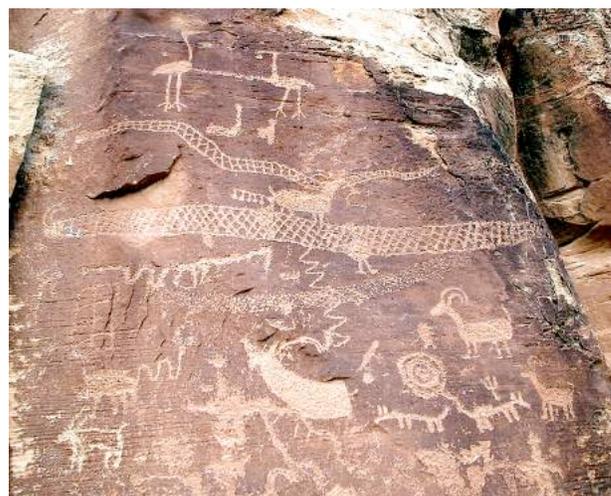


Figure 12. *This scene shows woven nets that were used to trap bighorn sheep and other animals (note the net ends with a bighorn head). Ten net scenes have been recorded in the research area and all are associated with bighorn sheep. Site in Nine Mile Canyon.*

in sequestering animals for a controlled kill (Figure 12). All of these techniques are well known in the ethnographic literature from many areas. The discovery of a net made of juniper from the Absaroka Mountains in northwest Wyoming dating to 8860 ± 170 BP believed to have been used in hunting bighorn sheep reflects the antiquity of this hunting strategy for hunting bighorns (Frison et al. 1986).

If we accept the rock art hunting scenes as sources of information about Fremont hunting organization and practices, the communal hunts depicted show the organized, coordinated, and concerted effort of a number of individuals using various hunting strategies to kill bighorn sheep. Often one hunter is portrayed larger than the others in the scene, which may indicate that he held a temporary position such as hunt boss or leader. The number of hunters depicted varies from scene to scene and the number of burden bearers varies greatly when they are depicted. Of course, only representative rather than total numbers of hunters and burden bearers may have been shown. Such communal hunts of the sort depicted in the rock art would have required considerable organization for gathering and transportation of weapons and other tools to the hunting site, and feeding the hunting party during travel if necessary, as well as butchering and preparing the kill for transport.

DISCUSSION

Having reviewed information about Fremont communal hunting scenes, we now briefly consider several of the questions that have developed from our study of them. The first question is whether there is any evidence in addition to the rock art portrayals that bighorns were hunted in Nine Mile Canyon and its environs. If people who lived in the canyon were hunting and presumably eating bighorns, one would expect to find sheep bones in the middens at habitation sites. As noted above, however, very few excavations have been carried out in Nine Mile Canyon and, in the case of the stream terrace sites excavated by the BYU field school, the middens were minimal and produced no faunal remains (Thompson 1993). Gillin (1955:11, 13, 23) found some faunal remains in three excavations, including Valley Village (N.M. 17) House C, Beacon Ridge (N.M. 2), and Sky House (N.M. 13), but none were identified as bighorn sheep.¹⁷ Two sites recorded during the USAS Castle Valley Chapter survey in Nine Mile Canyon did produce evidence of bighorn sheep hunting.

The first was found at the mouth of Argyle Canyon where it joins with Nine Mile. Three bighorn crania from which the horn cores had been removed were found in the same cache in a rock crevice with 13 large black chert preforms. Also nearby was a cache of 43 phragmites canes, some of which were of a size to be used for arrow shafts. At another site, in a rock shelter, a cached piece of bighorn hide was found.¹⁸ Though these remains have not been dated, they confirm the practice of hunting bighorn in the canyon.

In addition, habitation sites such as Cottonwood Village, which fall within the areas where concentrations of rock art hunting scenes occur, are still unknown in terms of dating and other matters, but they offer intriguing possibilities.

A more general and difficult to consider question is when communal hunting occurred in Nine Mile Canyon and whether the hunters were foragers, farmers, or somewhere on the continuum between those adaptive strategies. It is likely that both communal and individual hunting took place from at least Archaic through historic times and was practiced by those utilizing a variety of subsistence options. Of course communal hunting was clearly taking place in historic times as evidenced by the Ute/Numic hunting scenes but we are much less sure when communal hunting may have occurred during Fremont times. The major impediment to productive consideration of this question is our very incomplete knowledge of the history of occupation in Nine Mile Canyon, which provides us with a very limited perspective. Given these restrictions, for purposes of this paper we will utilize the correlates of Spangler's (2000b) proposed Tavaputs adaptation and the time period of A.D. 1000–1300 as a beginning point, although we realize that Fremont communal hunts such as those depicted in the rock art could have taken place before or after this time. Nonetheless, the best current evidence for Fremont occupation in Nine Mile Canyon is associated with this time period.

Of course it is most tempting to suppose that those participating in communal hunts were Fremont peoples living in the canyon contemporaneously with the hunts and this may have been the case. The scant evidence we currently have does not match well with that possibility for the time period of A.D. 1000–1300, however, given the lack of faunal remains of bighorns in the excavated sites as discussed above. Spangler (2000b) suggests for the lower canyon that there was a fairly small, perhaps seasonal horticultural population in the canyon that planted maize in the spring, left a small group to tend the fields, and then the larger group which had been gathering other resources (and perhaps hunting) elsewhere returned in the fall to harvest the crops before the group moved on to a winter occupation area. Where the group went to spend the winter may have depended upon their affiliations with other Fremont groups and Spangler has suggested they may have gone to villages such as Snake Rock, Turner-Look, Caldwell, or Whiterocks or in Nine Mile Canyon at Valley Village or Sunstone Village. It is possible they wintered in other sites in Nine Mile Canyon or in nearby areas of the Tavaputs Plateau that have not yet been identified. Spangler has pointed out the difficulties of trying to understand the possible affiliations of the Nine Mile groups, in that the Uinta Basin might appear to be a reasonable source for a horticultural population that moved into Nine Mile since the horticultural sites in the Uinta Basin may have been depopulated by about A.D. 1000 (Spangler 2000a). The architecture in Nine Mile is not like that in the Uinta Basin, however, and Uinta Gray pottery is much less frequently found in Nine Mile than is Emery Gray. Ties to the San Rafael area do not appear to be strong either.

Considering Fremont communal hunting in this context, if the population during the late Fremont period in Nine Mile was seasonal, highly mobile, and left the canyon in fall, they may not have been present for the prime opportunity to hunt bighorn sheep during the late fall/early winter rut. It seems likely, however, that they would have been aware

of this valuable resource, if it were available, and that some of the group could have returned to take advantage of it.

In considering how large a resource the bighorn might have represented, we don't know how many herds of bighorn sheep might have included Nine Mile Canyon in their range but, given the large number of the sheep believed to have lived throughout the west, there could have been several herds. The concentration of hunting and burden bearer rock art sites near the mouth of and between certain tributaries of Nine Mile Canyon may indicate general areas where hunting regularly occurred. Janetski (1997) has written an important article about the results of his test of resource intensification models developed in California and for the American Southwest on data from Fremont archaeological sites. The results indicated that "Faunal assemblages from archeological sites show a slow decline in relative numbers of large game animals between A.D. 500 and 1300" (Ibid: 1085). Unless the bighorn sheep populations associated with Nine Mile Canyon were over-hunted and their numbers greatly reduced, they should have been an attractive resource for almost any group. It seems less likely that these sheep populations would be over-hunted because of their apparent distance from villages of any size or those that were populated year round. Also, communal hunting of bighorn may not have occurred annually in Nine Mile Canyon.

We have focused on communal hunting of bighorns that likely occurred in the late fall/early winter in conjunction with the rut because a number of the rock art scenes support this scenario and it makes sense in terms of the condition of the animals at that time. Certainly, however, the sheep must have been hunted at other times as well, particularly by individual hunters.

Following are several possibilities (that are not mutually exclusive) we consider regarding late fall/early winter communal hunting:

- Fremont groups, who lived in sparsely populated Nine Mile Canyon sites from spring through fall, may have returned to hunt sheep during the late fall/early winter rut. They likely transported the meat and other products to their winter habitation sites, wherever those might have been; however, they also may have traded some of the meat and other products at villages. The hunt might have occurred too late in the year for the hunters to trade preserved animal products at trade fairs/festivals of the sort proposed by Janetski (2002) which may have been scheduled earlier in the fall. Items obtained from the hunt, such as hides and items made of horn, could be prepared over the winter and taken to the next year's trade fair/festival.
- Expeditions could have been organized by villagers to hunt bighorn sheep and other big game animals. This might have been not only to provide a supply of meat and other animal products but could have been linked with the prestige of successful hunting (Janetski 1997:1085). Given the more complex social organization and internal differentiation of some Fremont villages, such as Five Finger Ridge, sponsoring a successful hunting expedition could have been a prestige enhancing activity, especially where big game populations might have been reduced over time in the area surrounding the village. The burden bearer images in a number of rock art sites associated with hunting in Nine Mile Canyon could be seen as symbolizing participation in a recognized wider network that included hunting and trading.

In this paper we have not considered the important topic of transport costs regarding communal hunting of bighorn sheep although there are a number of important studies that provide models for transporting resources that are not consumed where they are found and must be transported to another location for processing and/or consumption.¹⁹ There are several reasons why we have not considered this hunting-related topic. First, other than the rock art, we have no hunting-related sites as a starting point, with the probable exception of the cache site at the mouth of Argyle

Canyon mentioned above which included the three bighorn crania, preforms, and phragmites canes. These could represent the remains of a hunt in that area with cached material left behind for future retrieval or a future hunt. Even if we knew where hunts occurred we don't know where the meat and other products were being transported to since we don't know if Fremont groups were wintering in Nine Mile Canyon or moved elsewhere.

As to the possibility of hunts organized by villages outside of Nine Mile Canyon, we would suggest that economics in transport was not a focus of communal hunting. This has been noted in other areas as well. For example, Knoll (2003) found that carrying game from high in the Uinta Mountains (from the area around Deadman Lake) where bighorn sheep were hunted did not produce a caloric return rate that was economically practical. In the case of a village organized hunt, with hunters sent out to procure bighorns, the prestige value of the hunt and the possession of the meat and other products of the hunt may have been emphasized over the time and effort required to acquire them. The risks of not finding animals for the hunt, and the resultant loss of prestige if the hunters returned home empty handed, may have been reduced by their knowledge of the predictability of bighorn behavior. This type of hunt may have been differentiated in many ways from individual hunting, particularly if there were ceremonies or gatherings to celebrate the return of a successful hunting party. Knoll (2003:31) notes that likelihood that there was a "prestige and/or mystical quality associated with the mountain sheep" and that bighorns meant more to prehistoric peoples than just "hide, horns, and meat" (Knoll:2003 referencing Grant 1980:32).

In this paper we have presented information about communal hunting scenes related to Ute/Numic and Fremont groups in Nine Mile Canyon. And, as proposed by Morwood and Smith (1996), we have also suggested information that we believe might be extracted from the rock art portrayals

about various aspects of the lifeways of the peoples who created them.

END NOTES

¹ We recognize both the problems and the value of this approach as set forth in Morwood and Smith 1996.

² A primary purpose of these surveys was documentation in aid of the nomination of Nine Mile Canyon to the National Register of Historic Places (NRHP). Both prehistoric and historic sites were recorded.

³ There are also numerous rock art depictions of what can be considered individual hunts (those that include one or two hunters) in Nine Mile Canyon.

⁴ These uses are discussed more extensively in Matheny et al. (1997:72-73)

⁵ While we have chosen to concentrate on hunting scenes, we should point out that there are many non-hunting related rock art depictions in Nine Mile Canyon and its tributaries.

⁶ The area is still used for deer and elk hunting. It is said that the last bighorn sheep died in the 1920s but they have been reintroduced to neighboring areas in recent years.

⁷ For a fuller discussion of ethology of the sheep revealed in these depictions see Matheny et al. 1997,

⁸ See Spangler 1995, Chapter 13, for an informative discussion of the issues relating to the “Shoshonean Stage: dated from about A.D. 1300 to historic times (A.D. 1640).”

⁹ The “Unc” parenthetical indicates that this information was provided by an informant from the Uncompaghre band.

¹⁰ William H. Ashley, who passed through the Uintah Basin in 1825, also commented on the fine clothing of the Utes who were dressed in mountain sheep skin and buffalo robes (Morgan 1964:20).

¹¹ The spiral element is heavily patinated, in contrast to the anthropomorphs and bighorn sheep which are not patinated, and is likely much earlier. Other elements found on the west (left hand) side of the panel include the name “John,” a group of pecked dots, and the letter “J.”

¹² See Janetski and Talbot 2000:2–7, for a discussion of shifting scholarly perspectives about the Fremont.

¹³ See Sammons-Lohse 1981 for an example of this view.

¹⁴ See Talbot 2000 for a discussion of other large Fremont sites, many of which have been largely destroyed by EuroAmerican settlement. Of particular interest is the very large site at Paragonah.

¹⁵ See Spangler (2004:132–138) for a discussion of architectural associations with rock art in the lower canyon.

¹⁶ There are also a total of 30 canines and 32 snake-like elements included in these panels.

¹⁷ From an earlier context, a section of worked horn was found with the “Basketmaker-like” burial in Rasmussen Cave (Gunnerson 1969:102).

¹⁸ The hide was determined to be from a bighorn sheep based on DNA analysis.

¹⁹ See, for example, Jones and Madsen 1989; Madsen et al. 2000; and Zeanah 2000, for studies which are related to the Great Basin.

REFERENCES

- Cole, Sally J.
1990 *Legacy on Stone: Rock Art of the Colorado Plateau and Four Corners Region*. Johnson Books. Boulder, Colorado.
- Coltrain, Joan B., and Steven W. Leavitt
2002 Climate and Diet in Fremont Prehistory: Economic Variability and Abandonment of Maize Agriculture in the Great Salt Lake Basin. *American Antiquity* 67(3):453–485.
- Driver, Jonathan C.
1990 Meat in Due Season: the Timing of Communal Hunts. In *Hunters of the Recent Past*, edited by Leslie B. Davis and Brian O. K. Reeves, pp. 11–33. Unwin Hyman, London.
- Duncan, Clifford
2000 The Northern Utes of Utah. In *A History of Utah's American Indians*, edited by Forrest S. Cuch. Utah State Division of Indian Affairs/ Utah State Division of History, Salt Lake City.

- Frison, George C., R. L. Andrews, J. M. Adovasio, R. C. Carlisle, and Robert Edgar
1986 A Late Paleoindian Animal Trapping Net from Northern Wyoming. *American Antiquity* 51(2):352–361.
- Geist, Valerius
1993 *Wild Sheep Country*. NorthWord Press. Minocqua, Wisconsin.
- Gillin, John P.
1955 Archaeological Investigations in Nine Mile Canyon, Utah. *University of Utah Anthropological Papers*, 21.
- Goss, J. A.
2000 Traditional Cosmology, Ecology and Language of the Ute Indians. In *Ute Indian Arts and Culture*, edited by William Wroth, pp. 27–52. Taylor Museum of the Colorado Springs Fine Arts Center. Colorado Springs, Colorado.
- Grant, Campbell
1980 The Desert Bighorn and Aboriginal Man. In *The Desert Bighorn*, edited by Gale Monson and Lowell Sumner, pp. 7–39. University of Arizona Press, Tucson.
- Gunnerson, James H.
1969 *The Fremont Culture: A Study in Culture Dynamics on the Northern Anasazi Frontier, Including the Report of the Claflin-Emerson Expedition of the Peabody Museum*. Papers of the Peabody Museum of Archaeology and Ethnology Vol. 59, No. 2. Cambridge, Mass.
- Hurst, Winston, and Bruce D. Louthan
1979 *Survey of Rock Art in the Central Portion of Nine Mile Canyon, Eastern Utah*. Department of Anthropology and Archaeology New Series No. 4. Brigham Young University, Provo, Utah.
- Janetski, Joel C.
1997 Fremont Hunting and Resource Intensification in the Eastern Great Basin. *Journal of Archaeological Science* 24:1075–1088.
2000 *Faunal Remains*. Clear Creek Canyon Archaeological Project: Result and Synthesis. Museum of Peoples and Cultures Occasional Papers No. 7, pp. 67–81. Brigham Young University, Provo, Utah.
- Janetski, Joel C. (continued)
2002 Trade in Fremont Society: Contexts and Contrasts. *Journal of Anthropological Archaeology* 21:344–370.
- Janetski, Joel C., and Richard K. Talbot
2000a *Project Overview and Context*. Clear Creek Canyon Archaeological Project: Results and Synthesis. Museum of Peoples and Cultures Occasional Papers No. 7, pp. 1–7. Brigham Young University, Provo, Utah.
2000b *Fremont Social and Community Organization*. Clear Creek Canyon Archaeological Project: Result and Synthesis, Museum of Peoples and Cultures Occasional Papers No. 7, pp. 247–262. Brigham Young University, Provo, Utah.
- Jones, Kevin T., and Michael D. Madsen
1989 Calculating the Cost of Resource Transportation: A Great Basin Example. *Current Anthropology* 30(4):529–534.
- Knoll, Michelle K.
2003 Prehistoric Adaptations in the Eastern Uinta Mountains, Utah. Unpublished Masters Thesis, Brigham Young University, Provo, Utah.
- Lomax, Becky
2008 Tracking the Bighorns. *Smithsonian* 38(12):21–24.
- Madsen, David B.
1989 *Exploring the Fremont*. Utah Museum of Natural History. Salt Lake City.
- Madsen, David B. and Steven R. Simms
1998 The Fremont Complex: A Behavioral Perspective. *Journal of World Prehistory*, 12(3):255–336.
- Madsen, David B., Thomas R. Scott, and Byron Loosle
2000 Differential Transport Costs and High-Altitude Occupation Patterns in the Uinta Mountains, Northeastern Utah. In *Intermountain Archaeology*, edited by David B. Madsen and Michael D. Metcalf, pp. 15–24. University of Utah Anthropological Papers No. 122. University of Utah Press, Salt Lake City.

- Matheny, Ray T., Thomas S. Smith, and Deanne G. Matheny
 1997 Animal Ethology Reflected in the Rock Art of Nine Mile Canyon, Utah. *Journal of California and Great Basin Anthropology* 19(1):70–103.
- Matheny, Ray T., Deanne G. Matheny, Pamela W. Miller, and Blaine Miller
 2004 Hunting Strategies and Winter Economy of the Fremont as Revealed in the Rock Art of Nine Mile Canyon. In *New Dimensions in Rock Art Studies*, edited by Ray T. Matheny, pp. 145–193. Occasional Paper Series No. 9. Museum of Peoples and Cultures, Brigham Young University, Provo.
- Morwood, M. J., and C. E. Smith.
 1996 *Contemporary Approaches to World Rock Art*. <http://www.une.edu.au/archaeology/WorldRockArt/analysis/php>
- Morgan, G.
 1964 *Diary of William H. Ashley: The International Struggle for the Fur Trade of the Missouri, the Rocky Mountains, and the Columbia, with Explorations Beyond the Continental Divide, Recorded in the Diaries and Letters of William H. Ashley and His Contemporaries. 1822–1838*. Old West Publishing Company. Denver, Colorado.
- Sage, Rufus B.
 1982 (1857) *Rocky Mountain Life*. University of Nebraska Press. Lincoln.
- Sammons-Lohse, Dorothy
 1981 Households and Communities. In *Bull Creek*, by Jesse D. Jennings and Dorothy Sammons-Lohse, pp. 11–135. Anthropological Papers No. 105. University of Utah. Salt Lake City.
- Schaafsma, Polly.
 1971 *The Rock Art of Utah: From the Donald Scott Collection*. Papers of the Peabody Museum of Archaeology and Ethnology, Volume 65.
- Smith, Anne M.
 1974 *Ethnography of the Northern Utes*. Papers in Anthropology No. 17. Museum of New Mexico, Santa Fe.
- Spangler, Jerry D.
 1993 Site Distribution and Settlement Patterns in Lower Nine Mile Canyon: The Brigham Young University Surveys of 1989–91. Unpublished Masters Thesis, Brigham Young University, Provo, Utah.
 1995 *Paradigms and Perspectives: A Class I Overview of Cultural Resources in the Uinta Basin and Tavaputs Plateau*. Vol. III, Uinta Research. Salt Lake City, Utah.
 2000a Radiocarbon Dates, Acquired Wisdom, and the Search for Temporal Order in the Uinta Basin. In *Intermountain Archaeology*, edited by David B. Madsen and Michael D. Metcalf, pp. 48–99. University of Utah Anthropological Papers No. 122. University of Utah Press, Salt Lake City.
 2000b One-Pot Pithouses and Fremont Paradoxes: Formative Stage Adaptations in the Tavaputs Plateau Region of Northeastern Utah. In *Intermountain Archaeology*, edited by David B. Madsen and Michael D. Metcalf, pp. 25–38. University of Utah Anthropological Papers No. 122. University of Utah Press, Salt Lake City.
 2004 Categories and Conundrums: The Rock Art of Lower Nine Mile Canyon. In *New Dimensions in Rock Art Studies*, edited by Ray T. Matheny, pp. 119–143. Occasional Paper Series No. 9. Museum of Peoples and Cultures. Brigham Young University, Provo, Utah.
- Spangler, Jerry D., and Donna K. Spangler
 2003 *Horned Snakes and Axle Grease*. Uinta Publishing. Salt Lake City, Utah.
- Speth, J. D., and K. A. Spielmann.
 1983 Energy Source, Protein Metabolism, and Hunter-Gatherer Subsistence Strategies. *Journal of Anthropological Archaeology* 2:1–31.

Talbot, Richard K.

2000 *Fremont Settlement Patterns and Demography*. Clear Creek Canyon Archaeological Project: Results and Synthesis. Occasional Paper No. 7, pp. 201–230. Brigham Young University, Provo, Utah.

Talbot, Richard K., and Joel C. Janetski

2000 *Use of Space at Five Finger Ridge*. Clear Creek Canyon Archaeological Project: Results and Synthesis. Occasional Paper No. 7, pp. 9–46. Brigham Young University, Provo, Utah.

Talbot, Richard K., Lane D. Richens, James D.

Wilde, Joel C. Janetski, and Deborah E. Newman
2000 *Excavations at Five Finger Ridge, Clear Creek Canyon, Central Utah*. Occasional Papers No. 5. Museum of People and Cultures, Brigham Young University, Provo, Utah .

Thompson, Patricia J.

1993 *Excavations in Nine Mile Canyon From 1892–1990: A Study in Cultural Diversity*. Unpublished Masters Thesis, Brigham Young University, Provo, Utah.

Willey, Gordon R.

1988 *Portraits in American Archaeology*. University of New Mexico Press. Albuquerque.

Winterhalder, B.

1981 Optimal Foraging Strategies and Hunter-Gatherer Research in Anthropology. In *Hunter-Gatherer Foraging Strategies*, edited by B. Winterhalder and E. A. Smith, pp. 13–35. University of Chicago Press. Chicago, Illinois.

Zeanah, David W.

2000 Transport Costs, Central-Place Foraging, and Hunter-Gatherer Alpine Land-Use Strategies. In *Intermountain Archaeology*, edited by David B. Madsen and Michael D. Metcalf, pp. 1–14. University of Utah Anthropological Papers No. 122. University of Utah Press, Salt Lake City.