

**Final Report:
Baseline Site Condition and
Vandalism Assessments of Archaeological Sites in
Tenmile Canyon, Grand County, Utah**

By

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Abstract

The Colorado Plateau Archaeological Alliance (CPAA) conducted intuitive surveys in Tenmile Canyon, an east-to-west trending tributary of the Green River, in March and April 2007 and again in March 2008. Four previously recorded sites were revisited and documented, and 34 unrecorded sites were identified and documented, all within an approximately 4 kilometer section of the canyon between Dripping Springs on the east and a point about 1 kilometer west of the Trail Canyon confluence. These included 17 special use localities, three storage sites, six rock art sites and 12 sheltered residential sites, most of them alcoves. These sites are indicative of Archaic and Formative adaptations to a water-stressed environment, and most (but not all) evidence suggests hunting and gathering was the predominant activity throughout prehistory. All sites were examined for evidence of adverse impacts from human activities, including legal and illegal OHV traffic, vandalism, graffiti and pedestrian activities. The study found that almost all sheltered residential and storage sites in alcoves and rockshelters have suffered significantly from episodic vandalism over the past 75 years. Open sites (special use localities) are suffering significant adverse effects from cross-country OHV travel, even though off-trail vehicular traffic has been prohibited. Rock art localities remain in relatively pristine condition, although panels found in alcoves with residential detritus have sometimes been marred by the addition of graffiti, initials and names.

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Introduction

The cultural resources found in the Tenmile Canyon drainage, located in the Green River Desert of southeastern Utah, have not been the focus of major scientific research, and the nature, density and diversity of sites there remain largely undocumented and unknown. Only a handful of small clearance surveys and Bureau of Land Management monitoring efforts have been conducted in the region generally, and only 10 sites have been formally documented in the bottom of the canyon drainage, few of them to currently acceptable standards. Eight additional sites have been documented on or near the north canyon rim. Despite the paucity of formally documented sites, it has long been assumed that this drainage, which features a rare source of permanent water in the Green River Desert, has considerable potential to contain abundant and significant cultural resources. Intuitive surveys conducted in the spring of 2007 and the spring of 2008 validated this assumption, demonstrating an exceptionally high density of archaeological sites, all of them recommended as eligible for listing on the National Register of Historic Places. This final report incorporates and augments many of the preliminary findings reported from 2007 (cf. Spangler and Boomgarden 2007).

Tenmile Canyon has two unique qualities that augment the potential that nationally significant cultural resources will be located here: (1) Aside from the Green River, it features the only free-flowing water source in the Green River Desert region. This water source appears to have been the focus of significant prehistoric occupations by Archaic hunters-gatherers and later Fremont farmer-foragers. Given that human populations were tethered to a greater or lesser degree to predictable water sources, there is significant potential that large numbers of eligible archaeological sites will be located throughout the canyon drainage wherever there is permanent water. And (2) the drainage features Navajo Sandstone formations that have eroded to create an unusually large number of spectacularly large, dry alcoves that appear to have afforded natural shelters for human occupations throughout the millennia. Despite the prevalence of vandalism, these shelters have significant potential for deep cultural deposits that could contribute important insights into millennia of human adaptations in the arid American West.

From March 30, 2007, through April 2, 2007, the Colorado Plateau Archaeological Alliance revisited three previously recorded sites and documented 18 additional sites in the upper portion of the Tenmile Canyon corridor to assess current site condition, including an examination of surface evidence of intentional vandalism, graffiti, ORV damage, illegal collecting, improper modern camping, site modification, littering, pedestrian impacts and recreation impacts evident on the site surface. Impacts caused by livestock were noted, but these are not the focus of this report. Archaeological sites were also analyzed based on their visibility, accessibility and potential for adverse effects. A CPAA crew conducted additional intuitive surveys in Tenmile Canyon from March 10, 2008, through March 12, 2008, when areas adjacent to the 2007 survey area were investigated. In particular, the crew sought to more closely examine bench areas that were not investigated in detail in 2007. Seventeen additional sites were documented. All 38 sites, located on lands administered by the BLM, were recorded to IMACS standards

and with a level of detail to assist land managers monitoring the cumulative effects of future public visitation. No systematic surveys were conducted.

CPAA investigations demonstrated that damage to cultural resources in the Tenmile Canyon drainage is ongoing and can be attributed to two major factors: (1) vandalism and looting of subsurface cultural deposits in dry alcoves that are prominent and readily visible from the canyon bottom, and (2) improper off-road vehicle (ORV) use that has caused damage to and accelerated erosion of surface deposits on the first bench area above the canyon bottom.

It is widely acknowledged by public land managers and the public at large that vandalism of archaeological sites in southeastern Utah has been a persistent problem dating back many generations, and that it continues to the present, albeit more covertly than in the past when “digging” ancient sites was considered to be a socially acceptable practice. Generations of vandals and looters in search of Pre-Columbian artifacts certainly recognized that deep alcoves in Tenmile Canyon would contain significant cultural deposits. Evidence of such looting activities is ubiquitous, and inscriptions found at looted sites in Tenmile Canyon demonstrate that looting probably occurred as early as the 1920s, and that it has reoccurred over subsequent decades and may be ongoing. The most recent inscription observed by CPAA at a vandalized site bears a date of 1997.

Vehicular damage to surface cultural deposits is also ubiquitous throughout the canyon, as evidenced by vehicle tracks on or through about 25 percent of sites examined. This damage was caused by vehicles leaving the marked trail in the bottom of the canyon to ascend onto the first bench level above the stream where the majority of sites are located. In some cases, the vehicles have created major routes around closure signs erected by the Bureau of Land Management, demonstrating a willful disregard for existing rules, regulations and management efforts. There is unequivocal evidence that individuals have used and continue to use motorized vehicles to gain access to archaeological sites (e.g. alcoves), contributing both directly and indirectly to adverse effects to properties that are clearly eligible for listing on the National Register of Historic Places. The sheer abundance of these “pioneer” routes suggests the BLM has expended minimal effort to enforce off-trail restrictions in Tenmile Canyon, and that the failure of the BLM to enforce existing ORV regulations would appear to be an abrogation of agency’s mandate as articulated in Executive Order 11989.

Although the surveys were not systematic, the 2007 data demonstrated a potential of 12.5 to 15.5 archaeological sites per linear kilometer within the drainage – potentially a total of 310 to 385 sites between Dripping Springs and the Green River. This assessment was supported by 2008 investigations when intuitive surveys identified 17 additional sites along about 1.3 kilometers of Tenmile Creek (ca. 13 sites per kilometer). This high density of sites stands in decided contrast to the BLM’s existing database (10 sites in the entire canyon), and suggests that current BLM management decisions related to Tenmile Canyon are predicated on previous research that is clearly inadequate. These data, gathered by CPAA over a limited seven-day period of field work, also demonstrate that the BLM has expended little effort to determine the nature, diversity, density and

distribution of sites throughout the canyon, and that the degradation of significant sites clearly eligible for the National Register of Historic Places remains a serious problem that warrants aggressive management.

Environment

It is generally agreed that the viability of human populations is constrained to a greater or lesser degree by the natural environment, including the distribution of plants and animals that can be procured with economic efficiency, the availability of shelter and fuel, and access to permanent water. In water-stressed desert environments, those locations that feature permanent water typically afford an optimal combination of plant and animal resources that were the focus of more intense and longer-term human adaptations than are evident in more arid areas. In the case of Tenmile Canyon, the perennial creek is the only source of permanent flowing water in the otherwise arid Green River Desert. Consequently, this drainage, which also features an abundance of natural shelters, should exhibit greater biological diversity conducive to human exploitation through all periods of human prehistory. It is also recognized that in areas of chronically low rainfall, an increase of a few inches per year would result in marked increases in the density and/or distribution of flora and fauna. In such arid environments, "fluctuation in resources would have almost immediate consequences in the density and viability of the human population" (Jennings 1978:13). Such fluctuations should be evident in the archaeological record found in the Green River Desert generally and in the pollen record, sediments and cultural materials evident in the large alcoves of Tenmile Canyon.

Ten Mile Canyon is an east-to-west trending drainage with perennial water located in the Mancos Shale physiographic unit of the Colorado Plateau (Stokes 1986). The Green River Desert is bordered on the north by the southern escarpment of the Book Cliffs, on the west by the Green River and on the south by the merging of the Green and Colorado rivers. The roughly 60-by-60 kilometer area is characterized by rolling hills of light tan, gray and bluish-gray clays and alluvial gravels overlying Jurassic sandstone formations. The Green River Desert also features expansive aeolian dunes, as well as outcrops of eroded Cretaceous-age sandstone (Figure 1). This region is generally characterized as arid with only about 6 inches of annual rainfall. The drainage itself features elevations ranging from about 4400 feet on the east at Dripping Springs to about 4,000 feet at its confluence with the Green River.

It is assumed, although not demonstrated empirically, that climatic conditions throughout the Green River Desert, including Tenmile Canyon, are similar to data collected in Green River, Utah, on the northwestern periphery of the Green River Desert. Based on weather data collected there, temperatures range from -42 degrees to +112 degrees Fahrenheit, a phenomenon attributed to the dry air and valley exposure (BLM 1980:2). The paucity of rainfall has resulted in vegetation communities dominated by blackbrush on the mesas above the Tenmile Canyon drainage, with sparse junipers, greasewood, saltbush, blackbrush, prickly pear and small sagebrush being common in the drainage itself (Figure 2). Specific floral species are consistent with taxa described for the Upper Sonoran Life Zone. Overall vegetative diversity and density can be characterized as sparse.



Figure 1: Cretaceous-age outcrops overlaying Jurassic-age sandstone on the mesa above Tenmile Canyon near Dripping Springs.



Figure 2: Sparse vegetation characteristic of the alluvial plain, ridges and side drainages.

Fed by intermittent springs originating in the underlying Navajo Sandstone, Tenmile Creek emerges as a consistent, flowing water source just east of Dripping Springs. The creek originates in the clay and shale deposits near the divide between the Colorado River and Green River, cutting deeper into Jurassic-age deposits as it moves from east to west. Tenmile Creek undulates to the west, merging with the Green River about 25 kilometers west of Dripping Springs. Subsequent erosion of the sandstone deposits has defined a clearly articulated canyon desert environment with white sandstone cliff walls, sloping expanses of white sandstone slickrock, a broad alluvial plain with soft, sandy soils and a riparian environment in proximity to a perennial water flow fed by seeps and springs that suggest a relatively high water table (Figure 3).



Figure 3: Small spring located in front of 42Gr3840.

Episodic down-cutting and filling of the canyon bottom has likely occurred over many millennia, although this remains speculative (geomorphology studies were not identified specific to Tenmile Canyon). The canyon is currently experiencing severe down-cutting of alluvial floodplains, as evidenced by the location of the creek 3 to 20 meters below the alluvial bench area. This down-cutting has resulted in vertical soil walls defining the lateral peripheries of the stream channel (Figure 4). Above these vertical walls are remnants of broad, relatively flat alluvial plains that range from 20 to 200 meters wide, sloping slightly upward toward an abutting cliff face. These deposits are characterized by deep, finely sorted sands with some colluvial deposits at the upper edge of the bench area that have eroded from the mesa above. These colluvial deposits include considerable quantities of chert, chalcedony and quartzite that were exploited for tool stone; most are small- to medium-sized nodules.



Figure 4: Down-cutting of the alluvial floodplain that characterizes upper Tenmile Canyon.

The areas where the alluvial plain adjoins the cliff walls are characterized by abundant natural rockshelters and alcoves (Figure 5), some of them as much as 100 meters wide by 30 meters deep. These are typically located at the upper edge of the bench area, but others are occasionally located in the cliff faces 2 to 5 meters above the bench. Several of the alcoves feature natural seeps, and many feature generally flat or slightly sloping floor areas that were ideal shelters for a variety of mammals, including humans. Alcoves with relatively flat floor surfaces typically feature deep aeolian deposits with remnants of human activities indicative of long periods of occupation. Roughly 70 alcoves were observed in the upper 4 kilometers of the canyon below Dripping Springs, but only about 35 were investigated. Of these, 22 had evidence of human occupation, storage or other activities. The abundance of natural shelters and the concurrent paucity of evidence for permanent residential architecture is likely not coincidental.

It is not known if current environmental conditions are similar to those evident prehistorically. Despite the permanent water source there appears to be a general paucity of economic plant species. Wild grasses (e.g., rice grass, wheatgrass) were not observed in significant quantities. Prickly pear cacti are abundant on the alluvial plains, and juniper berries could also have provided a consistent food source. However, ethnographic studies indicate these food resources were typically used during seasons of nutritional stress (cf. Kelly 1964). It is possible that invasive species (e.g., tamarisk, cheat grass) and livestock grazing have destroyed the biotic diversity once exploited by prehistoric populations.



Figure 5: Deep alcove typical of large shelters utilized by prehistoric humans in Tenmile Canyon.

The abundance of groundstone tools evident at residential alcove sites suggests that seeds were indeed important food resources throughout prehistory, and that the economic return on gathering and processing seeds was worth the investment in time and energy. The abundant burned and unburned bone evident in looters' back dirt piles also indicates that mammals ranging in size from small rodents to large ungulates were exploited, and that considerable effort was expended to extract all nutritional value from the animals. Whether Tenmile Canyon was primarily a locality for wild plant foraging or hunting or both cannot be ascertained from the limited investigations conducted.

Previous Research

Throughout the Southwest, most areas with cultural resources were well known to local residents and had been at least cursorily investigated from the 1890s through the mid 1950s by a variety of field expeditions sponsored by museums and universities in search of artifacts and curiosities for public display (Janetski 1997). However, a review of Utah Division of State History site forms and reports, conducted in the spring of 2006, revealed no record of any archaeological research conducted in the Tenmile Canyon area prior to the mid-1970s. A subsequent records search at BLM offices in Moab and consultation with BLM archaeologist Donna Turnipseed, conducted on March 30, 2007, verified this initial assessment.

It is surprising that Tenmile Canyon escaped the attention of early researchers, whose competition among themselves for museum collections in the first half of the Twentieth Century resulted in research expeditions into the most isolated and remote

regions of the state. Evidence that Green River residents were involved in the vandalism of sites in Tenmile Canyon in the 1930s is intriguing because Green River was a staging area for the landmark 1931 Claflin Emerson Expedition from the Peabody Museum at Harvard (Spangler et al. 2007), and later smaller archaeological expeditions that explored the Tavaputs Plateau to the north (Gaumer 1937, 1939; Leh 1937). It would seem highly unlikely that the presence of archaeologists in the small town would have gone unnoticed, or that local residents would not have spoken to them about where to find archaeological sites (early archaeologists almost always relied on local informants). A review of the Claflin Emerson field notes reveals no mention of Tenmile Canyon.

The first significant archaeological research in the region occurred on the northeastern periphery of the Green River Desert when Marie Wormington excavated several Fremont architectural sites at the base of the Book Cliffs near Cisco from 1939 through 1948. Her influential monograph (Wormington 1955) offered the first critical reevaluation of the Fremont Culture concept since Morss (1931) had initially proposed it more than two decades before, and it synthesized voluminous data generated by research throughout Utah and western Colorado to that time. There is no mention of Tenmile Canyon or the Green River Desert in her discussions, nor is the drainage illustrated on her maps of the region. However, there is recognition that sites in this area can be attributed to the Fremont culture, but with distinctive Ancestral Puebloan characteristics.

Research apparently did not resume in the Green River Desert region until 1960 when Alice Hunt published the results of isolated surface discoveries of large numbers of late Pleistocene and early Archaic projectile points, dubbed the Moab Complex. These had been recovered by Dallas Tanner from the Green River Desert northwest of Moab. A closer reading the report reveals that Folsom and Pinto points were recovered about 5 miles from “the nearest flowing spring” (Hunt and Tanner 1960:111), perhaps a reference to Tenmile Creek. More than 400 artifacts were collected, among them Paleoindian points commonly dated to about 9000 B.C. and one that was deemed identical to Lindenmeier Folsom points.

Other Paleoindian points have since been recovered from surface contexts in the Green River Desert, although few have been formally reported in the professional literature. One exception is 42Gr1956, located in the Green River Desert a few kilometers south of the town of Green River. This site produced 188 tools, including two Folsom point fragments. In addition, the site yielded spurred transverse end scrapers, borers or graters and numerous flakes with bifacial retouching with distinctive Folsom attributes. “The large amount of debitage, stone tools and weaponry implies a relatively large concentration of several families, possibly a band, who engaged in tool production and maintenance, faunal procurement and processing.” The accumulated evidence has prompted speculation that the rolling hills of the Green River Desert were once lush grasslands that responded to greater precipitation during Late Pleistocene times. These grasslands were conducive to large herbivores and the human populations who exploited them (Davis 1985:12).

The Uranium Surveys

The first formal research conducted in Tenmile Canyon resulted from proposed uranium exploration on the mesas above the drainage. In mid-1970s, the Tennessee Valley Authority (TVA) contracted with the Museum of Northern Arizona (MNA) to conduct clearance surveys of several hundred small tracts (drill holes) within the Robert G. Rees mining lease areas in and around Tenmile Canyon and elsewhere on the Green River Desert. From 1975 to 1976, MNA conducted numerous small Class III surveys in and around Tenmile Canyon, producing a final report (Keller 1975a) and at least three addendums relevant to this discussion (Keller 1976; Lipe 1975; Sant and Keller 1977) and two that are only peripherally related (Keller 1975b, 1975c).

The initial surveys in April 1975 (Project U-75-NI-011b) focused on 44 drill holes and access roads, at least 19 of them located on the north and south rims of Tenmile Canyon. Only one site was identified in Tenmile Canyon, a lithic scatter located about [REDACTED]. Site 42Gr583 was recorded at that time as a "small but dense scatter of lithic waste located on a sandy knoll just back from the canyon alluvium." No detailed description or site photographs were offered in the official site form, but the report submitted to TVA contains much more detailed descriptions, including a discussion of Jeddito Corrugated potsherds (Pueblo IV) found near the site (Keller 1975a). This site was re-documented in 2007.

These initial drill-hole surveys also resulted in the first examination of the lower Tenmile Canyon region. Two small areas on the north rim and four small areas on the south rim, along with associated southern tributaries, were investigated. These small surveys, which constituted the only archaeological investigations yet conducted in the lower canyon, did not examine the canyon bottom where cultural resources would be expected. No archaeological sites have yet been documented in the lower canyon.

A second MNA survey of 11 drill holes and access roads (Project U-75-NI-012b) was conducted in July 1975. This survey also focused on the mesa top and canyon rim areas on both sides of Tenmile Canyon, including six areas clustered within a one-square-mile area along the north rim of Tenmile Canyon [REDACTED]. Site 42Gr596 was identified around a sandstone outcrop near the north rim of the canyon. It was described as "several hundred lithic artifacts, mostly flakes, no tools, of white chert scattered around (a) sandstone outcrop." No detailed description or site photographs were offered in the state site form, although the report to TVA offers a much more detailed description that mentions the lithic scatter was localized around an outcrop 40 meters long by 3 meters high (Lipe 1975). This site has not yet been relocated.

Three additional MNA surveys (Project U-75-NI-0021b) were conducted from September through December 1975 involving 93 different drill holes. Two additional sites were identified in the bottom of Tenmile Canyon, [REDACTED]. Site 42Gr634 was described as a "burial and storage hardpan cists in floor of dry cave" with 1 meter of cultural fill. No detailed description or site photographs were offered in the state site

form, although a report to TVA offers much greater detail. This report indicates there are three alcoves, and that about a meter of ashy cultural materials and human bone were found in the center alcove, along with several unlined cache pits or hardpan cists in the floor of the alcove. The report mentions that similar materials were observed in the other two alcoves, but in lesser amounts (Keller 1976). Attempts to relocate this site in 2008 were unsuccessful.

Site 42Gr635 was described in state site forms as “hardpan cists in floor of dry cave.” The site was located on the north side of Ten Mile Canyon [REDACTED]. The report to TVA offers little additional information other than the alcove was *small* and the hardpan cists were located in an otherwise sterile floor of the alcove with no other associated artifacts. In 2008, a *large* alcove with hardpan cists was identified in the general area indicated for 42Gr635. However, given the discrepancy on the size of the alcove and the fact that BLM maps had plotted 42Gr635 further down canyon, it was decided the site documented in 2008 was not 42Gr635 (it was assigned the Smithsonian number 42Gr3992).

At least six other TVA surveys were conducted from June to November 1976 that covered 217 additional areas, some located on the canyon rims above Tenmile Canyon. No additional sites were identified in the Tenmile Canyon vicinity (Sant and Keller 1977). No attempts were made in 2007 or 2008 to identify the canyon rim sites.

At the same time MNA was conducting clearance surveys for TVA, BLM archaeologists conducted a limited monitoring survey in Tenmile Canyon. No formal report was completed, but Bruce Louthan recorded two additional sites in the canyon bottom. Site 42Gr660 was recorded in 1976 as an alcove measuring 20 meters by 6 meters with cultural deposits that included lithic debitage and charcoal. A biface fragment was collected at that time. [REDACTED]. No detailed descriptions were offered, and the photographs are of minimal quality. This site was re-documented in 2007.

The BLM at that time also recorded 42Gr661, described as a structure inside an alcove with a single chert flake and abundant charcoal. A lithic scatter was located 100 meters to the west. The site was located on the south side of Tenmile Canyon [REDACTED]. This site was located and re-documented in 2008 and found to be in good condition. The location of all previously recorded sites in the Tenmile Canyon area is indicated in Figure 6.

Clearance Surveys

Subsequent investigations in the Tenmile Canyon vicinity occurred sporadically over the next 25 years. These all involved surveys of small areas of 40 acres or less, or were linear in nature wherein only a narrow corridor was investigated. Despite the spatial limitations of these small clearance surveys, numerous significant lithic sites were identified, particularly in the north canyon rim area near Dripping Springs. These sites were not revisited during the 2007 or 2008 intuitive surveys.

Figure 6

In 1983, the Division of Conservation Archaeology conducted a linear survey for Geosource Seismic along the north side of Tenmile Canyon, identifying three sites on the canyon rim area west of Dripping Springs. Site 42Gr2130 was described as an extensive scatter of lithic tools and artifacts located [REDACTED]. Among the artifacts were a Basketmaker II projectile point, four bifaces, three cores and a uniface tool. The site was interpreted as a camp utilized repeatedly throughout prehistory. Site 42Gr2131 was a lithic scatter of biface thinning flakes but without diagnostic artifacts located [REDACTED]. And 42Gr2132 was described as a sparse lithic scatter without diagnostic artifacts that exhibited four different tool-stone materials and a potential for subsurface deposits. All three sites were deemed significant and potentially eligible for the National Register (Powers 1983).

In 1987, BLM archaeologist Julie Howard conducted a linear survey along a fence line on the north and south side of Tenmile Canyon. Three sites were identified, including 42Gr2131, a lithic scatter [REDACTED] on the south side. This site featured about 50 biface thinning flakes and a base fragment of a projectile point. Site 42Gr2132 was identified on the north side of Tenmile Canyon [REDACTED]. It was described as a quarry for reddish-white chert nodules located along the base of an Entrada Sandstone outcrop. Site 42Gr2133 was located about 2 miles north of Tenmile Canyon and south of Duma Point. The site was described as a small scatter of 25 biface thinning flakes without diagnostic artifacts. The report contains no discussion of the sites other than the sites were deemed “non-significant due to lack of depth, datable materials and diagnostic artifacts” (Howard 1987).

In 1991, Senco-Phoenix conducted a small survey for Chevron of a 40-acre well pad and access road on the north rim of Tenmile Canyon [REDACTED]. The two sites identified included 42Gr2434, described as a small scatter of 13 primary and secondary flakes and one core, and 42Gr2433, described as a heavy concentration of secondary and tertiary chalcedony and jasper flakes, several utilized flakes, cores, a biface fragment, a Uinta side-notched point and a possible hearth. Both sites were deemed significant. Researchers determined that “the rim of Tenmile Canyon and the canyon itself contain potentially significant resources” (Senulis 1992:2).

A linear survey along the bottom of Tenmile Canyon was conducted in 2001 and 2002 by Montgomery Archaeological Consultants along a route for the proposed Bookcliff Rattlers Motorcycle Race. Two sites were recorded in Tenmile Canyon relevant to this discussion. Site 42Gr3261 was described as a scatter of 64 lithic flakes and three metate fragments on exposed sandstone bedrock and aeolian dunes. The site is located on the north side of the canyon bottom [REDACTED]. And 42Gr3262 was described as a scatter of lithic debitage, a metate fragment, a biface and other stone tools on exposed sandstone bedrock and aeolian dunes. The site is located [REDACTED]. Both sites were deemed significant (Elkins and Montgomery 2002).

Although BLM efforts to document cultural resource in Tenmile Canyon have been negligible, it should be noted that volunteer efforts were initiated several years ago through a Challenge Cost Share Program grant to locate archaeological sites (Donna Turnipseed, personal communication 2007). Some 49 sites were identified and GPS locations noted. However, formal site documentation was never initiated, and the nature of these sites, as well as their eligibility for listing on the National Register, remains unknown. The location of these sites (Figure 7) indicates a tremendously high density of sites within the canyon corridor, although most of these remain undocumented. CPAA efforts to relocate these sites also raised some question about the accuracy of the GPS readings (or the North American datum used).

Survey Methods and Results

The 2007 intuitive surveys were conducted by a team of three experienced field archaeologists walking non-systematic transects across the bench areas abutting the stream and along the base of the first cliff level. Higher ledges and the canyon rim were not examined. Some bench areas were not examined due to the difficult access caused by severe down-cutting of the alluvial deposits in the bottom of the canyon. On March 30, the survey crew examined the north side of Tenmile Canyon from the BLM kiosk at Dripping Springs on the east to a point about 1.6 kilometers to the west. On March 31, the survey continued on the north side of the canyon to a distance of about 3.2 kilometers west of Dripping Springs, at which point an ORV access route from the north canyon rim intersects with the main route in the bottom of the canyon. The south side of the drainage was not examined during the course of the first two days.

To better determine the distribution and density of archaeological sites, efforts were initiated on April 1, 2007, and April 2, 2007, to more thoroughly examine a defined area of the canyon. An approximately 0.8 kilometer section of the canyon was selected, with the north rim access road, located approximately 3.2 kilometers west of Dripping Springs, defining the approximate center point. Both sides of the canyon were examined with a somewhat greater level of detail, although the surveys remained intuitive in nature in that topographic locations expected to contain cultural resources were examined. The south side of the canyon was examined in greater detail than was the north side, a bias precipitated by time constraints. Twelve sites were identified in this 0.8 kilometer portion of the canyon, nine on the south side and three on the north side. Additionally, two expansive lithic scatters were identified on the south side of the canyon within the same survey area but these were not recorded at that time due to time constraints (these were subsequently recorded in 2008).

A crew of three archaeologists returned to the same area in March 2008 and resumed the intuitive survey from the mouth of Trail Canyon downstream to the west about 1.3 kilometers (one rock art site had been recorded in this area in 2007). On March 10, the crew focused on a 1 kilometer section on the north side of Tenmile Canyon, including an unnamed side drainage on the north with abundant alcoves. Four sites were documented along the north side of the canyon, all of them at the base of the first cliff level. On March 11, the crew examined the bench area on the south side of the canyon,

recording two lithic scatters identified the previous year and documenting three additional lithic scatters and two rock art sites, all located along a bench area 1.3 kilometers long. On March 12, the crew completed documentation of five additional lithic scatters in the same area [REDACTED], three on the south side of the canyon and two on the north side.

Figure 7: Location of undocumented sites identified in Tenmile Canyon through CCSP grant.

The 2007 and 2008 intuitive surveys demonstrated that Tenmile Canyon contains a rich diversity of sites, including single-event localities indicative of tool manufacturing or maintenance activities; open special-use areas with lithics, groundstone and ceramics indicative of longer-term bi-gender activities; large alcoves with copious evidence of extended residential occupations and on-site storage; smaller shelters with residential detritus; storage facilities; and rock art localities. Temporally diagnostic artifacts were rare, but included small numbers of corrugated and plain gray potsherds at four sites, maize remnants at three sites, Rose Springs points at two sites and Archaic dart points at three sites. Additionally, rock art images are indicative of styles attributed to Archaic and Fremont peoples of the northern Colorado Plateau. Most of the stone tools were not temporally diagnostic. Material culture evidence observed at all 38 documented sites is summarized in Table 1.

Tenmile Canyon is particularly noteworthy for the abundance of large alcoves suitable for human occupation and which exhibit significant potential for deep cultural deposits. Twelve alcove or rockshelter sites were identified as having potential depth of cultural deposits. However, surface deposits at 10 of these have been vandalized, although these looters' pits likely do not extend more than 1 meter deep. This conclusion is based on anecdotal evidence derived from controlled excavations at looted cave sites in the eastern Great Basin (e.g. Danger Cave) that indicate that vandals rarely dig more than about 1 to 1.5 meters below the present ground surface, and that cultural deposits below that point are usually intact. Also augmenting the potential for intact deposits is the fact soft aeolian sands, such as those characterizing alcove deposits in Tenmile Canyon, are not conducive to deep pits inasmuch as the wall profiles will collapse without reinforcement (Kevin T. Jones, personal communication 2007). As demonstrated at 42Gr3833, cultural deposits at sheltered sites in Tenmile Canyon have the potential to extend at least 2.2 meters below present ground surface.

If environmental variables are consistent throughout the canyon, site density and distribution should be similar in those areas above and below the roughly 2-kilometer section of the canyon selected by CPAA for more intensive examination. Given that assumption, Tenmile Canyon would be expected to have a site density of about 13 to 15 sites per linear kilometer of the canyon bottom, and that these sites would be located in natural alcoves and rockshelters at the base of the first cliff level and on bench areas abutting the canyon bottom, and that the same suite of archaeological sites would be located on both sides of the canyon. A more comprehensive Class III survey of the drainage that included higher ledges, canyon rims and a more thorough examination of areas along the canyon bottom would likely demonstrate an even greater density of sites than demonstrated by the 2007-2008 intuitive surveys.

The 38 sites documented by CPAA (Figure 8) are considered to be representative of the nature, density and distribution of as-yet-undocumented sites that would be expected in other areas of the Tenmile Canyon drainage that exhibit a similar distribution of environmental resources, primarily alcoves, alluvial benches and permanent water. Sites documented in 2007 and 2008 are herein discussed from east to west:

Figure 8: Location of Tenmile Canyon sites documented by CPAA in 2007 and 2008.

42Gr583

This site, re-documented in 2007, consists of a lithic scatter located on the north side of Tenmile Canyon, [REDACTED]. This site was initially recorded in 1975 as a "small but dense scatter of lithic waste located on a sandy knoll just back from the canyon alluvium" (Keller 1975). Upon revisiting the site in 2007, it was found to consist of a discrete cluster of 33 chalcedony flakes and two chert flakes. Most were tightly clustered in an area 2 meters by 2 meters, or they were eroding downhill to the south from the main cluster (Figure 9). Based on the characteristics of the flakes, this site appears to represent a single lithic-reduction event. In addition, all of the chalcedony flakes are from the same reduction sequence, consisting entirely of Middle-Stage biface thinning flakes. The two chert flakes included one thinning flake and one Early-Stage flake with a small amount of cortex remaining on one edge. The flakes were observed in soft, finely sorted sands overlying white slickrock. There is a possibility of subsurface deposits, but such deposits are likely no more than 30 centimeters deep.



Figure 9: View to north of 42Gr583. Note primary cluster of lithics at center-left.

42Gr3354

This site, documented in 2007, consists of a dispersed artifact scatter located on a bench area on the north side of Tenmile Canyon [REDACTED]

[REDACTED] The artifact assemblage is comprised of more than 150 chert and quartzite flakes and a single corrugated grayware potsherd, all found along a bench area

extending about 80 by 80 meters (Figure 10). The flakes are predominantly tertiary biface thinning flakes, although a few secondary flakes were observed. The only lithic tools were a chert point tip and one broken biface. A complete inventory of artifacts was not conducted in 2007 given that this site at that time was being documented by BLM archaeologist Donna Turnipseed. The co-occurrence of later-stage lithic debitage and the corrugated potsherd may be evidence this site was the focus of longer-term, bi-gender camping activities, and that subsurface features (e.g., hearths) might be associated with these activities. Corrugated ceramics appear on the northern Colorado Plateau no earlier than about A.D. 1100, suggesting this may have been a late Fremont encampment.



Figure 10: View to the east of 42Gr3354 from existing vehicle route.

42Gr3829

This rock art site, documented in 2007, is located on the first cliff level on the north side of Tenmile Canyon [REDACTED]. The site consists of two panels of petroglyphs, one prehistoric and one historic, about 5 meters above present ground surface on a sheer cliff face. The western panel contains a variety of anthropomorphs and bighorn sheep depicted in a style commonly attributed to the Fremont culture (Figure 11), whereas the eastern panel depicts a scratched image of a horse. Their location high on the cliff face suggests that the original ground surface was originally much higher and that there has been significant erosion of the bench area below. This erosion has likely destroyed all cultural deposits that may have been associated with the site.



Figure 11: View to northwest of Fremont rock art panel at 42Gr3829.

42Gr3830

This rock art site, documented in 2007, is located on the first cliff level on the north side of Tenmile Canyon [REDACTED]. The panel consists of a single petroglyph of a vertical wavy line with a bulbous upper end (Figure 12). It is located on a vertical cliff face 1.6 meters above present ground surface, and it measures 1.3 meters high and has a maximum width of 5 centimeters. It is solidly pecked and moderately deep. The image is not temporally or culturally diagnostic, and no artifacts were observed in association with this site. Given the erosion of deposits below the panel, it is unlikely that cultural deposits are associated with this site.



Figure 12: View to north of petroglyph at 42Gr3830

42Gr3831

This residential site, documented in 2007, is located below a slightly overhanging cliff at the base of the first cliff level on the north side of Tenmile Canyon [REDACTED]. This site has been vandalized almost beyond recognition with a single looters' pit extending 14 meters across the suspected living area. However, lithic debitage, metate fragments, burned bone, ashy soils and charcoal were observed, mostly

in the back dirt piles from looting activities. More than 150 flakes and two metate fragments were observed in an area 15 meters by 8 meters (Figure 13). Artifacts extend south onto the bench area where they have likely eroded from the back dirt piles. There are likely intact cultural deposits on the bench area in front of the shelter, below the back dirt piles and perhaps below the looters' pits.



Figure 13: View to northeast of 42Gr3831. Pin flags denote artifacts.

42Gr3832

This alcove residential site, documented in 2007, is located in a large south-facing alcove at the base of the first cliff level on the north side of Tenmile Canyon [REDACTED]. This site consists of a large, deep alcove with a low ceiling that features abundant residential detritus and at least three distinct clusters of rock art (Figure 14). Approximately 20 looters' holes were observed on the interior. The shelter extends along 90 meters of cliff face and extends 4 to 5 meters deep (Figure 15). The height of the ceiling above present ground surface ranges from 1 to 2 meters. Residential detritus was noted throughout the shelter interior, primarily in back dirt piles found the entire length and width of the alcove. Artifacts include small numbers of grayware potsherds, lithic debitage, burned and unburned bone, and groundstone.

There are likely undisturbed cultural deposits on the bench area in front of the shelter, below the back dirt piles and perhaps below the looters' pits.



Figure 14: One of three clusters of rock art at 42Gr3832.

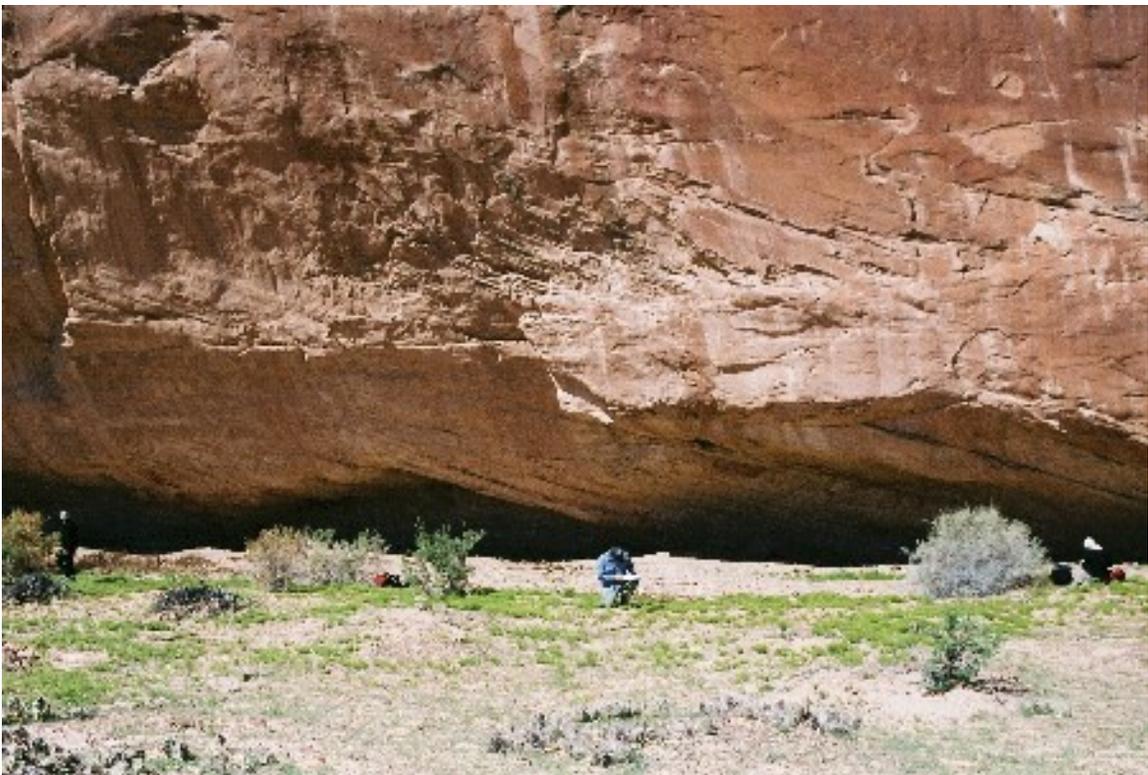


Figure 15: View to north of large sheltered area comprising 42Gr3832.

42Gr3833

This alcove residential site, documented in 2007, is located in a small south-facing alcove at the base of the first cliff level on the north side of Tenmile Canyon about [REDACTED]. The floor area (Area A)

measures about 7 meters east-west by about 5 meters north-south, and features a large looters' pit in the center (Figure 16). Artifacts are concentrated primarily around the west and east edges of floor, mostly in the back dirt piles. These include lithic debitage, metate fragments and a single grayware potsherd. An indistinct petroglyph is located on the back shelter wall above the floor area. Lithic debitage was also observed on the bench area in front of Area A, extending at least 10 meters to the south of the alcove and indicating a potential for buried cultural deposits in front of the shelter.



Figure 16: View to northeast of Area A floor area. Pin flags denote artifact locations.

Runoff from the shelter drip line has down-cut the eastern edge of the floor in Area A, exposing a vertical profile with intact cultural deposits featuring burned bone, charcoal, debitage and one potsherd. Two distinct charcoal layers are visible in the profile, one at 1.5 meters below present ground surface and one a 1 meter below present ground surface. These layers are substantially below the suspected depth of the adjacent looters' pit. The layers are about 20 centimeters thick. The runoff continues to the east where it has cut through soils to a depth of more than 3 meters and exposed profiles indicating intact cultural deposits in this area (Area B) to a depth of at least 2.2 meters (Figure 17).

A small amount of charcoal associated with lithic debitage and burned bone was recovered at 2.2 meters below present ground surface for radiocarbon analysis. Subsequent testing of the sample by Beta Analytic (B-229701) returned a conventional radiocarbon date of 4300 ± 40 B.P. (2 Sigma calibrated at 3010 to 2880 B.C.) with a median intercept of 2900 B.C. The ephemeral runoff area below these deposits featured lithic debitage, biface tools and a potsherd that were found eroding to at least 30 meters to the east and southeast of Area B. Two grinding slicks were also observed on the

bedrock surface directly above the alcove. Both grinding surfaces have entirely repatinated (Figure 18) and are likely of considerable age.



Figure 17: View to north of cultural deposits exposed in profile, Area B at 42Gr3833.



Figure 18: Repatinated grinding slicks at 42Gr3833.

42Gr3834

This alcove residential site, documented in 2007, is located in a large south-facing alcove at the base of the first cliff level on the north side of Tenmile Canyon about [REDACTED]. The C-shaped alcove extends 25 meters along the cliff wall and is about 5 meters deep (Figure 19). It has copious evidence of residential activities, including more than 300 lithic flakes, about 25 pieces of burned and unburned bone, and five metate fragments. A large looters' pit is located toward the front and center of the shelter that measures about 2 by 2 meters, although the large back dirt pile across the front indicates that a much larger area was looted. Deposits toward the back of the shelter appear to be intact, as well as those on the eastern periphery of the shelter. A sparse scattering of artifacts is located throughout the shelter, but most are concentrated in the back dirt piles and eroding down slope in front of the shelter. There are likely intact cultural deposits on the bench area in front of the shelter, below the back dirt piles and perhaps below the looters' pits.



Figure 19: View to east of 42Gr3834. Pin flags denote artifact locations.

42Gr3835

This scattering of lithic debitage and groundstone tools, documented in 2007, is located on a bench area abutting the creek on the north side of Tenmile Canyon [REDACTED]. The lithic scatter, documented in 2007, is sparse but expansive, covering an area about 50 meters wide (east-west) by 150 meters long (north-south), covering the entire bench from the base of the cliff to the edge

of the alluvial plain (Figure 20). The flakes are mostly red, yellow and brown chert, white chalcedony and quartzite. The flakes are primarily tertiary biface thinning flakes, with small amounts of secondary flakes and shatter. No chipped-stone tools or tool fragments were observed. This site contains more than 500 flakes and was likely the focus of repeated stone tool manufacturing and maintenance activities. A discrete cluster of groundstone fragments were observed on the western periphery of the site. These fragments may have been part of the same metate. These indicate the bench area was likely the focus of longer-term, bi-gender food processing activities, and that subsurface features (e.g., hearths) might be associated with camping and tool maintenance activities.



Figure 20: View to north of artifact scatter at 42Gr3835 covering entire bench to the base of cliffs.

42Gr3836

This residential site, documented in 2007, is located in a large alcove near the head of a small unnamed wash on the north side of Tenmile Canyon, [REDACTED]. At least two large looters' pits are located at the front of the sheltered area, and the associated back dirt piles have abundant lithic artifacts (Figure 21). About 150 lithic flakes were identified in the back dirt piles, as well as one metate fragment, one battering implement, a dark maroon river cobble and abundant ashy soils. Erosion is significant inside the shelter where runoff has exposed profiles of intact cultural deposits. A major charcoal and ash layer is located 50 to 60 centimeters below present ground surface and is about 20 centimeters thick. There is a second ash layer on the western periphery of the shelter. The looting appears to have focused on the front part of the alcove, and the interior deposits may be intact. The portion of the alcove with cultural deposits appears to be about 15 meters long by up to 5 meters deep, although the erosion makes it difficult to ascertain the extent of residential activities.



Figure 21: View to northwest of 42Gr3836. Pin flags denote artifact locations.

42Gr3837

This residential and rock art site documented in 2007 is located below a slightly overhanging cliff face at the base of the first cliff level on the north side of Ten Mile Canyon [REDACTED]. The site (Figure 22) extends along about 100 meters of cliff face and is comprised of three clusters of rock art images and five areas, all looted, with residential detritus in the back dirt piles and eroding on the bench area in front of the sheltered area. The rock art panels include heavily repatinated linear designs with circles and cross-hatches, the remains of a Fremont-like anthropomorph, and a petroglyph image of a hand and a star-like figure. Deep, finely sorted ashy soils are located directly below the third panel and in a looter's back dirt pile. The other four features were identified on the presence of oval and amorphous looters' pits with associated lithic flakes, groundstone, charcoal and ashy soils. There are likely intact cultural deposits on the bench area in front of the shelter, below the back dirt piles and below the looters' pits.



Figure 22: Site overview looking northeast of 42Gr3837. Site extends 100 meters along cliff base.

42Gr3838

This rock art site, documented in 2007, is located at the edge of a large north-facing alcove at the base of the first cliff level on the south side of Tenmile Canyon about [REDACTED]. The site includes a single panel of four Barrier Canyon style pictographs painted in red ochre and possibly yellow (Figure 23). One quadruped faces a large anthropomorph in the center that is at



Figure 23: View of Barrier Canyon rock art panel at 42Gr3838.

least 1.3 meters high and 54 centimeters wide and it appears to be holding a vertical wavy line. A quadruped to the right appears to be painted in yellow pigment with a dark red outline. The interior is largely obscured with mud. On the far right are remnants of an unknown red figure, probably a quadruped. The entire panel measures 2.4 meters wide by 1.3 meters high, and is 2 meters above present ground surface. The panel is located at the north edge of a large, deep alcove that has been significantly and repeatedly vandalized, despite the paucity of obvious cultural deposits. The only artifacts observed inside the shelter were chunks of charcoal and acorn husks, which may or may not be cultural.

42Gr3839

This lithic scatter documented in 2007 is located on a large bench area abutting the south side of Tenmile Creek near the northern edge of an unnamed southern tributary of Tenmile Canyon [REDACTED]. The site consists of a discrete scatter of predominantly tertiary flakes, a small number of secondary thinning flakes and two biface tools (Figure 24). The site extends 40 meters north-south by 50 meters east-west, and consists of approximately 300 flakes with a maximum density of 10 flakes per square meter. A majority are concentrated on the northern periphery of the site in a natural bowl area where they have likely eroded. There is a potential for subsurface deposits in the soft alluvial soils. The soils with potential deposits exhibit accelerated erosion due to ORV traffic throughout the site.



Figure 24: View to west of 42Gr3839. Pin flags denote artifact locations.

42Gr3840

This sheltered residential site, documented in 2007, is located in a large west-facing alcove at the base of the first cliff level near the northern edge of an unnamed southern tributary of Tenmile Canyon [REDACTED]. The alcove measures about 25 meters across the front by 25 meters deep (Figure 25). A pool of water, likely a seep, is located about 25 meters in front of the alcove. The shelter features numerous groundstone artifacts, including slab metates and bedrock grinding slicks. Other artifacts include sparse tertiary thinning flakes, some burned bone and abundant charcoal that may or may not be prehistoric. No culturally or temporally diagnostic artifacts were observed. The alcove has been severely looted with at least 25 discernible areas with looters' holes or depressions. These pits have largely refilled with aeolian sands, making it difficult to determine their original depth. Based on erosion profiles, there is considerable potential for cultural deposits extending more than 2 meters deep. There are also likely intact cultural deposits in potential occupation areas in front of the shelter, below the back dirt piles and below the looters' pits.



Figure 25: View to northeast of 42Gr3840 living area within the alcove. Pin flags denote artifact locations. See also Figure 3.

42Gr3841

This sheltered residential site or campsite documented in 2007 is located in a small west-facing alcove near the northern edge of an unnamed southern tributary of Tenmile Canyon [REDACTED]. The alcove (Figure 26) measures about 3 meters north-south by 2 meters east-west by 2.5 meters high. The

sheltered area has sparse remnants of human activities and exhibits no evidence of looting. Thick, dense ashy soils are eroding from the back of the shelter down slope toward the south. One piece of burned sandstone is located on the north side of the shelter, measuring about 15 by 10 centimeters. The ashy soils measure 1 meter wide by 4.5 meters long. Tertiary thinning flakes are located in the ashy deposits. Intact cultural deposits are being impacted by erosion and livestock.



Figure 26: View to northeast of 42Gr3841. Occupation area center frame in front of vegetation.

42Gr3842

This sheltered residential and storage site, documented in 2007, is located at the base of the first cliff level in a large west-facing alcove near the northern edge of an unnamed southern tributary of Tenmile Canyon [REDACTED]. The massive west-facing alcove is approximately 100 meters wide and 30 meters front to back at the widest point (Figure 27). Another small interior alcove at the rear extends another 3 to 4 meters and encloses a natural seep with a pool of water. The sheltered area features abundant residential detritus, one rock art panel, one circular storage structure and corncobs, corn husks and corn stalks. Artifacts were observed in front of the shelter extending 20 meters to the west and south, indicating the potential presence of occupation areas outside the alcove.

Artifacts inside the sheltered area consist mostly of tertiary thinning flakes, corn remnants, bedrock grinding slicks, burned and unburned bone, two hammerstones, one battering implement and chunks of charcoal that may or may not be prehistoric. The corn remnants are all clustered in an area about 30 meters south of the storage unit (Figure 28),

suggesting the presence of a second storage facility that has been dismantled and destroyed during the episodic looting at the shelter. The corn husks and corn stalks imply that farming occurred in the immediate area. Research indicates that those portions of corn plants without economic value would not be transported a significant distance (Metcalf and Barlow (1992).



Figure 27: View to southeast of main occupation area at 42Gr3842.



Figure 28: View to north of artifact cluster, mostly maize remnants at 42Gr3842.

42Gr3843

This storage locale documented in 2007 is located in a large east-facing alcove at the base of the first cliff level near the western edge of an unnamed southern tributary of Tenmile Canyon [REDACTED]. The site consists of a series of bell-shaped cists excavated into a hardpan clay matrix at the back of the alcove (Figure 29). The cists occupy the southern half of a sheltered area about 20 meters wide by 3 to 4 meters deep. At least six cists are discernible, and there are possible remnants of a seventh cist but these are not clearly articulated. The front walls of five of the six definable cists have collapsed outward (or were dismantled by vandals), exposing the interior chambers in profile. One of the cists is intact (Figure 30) and is about half filled with aeolian sand. A lithic scatter is located about 30 meters to the north-northeast of the cists. One biface fragment or possible Archaic point fragment was observed in this area.



Figure 29: View to west of hardpan storage cists at 42Gr3843.



Figure 30: View of intact cist at 42Gr3843

42Gr3995

This open lithic scatter, documented in 2008, consists of three distinct clusters of lithic debitage, mostly tertiary thinning flakes, along the upper edge of an arroyo down-cut about 5 meters deep that is located at the mouth of an unnamed side drainage on the south side of Tenmile Canyon (Figure 31). At least three large projectile points or knife blades were identified (Figure 32). The erosion is cutting into the sandy alluvial deposits where the lithic scatter is located, but no artifacts were observed in the exposed profile, suggesting cultural materials are eroding from deflated dunes on the bench area. However, at least three thermal features with discrete charcoal or ash were observed in the arroyo profile.



Figure 31: General site overview of 42Gr3995 with pin flags denoting artifact clusters.



Figure 32: Plan view of biface tools from 42Gr3995.

42Gr3844

This storage facility, documented in 2007, is located in a small north-facing alcove at the base of the first cliff level near the western edge of an unnamed southern tributary of Tenmile Canyon [REDACTED]. The site consists of the remnants of a D-shaped drylaid masonry structure, probably a granary that occupies the eastern portion of an alcove that measures 12 meters long by 3 meters deep by 2 to 4 meters high. The structure consisted of unmodified sandstone slabs stacked in a semicircular pattern with the back wall of the shelter comprising the back wall (Figure 33). No remnants of adobe were observed. Pieces of juniper matting are visible under the front wall and eroding down slope (Figure 34). The matting is most visible at the east edge of the structure. Based on the profile of the feature, interior deposits are no more than 5 centimeters deep.



Figure 33: View to east of drylaid storage structure at 42Gr3844.



Figure 34: View of juniper bark matting in stone matrix at 42Gr3844.

42Gr660

This sheltered residential site documented in 2007 is located on the north side of Tenmile Canyon [REDACTED]. This site was initially recorded in 1976 as an alcove measuring 20 meters by 6 meters with cultural deposits that included lithic debitage and charcoal. A biface fragment was collected at that time. Upon revisiting the site in 2007, the site was found to be a large, south-facing alcove on the north side of Tenmile Canyon that features a steep, sloping floor and a relatively flat area at the back of the alcove that was the focus of residential activities (Figure 35). Residential detritus is eroding from the back of the shelter to the south along the sloping floor and onto the alluvial bench area directly below. A concentration of lithic debitage, groundstone tools, bone and potsherds was observed on the bench area directly below the alcove and extending east and west of the alcove a total of 30 meters east-west by 5 meters north-south (Figure 36).



Figure 35: View to north of 42Gr660, large alcove with residential detritus.

The flat living area inside the alcove is about 2 meters wide and the ceiling of the shelter is about 2.5 meters above present ground surface at this point. Deposits at this point are badly looted, but lithic debitage, corncobs and burned and unburned bone are visible in the deposits, although they are not abundant. Given the presence of groundstone tools, corrugated potsherds and corncobs, this site was likely the focus of residential activities during the late Formative (after A.D. 1100), perhaps by a small

number of Fremont farmer-foragers. The south-facing aspect of the shelter implies that it could have been occupied during colder seasons. There is a paucity of recognizable storage or architectural features, although this may be a function of repeated looting.



Figure 36: Location of artifacts eroding on front of and to the east of alcove at 42Gr660.

42Gr3845

This sheltered residential site, documented in 2007, is located in a large west-facing alcove about 5 meters above the base of the first cliff level [REDACTED]. The alcove, which features a sloping and multi-leveled living surface measures about 50 meters north-south and has a maximum depth of 30 meters east-west on the southern periphery (Figure 37). The north end of the alcove features shallow deposits that have been looted to bedrock surfaces. This area features hand-and-toe holds carved into the vertical cliff face to facilitate access to the shelter. At the top of the hand-and-toe holds is a faded red pictograph panel. On the northern periphery of the alcove is a deep pit with vertical sides that may be remnants of a looted bedrock storage cist with a depth of about 50 centimeters.

The center portion of the alcove features a series of bedrock slicks, along with historic inscriptions dating to at least 1930. This area features an abundance of large, medium and small sandstone slabs that appear to have been discarded during the episodic looting of the shelter. This area features comparatively greater numbers of artifacts, including tertiary thinning flakes, unusually large corncobs (Figure 38), burned and unburned bone, charcoal, clumps of adobe with finger impressions and one possible coprolite. The southern portion of the alcove is the deepest but it contains comparatively

fewer artifacts. Abundant stone slabs suggest that any architectural features in this area were dismantled during looting. A sparse scattering of lithic debitage, charcoal and bone were observed in this area. There are likely intact cultural deposits in potential occupation areas in front of the shelter, below the back dirt piles and below the looters' pits.

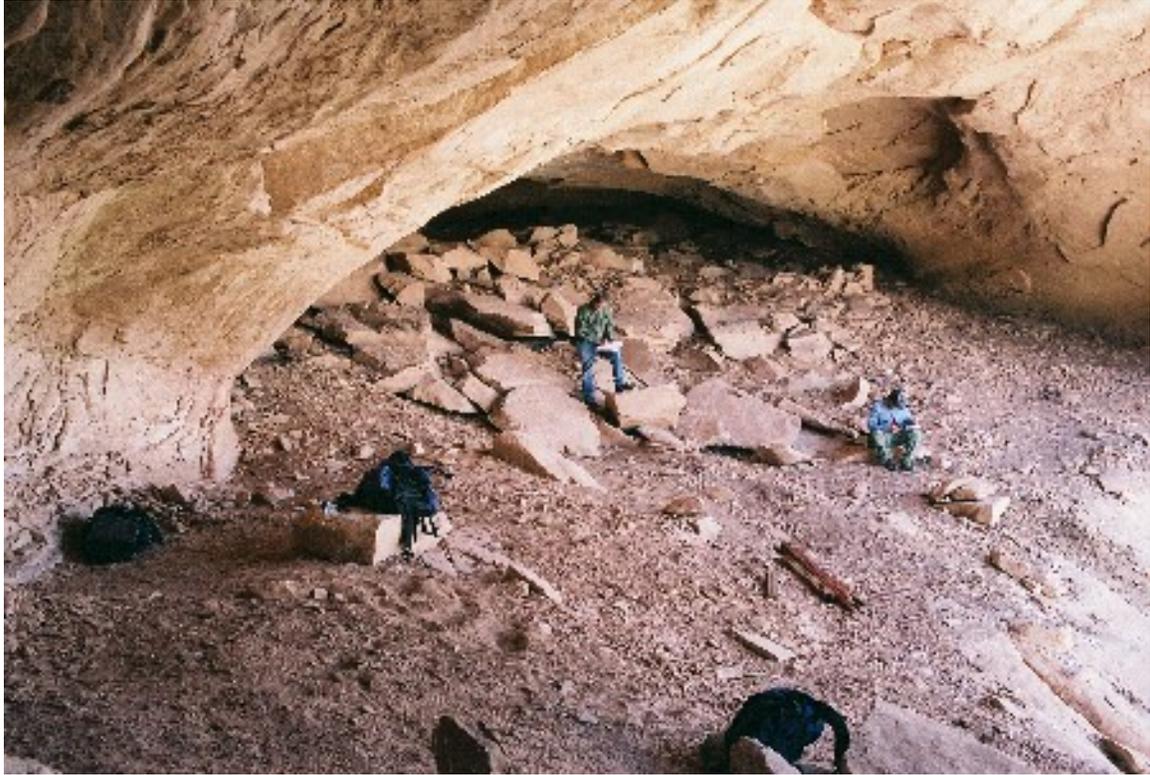


Figure 37: View to south of south portion of alcove at 42Gr3845.



42Gr3845.

Figure 38: View of large corn cobs at

42Gr3991

This site, documented in 2008, consists of a medium-sized west-facing alcove roughly 35 meters wide and 8 meters deep located about 300 meters inside a prominent unnamed side canyon on the north side of Ten Mile Canyon. On the north edge of the sheltered area is a sandstone boulder with grinding on the surface (Figure 39). The floor of the shelter is steeply sloped (Figure 40), and no other cultural materials were identified. These have likely eroded into the drainage below.



Figure 39: Ground surface on a boulder at 42Gr3991



Figure 40: Sloping floor of alcove at 42Gr3991

42Gr3996

This site, documented in 2008, consists of a dispersed lithic scatter of approximately 100 to 150 pieces of debitage covering a relatively flat sandy area and eroding down a slight slope, [REDACTED] (Figure 41). No tools or features were identified. The site measures about 50 by 20 meters, with artifact displacement occurring in and along an ephemeral drainage to the north-northwest.



Figure 41: Main debitage cluster at 42Gr3996. Trail Canyon is the down-cut on the right.

42Gr3997

This site, documented in 2008, consists of a dispersed scatter of 50 to 75 lithic flakes, predominantly tertiary flakes but with occasional secondary flakes, clustered along the base of a steep slope and extending onto the slickrock bench area on the south side of Tenmile Canyon (Figure 42). Tools observed on site included two cores, one biface fragment and one simple scraper (Figure 43). Based on the pattern of dispersal, it was assumed the artifacts had eroded from the steep slope. A cursory inspection of the slope revealed only a single flake about 50 meters up slope and about five flakes near the top of the slope against the base of the cliff (these were not included within the site parameters). Most artifacts were clustered in an area 20 meters east-west by 10 meters north-south, and concentrated at the base of the slope. Stone tools were all observed at the edge of the slickrock or on the slickrock itself where they were quite visible.



Figure 42: Site overview of 42Gr3997 looking southeast (pin flags denote artifacts).



Figure 43: Plan view of stone tools observed at 42Gr3997.

42Gr3846

This rock art site, documented in 2007, is located at the base of the first cliff level on the south side of Tenmile Canyon, [REDACTED]

[REDACTED] The site consists of two separate pictograph panels, one painted in vivid red colors that are visible from the canyon bottom. The second panel to the east is largely faded and barely discernible. Panel 1 consists of a tall oval anthropomorph with feet and horns that measures 76 centimeters high and is painted in dark red (Figure 44). The figure has a single line projecting from the head area. To the right is a Fremont-like anthropomorph with a triangular body, a long narrow neck and small round head. It is painted in the same dark red color. It is 35 centimeters tall and features no arms, legs or other appendages. Panel 2 is located just to the east and consists of a very faded red rectangular figure with a long neck, head and small arms. It appears to be holding something in its left hand. The figure measures 66 centimeters tall. The presence of one yellow-brown chert flake and one quartzite core below Panel 1 indicate the potential for cultural deposits on the slopes below the site, although the area directly below the panels is largely bedrock.



Figure 44: View to south of Panel A at 42Gr3846.

42Gr3998

This site, documented in 2008, consists of a scatter of 50 to 70 flakes and one burned sandstone slab, all dispersed across a bedrock surface with sandy deposits on the first bench area on the south side of Tenmile Canyon (Figure 45). Flakes are predominantly middle-stage and late-stage tertiary thinning flakes and pressure flakes.

Tool stone included white and pink mottled chalcedony; white, red and gray chert; and gray quartzite with black inclusions. Tools observed included two cores. No temporally or culturally diagnostic artifacts were observed.



Figure 45: General overview of 42Gr3998 looking west down canyon. Pin flags denote artifacts.

42Gr3992

This site consists of two adjacent alcoves (Figure 46), one with depressions and disarticulated construction stones, and the other with at least six hardpan storage cists, some of which are still intact. Alcove A is the easternmost of the two alcoves and faces onto the broad bench area on the north side of the canyon. It measures about 9 meters by 5 meters. On the west side of the alcove is a depression with a rubble mound on the down-slope side (Figure 47). The rubble or roughly laid wall consists of about 20 small and medium sandstone slabs stacked up to four courses high. These could have been stacked during looting of the shelter that resulted in the depression. On the east side of the alcove is a large looters' pit with stone detritus in a circular pattern around the pit. It appears the stones may represent a disassembled structural feature that is no longer recognizable. There is a general paucity of artifacts inside Alcove A, which has been used as a den by a large carnivore.



Figure 46: View to the north of 42Gr3992 with Alcove A (right) and Alcove B (left)



Figure 47: View of rubble mound in Alcove A at 42Gr3992.

Alcove B is located to the northwest from Alcove A and is oriented toward the ephemeral drainage rather than the broad bench area. The alcove measures about 40 meters long and up to 10 meters wide at the drip line, although most of the interior area is a steep slope overlaid with ceiling spall. The flat surface area is limited to two areas on the extreme east periphery of the alcove and on the far west edge. At least five hardpan cists are located on the east side of the alcove and one on the west side. One bell-shaped cist remains intact although largely emptied of interior deposits (Figure 48). One small petroglyph is located on the back wall of the shelter. A lithic scatter is located about 50 meters to the west-northwest of Alcove B on a dune.



Figure 48: Plan view of bell-shaped hard-pan cist at Alcove B (42Gr3992).

42Gr3993

This site, documented in 2008, consists of a dispersed scatter of secondary and tertiary flakes, mostly middle- and late-stage flakes with some pressure flakes, and at least seven biface tools, including an impressive large point fragment of tan chert (Figure 49). About 200 flakes were identified, all of yellow and white/clear chalcedony, quartzite and various colors of chert. The artifacts are located at the base of a cliff on the north side of Tenmile Canyon and extend roughly east-west along a small erosion channel along the base of the cliff and then south as the channel cuts into the bench (Figure 50). The pattern of dispersal seems to indicate that artifacts have washed over the top edge of the cliff above and have eroded down the sloping bench. However, the area above the site is white Navajo sandstone slickrock with no obvious origin for the cultural deposits.



Figure 49: Stone tools observed at 42Gr3993.

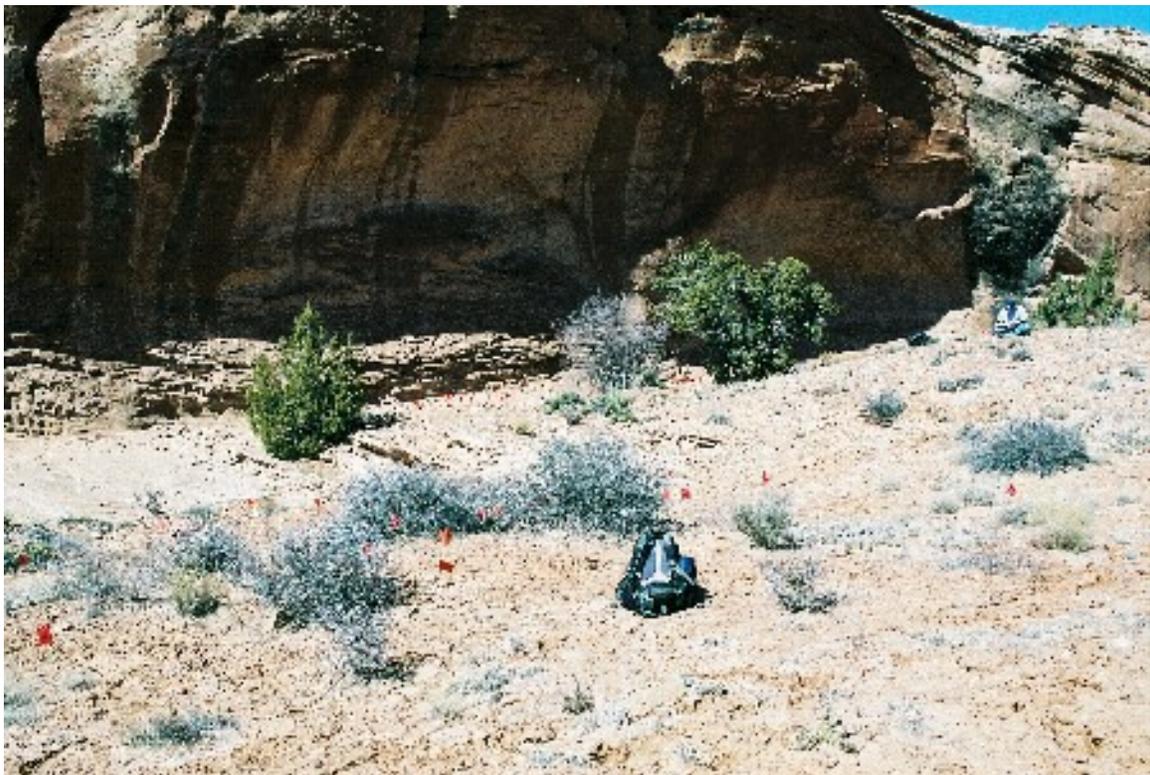


Figure 50: View to north of 42Gr3993 with dispersal pattern along ephemeral wash.

42Gr3994

This site consists of a prominent alcove at the base of the first cliff level on the north side of Tenmile Canyon with sparse artifacts, grooved stones and a possible dismantled hardpan cist (Figure 51). The dominant feature is a large looters' pit that has removed a major portion of the hardpan clay matrix, likely destroying any subsurface features (e.g. hardpan cists). In front of the looted area are three sandstone boulders with smooth surfaces where grooves have been ground into the surfaces, perhaps sharpening grooves. Also exposed in profile is a crescent-shaped depression that could indicate the remnants of a large subterranean feature. Artifacts were generally rare, consisting of four lithic flakes, a chert hammerstone and a bone tool with a rounded tip and a notched base. The tool was constructed from a rib bone from an undetermined mammal. Of interest is a profile that exhibits a layer of animal dung below the hardpan matrix (Figure 52).



Figure 51: View to the west of boulders with grooves and the looted hardpan matrix at 42Gr3994.



Figure 52: Hardpan clay matrix overlaying a dung layer at 42Gr3994.

42Gr3999

This site, documented in 2008, consists of a light and dispersed scatter of lithic debitage covering an area 29 by 15 meters, and located on the first bench area on the south side of Tenmile Canyon [REDACTED] (Figure 53). A total of 29 flakes were observed, consisting of white and red quartzite, brown chert, red chert and white-to-clear chalcedony. All flakes were tertiary middle-stage, late-stage or fragments, and no stone tools were observed.



Figure 53: View to the west of 42Gr3999 (pin flags denote artifacts).

42Gr4006

This site, documented in 2008, consists of a dispersed scatter of lithic artifacts located on top of a sandy knoll and along the sloping bench area on the north side of Tenmile Canyon [REDACTED] (Figure 54). More than 100 flakes were observed in an area 125 by 35 meters, most of them eroding toward the canyon bottom. This terrace appears to have been a lithic procurement area as evidenced by the predominance of secondary and tertiary early-stage flakes, and the abundance of tested cobbles eroding from sandy deposits.



Figure 54: View to the south of 42Gr4006 (pin flags denote artifact clusters).

42Gr4005

This site, documented in 2008, consists of a very light and dispersed scattering of 15 lithic flakes in an area 18 by 18 meters in size, located near the toe of a sloping bench area on the north side of Tenmile Canyon [REDACTED]. The flakes all seem to be eroding down slope to the south from a flat area that has no visible surface artifacts, suggesting the possibility of subsurface deposits in this area. All of the debitage was observed in an ephemeral wash (Figure 55).



Figure 55: View of 42Gr4005 with artifacts eroding into the ephemeral wash.

42Gr661

This site was initially recorded in 1976 by Bruce Louthan and D. Naegle, and was re-identified in 2008. It was found to consist of a large southwest-facing dry alcove with remnants of two drylaid circular or D-shaped structures. Feature 1, the northernmost structure, has multiple courses of construction stone and is more clearly defined (Figure 56). It is D-shaped and appears to utilize the back wall of the shelter as the back wall of the structure. However, there is a scattering of stones along the base of the shelter wall, suggesting the possible presence of a back wall. The interior measures 1.5 meters north-south by 1.25 meters east-west, and it has a maximum height of 24 centimeters on the west wall. At least two courses of stone are evident on the northwest side and a portion of the southwest wall. Much of the remaining walls on the east and south consist of a single layer of stone. The abundance of unmodified stones around the structure suggests the original wall height was higher but the walls have collapsed, perhaps due to repeated use of the interior by animals.

Feature 2 (Figure 57) is located 5 meters to the south of Feature 1. It consists of a circular alignment of a single layer of unmodified sandstone slabs arranged in a single layer. There is no evidence of coursed masonry walls or collapsed rubble to imply the structure featured standing walls at one time. A few chunks of charcoal were observed on the interior surface and around the feature, but artifacts were quite rare in this area of the shelter. The alignment measures 1.5 meters north-south by 1.6 meters east-west and currently has a maximum height of 12 centimeters.



Figure 56: Feature 1 at 42Gr661. Note how the stones have been crudely stacked into courses.



Figure 57: Feature 2 at 42Gr661. Note the alignment is more ephemeral than Feature 1.

42Gr4002

This site, documented in 2008, consists of a lithic scatter consisting of more than 500 flakes covering an area roughly 88 by 37 meters (Figure 58). It covers the entire high

portions of the sandy bench area on the east side of Tenmile Creek (south side of the canyon). All reduction stages are represented from primary through tertiary pressure flaking, with tertiary middle-stage flaking dominating the assemblage. Five formal tools were identified, including two cores and two biface base fragments, as well as one graver-type tool that appears to be corner-notched (Figure 59). Tool stone included chert, chalcedony and quartzite of multiple colors. This site is likely the lithic scatter referred to in the original recording of 42Gr661.



Figure 58: General view of 42Gr4002 looking south toward 42Gr661 and 42Gr4000.



Figure 59: Plan view of stone tools from 42Gr4002.

42Gr4000

This site, documented in 2008, consists of a single petroglyph panel at the base of a sandstone cliff on the northernmost edge of a large natural amphitheater on the east side of Tenmile Creek (on the south side of the canyon). The panel consists of four elements that have almost completely repatinated (Figure 60). They have been pecked into a very dark patinated surface that measures 1.1 by 0.5 meters in size. The elements are not clearly discernible in direct sunlight but are solidly pecked.



Figure 60: Close-up view of repatinated figures at 42Gr4000.

42Gr4003

This site, documented in 2008, consists of a large lithic scatter of more than 500 flakes eroding to the south and southwest from a sloping bench area with stabilized and active dunes (Figure 61), located on the east side of Tenmile Creek (south side of the canyon). The assemblage is dominated by tertiary middle-stage reduction flakes, but with occasional secondary flakes, early-stage tertiary flakes and some shatter. Tool material is the same quartzite, chert and chalcedony assemblage noted at 42Gr4002, which is located on the same bench near this site. Two biface fragments were identified.



Figure 61: General view of 42Gr4003 looking east toward large alcove area in upper center frame where 42Gr4000 and 42Gr4001 are located.

42Gr4001

This site, documented in 2008, consists of a single north-facing petroglyph consisting of two parallel vertical undulating lines (Figure 62), located on a boulder within a large sheltered area on the east side of Tenmile Creek (south side of the canyon). The panel is quite visible at a considerable distance even though it is quite small. No artifacts were observed in association with the figure, and there is nothing spatially, temporally or culturally diagnostic about the panel.



Figure 62: View to southeast of petroglyph image at 42Gr4001.

42Gr4004

This site, documented in 2008, consists of a localized scattering of lithic detritus fairly tightly clustered within an area measuring 3.7 by 5.1 meters, at the upper edge of the bench area on the east side of Tenmile Creek (south side of the canyon). A total of 54 pieces of debitage was observed, 48 of which appear to derive from the same host stone. One gray quartzite side scraper was constructed from a large, early-stage flake of medium-grained gray quartzite. The artifacts were located under and around a large juniper tree (Figure 63).



Figure 63: View to the east of 42Gr4004.

Culture History Discussion

The 2007-2008 intuitive surveys documented a broad suite of rock art sites located on cliff faces, artifact scatters located on the bench areas abutting Tenmile Creek and in protective alcoves, surface and subsurface storage localities in alcoves, and residential sites, all of them in alcoves or at the base of a cliff with a protective overhang. Some of these residential sites also contained rock art and storage features. These sites, which contain a variety of temporally diagnostic artifacts, are reflective of a broad range of human activities throughout the Archaic and Formative periods of time, including tool manufacturing and maintenance, temporary and longer-term camping by bi-gender groups of foragers, maize horticulture by sedentary or semi-sedentary farmers, food processing, food storage and ceremony (see Table 1).

No unequivocal evidence of Paleoindian occupations was identified, although there would appear to be significant potential that deep alcove sites found throughout Tenmile Canyon will contribute to a much broader understanding of the earliest human adaptations on the northern Colorado Plateau, perhaps during terminal Pleistocene or early Holocene times. To date, all evidence of Paleoindian occupations in the region has resulted from

open sites or isolated finds of distinctive artifacts on the mesa above Tenmile Canyon and along the Green River corridor. The abundance of large, dry alcoves suitable for human occupation located throughout Tenmile Canyon would have been especially attractive to human groups seeking shelter throughout all periods. Indeed, these alcoves feature cultural deposits of tremendous depth. Although surface deposits have been disturbed by looting, lower deposits of potential Paleoindian and Archaic age are likely intact. This was demonstrated at 42Gr3833, an alcove with a layer of charcoal, bone and stone debitage at 2.2 meters below present ground surface, and at 42Gr3994 where dung from large herbivores was observed in an exposed profile *below* the hardpan clay layers commonly used by Archaic peoples for subsurface storage facilities.

Evidence of Archaic occupations was observed at a total of six sites, four located on the south side of Tenmile Canyon and two on the north side. Site 42Gr3838 consists of a single panel of four Barrier Canyon style pictographs painted in red ochre and possibly yellow. The Barrier Canyon rock art style is generally attributed to Late Archaic times and is seen as antecedent to Fremont rock art on the northern Colorado Plateau. Named after a tributary of the Green River where the figures are particularly common, “The dominant motif in these paintings is the long, dark form of the human torso. . . . These highly abstracted and mummy-like anthropomorphs which seem to hover against the cliff walls determine the overall aesthetic impact of the Barrier Canyon Style, not only because of their repeated occurrence in each site, but also because of their great size in comparison with the few other elements occurring with them which are often tiny adjuncts to the major anthropomorph theme” (Schaafsma 1971:69). Tipps (1995) has since defined a temporal range of about 1900 B.C. to A.D. 300 for the Barrier Canyon rock art style.

Additionally, petroglyphs at 42Gr4000, located on the outside edge of a large alcove on the east side of Tenmile Creek, are almost completely repatinated, a process of mineralization that typically implies considerable antiquity. These images are not typical of Fremont or Ancestral Puebloan images, and given the level of repatination evident at this site they could be Archaic in age, although this remains extremely speculative.

Potential evidence of Archaic occupations was observed at 42Gr3839, a lithic scatter with the fragment of a large side-notched atlatl dart point. And three large bifaces consistent in size and shape with atlatl dart points were observed about 100 meters to the west at 42Gr3995 (see Figure 32 earlier in this report). And at nearby 42Gr3843, a biface base fragment consistent in size and shape with an atlatl dart point was found in cultural deposits in front of six or seven bell-shaped, hardpan storage cists. Hardpan cists were also observed at 42Gr3992 on the north side of the canyon (this report), and at 42Gr634 and 42Gr635 by MNA crews (Keller 1976). No temporally diagnostic artifacts were observed at these three sites, although bell-shaped subterranean storage chambers have typically been associated with Late Archaic or early Basketmaker occupations on the northern Colorado Plateau (cf. Reed 2000; Talbot and Richens 1996). Very little has been reported about storage cists excavated into a hard, rock-like clay matrix, typically referred to as “hardpan cists.”

Table 1: Summary of material culture evidence

Site No.	Site Type	Cultural Affiliation	Lithic Artifacts	Ceramics	Groundstone	Organics
42Gr583	Lithic Scatter	Unknown	Yes	No	No	No
42Gr660	Alcove	Fremont	Yes	Yes	Yes	Yes
42Gr661	Alcove	Unknown	Yes	No	No	Yes
42Gr3354	Artifact Scatter	Fremont	Yes	Yes	No	No
42Gr3829	Rock Art	Fremont	No	No	No	No
42Gr3830	Rock Art	Unknown	No	No	No	No
42Gr3831	Alcove	Unknown	Yes	No	Yes	No
42Gr3832	Alcove	Fremont	Yes	Yes	Yes	No
42Gr3833	Alcove	Fremont Archaic	Yes	Yes	Yes	No
42Gr3834	Alcove	Unknown	Yes	No	Yes	No
42Gr3835	Artifact Scatter	Unknown	Yes	No	No	No
42Gr3836	Alcove	Unknown	Yes	No	Yes	No
42Gr3837	Residential	Unknown	Yes	No	Yes	No
42Gr3838	Rock Art	Archaic	No	No	No	No
42Gr3839	Lithic Scatter	Archaic	Yes	No	No	No
42Gr3840	Alcove	Unknown	Yes	No	Yes	No
42Gr3841	Rockshelter	Unknown	Yes	No	No	No
42Gr3842	Alcove	Fremont	Yes	No	Yes	Yes
42Gr3843	Storage Cists	Archaic	Yes	No	No	No
42Gr3844	Granary	Unknown	No	No	No	Yes
42Gr3845	Alcove	Fremont	Yes	No	Yes	Yes
42Gr3846	Rock Art	Fremont	Yes	No	No	No
42Gr3991	Special Use	Unknown	No	No	Yes	No
42Gr3992	Storage Cists	Archaic	Yes	No	No	No
42Gr3993	Lithic Scatter	Unknown	Yes	No	No	No
42Gr3994	Alcove	Unknown	Yes	No	Yes	Yes
42Gr3995	Lithic Scatter	Archaic	Yes	No	No	Yes
42Gr3996	Lithic Scatter	Unknown	Yes	No	No	No
42Gr3997	Lithic Scatter	Unknown	Yes	No	No	No
42Gr3998	Lithic Scatter	Unknown	Yes	No	No	No
42Gr3999	Lithic Scatter	Unknown	Yes	No	No	No
42Gr4000	Rock Art	Archaic?	No	No	No	No
42Gr4001	Rock Art	Unknown	No	No	No	No
42Gr4002	Lithic Scatter	Unknown	Yes	No	No	No
42Gr4003	Lithic Scatter	Unknown	Yes	No	No	No
42Gr4004	Lithic Scatter	Unknown	Yes	No	No	No
42Gr4005	Lithic Scatter	Unknown	Yes	No	No	No
42Gr4006	Lithic Scatter	Unknown	Yes	No	No	No

Although distinctively Archaic artifacts were rare, it should be noted that many alcoves featured aceramic deposits that could be evidence of Archaic adaptations. Even at those alcove sites with later Formative artifacts on the site surface, it is highly probable that these Formative deposits overlay Archaic deposits. This was evident at 42Gr3833 where an occupation level at least 2.2 meters below present ground surface, exposed in a profile created by a natural pour-off, returned a radiocarbon date of 4300 \pm 40 B.P. (2900 B.C. calibrated; B-229701), or within the Middle Archaic as traditionally defined on the northern Colorado Plateau (cf. Spangler 2002). This site also featured ceramics in the

disturbed surface deposits, supporting the contention that Formative occupations overlay earlier Archaic occupations. It is also probable that intact Archaic deposits are located below the lowest extent of looters' pits at many other alcove sites in the canyon.

CPAA research in 2007 identified the first, albeit limited evidence that prehistoric inhabitants of Tenmile Canyon were cultivating maize in the canyon corridor. In fact, the only evidence of Fremont occupations in the entire region are distinctive rock art panels along the Colorado River to the south of Tenmile Canyon, and Fremont residential sites at the base of the Book Cliffs to the northeast (Wormington 1955). It is generally assumed that evidence of Formative adaptations (primarily maize horticulture, but also masonry architecture) from sites north and west of the Colorado River can be attributed to the Fremont culture (Jennings 1978). Generally, the Fremont have been described as highly adaptable farmers *and* foragers, switching from maize farming to foraging in response to changes in the availability of floral and faunal species and the viability of horticulture (Madsen and Simms 1998).

Proto-Formative adaptations focused to a greater or lesser degree on maize appear across the northern Colorado Plateau as far north as the Uinta Basin as early as A.D. 250 (Talbot and Richens 1996). As discussed by Barlow (2006), the archaeological record from A.D. 300 to 600 consists predominantly of Archaic-like camps, but with the addition of open, aceramic farmer-forager habitation sites with shallow, dish-shaped habitation floors that could be shallow pit structures or wickiups. The artifact assemblages include Archaic dart points, arrow points, Archaic groundstone, bell-shaped storage pits, remains of wild flora and occasionally maize. Overall, assemblages “suggest that Archaic lifeways persisted throughout the region, but with maize horticulture playing an increasingly important role, perhaps in winter food storage, for some households or bands of foragers” (2006:6-2).

The beginning of the Formative on the northern Colorado Plateau is traditionally assigned to the appearance of ceramic technology and its concurrent implications for sedentism at about A.D. 600 (Spangler 2001, 2002). Hence, the presence of corncobs at residential sites might be associated with pre-Formative and/or Formative horticultural adaptations. Corncobs were observed at three alcove sites in Tenmile Canyon, all in the same general area and within view of one another. Corncobs were observed at 42Gr660 and 42Gr3845, and corncobs, corn stalks and husks were observed at 42Gr3842. The identification of corncobs, corn husks and corn stalks suggests that horticulture was being practiced in Tenmile Canyon. As discussed by Metcalfe and Barlow (1992), corn stalks and husks are rarely, if ever, transported a significant distance from corn fields (Metcalfe and Barlow 1992). This suggests that corn stalks and husks at 42Gr3842 are evidence that maize was cultivated along the Tenmile Canyon floodplain in close proximity to the alcove where the remains were observed.

The presence of arrow points is an equivocal temporal marker. Archaeological evidence from northeastern Utah has demonstrated that bow and arrow technology appeared in northeastern Utah by about A.D. 100, perhaps as early as A.D. 1 (McKibbin 1992), but the bow and arrow did not replace the atlatl as the preferred hunting weapon

until several centuries later. By about A.D. 400, projectile points found at archaeological sites in eastern Utah are predominantly corner-notched arrow points referred to as Rose Spring, Eastgate or Rosegate Series. By inference, sites yielding Rose Spring points date no earlier than about A.D. 100, and probably after A.D. 400 when they become ubiquitous. Rosegate points are typically considered to be markers of the Fremont Complex, although the point type extends far beyond the area occupied by Fremont farmer-foragers. Rose Spring arrow points (Figure 64) were observed at two sites in Tenmile Canyon, at 42Gr3832 and 42Gr3842, both of which are alcove sites (one with ceramics and one without). Both were observed within disturbed surface deposits.



Figure 64: Rose Spring point from 42Gr3842

Potsherds are extremely rare at sites in Tenmile Canyon, suggesting (1) local populations were extremely mobile and that this mobility was not conducive to the local manufacture of ceramics, or (2) because potsherds would have been located at or near the surface of the alcove deposits, they were removed or destroyed during episodic looting of the alcoves. It should be noted that Fremont adaptations on the nearby Tavaputs Plateau immediately north of the Green River Desert, despite exhibiting considerable complexity, also exhibit a paucity of ceramic artifacts (Spangler 2000, 2002; Spangler et al. 2007). Three alcove residential sites contained evidence of grayware ceramics consistent with Fremont types observed elsewhere in eastern Utah. Two grayware potsherds were observed at 42Gr660, two additional grayware potsherds at 42Gr3833, and five potsherds at 42Gr3832, one with evidence of an applied ridge as decoration. All of the potsherds were body fragments that had been smoothed on the interior and exterior. All potsherds exhibited fine to coarse black stone tempering similar to tempering agents utilized by Fremont populations in the San Rafael Swell and Tavaputs Plateau.

Convincing evidence of a late Formative presence in Tenmile Canyon is limited to two sites with temporally distinctive corrugated potsherds (42Gr3354 and 42Gr660). Corrugated ceramics appear on the northern Colorado Plateau after about A.D. 1100 (Spangler 2001), suggesting this site was occupied sometime at or after that point. This tentative date would be consistent with the Uinta side-notched point earlier described from 42Gr2493 on the north rim of Tenmile Canyon (Senulis 1992). Side-notched arrow points appear on the northern Colorado Plateau after about A.D. 1000 (Holmer and Weder 1980). The paucity of quantitative evidence precludes any discussion of late Formative adaptations.

The demise of the Fremont Complex north of the Colorado River is generally demarcated by the disappearance of agricultural lifeways and their accoutrements, including ceramic technology and masonry architecture. No evidence has yet been

reported from the Tenmile Canyon area of post-Formative occupations attributed to Numic-speaking populations after about A.D. 1250, nor was any evidence observed during the 2007 intuitive surveys. However, 42Gr3829 contains a representational rock art depiction of a horse (Figure 65) that potentially could be attributed to historic Ute occupations in the region. It also could be the work of cowboys and shearers.



Figure 65: Horse image at 42Gr3829.

Artifact Analysis

All artifacts observed during the investigations in Tenmile Canyon were analyzed and recorded according to standard field techniques and left *in-situ* or cached to discourage surface collecting. Formal artifacts were plotted on sketch maps, counted and described. Some flaked stone tools encountered during the 2008 investigations were also sketched and photographed in order to obtain a visual record of representative types observed in the area. Broad categories such as debitage, biface, projectile point, groundstone, etc. were used to initially separate the artifacts into general groups based on material type, morphological attributes, and implied function. Each of those categories was then further subdivided into smaller categories as needed.

More than 5,068 prehistoric artifacts were encountered during the investigations in 2007 and 2008. The artifact assemblages consisted of four primary classes: ceramics, lithics, organics and bone. These classes were further subdivided to facilitate more accurate descriptions of different artifact functions. The lithic assemblages were comprised of flaked stone tools, debitage, groundstone, and fire-cracked rock (FCR). The ceramic assemblages consisted entirely of broken sherds. The bone assemblages were subdivided into worked and non-worked bone.

Ceramic Artifacts. Since no items were collected during the investigations reported here, the analysis of ceramic artifacts merely describes the morphological attributes of these items. The placement of these artifacts into classificatory types was therefore not possible. A total of 11 fragmented ceramic items were observed in 2007,

and none were observed in 2008. All ceramics observed were of a fragmentary nature, without any diagnostic elements such as rims or necks. Vessel form, therefore, remains indiscernible. The ceramics observed consisted of nine plain grayware sherds and two corrugated sherds. Ceramic artifacts were only observed at four of the 38 sites reported here: 42Gr660 (n=2), 42Gr3354 (n=1), 42Gr3832 (n=5), 42Gr3833 (n=3). It is entirely possible that all pieces are representative of cooking/utilitarian vessels.

Flaked Stone Artifacts. All artifacts derived from stone sources were categorized as lithic artifacts. This class was further subdivided to include flaked stone tools, cores, debitage, groundstone and fire-cracked rock (FCR). Flaked stone items comprised the largest portion of the artifact assemblages in Tenmile Canyon, consisting of more than 5,037 specimens. Flaked stone tools can be defined as stones from which flakes have been removed as a result of human intent or use (Whittaker, 1994; Crabtree, 1972; Odell, 2003). This category includes both formal and expedient tools such as unifaces, bifaces, projectile points and drills, and is distinguished from groundstone artifacts. A total of 37 flaked-stone tools were observed in Tenmile Canyon during the 2007 and 2008 investigations. All flaked stone tools were examined macroscopically for signs of edge wear (either use wear or edge grinding) and were sorted by tool type.

Unifaces are flakes that have been shaped by the intentional removal of flakes by percussion from only one side or surface, and along one or more margins of a tool (Whittaker 1994; Odell 2003; Crabtree 1972). Four artifacts assigned to this category included non-descript unifacial tools, scrapers and spokeshaves. Scrapers are an example of unifacial tools, which exhibit a steep working edge (>45 degrees), that would be useful as scraping tools, tools for planing wood or bone, or for cutting (Whittaker 1994). All identified scrapers were side scrapers, which can be defined as elongate forms with one or both parallel edges showing retouch and/or use.



A total of three scrapers was noted at sites 42Gr3993, 42Gr3997 and 42Gr4004. The first scraper (42Gr3993) consisted of a red chert flake with microflaking along one lateral edge. The second (42Gr3997) was a gray quartzite specimen that exhibited microflaking along one lateral edge and on the distal end, and measured 5.5 by 3.2 by 2 centimeters in size. Figure 66 shows the specimen from 42Gr4004, which consists of a quartzite flake that has microflaking along both lateral edges. The scraper is a rather large flake measuring 9 by 6.8 by 1.9 centimeters in size.

Figure 66: Side scraper from site 42Gr4004.

A spokeshave is a unifacial tool that has at least one retouched lunate (crescent or moon-shaped) notch in one of the edges. While a spokeshave is typically thought of as a tool used to shape and smooth wooden rods and shafts, it is difficult to determine if this was actually the function of these tools. One of these items observed at site 42Gr3993 consisted of a tan chert material with pink inclusions. This specimen exhibited one lunate notch with microflaking, as well as microflaking along on one of the lateral edges (Figure 67). It is likely, based on morphology and retouch, that this tool served dual functions as both a scraper and spokeshave.



Figure 67: Spokeshave from 42Gr3993

Bifaces are tools that have been shaped by the intentional removal of flakes from opposing sides by percussion (Whittaker 1994; Crabtree 1972; Odell 2003). They lack hafting elements (notches or stems) that would identify them as projectile points, and have therefore been placed in their own category. The classification system used in the analysis of the Tenmile Canyon assemblages combines the biface manufacturing stages defined by Wenker (2000) and Whittaker (1994). The stages of biface manufacture are:

- **Stage 1 Bifaces.** Bifaces fitting into this category exhibit only minimal modification and may be indistinguishable from bifacial cores. These bifaces represent the initial stages of raw material procurement and/or testing.
- **Stage 2 Bifaces.** This category also includes those items in the initial stages of thinning, with controlled flaking, around part or all of the tool's edge. The flaking is irregular and flake scars usually do not cross the midline of the tool.
- **Stage 3 Bifaces.** These items represent the stages of thinning the item's cross-section without diminishing the outline shape of the tool.
- **Stage 4 Bifaces.** These items are still being thinned, but initial shaping is coming into play, and the item's final shape is started.
- **Stage 5 Bifaces.** These bifaces are completely thinned, and final shaping is being performed, or is complete. Pressure flaking may also be applied. These can be classified as highly symmetrical. These bifaces exhibit well-controlled flaking and the edges are straight and regular.

A total of 21 bifaces were observed during the course of investigations reported here. While projectile points are commonly analyzed separately from bifaces, a number of possible projectiles were either too fragmentary or did not match with any particular "type" and were subsequently analyzed as bifaces. All specimens are representative of the later stages of bifacial reduction, stages 3 through 5, implying that tool stone was

being reduced at a different location and transported to the respective sites as finished or almost finished pieces or blanks. These bifaces are summarized in Table 2.

Table 2: Summary of biface tools from Tenmile Canyon (2007-2008)

SITE NUMBER	MATERIAL	TYPE	STAGE
42Gr3354	Pink-red chert	Tip fragment	5
	Red chert	Base fragment	5
42Gr3833	Chert	Base fragment	5
	Chert	Base fragment	5
	Chert	Base fragment	5
42Gr3834	Chert	Base fragment	4
	Chert	Base fragment	5
42Gr3836	Unknown	Mid-section fragment	5
42Gr3839	Tan chert	Fragment	4
42Gr3843	Chalcedony	Base fragment	5
42Gr3993	Tan chert	Tip fragment	5
	Gray chert	Fragment	3
	Gray chert	Fragment	3
	Gray chert	Fragment	3
	Gray chert	Fragment	4
	Gray chert	Fragment	4
42Gr3997	Gray chert	Base fragment	5
42Gr4002	Red chert	Base fragment	4
	Clear chalcedony	Base fragment	5
42Gr4003	Orange metaquartzite	Fragment	3
	Tan chert	Tip fragment	4

Bifacial Blades are bifacially flaked items that are generally triangular to lanceolate in form, exhibiting a cutting edge around the entire circumference and lacking tangs or other indicators of hafting (Aikens 1970). These artifacts are interpreted as general purpose tools that could be used for a multitude of tasks including cutting, scraping and incising. A total of eight specimens fit into this category (representative examples are illustrated in Figure 68).

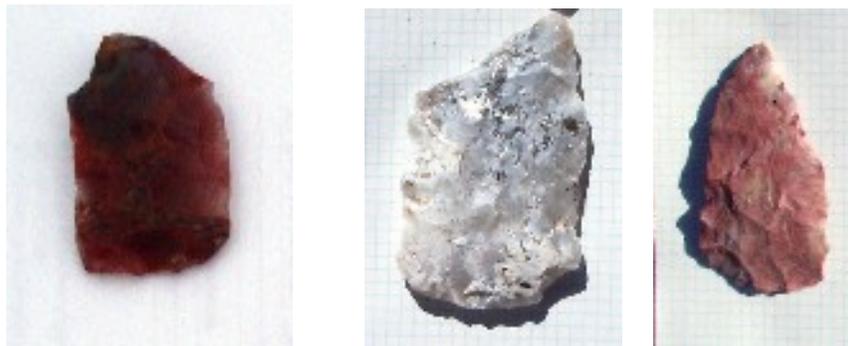


Figure 68: Bifacial blades (left) site 42Gr4002; (center) site 42Gr3993; (right) site 42Gr3995.

Drills are bifacial tools with narrow shafts rather than broad blades. They are usually diamond-shaped in cross-section at their short axis. They were used in a rotary motion in order to perforate rigid items. Two drill fragments were observed during the course of CPAA investigations: a white chert drill expediently crafted from a biface thinning flake, documented at 42Gr3833 in 2007, and a white quartzite hafted drill found during the 2008 investigation of 42Gr3995 (Figure 69).



Figure 69: Hafted drill from site 42Gr3995.

Projectile points are bifacial tools that exhibit formal hafting elements at their bases. While there has been much debate concerning morphological typologies and the effects of rejuvenation on projectile form in the past (Flenniken and Raymond 1986; Thomas 1986; Flenniken and Wilke 1989; O’Connell and Inoway 1994), the often broken or “spent” form is commonly what the archaeologist encounters. Therefore, the established typologies provide the basis for the reporting here. The projectile points identified in the Tenmile Canyon assemblages were placed into the commonly accepted categories for Great Basin projectile points outlined by Thomas (1981), with additional descriptions following Holmer (1979, 1986).

A total of 5 clearly identifiable projectile points were identified and can be placed into types representative of the Archaic (n=2) and a Formative archaeological complex (n=3). Following are descriptions for the point types identified. *Elko corner-notched points* are a type characterized by a “triangular blade form with straight to slightly convex edges. The corner notches form tangs and an expanding stem that is narrower at its base than the maximum blade width. The base ranges from slightly concave to slightly convex” (Holmer 1979). The Elko series points are considered the least temporally diagnostic of the point types found in the Great Basin and Colorado Plateau. They appear first in the Eastern Great Basin and Colorado Plateau sometime after 7600 B.P., with a temporal span of 3500 and 1400 B.P. everywhere in the Great Basin and northern Colorado Plateau. In addition, there are few morphological characteristics of this point type that differentiates one time period from another (Holmer 1979). With a roughly 7,000 year temporal span and two distinct “hiatus” periods for this point type, assigning a specific age is problematic. One point at 42Gr3995 is consistent with Holmer’s description for Elko corner-notched points (Figure 70).

Large side-notched points comprise a class that combines a number of previously defined point types including Northern Side-notched and Elko side-notched (Thomas 1981). While points fitting into this category in the Eastern Great Basin have fairly limited age ranges (Northern side-notched from 7000 to 6300 B.P.; Rocker side-notched from 6800 to 5300 B.P.; Sudden side-notched from 6400 B.P. 4700 B.P.), Thomas states that



Figure 70: Elko corner-notched point (42Gr3995)

there is not a large enough sample to provide temporal information, but that they are older than the 1300 B.P. emergence of the Desert side-notched type (Thomas 1981). One point of this type was observed at site 42Gr3839 and is most likely attributable to the Elko side-notched variety.

Rosegate Series points comprise a class that combines the previously defined Rose Spring and Eastgate point types (Thomas 1981). These points are characterized as small, corner-notched points with expanding (although sometimes negligibly) stems. The temporal range for this class is from roughly A.D. 400 to A.D. 1300, but since these points are commonly associated with bow and arrow hunting technology, most likely emerge earlier (see Holmer 1986). Three of these points were identified at sites 42Gr3832, 42Gr3842 and 42Gr4002. The specimen found at 42Gr4002 has been re-worked to a sharp point that is more consistent with a perforator or graver.

Cores, or large pieces of host material from which flakes are removed, were fairly common (n=11) in the open lithic assemblages in Tenmile Canyon, but were less common in the sheltered sites investigated. The low number of cores in relation to finished bifaces and debitage suggest that some tool manufacture did occur to some extent at both types of sites, but was not a major activity. Tools were most likely reduced to a point more amenable to transport at those sites interpreted as tool stone procurement locations (42Gr4004 and 42Gr4006) and brought from those localities to the other sites for further reduction, with tool maintenance and repair occurring as needed.

A total of seven hammerstones were observed at sites in Tenmile Canyon. These items can be defined as hand-held cobbles that were used as percussion devices. The items matching this description found during the 2007 and 2008 investigations also exhibited heavy battering or crushing at both ends, as well as along at least one margin of each tool. Numerous flake scars suggest that they may have also been used as cores prior to use as hammering implements. Hammerstones were identified at sites 42Gr660, 42Gr3836, 42Gr3837, 42Gr3842 (n=3), and 42Gr3994.

Battered implements are stone tools that exhibit some kind of battering or crushing on one or both ends, or along one or more sides, although a clear interpretation of use as a hammering implement is equivocal. Three of these items were observed at sites 42Gr3835, 42Gr3842 and 42Gr3844.

An inventory of the morphological characteristics of flaked stone debitage was performed, and a total of 4,940 pieces of debitage, all comprised of locally available quartzite, cherts and chalcedonies was observed during the course of investigations in Tenmile Canyon. The analysis of lithic debitage focused on the basic features of the flakes themselves. The first step in the analysis process was to determine a flaking stage: primary, secondary or tertiary. This was determined by the amount of cortex present on the dorsal surface of the artifact. A primary flake retains roughly 95 percent cortex on the dorsal surface, a secondary flake 1 to 94 percent cortex on the dorsal surface, and a tertiary flake has no cortex at all.

The second step in the analysis was to make a determination of the stage of reduction (early, middle or late) represented by each individual flake in the assemblage. This determination was based on multiple variables, which included but were not limited to platform preparation characteristics, flake size and shape, and the total number and direction of dorsal scars. The criteria used, as well as the method for identifying the stage of reduction follows Wenker (2000), which is a simplified version of Flenniken (2002). For the purposes of this analysis,

- *Early-stage* flakes are those that can be classified as having been produced during the initial stages of core reduction, by hard-hammer percussion techniques. These flakes typically include broad, simple platforms with little or no platform preparation, a thick transverse cross-section, a low frequency of dorsal flake scars, and quite often have cortex remaining on the dorsal surface.
- *Middle-stage* flakes can be characterized as having a prepared platform, often multi-faceted, which represents a small segment of a prepared and often dulled (by grinding) bifacial tool edge. Also known as biface-thinning or biface-reduction flakes, these flakes may also exhibit a combination of a thin, transverse cross-section; an expanding, “teardrop” shape with feathered terminations; multiple flake scars originating from varied directions; a lipped platform; and little or no cortex on the dorsal surface.
- *Late-stage* flakes (i.e. - pressure flakes) are usually very small, narrow and elongated flakes with multiple dorsal flake scars. They exhibit platforms prepared by grinding, are multi-faceted, and contain no cortex on the dorsal surface.
- For those pieces that are either incomplete or do not exhibit the characteristics needed to identify which stage of reduction produced them, the category of “*Fragment*” is often used (and was in our analysis).
- A *utilized flake* can be defined as a flake that has not been modified after its removal from a core, but shows signs of obvious use-wear such as micro-flaking or edge rounding. Two utilized flakes were found, one at 42Gr3833 and one at 42Gr3834.

Using these criteria, all specimens were examined in order to determine if there was any edge wear, microflaking or platform preparation visible. Complete inventories were not compiled for each site containing these types of artifacts, and although the

tertiary middle-stage of reduction is the dominant flake type encountered at all sites, a representative tabulation of flake-types does show a fairly accurate patterning that is found in the Tenmile Canyon area. The reduction stages of all tabulated debitage are summarized in Table 3.

	Early	Middle	Late	Fragment	Total	%
Primary (>95%)						
Secondary (1-94%)	4	1		1	6	5
Tertiary (0%)	8	102	6	10	126	95
Total	12	103	6	11	132	
%	9	78	5	8		100

Table 3: Analysis of lithic debitage flaking stages from the tallied assemblages from both years. Percentages were rounded to the nearest one-tenth of a percent.

The open sites encountered during the CPAA investigations of 2007 and 2008 appear to represent diffuse scatters of lithic material where prospecting and tool-stone procurement activities occurred, along with direct free-hand percussion reduction of bifacial blanks. The presence of utilized flakes, scrapers and Stage 4 bifaces indicates some cutting and/or scraping activities also took place on these sites. These open sites are found in areas where chert, chalcedony, and quartzite cobbles are naturally eroding from the sand. The characteristic Neapolitan appearance of the Jurassic-age Morrison Formation is visible in certain areas throughout the canyon system. This formation often contains high quality cryptocrystalline tool-stone. We believe that these materials are both eroding out of overlying strata as well as being washed down into the canyon from above by colluvial action.

It is therefore plausible that these sites represent areas of prospecting where cobbles of high quality Morrison Formation tool-stone materials were tested for their suitability for stone tools. Larger versions of these sites found elsewhere on the northern Colorado Plateau are typically characterized by numerous tested cobbles, early-stage or primary decortication flakes and expedient bifaces. Tool stone would typically be reduced to biface form to remove portions of low utility and thus eliminating the transport costs of useless material. A number of bifaces would be quickly produced and only the best materials would be transported to a central place for additional reduction and heat treatment. Because of limited carrying capacity of the toolmaker, undesirable pieces would be left behind. The sites encountered in Tenmile Canyon probably represent multiple events.

Groundstone. Groundstone items encountered in 2007 and 2008 consisted of complete and fragmented manos, portable and bedrock metates, grinding slicks, grooves and other stone items that have been ground, battered, pecked, abraded, or otherwise smoothed and shaped by human use. These items were used to grind plant material as well as animal bones which were pounded or ground, cooked or mixed with fat, and eaten

(Stewart 1941; Steward 1941; Gilmore 1953). The tool-stone material (sandstone) for these implements is locally available.

A total of 42 pieces of groundstone (whole or fragmentary) were identified at sites in Tenmile Canyon, and were described and analyzed in a manner similar to Adams (2002). Thirty-six metate fragments (all representing slab-type), and five localities with multiple non-portable bedrock metate/boulder grinding slicks were documented and photographed. All of these items were constructed of sandstone slabs or onto sandstone surfaces (see Figure 18 earlier in this report). The most common surface alterations consist of grinding and pecking, although shaping and polishing from repeated use are also present on some items. These items were identified at sites 42Gr660, 42Gr3831, 42Gr3832, 42Gr3833, 42Gr3835, 42Gr3836, 42Gr3837, 42Gr3840, 42Gr3842, and 42Gr3991. In addition, site 42Gr3994 contained three sandstone boulders containing what appear to be sharpening grooves. A total of four grooves were identified, ranging in size from 21 to 29 centimeters in length and 0.6 to 1.6 centimeters in width.

Fire-Cracked Rock (FCR). Fire-cracked rock can be distinguished from natural stone materials as being very angular and blocky in appearance, with some discoloration caused by the heating process. As stones are continually heated and cooled, the thermal properties of the stones cause them to expand and contract, causing them to crack and break down to smaller fragments. There comes a point when the thermal capacity of the stone can no longer retain the heat required to cook food or boil water. When a stone reaches a point when it can no longer effectively conduct heat transfer, it is discarded for another stone that will accomplish the task (Jensen et al. 1999).

The use of stones for cooking is well documented in the ethnographic literature (Smith 1974; Fowler 1986; Steward 1941). Boiling water for stew-like concoctions, meat or seed meal used in preparing mush or gruel was common (Fowler 1986). In addition, large game was sometimes cooked by filling the body cavity with hot rocks and water (Fowler 1986). More often, however, boiling required the use of water-tight and often pitch-lined baskets (Steward 1941; Gilmore 1953), and during Formative times, ceramic vessels with plastic properties that could accommodate boiling for extended periods.

Pit roasting also utilized stones. Pinyon cones were roasted to release the seeds, and other seed resources, such as Indian Rice Grass, were also processed in this manner (Jensen et al. 1999; Simms et al. 1999). Most root resources require thermal alteration to remove or stabilize toxins and make them suitable for human consumption (Fowler 1986; Wandsnider 1997). In describing the cooking of tubers (Camas), Meriwether Lewis described the utilization of four to six pounds of stones that are heated directly by fire to a red-hot state in pits that were two-feet in depth. Part of the cooking process involves pouring water on and around the stones to produce steam to aid in the cooking of the roots (Moulton 2002). This process would aid in the fragmentation of the heating stones (the heating and rapid cooling) that results in the tell-tale angular blockiness indicative of this artifact type.

Experimental replication on the production of FCR by students at Utah State University in the late 1990's refined estimates on the duration of site occupation and intensity of activity by examining the breakdown rates of rocks used for cooking, identifying the relative size grades of re-usable versus discarded stones, and recording the decline in efficiency as the stone fragment get smaller (Jensen et al.1999). While elements exhibiting characteristics of this artifact type cover virtually any size-grade imaginable, high-intensity surface fires can create similar morphological markers on small stone pieces. Overall, this artifact class ranges from 5.3 by 4.0 by 1.4 millimeters, to pieces larger than 120.7 by 80.9 by 75.7 millimeters in size. Items fitting into this category were found at site 42Gr3995.

Bone Artifacts. Bone artifacts typically consisted of bone fragments too small to be identified as to species. Numerous fragmented and unmodified faunal materials, both burned and un-burned, were observed at alcove sites with evidence of residential occupations, and typically were observed in the back-dirt piles from looters. Several exhibited distinct cut or butcher marks and splitting of the bones lengthwise to extract marrow. No tallies of bone fragments were compiled, and the context and agent of manufacture were indeterminate.

Only one bone artifact was observed that exhibited intentional shaping or other marks of human origin. At 42Gr3994, a rib bone from an unidentified medium-sized mammal exhibited a rounded tip and a notched base. This tool measured 11.4 centimeters long by 0.8 centimeters wide and was 0.3 centimeters thick.

Organic Materials. Organic materials that could assist in the establishment of temporal context was limited to charcoal at numerous alcove sites (and one open site), juniper bark, wood and maize remnants. A possible digging stick was found at site 42Gr3842 that measured 59 centimeters long by 3 centimeters in diameter. The greasewood stick had been sharpened and tapered on one end that also appeared to be fire-hardened. At site 42Gr3844, the remnants of shredded juniper bark below the front wall of a D-shaped structure, suggesting a bark barrier of some sort had been laid along the floor area prior to construction (see Figure 34 earlier in this report).

As discussed above, corncobs were observed at 42Gr660 and 42Gr3845, and corncobs, corn stalks and husks were observed at 42Gr3842, all alcove sites within view of one another (see Figure 38 earlier in this report). As discussed by Metcalfe and Barlow (1992), corn stalks and husks are rarely, if ever, transported a significant distance from corn fields (Metcalfe and Barlow 1992). This suggests that corn stalks and husks at 42Gr3842 are evidence that maize was being cultivated and processed along the Tenmile Canyon floodplain in close proximity to the alcove where the remains were observed.

Site Condition and Eligibility Assessments

Most of the 38 sites documented during the course of the 2007-2008 intuitive surveys were found to have suffered significant and cumulative impacts from the combined effects of vandalism, vehicular traffic and livestock. Rock art panels found

without associated features appear to have suffered the least adverse impacts, whereas alcove sites with deep aeolian deposits and associated features (e.g. architecture, rock art, grinding slicks) appear to have experienced the greatest amount of damage. Although the sample size is admittedly small, adverse impacts appear to be associated primarily with two factors: (1) the visibility of large alcoves from the canyon bottom, which has been accessible by vehicle since at least the 1960s, and (2) increased accessibility to the first bench area above the creek by wheeled vehicles that are mechanically capable of extreme off-trail travel.

The visibility of the large alcoves has resulted in multiple episodes of vandalism and looting, some occurring as early as the 1920s and as recently as the 1990s, based on inscriptions observed at looted sites and the age of associated detritus left behind by looters. This looting has been massive, with some sites exhibiting more than 20 individual looters' pits that have destroyed the surface context of 50 to 80 percent the living areas within the alcoves. The looting has also been systematic, with evidence that looters have used shovels, screens and artificial lighting. Based on the vertical profiles now evident in some looter's pits, the now-deflated looters' pits extend at least 20 to 50 centimeters below present ground surface, but probably no more than 1 meter in depth due to the unstable sandy aeolian deposits. Eleven of the 13 sheltered residential sites and two of the three alcove storage sites identified by CPAA have been vandalized, most of them seriously. One site that was not vandalized was a small shelter, perhaps a temporary camp, with ephemeral residential detritus that may have gone unnoticed during the vandalism of two adjacent, much larger shelters. And the other undamaged site is an alcove where looting noted in the 1970s but is no longer obvious.

Difficulty of access does not appear to have been a factor inhibiting vandalism. Eleven of the sheltered residential areas and all three sheltered storage sites are located in alcoves at the base of the first cliff level where access is extremely easy. Nine of these residential sites had been seriously looted, as had two of the storage sites. Both of the sheltered residential sites with moderate-to-difficult access had been seriously looted. Both alcoves with moderate-to-difficult access were located in alcoves situated about 3 to 5 meters directly above the edge of the alluvial plain. In the case of 42Gr660, access involves free-climbing about 3 meters of vertical cliff wall to a sloping area that leads to the interior of the shelter. In the case of 42Gr3845, small hand-and-toe holds were carved into the vertical cliff face (prehistorically) to provide access to the floor area of the alcove about 5 meters above.

Bench areas on both sides of the canyon exhibit evidence of repeated and ongoing off-trail motorized activities. During the 2007 surveys, illegal motorized vehicle use was observed to have occurred since a major rainstorm four days prior. In 2008, despite cold and wet conditions early in the season, several major trails onto the bench area had already been created. In at least one instance, the illegal trail was created around a BLM trail closure sign (Figure 71). During both 2007 and 2008, CPAA archaeologists observed motorcyclists violating current trail rules that restrict vehicular traffic to a signed trail in the bottom of the canyon. During both years, improper vehicular use was observed to be

directly impacting the integrity of significant sites believed to be eligible for listing on the National Register of Historic Places.



Figure 71: Established ORV trail on bench area above BLM signed trail in the canyon bottom.

It is emphasized that BLM prohibitions on off-trail travel are being routinely ignored. This was observed by CPAA crew members on April 1, 2007, when a group of motorcyclists descended from the north canyon rim on steep white slickrock, passing within a few meters of 42Gr3833 and 42Gr3834 before crossing the alluvial plain and the canyon bottom and then ascending the south cliff face (Figure 72). Both sites had been recorded earlier that day and exhibited no evidence at that time that mechanized vehicles were driving through or near the cultural deposits. And on March 11, 2008, a motorcyclist was observed driving his vehicle through 42Gr4002 and 42Gr4003, both of which are open lithic sites with an abundance lithic debitage and stone tools.

All 38 sites evaluated by CPAA are recommended as eligible for listing on the National Register under Criteria A, C and/or D in that they contribute to broad patterns of Archaic and Formative prehistory on the northern Colorado Plateau; they embody distinctive characteristics of type, period or method of construction, or represent a significant and distinguishable entity, even if the individual sites lack distinction; and they are likely to yield important information about the prehistory of the region. The impacts and potential eligibility of these sites are discussed here individually:



Figure 72: Motorcycles descending from north rim of canyon adjacent to 42Gr3833 and 42Gr3834.

42Gr583

This small but dense scatter of lithic artifacts is located about 30 meters to the west of a heavily traveled ORV route (Figure 73). The site location is clearly visible from that route, and it is easily accessible to wheeled vehicles. No vehicle tracks were observed directly associated with the site, and the presence of some biotic crusts on existing soils suggests this site rarely receives visitation. Dune areas about 30 meters to the southwest of the site do have vehicle tracks, demonstrating the potential that off-trail ORV travel will eventually extend to the north and impact the integrity of this site. No evidence of pedestrian foot traffic, litter or vandalism was observed. This site remains in good condition.

The absence of temporally diagnostic artifacts and the presence of potentially shallow deposits overlying bedrock militate against National Register eligibility. However, when the site is placed within the context of nearby special-use and alcove residential sites, this site is recommended as eligible under Criterion A in that it is associated with broad patterns of human prehistory on the Colorado Plateau, and under Criterion D in that it could contain subsurface deposits that would yield important information about prehistoric special-use sites, lithic procurement strategies and land-use patterns in the Tenmile Canyon area generally.



Figure 73: View to south of 42Gr583 with existing vehicle route at center frame.

42Gr660

The sheltered residential site is located inside a large, prominent alcove on the north canyon wall that is easily visible from the main ORV trail in the canyon bottom about 50 meters to the south. The bench area directly below the alcove has been repeatedly accessed by motorized vehicles, which have cut trails from the creek through an 8- to 10-meter-high down-cut in the alluvial deposits (Figure 74). Vehicle tracks were observed across the bench area below the site, including areas near the cliff face in proximity to artifact concentrations (but not through them). Cultural deposits in front of the alcove and along the base of the cliff to the east remain vulnerable to vehicular traffic. The alcove itself is about 6 meters above the base of the cliff, and access involves scaling a vertical cliff face about 3 meters and then a sloping cliff face another 3 meters to the sloping alcove floor covered with deposits. Pedestrian access to the alcove is difficult but not impossible given the numerous footprints that suggest repeated visitation.

The interior of the alcove features significant, probably repeated episodes of vandalism. At least seven looters' pits are visible along the back wall of the alcove, ranging in size from 80 centimeters to 1.5 meters in diameter. Most of the pits have refilled with eroded sands, and are currently 25 to 35 centimeters deep. Additionally, a rectangular impression in the sand at the rear of the shelter suggests that someone with a sleeping pad recently spent the night in the shelter. No litter was observed inside the shelter, and only small fragments of broken clear glass were observed on the bench area outside. This site is in poor condition.



Figure 74: ORV access through alluvial down cutting leading to 42Gr660.

Despite the extensive looting, this site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the utilization of natural shelters by foraging populations. Most relevant, this site is eligible under Criterion D in that it likely contains significant subsurface deposits that would yield important information about prehistoric non-architectural residential occupations, lithic procurement strategies, bi-gender foraging camps and land-use patterns in the region generally. The charcoal could also contribute important temporal context to prehistoric adaptations throughout the region, and pollen evidence could contribute to a greater understanding of how those adaptations were influenced or constrained by changes to the local environment. Microrefuse analyses could also contribute important insights into prehistoric subsistence. Although looting has destroyed some surface deposits, it is highly probable that intact cultural deposits are located below the area disturbed by looters, as well as below the back dirt piles and in the undisturbed alluvial deposits in front of the shelter.

42Gr661

Located in middle Tenmile Canyon, 42Gr661 is not readily accessible to pedestrians, given the long distances involved. However, it is easily accessible to motorized users. ORVs have repeatedly accessed the bench area below the site in this area of the canyon, as evidenced by well worn two-track trails up the embankments and across the bench. The BLM has posted a route closure sign at the point the trail diverges from the canyon bottom, but vehicle tracks actually go around the sign and continue onto the bench (Figure 75). A major (but illegal) ORV trail leads to within 50 meters of the

site, and ephemeral tracks from two-tracked vehicles lead from the major spur route across the white slickrock. Old tire tracks were observed in the sand deposits at various intervals leading right up to the site. The alcove is located about 7 meters vertical distance above the major trail at a 5 degree slope. Vehicular access to the area in front of the alcove is possible, but probably not to the interior deposits.



Figure 75: Major spur route leading around BLM route closure sign. Trail leads to alcoves with 42Gr661, 42Gr4000 and 42Gr4001, and through 42Gr3999, 42Gr4002 and 42Gr4003.

Despite the prominence of this alcove, there is little or no evidence of vandalism to interior deposits. The 1976 site form indicated possible vandalism (or a depression where animals had bedded down), but this was not clearly evidence in 2008. There are no obvious back dirt piles or depressions, no inscriptions or graffiti, and no litter or detritus from past looting activities. No footprints were observed on the site in 2008, suggesting this site has not received recent visitation, although the vehicle trails suggest that the site does receive periodic visitation. The primary impacts to this site have been precipitated by livestock, as evidenced by the bioturbation and copious amounts of dung (Figure 76). It appears cattle have bedded down inside Feature 1, perhaps precipitating the collapse of the structure walls. Dung was observed inside both Feature 1 and Feature 2. Generally, the site appears to be in the same condition as observed in 1976, although animal impacts appear to be ongoing.



Figure 76: Bioturbation and livestock dung on site surface at 42Gr661.

Given the material culture evidence of residential activities, this site is eligible under Criterion A inasmuch as it is directly associated with broad patterns of Archaic and/or Fremont/Ancestral Puebloan prehistory on the Colorado Plateau, with attributes unique to the Green River Desert sub-region. This site could reflect human adaptations during Formative times, when foraging was supplemented by agricultural production that warranted the construction of storage facilities. This site is also eligible under Criterion D inasmuch as it has considerable potential to contribute to a better understanding of how and why prehistoric groups exploited local environments, in particular human responses to periodic and persistent droughts, concurrent and evolving storage strategies to ameliorate the effects of food shortages, shifting agricultural practices to accommodate growing populations, and defensive strategies to militate against predatory groups.

42Gr3354

This dispersed scatter of lithic and ceramic artifacts is located on both sides of a heavily traveled ORV route that leads into the bottom of Tenmile Canyon. The ORV route, the installation of a cattle guard and the construction of a fence line perpendicular to the ORV trail (Figure 77) have all impacted the integrity of the site, as well as potential cultural deposits. This site has also been heavily impacted by off-trail vehicle activities. The area around the cattle guard appears to have become a staging area for ORVs prior to descending into the bottom of the canyon. There is considerable evidence that vehicles have not remained on the trail at this point inasmuch as 20 to 25 vehicle trails were located on the bench area around the cattle guard (Figure 78). Most were single-tracks (motorcycles). Tracks on sloping areas of the site appear to have resulted in accelerated

erosion, which has exposed artifacts, some of which were observed in the ruts of the tire tracks. The densest concentration of artifacts is located east of the road in an area that has been less severely impacted by mechanized vehicles. However, this area also exhibits evidence of off-trail vehicle tracks. This was the only site identified by CPAA that had been directly impacted by the main ORV trail. This site is in fair condition due to the fact that the primary concentration of artifacts is located to the east of the road in areas impacted by vehicles to a lesser extent.



Figure 77: View to north of cattle guard and ORV trail at 42Gr3354. Pin flags denote artifacts.



Figure 78: Fence line and vehicle tracks at 42Gr3354.

This site is eligible under Criterion A in that it is associated with broad patterns of human prehistory on the Colorado Plateau, particularly during late Formative times when traditional boundaries between Fremont and Ancestral Puebloan groups collapsed, resulting in a blending of material culture traits after A.D. 1000 (cf. Madsen and Simms 1998). The presence of corrugated ceramics suggests this site was occupied after A.D. 1100. It is also eligible under Criterion D in that it could contain subsurface deposits that would yield important information about prehistoric special-use sites, lithic procurement strategies, bi-gender foraging camps and land-use patterns in the region generally.

42Gr3829

This rock art site is located on a cliff face abutting a narrow north bench area directly above a 7-meter high vertical down-cut in the alluvial deposits. The site is visible from the main ORV trail in the bottom of the canyon about 120 meters to the south. The site is located high on a cliff face where it is not accessible to touching, tracing or rubbing, and is therefore in excellent condition. However, the bench area is littered with clay pigeons, indicating that shotgun blasts have been directed (probably inadvertently) at the rock art panels. Pedestrian access is easy, and there is no evidence that vehicles have yet breached the vertical down-cut to gain direct access to the bench. Such access would be difficult, but not impossible given evidence observed elsewhere in Tenmile Canyon. With the exception of the historic inscription of a horse unassociated with the prehistoric images, no other impacts were observed. This site is in excellent condition.

This site represents a remarkable example of Fremont rock art with precise pecking that has resulted in distinct anthropomorphic, zoomorphic and abstract images. As such, it is eligible under Criterion C in that it embodies distinctive characteristics of type, period or method of construction that constitutes a significant and distinguishable entity. It is also recommended as eligible under Criterion D in that it could contribute to an understanding of land-use patterns in the region generally, as well as to an understanding of prehistoric ceremonialism, religion and communication.

42Gr3830

This rock art site is located on a cliff face abutting a narrow bench area directly above a 10-meter high vertical down-cut in the alluvial deposits. The site is not visible from the main ORV trail in the bottom of the canyon about 100 meters to the south, and given the ephemeral nature of the single petroglyph image it has likely escaped notice from most pedestrian visitors. Pedestrian access is difficult due to the steep down-cutting of the alluvial deposits. No adverse human activities were observed at this site and there is no evidence it has been visited recently. No ORV tracks were observed on the bench area, and there is no evidence vehicles have attempted to breach the vertical down-cuts in this area. Vehicular access to the bench would be difficult but not impossible given evidence observed elsewhere in Tenmile Canyon. This site is in good condition.

The presence of a single, non-diagnostic image militates against National Register eligibility. However, this site is recommended as eligible under Criterion C in that it comprises a part of a significant and distinguishable catalog of images whose components may lack individual distinction but which collectively contribute to a broader understanding of spatial and temporal relationships between prehistoric populations. It is also recommended as eligible under Criterion D in that it could contribute to an understanding of land-use patterns in the region generally, as well as to an understanding of prehistoric ceremonialism, religion and communication.

42Gr3831

This sheltered residential site is located in an alcove abutting the north edge of a broad bench area above a 3-meter high vertical down-cut in the alluvial deposits. The alcove is visible from the main ORV trail about 50 meters to the south. The down-cut is easily negotiated by pedestrians and mechanized vehicles. Ephemeral vehicle tracks were observed on the bench area about 30 meters south of the alcove, and the down-cut has been worn down in several areas where vehicles have attempted to access the bench. Potential cultural deposits in front of the sheltered living area remain vulnerable to vehicle traffic. No pedestrian trails were observed on the bench area, but recent footprints were observed at the site. This site is not obvious as a residential locality except for evidence of massive looting that has exposed cultural materials.

The site consists of a sheltered area that has been excavated to a depth of at least 0.5 meters. The interior area of the shelter features what now appears to be a single trench about 14 meters long with an adjacent berm of back dirt along the trench in front of the sheltered area (see Figure 13 earlier in this report). Abundant lithic debitage was observed in the back dirt piles and on the bench area in front, as well as burned stone and fragments of groundstone. The vandals likely used screens given the absence of finished stone tools, piles of lithic debitage that have been dumped in a single location and finely sorted back dirt. The vandalism is not recent as evidenced by some re-vegetation of the looters' trench and back dirt piles. Trash associated with the vandalism was minimal, consisting of an aluminum can that had been discarded about 5 meters south of the site. The site has also been impacted by livestock. Surface deposits at this site are in poor condition.

Despite the extensive looting, this site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the utilization of natural shelters by foraging populations during Formative and Archaic times. It is particularly eligible under Criterion D in that it likely contains significant subsurface deposits that would yield important information about prehistoric non-architectural residential occupations, lithic procurement strategies, bi-gender foraging camps and land-use patterns in the region generally. The abundant charcoal could also contribute important temporal context to prehistoric adaptations throughout the region; pollen evidence could contribute to an understanding of how those adaptations were influenced or constrained by changes to the local environment; and microrefuse analyses could contribute insights into prehistoric subsistence strategies.

Although looting has destroyed a major section of the suspected living area, it is highly probable that intact cultural deposits are located below the area disturbed by looters, as well as below the back dirt piles and in undisturbed deposits in front of the shelter.

42Gr3832

This sheltered residential site with rock art is located in an alcove abutting the north edge of a broad bench area above a 3-meter-high vertical down-cut in the alluvial deposits. The alcove is visible from the main ORV trail about 50 meters to the south, and the down-cut is easily negotiated by pedestrians and mechanized vehicles. Ephemeral vehicle tracks were observed on the bench area about 30 meters to the south of the alcove, and the down-cut has been worn down in several areas where vehicles have attempted access to the bench. Potential cultural deposits in front of the sheltered living area remain vulnerable to vehicle traffic. This alcove has been severely looted with at least 20 looters' pits and/or depressions evident the entire length and width of the sheltered area. Some pits have eroded into shallow dish-shaped depressions, whereas others retain profiles with vertical sides.

Some looters' pits are about 1 meter in diameter and others appear to be about 2 to 4 meters in diameter (Figure 79). The pits extend at least 50 centimeters deep, although the original depth may have been greater. It does not appear that screens were used given the presence of potsherds and tools in the back dirt, and the absence of piles of discarded lithics. The looting appears to have been systematic given that the entire floor area has been disturbed. The back wall has been marred by graffiti, mostly black charcoal that has been rubbed on the surface and light scratch marks (Figure 80). The site is littered with broken brown beer bottles, aluminum cans, a steel can with an aluminum top, aluminum pull tabs and a Camel filters cigarette package (Figure 81). The site has also been impacted by livestock. Surface deposits at this site are in poor condition.



Figure 79: Shallow looters' pits at 42Gr3832.

Despite the extensive looting, this site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the utilization of natural shelters by foraging populations during Formative and Archaic times. The presence of rock art images suggests longer-term residency rather than single-event occupations. The rock art itself may be eligible under Criterion C in that it embodies distinctive characteristics of type, period or method of construction that, although lacking individual distinction, constitutes a significant and distinguishable entity. Most

relevant, this site is eligible under Criterion D in that it likely contains significant subsurface deposits that would yield important information about prehistoric non-architectural residential occupations, lithic procurement strategies, bi-gender foraging camps and land-use patterns in the region generally. The pollen evidence and charcoal could also contribute important temporal context to prehistoric adaptations throughout the region, and how those adaptations were influenced or constrained by changes to the local environment. Microrefuse analyses could also contribute important insights into prehistoric subsistence. Although looting has destroyed some surface deposits, it is highly probable that intact cultural deposits are located below the area disturbed by looters, as well as below the back dirt and in the undisturbed alluvial deposits in front of the shelter.



Figure 80: Charcoal graffiti at 42Gr3832.



Figure 81: Litter at 42Gr3832.

42Gr3833

This sheltered residential and rock art site is located in a small alcove abutting the north edge of a broad bench area above a 3-meter high vertical down-cut in the alluvial deposits. The alcove is visible from the main ORV trail 100 meters to the south, and an ephemeral wash leads directly to the site. Both the wash and the down-cut can be easily negotiated by pedestrians and mechanized vehicles. At the time the site was recorded, no evidence of vehicular traffic was observed on the bench area adjacent to the site. However, motorcyclists were later observed passing within 25 to 50 meters of the site, and the bench area probably now exhibits evidence of vehicle tracks. Potential cultural deposits in front of the sheltered living area remain vulnerable to vehicle traffic. No pedestrian trails or footprints were observed on or around this site at the time it was documented.

Approximately half of the alcove has been subjected to illegal excavations as evidenced by looters' back dirt piles around the exterior edges of the shelter floor and a single depression at the center that has largely refilled. The current pit is about 3 meters

in diameter with a maximum profile of 50 centimeters in depth (see Figure 16 earlier in this report). The back dirt piles have abundant artifacts, including lithics, groundstone and one potsherd. Sparse vegetation is growing in the back dirt piles, suggesting that the vandalism was not recent. An aluminum Budweiser can that had been discarded to the east is not weathered. The eastern half of the sheltered area has suffered extensive natural erosion that has exposed cultural deposits, but there is no evidence in the natural profiles that it has been vandalized. This site has also been impacted by livestock. This site is in fair condition although suffering extensively from erosion.

Despite the looting of the western portion of the alcove, this site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the utilization of natural shelters by foraging populations during Formative and Archaic times. Most relevant, this site is eligible under Criterion D in that it likely contains significant subsurface deposits that would yield important information about prehistoric non-architectural residential occupations, lithic procurement strategies, bi-gender foraging camps and land-use patterns in the region generally. The pollen evidence and charcoal could also contribute important temporal context to prehistoric adaptations throughout the region, and how those adaptations were influenced or constrained by changes to the local environment. Microrefuse analyses could also contribute important insights into prehistoric subsistence. Although looting has destroyed some surface deposits, it is highly probable that intact cultural deposits are located below the area disturbed by looters, as well as below the back dirt piles and in the undisturbed alluvial deposits in front of the shelter.

42Gr3834

This sheltered residential site is located in a small alcove abutting the north edge of a broad bench area above a 3-meter high vertical down-cut in the alluvial deposits. The alcove is visible from the main ORV trail 120 meters to the south, and an ephemeral wash leads directly to the site. Both the wash and the down-cut can be easily negotiated by pedestrians and mechanized vehicles. At the time the site was recorded, no evidence of vehicular traffic was observed on the bench area adjacent to the site. However, motorcyclists were later observed passing within about 25 meters of the site, and the bench area probably now exhibits evidence of vehicle tracks at the current time. Potential cultural deposits in front of the sheltered living area remain vulnerable to vehicle traffic. No pedestrian trails or recent footprints were observed at this site, although a game trail is located to the west of the alcove that could facilitate pedestrian traffic.

A single large looters' pit located toward the front of the shelter measures about 2 meters by 2 meters and has a maximum depth of 50 centimeters (Figure 82). A second depression was observed on the west side of the alcove. Both have largely refilled through natural erosion. The back dirt piles in front of the shelter are substantial, indicating that original episodes of vandalism were more significant than is currently evident (see Figure 19). Artifacts were observed eroding down slope in front of the shelter about 5 meters. Discarded trash included a broken short-necked brown beer bottle

and a rusted tin can. This site has also been impacted by large herbivores, perhaps sheep. This site is in fair condition.



Figure 82: Large looters' pit and associated back dirt pile at 42Gr3834.

Despite the extensive looting, this site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the utilization of natural shelters by foraging populations. Most relevant, this site is eligible under Criterion D in that it likely contains significant subsurface deposits that would yield important information about prehistoric non-architectural residential occupations, lithic procurement strategies, bi-gender foraging camps and land-use patterns in the region generally. The charcoal could also contribute important temporal context to prehistoric adaptations throughout the region, and pollen evidence could contribute to a greater understanding of how those adaptations were influenced or constrained by changes to the local environment. Microrefuse analyses could also contribute important insights into prehistoric subsistence. Although looting has destroyed some surface deposits, it is highly probable that intact cultural deposits are located below the area disturbed by looters, as well as below the back dirt piles and in the undisturbed alluvial deposits in front of the shelter.

42Gr3835

This expansive scatter of chipped-stone and groundstone artifacts extends along about 150 meters of a broad bench area that abuts the north cliff face and above a 5-meter-high down-cut in the alluvial deposits. The steep down-cut cannot be easily negotiated by pedestrians or mechanized vehicles at the point where the site is located,

but the bench area can be accessed at other locations to the east of the site and through an ephemeral wash on the western edge of the site. The bench area is visible from main ORV trail about 30 meters south of the southern periphery of the site. A single set of motorcycle tracks were observed running across the site (see tire tracks in lower center frame of Figure 20 earlier in this report), but these were not recent. However, the site remains vulnerable to wheeled vehicles. The only other adverse impact observed at this site was a cluster of lithic artifacts that had been stacked into a pile, suggesting the site has been surface collected (Figure 83). The site remains in relatively good condition.



Figure 83: Collector's pile of lithic artifacts observed at 42Gr3835.

Given the exceptionally expansive nature of this site, it is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the repeated utilization of a large area of the alluvial bench for tool maintenance and seed processing. Most relevant, this site is eligible under Criterion D in that it likely contains significant subsurface deposits that would yield important information about prehistoric, lithic procurement strategies, bi-gender foraging camps and land-use patterns in the region generally.

42Gr3836

This sheltered residential site is located in an alcove near the head of a small unnamed wash on the north side of the canyon. It is located about 200 meters north of the main ORV trail [REDACTED]

[REDACTED]. It is visible and easily accessible by pedestrians from both

vehicle routes. It appears that some individuals have gained access to the site with motorized vehicles as there are ORV tracks leading to within 30 meters of the site and in the bottom of the wash. At least three separate motorcycle tracks (single-tracks) are located to the southwest of the alcove about 30 meters. Cultural deposits in front of the shelter remain vulnerable to vehicular traffic, although access would be steep and sandy. The site features at least two large looters' pits, both of which have deflated due to interior water erosion and are currently 20 to 25 centimeters deep (Figure 84).



Figure 84: Looters' pits and exposed charcoal profiles from erosion at 42Gr3836.

A rusted, flat-bladed shovel found at the site is probably associated with the vandalism of the alcove (Figure 85). The level of rust, the absence of a wooden handle and the nature of the deflated pits indicate that the vandalism was not recent. The site receives some visitation as evidenced by recent footprints. The site is littered with Coke, Pepsi and Shasta cans (Figure 86). The site has also been impacted by livestock. This site is in fair condition.

Despite the extensive looting, this site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the utilization of natural shelters by foraging populations. Most relevant, this site is eligible under Criterion D in that it likely contains significant subsurface deposits that would yield important information about prehistoric non-architectural residential occupations, lithic procurement strategies, bi-gender foraging camps and land-use patterns in the region generally. The charcoal could also contribute important temporal context to prehistoric adaptations throughout the region, and pollen evidence could contribute to a greater understanding of how those adaptations were

influenced or constrained by changes to the local environment. Microrefuse analyses could also contribute important insights into prehistoric subsistence. Although looting has destroyed some surface deposits, it is highly probable that intact cultural deposits are located below the area disturbed by looters, as well as below the back dirt piles and in the undisturbed alluvial deposits in front of the shelter.



Figure 85: Rusted shovel blade at 42Gr3836.



Figure 86: Litter at 42Gr3836.

42Gr3837

This sheltered residential and rock art site is located along the base of the first cliff level and above the bench area on the north side of Tenmile Canyon. The cliff area is visible from the main ORV access route 70 meters to the south, and from an alternate vehicular route from the north canyon rim about 70 meters to the east. Pedestrian access through the steep down-cuts is easy, and vehicular access would be possible, although there is no evidence of this on the bench area in front of the site. Cultural deposits in front of the sheltered area remain vulnerable to vehicular traffic. Well-worn pedestrian trails lead to the site from the cattle guard on the alternate access route to the east, and recent footprints were observed throughout the site.

The site is marred by repeated episodes of vandalism and graffiti, perhaps since the 1930s. At least five looters' pits were identified. Copious evidence of residential activities is located at the base of the cliff, mostly in five back dirt piles resulting from illegal excavations. One looter's pit extends at least 1 meter deep, and others have profiles greater than 30 centimeters deep (Figure 87). Approximately 50 percent of the suspected residential area has been disturbed by looters, although much of the site appears to be relatively undisturbed. A stack of lithic artifacts on one boulder indicates that surface collection of artifacts continues to be a problem at this site. Inscriptions and graffiti dating as early as 1933 were observed on the cliff face around prehistoric rock art images

(Figure 88). The site is littered with aluminum cans and broken green and brown bottle glass. This site has also been impacted by livestock. Overall, this site is in poor condition.



Figure 87: Looters' pit and adjacent collectors pile of artifacts at 42Gr3837.

Despite the extensive looting, this site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the utilization of sheltered areas by foraging populations. This site also features rock art with distinct anthropomorphic, zoomorphic and abstract images. As such, it is eligible under Criterion C in that it embodies distinctive characteristics of type, period or method of construction that constitutes a significant and distinguishable entity, even if the images are not individually distinctive.

Most relevant, this site is eligible under Criterion D in that it likely contains significant subsurface deposits that would yield important information about prehistoric non-architectural residential occupations, lithic procurement strategies, bi-gender foraging camps and land-use patterns in the region generally. The charcoal could also contribute important temporal context to prehistoric adaptations throughout the region, and pollen evidence could contribute to a greater understanding of how those adaptations were influenced or constrained by changes to the local environment. Microrefuse analyses could also contribute important insights into prehistoric subsistence. Although looting has destroyed some surface deposits, it is highly probable that intact cultural deposits are located below the area disturbed by looters, as well as below the back dirt piles and in the undisturbed alluvial deposits in front of the shelter.



Figure 88: Graffiti scratching at 42Gr3837 with a date of 1937.

42Gr3838

This rock art site is located at the edge of a large alcove at the base of the first cliff level near the head of an unnamed ephemeral wash on the south side of the canyon. The alcove is visible from the main ORV route about 300 meters to the north. No vehicle tracks lead to the site or up the ephemeral wash below, although tracks were observed on the bench area about 250 meters north and east of the site. Pedestrian access is easy, but vehicular access would be difficult. There are no well established pedestrian trails, but there were recent footprints leading to the site and within the adjacent alcove. The rock art itself has not suffered from vandalism. However, the large alcove next to the site has been subjected to repeated vandalism, as evidenced by a series of looters' pits, graffiti and a plastic-coated metal hook.

At least seven looters' pits were observed, although they are poorly defined and there is no convincing evidence the looters impacted cultural deposits. The pits, located mostly along the back wall of the alcove, range in depth from 25 to 35 centimeters. All are located along the back wall of the shelter (Figure 89). The vandalism appears to have occurred despite the absence of surface artifacts indicative of subsurface deposits. Given the abundant sandstone slabs inside the alcove, it is possible the looters were drawn to architectural features that were subsequently dismantled. Graffiti is common on boulders inside the shelter; one inscription bears a date of 1997 (Figure 90). The rubber or plastic-coated hook was screwed into the ceiling of the alcove directly above the looted area, probably to hang a light while excavating at night (Figure 91). The shelter has also been impacted by livestock.



Figure 89: Deflated looters' pits at the back of alcove adjacent to rock art at 42Gr3838.

This site is eligible under Criterion A in that it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular Archaic adaptations to water-stressed environments and perhaps utilization of rockshelters during seasonal foraging activities. This site is also recommended as eligible under Criterion C in that it comprises a part of a significant and distinguishable catalog of images whose components may lack individual distinction but which collectively contribute to a broader understanding of spatial and temporal relationships between prehistoric populations. It is also recommended as eligible under Criterion D in that it could contribute to an understanding of land-use patterns in the region generally, as well as to an understanding of prehistoric ceremonialism, religion and communication.



Figure 90: Graffiti at 42Gr3838.



Figure 91: Hook in ceiling of alcove at 42Gr3838.

42Gr3839

This dispersed lithic scatter is located on a bench area about 100 meters south of the main ORV route in the bottom of the canyon and at the mouth of a distinct amphitheater-like side canyon with multiple alcoves. Informal spur trails lead from the main ORV route over the bench area, through the deposits and into the side canyon toward several large alcoves that are visible from the main ORV route. Motorized travel to and from these alcoves has caused significant damage to the integrity of the surface deposits at this site, including accelerated erosion along the tire tracks (artifacts were observed in the ruts) and disturbance of the spatial context of the artifacts (Figure 92). Vehicle tracks were attributed to at least six recent motorcycles (single tracks) and one ATV (dual tracks). The tire tracks were made sometime since a major rainstorm four days before the site was documented. Pedestrian access is easy. The presence of finished stone tools, in conjunction with the absence of piles of lithic artifacts, suggests this site has not been surface collected. However, the site remains vulnerable to surface collecting by individuals walking to the alcoves and to continued vehicle travel through the site. This site is in fair condition.



Figure 92: Tire tracks through 42Gr3839, looking south.

This site is eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular hunting and gathering during Archaic times. It is also eligible under Criterion D in that it could contain subsurface deposits that would yield important information about prehistoric special-use sites, lithic procurement and tool maintenance strategies and land-use patterns in the region generally. The presence of an atlatl dart point suggests this site could contain Archaic age deposits, and therefore may contribute important information about pre-farming adaptations in water-stressed environments.

42Gr3840

This sheltered residential site is located in a large alcove at the base of the first cliff level on the south side of canyon. It is easily visible and accessible from the main ORV route about 150 meters to the north. A well traveled ORV spur route leads from the main access route across the south bench to a point about 25 meters in front of the alcove (Figure 93). Lithic flakes and one biface tool were observed in the tire tracks in front of the shelter. Artifacts also extend in front of the shelter a considerable distance, indicating the potential for cultural deposits on the adjoining bench area that could be vulnerable to motorized vehicles. A well-worn pedestrian path leads from that point to the alcove interior, and footprints are prevalent throughout the shelter interior.



Figure 93: ORV tracks leading to 42Gr3840. Lithic artifacts were observed in tracks.

The interior deposits have been severely impacted by looting since about 1930. At least 25 looters' pits or depressions with back dirt are visible with depths ranging up to 50 centimeters. Some pits have refilled and others retain profiles (Figure 94). At least 70 percent of the shelter surface has been impacted by looting. Modern and historic inscriptions are located throughout the site (Figure 95). Large chunks of charcoal on the shelter surface could be prehistoric, but may also be evidence of modern campfires. A

comparison of the site to a photograph taken in 1998 indicates that one metate fragment has been removed since that time (Figure 96). The site has also been impacted by livestock. Surface deposits at this site are in poor condition.



Figure 94: Looters' pits prevalent throughout 42Gr3840.

Despite the extensive looting, this site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the utilization of natural shelters by foraging and farming populations. Most relevant, this site is eligible under Criterion D in that it likely contains significant subsurface deposits that would yield important information about prehistoric



Figure 95: Historic inscriptions over prehistoric bedrock metates at 42Gr3840.

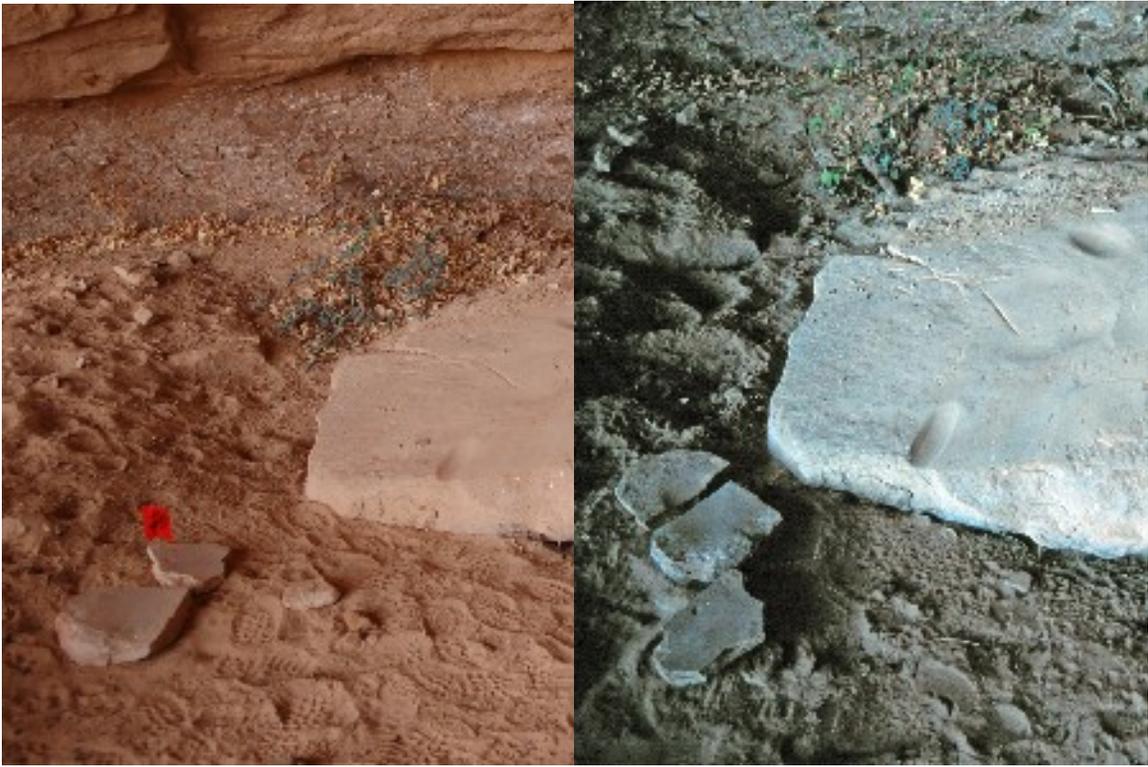


Figure 96: View of groundstone cluster in 2007 (left) versus same view in 1998 (right).

non-architectural residential occupations, lithic procurement strategies, bi-gender foraging camps, horticultural adaptations and land-use patterns in the region generally. The charcoal could also contribute important temporal context to prehistoric adaptations throughout the region, and pollen evidence could contribute to a greater understanding of how those adaptations were influenced or constrained by changes to the local environment. Microrefuse analyses could also contribute important insights into prehistoric subsistence. Although looting has destroyed some surface deposits, it is probable that intact cultural deposits are located below the area disturbed by looters, as well as below back dirt piles and in undisturbed alluvial deposits in front of the shelter.

42Gr3841

This sheltered residential site or camp is located in a small rockshelter at the base of the first cliff level on the south side of Tenmile Canyon. It is not visible from the main ORV route in the bottom of the canyon about 200 meters to the north, nor is it visible from vehicle spur routes 50 meters to the west that lead to larger, more prominent alcoves nearby. The cultural deposits are undisturbed, there are no footprints on or near the site, and vehicular traffic has bypassed the site to the west. The paucity of obvious surface cultural deposits, the small size of the shelter in relation to others nearby and a site location obscured from easy view have probably contributed to the absence of looting. This site is in good condition.

This site is recommended as eligible under Criterion D in that it likely contains intact subsurface deposits that would yield important information about prehistoric non-architectural residential occupations, lithic procurement strategies and foraging camps. The charcoal could also contribute important temporal context to prehistoric adaptations throughout the region, and pollen evidence could contribute to a greater understanding of how those adaptations were influenced or constrained by changes to the local environment. This site appears to represent a small, ephemeral occupation, perhaps as a seasonal camp, that could contribute important insights to land-use patterns, in particular temporary camps and their relationship to more permanent alcove occupations nearby.

42Gr3842

This sheltered residential site is located in a large alcove at the base of the first cliff level on the south side of the canyon. The alcove is readily visible from the main ORV route about 300 meters to the north, and from an ORV spur route that leads to a point about 30 meters west of the alcove. Artifacts extend in front of the alcove a considerable distance, suggesting the potential for buried deposits that could be vulnerable to vehicular traffic. A few tertiary flakes and one biface fragment were observed in the tire tracks in front of the alcove. A pedestrian trail leads about 30 meters from the ORV spur trail to the interior of the alcove where there are an abundance of footprints suggesting this site receives significant visitation. The alcove interior has been badly looted with approximately 75 percent of the site surface impacted by illegal digging activities. Eroded looters' holes are evident across the entire site, and are believed to be attributed to episodic digging activities since the 1930s. Most of these holes have filled in through natural erosion and are 10 to 25 centimeters in depth, although some extend to more than 30 centimeters (Figure 97).



Figure 97: One of the deeper looters' pits at 42Gr3842.

Graffiti is prominent on three large boulders (Figure 98) and it has, in some cases, impacted the integrity of the bedrock grinding slicks inside the shelters. Another concentration of graffiti is found on an isolated boulder outside the alcove on the southern periphery of the site adjacent to the ORV spur trail. The storage unit on the north side of the alcove features stacked stones that were not evident in a 1998 photograph (Figure 99), suggesting the feature has been modified. Foil, a matchbook and old rusted tin cans (probably milk cans associated with the cowboy camp) are littered about the site. A discarded backpack strap appears to be recent. Livestock have impacted the residential area with isolated concentrations of dung and considerable bioturbation of the surface deposits. On the south periphery of the alcove are two vertical posts with a connecting wire and metal shower hook rings suggestive of a hitching rail for livestock (Figure 100). This implies the shelter was used as a cowboy camp, and that charcoal and burned beams on the site surface may be modern. The posts are firmly set into subsurface deposits. Surface deposits at this site are in poor condition.

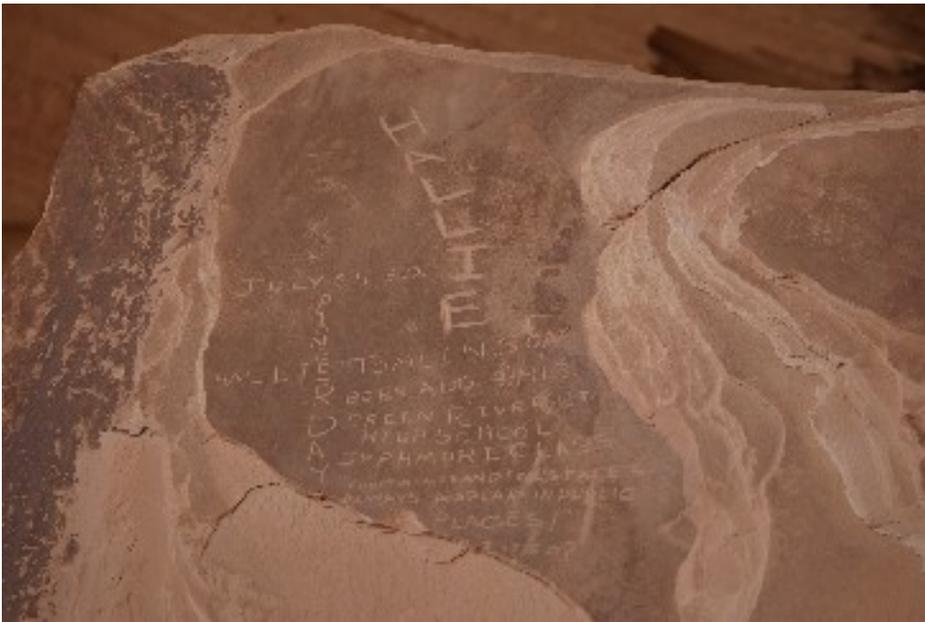


Figure 98: Extensive graffiti at 42Gr3842 dating to 1930s.



Figure 99: Storage facility at 42Gr3842 as seen in 2007 (left) and 1998 (right).

Despite the extensive looting, this site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the utilization of natural shelters by farming and foraging populations. Most relevant, this site is eligible under Criterion D in that it likely contains significant subsurface deposits that would yield important information about prehistoric non-architectural residential occupations, lithic procurement strategies, bi-gender foraging and farming occupations, and land-use patterns in the region generally. Evidence that maize was being grown nearby could contribute important insights into prehistoric subsistence, in particular farming versus foraging, during Formative times. Microrefuse analyses could also contribute important insights into prehistoric subsistence.

The storage facility also has a potential to contribute important insights into prehistoric subsistence, the production or acquisition of food surpluses that warranted their storage for future consumption, and the implications of storage strategies on prehistoric mobility and sedentism. It is emphasized that prehistoric architecture is particularly rare in Tenmile Canyon, and little is known about the factors that influenced prehistoric populations to construct or eschew permanent residential and storage structures. The charcoal could also contribute important temporal context to prehistoric adaptations throughout the region, and pollen evidence could contribute to a greater understanding of how those adaptations were influenced or constrained by changes to the local environment. Although looting has destroyed some surface deposits, it is probable that intact cultural deposits are located below the area disturbed by looters, as well as below the back dirt piles and in the undisturbed alluvial deposits in front of the shelter.



Figure 100: Rusted tin cans and hitching posts at 42Gr3842. Note the seep in upper left frame.

Despite the extensive looting, this site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the utilization of natural shelters by farming and foraging populations. Most relevant, this site is eligible under Criterion D in that it likely contains significant subsurface deposits that would yield important information about prehistoric non-architectural residential occupations, lithic procurement strategies, bi-gender foraging and farming occupations, and land-use patterns in the region generally. The charcoal could also contribute important temporal context to prehistoric adaptations throughout the region, and pollen evidence could contribute to a greater understanding of how those adaptations were influenced or constrained by changes to the local environment. Microrefuse analyses could also contribute important insights into prehistoric subsistence. Although looting has destroyed some surface deposits, it is probable that intact cultural deposits are located below the areas disturbed by looters, as well as below the back dirt piles and in alluvial deposition in front of the shelter.

42Gr3843

This site with bedrock cists in a natural clay matrix and associated lithic scatter is located within and adjacent to a large alcove in a side drainage on the south side of Tenmile Canyon and about 400 meters from the existing main ORV route. The alcove is readily visible from the ORV route, and ORV tracks lead from the bottom of the canyon to all prominent alcoves inside the side drainage where this site is located. Motorcycle tracks are located 5 meters in front of the alcove and through the adjacent lithic scatter (Figure 101). A second series of tracks is located about 50 meters down slope. This site is in poor condition with five out of six cists missing their front walls, probably due to dismantling by looters to expose interior deposits. Small and medium chunks of the clay matrix are visible in the front of the cists, but there is not enough remaining clay to have comprised the entire front walls of all five cists. The thin layer of aeolian sand in the bottom of the broken cists suggests that all deposits were removed at some point. The surrounding alcove floor has also been impacted by livestock.

Despite the extensive looting, this site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the utilization of natural shelters for storage, probably in late Archaic times. Most relevant, this site is eligible under Criterion D in that these storage features will likely yield important information about prehistoric subsistence and the role of food storage in the emergence of horticulture in the region and the consequent implications of storage on sedentism. It remains possible that cultural materials are located inside the intact storage cist. Furthermore, the nearby lithic scatter is located in an area with potential subsurface deposits. These deposits, which contain a possible Archaic dart point fragment, could contribute to a greater understanding of land-use patterns in the region generally.



Figure 101: ORV trails leading directly to 42Gr3843 and through associated lithic artifacts.

42Gr3844

This storage site is located in a small alcove on the south side of Tenmile Canyon. The small alcove is visible from the main ORV route in the bottom of the canyon about 100 meters to the north. Direct vehicular access to the structural feature is likely not feasible, but access to the slope below the site is possible. Motorcycle and ATV tracks are visible on the bench area about 75 meters to the north of the site. This architectural feature is badly deteriorated, probably due to natural erosion resulting from the alcove's northern aspect. It is likely that bedrock is located only a few centimeters below the overlying deposits. There were no footprints leading to the site, no litter and no obvious evidence of vandalism. Several wall stones are lying in front of the outer wall, suggesting the possibility that the structure was partially dismantled in the past. This could, however, be a natural wall collapse. There is no obvious evidence this site is being adversely impacted by human activities. This site is in poor condition.

This site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the emergence of masonry architectural features that were utilized for storage, an adaptation considered to be a hallmark of the Fremont culture. Most relevant, this site is eligible under Criterion D in that it constitutes a storage facility with a potential to contribute important insights into prehistoric subsistence, the production or acquisition of food surpluses that warranted their storage for future consumption, and the implications of storage strategies on prehistoric mobility and sedentism. It is emphasized that prehistoric architecture is particularly rare in Tenmile Canyon, and little is known about the factors that influenced prehistoric populations to construct or eschew permanent architectural features.

42Gr3845

This sheltered residential site is located in a large alcove [REDACTED]. It is situated in a cliff face above the adjoining slope, requiring the use of hand-and-toe holds to gain access to the alcove residential area. The alcove is not visible from the main ORV route about 300 meters to the north. However, vehicles have traveled up the bottom of Trail Canyon, and motorcycle tracks (single-track) were observed in the bottom of the wash about 40 meters below the alcove. Direct vehicular access to cultural deposits below the alcove would be difficult but possible, whereas interior deposits are accessible to pedestrians with some difficulty. This site has been seriously vandalized, probably during repeated episodes dating to at least 1930. Approximately 80 percent of the site surface appears to have been impacted by illegal excavations and graffiti.

At least 22 looters' pits were identified, either through notable depressions and/or associated back dirt piles. Most looters' holes are only 10 to 20 centimeters deep, having re-filled through continued erosion and the collapse of unstable aeolian sand. A possible cist (a pit with vertical sides) has been excavated to a depth of 50 centimeters (Figure 102). The abundance of stone slabs scattered about and stacked in circular patterns in the adjacent back dirt piles suggest that architectural features were indeed present but were dismantled during looting (Figure 103). The site is littered with trash, including pull-tab Olympia beer cans, a sardine can lid, brown bottle glass and a soda can. At some point, looting was facilitated with a two-person, quarter-inch mesh screen, the handles of which remain on the floor of the shelter (Figure 104). This site also contains numerous bedrock grinding slicks that have been marred by graffiti (Figure 105). Surface deposits at this site are in poor condition.



Figure 102: View of deflated looter's pit and deep pit with vertical sites at 42Gr3845.



Figure 103: View of looter's pit with stones discarded in a circular pattern at 42Gr3845.

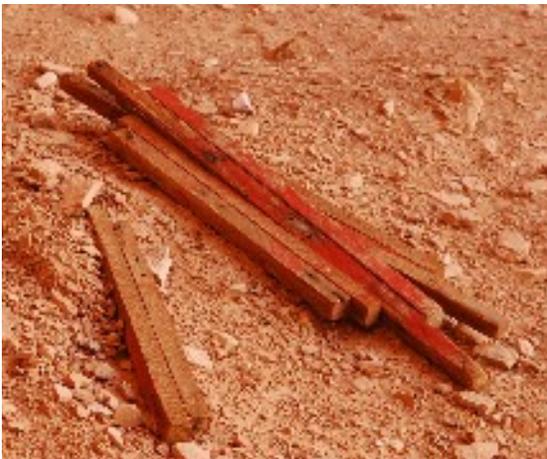


Figure 104: Screen handles at 42Gr3845.



Figure 105: Graffiti at 42Gr3845.

Despite the extensive looting, this site is recommended as eligible under Criterion A because it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular the utilization of alcoves and rockshelters by farmer-forager populations. Most relevant, this site is eligible under Criterion D in that it likely contains significant subsurface deposits that would yield important information about prehistoric non-architectural residential occupations, lithic procurement strategies, bi-gender foraging and farming occupations, and land-use patterns in the region generally. Evidence that maize was being grown nearby could contribute important insights into prehistoric subsistence, in particular farming versus foraging, during Formative times. Microrefuse analyses could also contribute important insights into prehistoric subsistence.

The presence of potential subsurface cists also have a potential to contribute important insights into prehistoric subsistence, the production or acquisition of food

surpluses that warranted their storage for future consumption, and the implications of storage strategies on prehistoric mobility and sedentism. The charcoal could also contribute important temporal context to prehistoric adaptations throughout the region, and pollen evidence could contribute to a greater understanding of how those adaptations were influenced or constrained by changes to the local environment. Although looting has destroyed some surface deposits, it is probable that intact cultural deposits are located below the area disturbed by looters, as well as below the back dirt piles and in the undisturbed alluvial deposits in front of the shelter.

42Gr3846

This rock art site is located at the base of the first major cliff level on the south side of Tenmile Canyon and it is readily visible from the main ORV route in the bottom of the canyon about 300 meters to the south. The bench area 150 to 200 meters north of the site features numerous ORV tracks, most of them parallel to the stream. However, one set of motorcycle tracks leads to within 40 meters of the site. There is no evidence that vehicles have yet gained access to the ledge where the site is located. The slope below the site features a number of ephemeral trails, either pedestrian or animal, that lead up slope in the general direction of the site. However, no recent footprints were observed at or near the site, and there is no evidence of graffiti or vandalism. It is likely that this site receives considerable visitation given its visibility from the bottom of the canyon. The site remains in excellent condition.

This site is eligible under Criterion A in that it is associated with broad patterns of human prehistory on the northern Colorado Plateau, in particular Fremont adaptations. The rock art at this site is also recommended as eligible under Criterion C in that it comprises a part of a significant and distinguishable catalog of images whose components may lack individual distinction but which collectively contribute to a broader understanding of spatial and temporal relationships between prehistoric populations. It is also recommended as eligible under Criterion D in that it could contribute to an understanding of land-use patterns in the region generally, as well as to an understanding of prehistoric ceremonialism, religion and communication.

42Gr3991

This site is located about 400 meters inside a side canyon on the north side of Tenmile Canyon and is not visible from the main ORV trail in the bottom of Tenmile Canyon. However, there are fresh motorcycle tracks leading up the bottom of the side canyon that pass to within 20 meters of the alcove, which is visible from the spur route and to anyone walking or riding up the bottom of the side drainage. There are no vehicle tracks leading to the alcove, and no pedestrian footprints were observed on or around the alcove (but they were observed on the slope on the opposite side of the drainage). There is no evidence of graffiti or vandalism at this site, and camping impacts are limited to a fire ring about 350 meters to the northwest near the mouth of the drainage. Two cattle fences have been constructed within the viewspread of the site, one about 100 meters to the southwest and one about 100 meters to the northwest. No litter was observed on site,

but broken brown bottle glass was observed on the slope on the west side of the drainage. Cattle dung was observed on the slope directly in front of the alcove but not inside.

Individually, this site may not be eligible for listing on the National Register given the absence of cultural deposits and the lack of temporally or culturally diagnostic artifacts. However, when taken in the context of adjacent and surrounding sites in this area of Tenmile Canyon, this site may be eligible under Criterion D in that it has potential to contribute important insights into prehistoric land-use patterns, in particular how and why prehistoric groups exploited local environments, how different environmental settings were utilized to acquire, process and store food products, and human responses to periodic and persistent droughts. Because very little is known about special-use sites in Tenmile Canyon, this site could contribute to broader understanding of the role of limited water sources in hunting and gathering strategies throughout time and in response to changing climatic conditions.

42Gr3992

Despite evidence of vandalism, this site remains in good condition with at least three intact hardpan cists inside Alcove B, as well as undisturbed locations that could contain additional storage features. However, two looters' pits are evident in Alcove A, and three hardpan cists inside Alcove B appear to have been looted and portions of the cists removed. Both prominent alcoves are readily visible from the canyon bottom by individuals traveling up canyon, and they are particularly noticeable from the bench area above the stream. There is no evidence in this portion of the canyon that vehicles have breached the bench area above the signed ORV trail along the stream bed, although there remains potential this could occur. Recent pedestrian tracks were observed about 50 meters to the south. Broken brown bottle glass was observed about 35 to 40 meters to the west on and around a dune. The presence of large and sometimes burned animal bones, probably cow, suggests Alcove B was utilized as a historic/modern camp at some point, although there is a paucity of charcoal to indicate that animals were actually cooked at this locality. Livestock impacts are limited to dung along the sloping dune areas in front of the alcoves, including throughout the lithic scatter. It is unlikely that cattle could directly impact deposits on the alcove interiors given the steep slopes.

The primary impacts at this site are vandalism/looting. Alcove A has two areas with possible cultural features that have been modified by episodic vandalism and animal activities. On the west side of the shelter is a depression with a rubble mound on the down-slope side (Figure 106). The mound features about 20 small and medium sandstone slabs stacked up to five courses high. The depression measures about 1 meter east-west by 80 centimeters north-south. The interior has deflated and refilled with aeolian sands and is currently only about 5 centimeters deep. The area appears to have been used by animals to bed down. The rubble mound in front is 90 centimeters east-west by 40 centimeters north-south and extends up to 18 centimeters high at the highest point. The stones are loosely stacked and do not appear to be an intentional wall but rather stones discarded during excavation of the pit behind the mound. On the east side of Alcove A is another looters' pit with disarticulated stones (Figure 107).



Figure 106: Alcove A west side discarded rubble **Figure 107: Alcove A east side looters' pit**

At Alcove B, Cist 4 appears to have been damaged during looting and exposed in profile when a dividing wall between two chambers was removed (Figure 108). The south wall of the feature is missing. The front of Cist 5 was also removed, probably during looting, exposing the interior profile of the cist. And Cist 6 also features a missing front wall and a looters' pit on the interior that is 50 by 50 centimeters and 24 centimeters deep at the vertical back wall. The evidence at Cist 4, Cist 5 and Cist 6 implies that the standard method of looting the cists was to excavate laterally into the hardpan, removing the front sidewalls as cists were encountered to expose deposits in profile.



Figure 108: Cist 4, which may be two hardpan cists with a dividing wall removed during looting.

This site is eligible under Criterion A inasmuch as it is directly associated with broad patterns of Late Archaic and/or Basketmaker prehistory on the Colorado Plateau, with attributes unique to the Green River Desert sub-region. This site appears to reflect human adaptations during Late Archaic or early Formative times, when foraging was supplemented by agricultural production that warranted storage facilities. This site is also eligible under Criterion C in that the hard-pan cist architecture embodies distinctive characteristics of architectural styles, periods of time and methods of construction. Hardpan cists are typically associated with Late Archaic or Basketmaker II occupations on the northern Colorado Plateau and are considered to be evidence of a transition to more sedentary lifeways. This architecture, while lacking individual distinction, nonetheless is significant and distinguishable inasmuch as it is part of a larger catalog of architectural sites representative of Late Archaic and Formative storage strategies. This site is also eligible under Criterion D inasmuch as intact deposits have considerable potential to contribute to a better understanding of how and why prehistoric groups exploited local environments during Formative times, in particular human responses to periodic and persistent droughts, concurrent and evolving storage strategies to ameliorate the effects of food shortages, shifting agricultural practices to accommodate growing populations, and defensive strategies to militate against predation.

42Gr3993

This artifact scatter is located about 20 meters vertical distance above the Tenmile Canyon ORV trail and about 200 meters horizontal distance from the trail. The abundance of artifacts on the site surface makes it readily visible to passersby, although it may not be recognizable as a cultural site to casual visitors. There is an abundance of finished stone tools at this site that could be subject to surface collection, and at least one tool had been left on a ledge in prominent view, presumably as a “trophy” (Figure 109) that suggests the site has been visited and artifacts have been disturbed or removed.



Figure 109: Biface tool left on a cliff ledge, presumably as a trophy by visitors to the site.

This site was encountered as crews were attempting to access a prominent alcove (42Gr3994) a short distance to the west. It is anticipated that visitors to the canyon have already encountered and will continue to encounter this site while attempting to reach the alcove. There was no evidence of litter, modern inscriptions or graffiti, and there is no evidence that motorized vehicles have traveled onto the bench area where the site is located, although vehicular access is possible. There is no evidence of camping on or near the site, no pedestrian footprints were observed anywhere near the site, and there are no signs of subsurface disturbance other than bioturbation. Adverse impacts appear to be limited to fresh cattle hoof prints throughout the site and abundant quantities of desiccated cattle dung that suggest the area near the cliff face is utilized by livestock as a bedding area. The site remains in relatively good condition, but ongoing erosion will likely continue to expose artifacts and make them susceptible to improper collection.

Although no temporally diagnostic artifacts or architecture were observed here, this site is eligible under Criterion D inasmuch as it has considerable potential to contribute to a better understanding of land-use patterns in the canyon drainage and how and why prehistoric groups exploited local environments, in particular human responses to periodic and persistent droughts, concurrent and evolving strategies to ameliorate the effects of food shortages, shifting subsistence practices to accommodate growing populations, and strategies to militate against predatory groups. Because very little is known about special-use sites in Tenmile Canyon, subsurface deposits here could contribute to temporal perspectives, a broader understanding of the exploitation of canyon resources and the nature of land-use patterning in prehistoric times.

42Gr3994

This prominent alcove is visible from the canyon bottom and likely attracts visitors. Pedestrian access 200 meters up the 15-degree slope is easy. There is no indication that vehicles have attempted to ascend the bench, no footprints were observed on or around the site, and there are no pedestrian trails. It appears the site has been vandalized at some point in the past. The smooth surface of one boulder has been scraped, and the scratches and scrapes appear recent (Figure 110). Furthermore, the area behind the boulders features a distinct area that appears to have been excavated into the hardpan clay matrix (Figure 111). The pit measures 1.2 meters by 1.4 meters and has a maximum depth of 50 centimeters. There is no back dirt pile. The interior has refilled with thin sediments, mostly clay, sand and dried vegetation. This pit probably represents the complete destruction of a hardpan cist during looting. Overall site condition is fair with considerable potential for cultural deposits.

Although this site lacks temporally or culturally diagnostic artifacts or features, this site may be eligible under Criterion D in that it has potential to contribute important insights into prehistoric land-use patterns, in particular how and why prehistoric groups exploited local environments, how different environmental settings were utilized to acquire, process and store food products, and human responses to periodic and persistent droughts. Because very little is known about special-use sites in Tenmile Canyon, this

site could contribute to broader understanding of the role of limited water sources in hunting and gathering strategies throughout time and in response to changing climatic conditions. Also, the dung layer below the hardpan clay matrix could contain important data relevant to prehistoric climates in the region.



Figure 110: Prehistoric (patinated) grooves at 42Gr3994 that have been scratched and scraped.



Figure 111: Excavated hardpan clay area behind the grooved boulders at 42Gr3994.

42Gr3995

This site is located about 75 meters from a well-worn ATV route that ascends from the bottom of the canyon onto the bench area and leads towards several large alcoves inside the side drainage on the south side of Tenmile Canyon. There is no indication vehicles have impacted surface deposits at this site. The site itself is not readily visible due to overlying vegetation, although the thermal features are visible to anyone walking along the bottom of the arroyo. The site has been visited in the past as evidenced by a glass canning jar left on site (Figure 112). The site has been impacted by cattle grazing and dung accumulation, although there were no recent impacts. The only other impacts observed is the down-cutting of the dry wash that has eroded the soft sandy banks and continue to threaten the site.



Figure 112: Glass canning jar observed at 42Gr3995.

This site is eligible under Criterion A inasmuch as it is directly associated with broad patterns of Archaic prehistory on the Colorado Plateau. When taken in context with other special use localities in the canyon, this site is characteristic of forager adaptations, probably during pre-agricultural times when hunting with large stone dart points was a prevalent subsistence strategy. This site is also eligible under Criterion D inasmuch as it has considerable potential to contribute to a better understanding of land-use patterns in the canyon drainage and how and why prehistoric groups exploited local environments, in particular human responses to periodic and persistent droughts, lithic procurement and processing strategies, and shifting subsistence practices to accommodate growing populations. Because very little is known about special-use sites in Tenmile Canyon, the

potential for subsurface deposits here could contribute to temporal perspectives, a broader understanding of the exploitation of canyon resources and the nature of land-use patterning in prehistoric times.

42Gr3996

This site [REDACTED] may not be readily recognizable as an archaeological locality due to the dispersed nature of the cultural deposits and the absence of obvious tools or features. Impacts to the site include a single set of motorcycle tracks running north-south through the western edge of the primary artifact cluster. The vehicle apparently impacted the site while in route from the canyon bottom to the rolling white slickrock above the site. The site has also been impacted by recent cattle grazing, as evidenced by footprints and dung across the entire site. There is no evidence of illegal excavations, no litter, no camping and no other adverse impacts associated with human activities. It is possible that finished stone tools have been surface collected from this site given its location along a pedestrian access route to a prominent rock art site just down canyon (42Gr3846). The site remains in good condition with potential to contain undisturbed subsurface deposits.

Even though no temporally diagnostic artifacts or architecture were observed here, this site is eligible under Criterion D inasmuch as it has considerable potential to contribute to a better understanding of land-use patterns in the canyon drainage and how and why prehistoric groups exploited local environments, their lithic procurement and processing strategies, human responses to periodic and persistent droughts, concurrent and evolving foraging strategies to ameliorate the shifting availability of local resources. Because very little is known about special-use sites in Tenmile Canyon, the potential for subsurface deposits here could contribute to temporal perspectives, a broader understanding of the exploitation of canyon resources and the nature of land-use patterning in prehistoric times.

42Gr3997

This site is located about 20 meters vertical distance above the Tenmile Canyon ORV route and 100 meters horizontal distance from the route, and up a 10 degree slope. Pedestrian and vehicle access to the bench area is easy. The site is also located along a major pedestrian trail leading to a nearby rock art site (42Gr3846), and it is quite possible that artifacts/stone tools have been surface collected in the past. The pedestrian trail runs east-west and is visible on the slope to the southwest of the site itself (but not through the site). It is assumed that pedestrians are walking on the slickrock adjacent to the lithic scatter. Given the ephemeral nature of the site, it is possible it has gone unrecognized by most casual visitors. However, stone tools were observed on the slickrock itself, where they were readily identifiable as such. There is evidence of vehicles on the adjacent bench area, and single-track vehicles have left tracks in the sandy deposits about 100 meters to the north, although there are no tracks on the site itself. There is no evidence of camping, litter, vandalism or looting on or around the site. The only direct impacts appear to be livestock grazing, as evidenced by copious dung and bioturbation.

Even though no temporally diagnostic artifacts or architecture were observed here, this site is eligible under Criterion D inasmuch as potential deposits have considerable potential to contribute to a better understanding of land-use patterns in the canyon drainage and how and why prehistoric groups exploited local environments, their lithic procurement and processing strategies, human responses to periodic and persistent droughts, and concurrent and evolving foraging strategies to ameliorate the shifting availability of local resources. Because very little is known about special-use sites in Tenmile Canyon, the potential for subsurface deposits here could contribute to temporal perspectives, a broader understanding of the exploitation of canyon resources and the nature of land-use patterning in prehistoric times.

42Gr3998

This site is located about 20 meters vertical distance above the Tenmile Canyon ORV route and about 100 meters horizontal distance at a slope of about 17 degrees. Access from the canyon bottom is easy. This site is ephemeral and may not be recognizable to casual visitors. It is likely the site has been encountered by individuals attempting to access a prominent rock art site above (42Gr3846), but there is minimal evidence of any adverse impacts. There is no litter, no evidence of camping, no vandalism and no pedestrian impacts, although it remains possible the site has been surface-collected by pedestrians in the past. The only observable impacts were recent cattle dung and hoof prints that have bioturbated the thin soils overlaying the bedrock.

National Register eligibility is equivocal given the absence of temporally diagnostic artifacts and minimal potential that cultural deposits extend more than 10 to 20 centimeters. However, this site may, when examined within the context of other special use localities in the same area, be eligible under Criterion D inasmuch as it has potential to contribute to a better understanding of land-use patterns in the canyon drainage and how and why prehistoric groups exploited local environments, their lithic procurement and processing strategies, and concurrent and evolving foraging strategies to ameliorate the shifting availability of local resources. Because very little is known about special-use sites in Tenmile Canyon, the site when examined collectively with other sites could contribute to a better understanding of the nature of land-use patterning, and the role of limited water sources in hunting and gathering strategies throughout time and in response to changing climatic conditions.

42Gr3999

This lithic scatter has been directly impacted by improper ORV traffic through the western edge of the site. The ORV trail is narrow but is well-traveled and well-worn, although not recently (Figure 113). The trail appears to connect to another, more-frequently used ORV trail to the south that in turn leads to several large alcoves on the east side of the creek at this point. The BLM has posted route closure signs at the base of the bench area, but these signs are routinely ignored, as evidenced by the recent and abundant vehicle tracks going around the signs. The legal ORV route is located about 100

meters to the north and northwest. This area appears to be susceptible to illegal routes onto the bench area because of the gradual slope. The nature of the dispersed lithic scatter is such that individuals traveling the spur route probably have not recognized the cultural deposits as such, although it is possible stone tools have been observed and were collected. The trail cuts through the west side of the site. The site also exhibits significant bioturbation and cattle dung. There is no evidence of litter, camping, improper excavations or other adverse impacts. The site remains in fair condition but is susceptible to accelerated erosion.



Figure 113: Worn vehicle path through western edge of 42Gr3999 (pin flags denote artifacts).

This site is eligible under Criterion D inasmuch as potential subsurface deposits can contribute to a better understanding of land-use patterns in the canyon drainage, in particular the role of special-use localities and how and why prehistoric groups exploited specific local environments. These insights can contribute to explanations of human responses to periodic and persistent droughts, lithic procurement and processing strategies, and shifting subsistence practices to accommodate growing populations. Because very little is known about special-use sites in Tenmile Canyon, the potential for subsurface deposits here could contribute to temporal perspectives, a broader understanding of the exploitation of canyon resources and the nature of land-use patterning in prehistoric times.

42Gr4000

This site is not readily recognizable as a rock art site due to the heavy degree of repatination. Nevertheless, access to the site is easy from a well worn ORV route leading from the canyon bottom onto the bench area above the stream and to within 75 meters south and west of the site. The trail is at the same level as the site. There is no evidence that vehicles have reached the alcove where the site is located, although the prominence of the alcove has likely drawn visitors to the site location. There is no indication of litter, camping or pedestrian impacts at this site, and there are no livestock impacts on site or close to it. This site appears to be suffering only from severe erosion.

The extreme degree of repatination evident at this site could be evidence of considerable age, perhaps an unknown or undefined Archaic style. As such, this site may be eligible under Criterion A inasmuch as it is directly associated with broad patterns of Archaic/Formative prehistory on the Colorado Plateau, with attributes unique to the Green River Desert sub-region, and under Criterion C in that the rock art, while lacking individual distinction, nonetheless is significant and distinguishable inasmuch the images and motifs are part of a larger catalog considered to be unique to the region.

Likewise, the rock art components at this site are also eligible under Criterion D inasmuch as the rock art found in the area demonstrates a consistency in form, a level of skill in its creation and knowledge about specific construction techniques that are evident over broad geographic areas. This could be evidence of a society in which the individuals who created these images were privileged or influential, and that the presence of these images may reflect an institutionalized system of religious attitudes, beliefs and practices. The existence of rock art images in their relative contexts could also yield information important in determining the meaning, purpose and function of these various images, including why it was created, how it integrated preliterate societies, how it reflects ideological beliefs or practices, and how these ideological concepts varied or remained consistent across time and space, which could also offer important clues as to ethnicity.

42Gr4001

This rock art site is visible from an unauthorized ORV spur trail that leads to within 25 meters of the site, and it appears the spur route was created for the specific purpose of accessing the alcove where the site is located. There is no evidence of looting of the shallow interior deposits, or of graffiti or inscriptions inside the alcove area. Most of the site area is bedrock and no footprints were visible. There is no evidence of camping, littering or other human activities. Livestock dung was observed about 20 meters to the north, but there is no evidence livestock are directly impacting the site. With the exception of the ORV trail to within 25 meters of the site, there is little evidence to indicate this site receives consistent or even periodic visitation.

This site may be eligible under Criterion C in that the rock art, while lacking individual distinction, is significant and distinguishable inasmuch the images and motifs are part of a larger catalog considered unique to the region. Likewise, the rock art

components at this site are also eligible under Criterion D inasmuch as the rock art found in the area demonstrates a consistency in form, a level of skill in its creation and knowledge about specific construction techniques that are evident over broad geographic areas. This could be evidence of a society in which the individuals who created these images were privileged or influential, and that the presence of these images may reflect an institutionalized system of religious attitudes, beliefs and practices. The existence of rock art images in their relative contexts could also yield information important in determining the meaning, purpose and function of these various images, including why it was created, how it integrated preliterate societies, how it reflects ideological beliefs or practices, and how these ideological concepts varied or remained consistent across time and space, which could also offer important clues as to ethnicity.

42Gr4002

This site is located on a sloping bench area where multiple unauthorized ORV spur routes are located, and at least two of these routes cut through and directly impacted cultural deposits at this site (Figure 114). Vehicle access to the bench area is easy and well established, despite a BLM route closure sign at the illegal trail access point. The vehicle tracks have undoubtedly accelerated erosion of artifacts, and ongoing impacts to the site integrity are substantial. There is no indication of illegal excavation, no evidence of camping and no evidence of surface collection of artifacts, and only one piece of litter was observed (a tin tobacco can with a hinged lid). The only other adverse impacts to this site are copious cattle dung and bioturbation from hoof prints.



Figure 114: Bench area with multiple ORV spur routes. Tenmile Creek is lower frame, 42Gr661 is in the upper left alcove, and 42Gr4000 and 42Gr4001 are in the upper right alcove.

This site is eligible under Criterion D inasmuch as subsurface deposits have considerable potential to contribute to a better understanding of land-use patterns in the canyon drainage and how and why prehistoric groups exploited local environments, in particular human responses to periodic and persistent droughts, lithic procurement and processing strategies, and shifting subsistence practices to accommodate growing populations. Because very little is known about special-use sites in Tenmile Canyon, the potential for subsurface deposits here could contribute to temporal perspectives, a broader understanding of the exploitation of canyon resources and the nature of land-use patterning in prehistoric times.

42Gr4003

This site, on the same sloping bench area as 42Gr4002, and multiple ORV spur routes crisscross the bench. Some of these routes are ephemeral and others are major routes subject to repeated use. At least two of these major routes cut through cultural deposits and have directly impacted them (Figure 115). Vehicle access to the bench area is easy and well established, despite a BLM route closure sign at the trail access point. The vehicle tracks have undoubtedly accelerated erosion of artifacts, and ongoing impacts to the site integrity are substantial. There is no indication of illegal excavation, camping activities, surface collection of artifacts or litter. Beyond the substantial impacts from vehicles, the only other adverse impacts to this site are cattle dung and bioturbation from hoof prints.



Figure 115: View of major ORV route through middle of 42Gr4003.

This site is eligible under Criterion D inasmuch as subsurface deposits have potential to contribute to a better understanding of land-use patterns in the canyon drainage and how and why prehistoric groups exploited local environments, in particular human responses to periodic and persistent droughts, lithic procurement and processing strategies, and shifting subsistence practices to accommodate growing populations. Because very little is known about special-use sites in Tenmile Canyon, the potential for subsurface deposits here could contribute to temporal perspectives, a broader understanding of the exploitation of canyon resources and the nature of land-use patterning in prehistoric times.

42Gr4004

This site is located on the same sloping bench area as 42Gr4002 and the multiple ORV spur routes that crisscross the bench. Some of these routes are ephemeral and others are major routes subject to repeated use. Vehicular access to the site area from the canyon bottom is easy and a major ORV route passes within 5 meters of the site. The major trail so close to the site creates a potential that vehicles will depart from the established trail and directly impact surface and subsurface deposits. However, the ephemeral nature of the lithic scatter is such that it may have gone unnoticed by most canyon visitors. Overall, the site remains in excellent condition with no evidence of on-site litter, camping, pedestrian impacts, surface collecting or vandalism impacts. The bench area has been bioturbated by cattle grazing and features copious amounts of dung.

Despite the absence of temporally or culturally diagnostic artifacts, this site is eligible under Criterion D inasmuch as subsurface deposits have considerable potential to contribute to a better understanding of land-use patterns in the canyon drainage and how and why prehistoric groups exploited local environments, in particular human responses to periodic and persistent droughts, lithic procurement and processing strategies, and shifting subsistence practices to accommodate growing populations. Because very little is known about special-use sites in Tenmile Canyon, subsurface deposits could contribute to temporal perspectives, a broader understanding of the exploitation of canyon resources and the nature of land-use patterning in prehistoric times.

42Gr4005

Pedestrian and vehicle access to this site from the canyon bottom is easy, as evidenced by vehicle tracks through the site. Two motorcycle tracks are located on the north edge of the site and appear to indicate a single episode (one vehicle venturing onto the bench and returning to the main trail in the bottom of the canyon). Despite the tracks, the site remains in good condition with no evidence of litter, camping, pedestrian trails, vandalism or surface collection of artifacts. There are impacts from livestock, as evidenced by hoof prints throughout the site.

Despite the paucity of temporally or cultural diagnostic artifacts, this site is eligible under Criterion D inasmuch as the artifacts appear to be eroding from subsurface

contexts where there is potential for intact deposits. These subsurface deposits have considerable potential to contribute to a better understanding of land-use patterns in the canyon drainage and how and why prehistoric groups exploited local environments, in particular human responses to periodic and persistent droughts, lithic procurement and processing strategies, and shifting subsistence practices to accommodate growing populations. Because very little is known about special-use sites in Tenmile Canyon, the potential for subsurface deposits here could contribute to temporal perspectives, a broader understanding of the exploitation of canyon resources and the nature of land-use patterning in prehistoric times.

42Gr4006

This site location consists of a prominent ridge or bench area extending to the valley floor that affords opportunity for vehicles to ascend to the north bench. The site itself may not be recognizable to casual visitors as an archaeological site. An ORV trail cuts through the southern edge of the site, but utilization of this trail appears to occur infrequently. There is no evidence of pedestrian trails, litter, surface collecting, vandalism or other human impacts. The site does exhibit direct impacts from cattle grazing, as evidenced by hoof prints and cattle dung throughout the site. Overall, the site is in good condition despite the vehicular impacts.

Despite the paucity of temporally or cultural diagnostic artifacts, this site is eligible under Criterion D inasmuch as the artifacts appear to be eroding from subsurface contexts where there is potential for intact deposits. These subsurface deposits have considerable potential to contribute to a better understanding of land-use patterns in the canyon drainage and how and why prehistoric groups exploited local environments, in particular lithic procurement and processing strategies and their relationship to shifting subsistence practices. Because very little is known about special-use sites in Tenmile Canyon, deposits here could contribute to temporal perspectives, a broader understanding of the exploitation of canyon resources and the nature of land-use patterning in prehistoric times.

Adverse Impacts Summary

An examination of 38 sites within a small portion of Tenmile Canyon revealed (1) all of the sites identified are located in sheltered areas abutting or just above the floodplain, on cliff faces and on adjacent alluvial benches where they are easily visible and/or accessible to the public. (2) Most alcove sites visible from the existing route have suffered significant vandalism, site degradation and illegal collecting from canyon visitors, and that these activities have been episodic over the past 75 years. (3) Off-road vehicles are damaging cultural deposits on the bench areas, and perhaps cultural deposits located in front of alcoves and rockshelters, and that ORV traffic has accelerated adverse impacts to cultural resources. And (4) many alcove sites have suffered impacts from livestock, including bioturbation and copious animal dung. Most impacts to archaeological sites in the Tenmile Canyon drainage can be attributed to two interrelated factors: vandalism (illegal excavations, site modifications, surface collecting, littering and

graffiti) and vehicle impacts (increased accessibility facilitated by motorized access, and direct and indirect impacts caused by motorized vehicles). Non-vehicular adverse impacts to all 38 sites are summarized in Table 4.

Table 4: Summary of non-vehicular adverse effects

Site No.	Site Type	Looting	Graffiti	Site Modified	Surface Collection	Litter	Livestock	Foot Traffic
42Gr583	Lithic Scatter	No	No	No	No	No	No	No
42Gr660	Alcove: Residential	Major	No	Unknown	Yes	Yes	No	Yes
42Gr661	Alcove: Architectural	Minor	No	Yes	No	No	Yes	No
42Gr3354	Artifact Scatter	No	No	No	No	No	Yes	No
42Gr3829	Rock Art	No	No	No	No	Yes	No	No
42Gr3830	Rock Art	No	No	No	No	No	No	No
42Gr3831	Alcove: Residential	Major	No	Unknown	Yes	Yes	Yes	Yes
42Gr3832	Alcove: Residential	Major	Yes	Unknown	Yes	Yes	Yes	Yes
42Gr3833	Alcove: Residential	Major	No	Unknown	Yes	No	Yes	No
42Gr3834	Alcove: Residential	Major	No	Unknown	Yes	Yes	Yes	Yes
42Gr3835	Artifact Scatter	No	No	No	Yes	No	No	No
42Gr3836	Alcove: Residential	Major	No	Unknown	Yes	Yes	Yes	Yes
42Gr3837	Residential, Rock Art	Major	Yes	Unknown	Yes	Yes	Yes	Yes
42Gr3838	Rock Art	Major	Yes	Unknown	Yes	Yes	Yes	Yes
42Gr3839	Lithic Scatter	No	No	No	No	No	Yes	No
42Gr3840	Alcove: Residential	Major	Yes	Unknown	Yes	Yes	Yes	Yes
42Gr3841	Rockshelter: Camp	No	No	No	No	No	No	No
42Gr3842	Alcove: Residential	Major	Yes	Yes	Yes	Yes	Yes	Yes
42Gr3843	Storage Cists	Major	No	Yes	Yes	No	Yes	No
42Gr3844	Granary	No	No	Possible	No	No	No	No
42Gr3845	Alcove: Residential	Major	Yes	Unknown	Yes	Yes	No	Yes
42Gr3846	Rock Art	No	No	No	No	No	No	Yes
42Gr3991	Alcove: Special Use	No	No	No	No	No	Yes	No
42Gr3992	Storage Cists	Major	No	Yes	No	Yes	Yes	Yes
42Gr3993	Lithic Scatter	No	No	No	Yes	No	Yes	No
42Gr3994	Alcove: Special Use	Major	Yes	Yes	No	No	Yes	No
42Gr3995	Lithic Scatter	No	No	No	No	Yes	Yes	No
42Gr3996	Lithic Scatter	No	No	No	No	No	Yes	No
42Gr3997	Lithic Scatter	No	No	No	No	No	Yes	Yes
42Gr3998	Lithic Scatter	No	No	No	No	No	Yes	No
42Gr3999	Lithic Scatter	No	No	No	No	No	Yes	No
42Gr4000	Rock Art	No	No	No	No	No	No	No
42Gr4001	Rock Art	No	No	No	No	No	No	No
42Gr4002	Lithic Scatter	No	No	No	No	No	Yes	No
42Gr4003	Lithic Scatter	No	No	No	No	No	Yes	No
42Gr4004	Lithic Scatter	No	No	No	No	No	Yes	No
42Gr4005	Lithic Scatter	No	No	No	No	No	Yes	No
42Gr4006	Lithic Scatter	No	No	No	No	No	Yes	No

Vandalism. The malicious looting and vandalism of archaeological sites in Tenmile Canyon appears to have a long tradition that extends almost eight decades. It is clear from the inscriptions found in alcove sites in Tenmile Canyon that the cultural resources of this area were well known to local residents perhaps as early as 1921 but certainly by 1930 when looting of cultural deposits in the canyon apparently became commonplace. Based on one particular inscription at 42Gr3842, dated July 24, 1930, these “excavations” may have been conducted by young adults from nearby Green River, Utah. Other inscriptions at 42Gr3837 dated to 1933 suggest individuals of Hispanic ethnicity may also have been involved in activities in the area.

Archaeologists working throughout the northern Colorado Plateau in the 1930s were increasingly critical of the proliferation of looting and vandalism (cf. Gaumer 1937, 1939; Judd 1926), as did the Utah State Legislature, which banned "all exploration and excavations for, as well as prohibiting the removal of, prehistoric relics from the state without a permit from the State Parks Commissioners" (Struvell and Pulver 1935:C). However, there was little negative social stigma associated with the looting of archaeological sites at that time, and such looting became traditional family activities all across southern Utah. Preliminary data from Tenmile Canyon suggest that this drainage was enveloped within that tradition, certainly by residents of Green River and perhaps elsewhere, and that looting has continued through recent times, as evidenced by a 1997 inscription at 42Gr3838. Vandalism data are summarized in Table 5.

At least 15 of the 38 sites (40 percent) documented by CPAA exhibited evidence of malicious vandalism, primarily in the form of illegal excavations involving shovels, screens and ancillary equipment (see Table 3). Illegal digging appears to have been focused primarily on highly visible sheltered areas with residential detritus, rock art and/or storage features. At least 15 of 18 sites located within alcoves or sheltered areas have been vandalized (83 percent), including one alcove next to a rock art site (42Gr3838) that had no obvious cultural deposits. By comparison, there is no convincing evidence of malicious vandalism at open artifact scatters (aside from occasional trophy piles suggestive of artifact collection). And only one cliff site (42Gr3837) exhibited looting, as evidenced by massive looters’ pits along the base of a cliff that have exposed residential detritus. These data suggest that illegal excavations are focused almost exclusively on large alcoves and rockshelters with a potential for deep cultural deposits.

Evidence of vandalism was examined utilizing a model modified from Nickens et al. (1981), developed by CPAA for the Tavaputs Plateau just north of Tenmile Canyon. That study (Spangler, Arnold and Boomgarden 2006) examined the relationship of vandalism to controlled access points, distance from a road or ORV trail, and site visibility. This study found that those sites visible from an existing route were more likely to have been vandalized regardless of distance, as were other sites within 200 meters of an existing vehicle route. The Tenmile Canyon data are also consistent with a recent CPAA study in southeastern Utah that demonstrated the greatest evidence of adverse human impacts were identified at sites that are visible from an existing ORV route (Spangler 2006).

Both CPAA studies are consistent with other vandalism research in the Southwest. Nickens et al. (1981) found that archaeological sites within 100 meters of an existing dirt road that were more than 20 miles from a town were more likely to have been vandalized; these findings were supported by interviews with known artifact collectors. Simms (1986) also observed a correlation between vandalism and visibility from the road, distance from the road and ease of access. Of note, all alcoves and rockshelters in Simms' sample had been vandalized. Ahlstrom et al. (1992) found site type to be a major factor in vandalism.

The data from all five studies would appear directly applicable to a study of vandalism in Tenmile Canyon where site type (residential and storage sites) and site visibility (large alcoves) appear to correlate with the prevalence of site vandalism. Fifteen of the 19 sites (79 percent) located in alcoves are visible from the legal ORV access road in the bottom of Tenmile Canyon or from an established vehicle route on the north canyon rim opposite the confluence of Trail Canyon. Of the 15 visible sites, all but three sites had been looted. Of the non-vandalized sites, 42Gr3844 features a granary-like structure inside a sheltered area, but with extremely shallow interior deposits that could have been looted; and 42Gr4000 and 42Gr4001 are rock art sites without any associated cultural deposits that could have been looted. In effect, all visible alcoves with cultural deposits had been looted (in the case of 42Gr661, the looting appears to have been minimal or confined to the surface).

Of note, visibility from the main (legal) access route is but one factor and it may not be a determining factor in whether or not alcove sites will be vandalized. Of the four alcove sites not visible from the bottom of Tenmile Canyon, two (42Gr3838 and 42Gr3845) had been severely looted by individuals using screens and night lighting. Both sites are within 400 meters of the Tenmile Canyon ORV trail. One site (42Gr3841) that was not looted is located in a small alcove hidden by a knoll. Cultural materials here are sparse and may have gone undetected by looters. In the other instance (42Gr3991) there are no cultural deposits in the bottom of the alcove that could have been looted. Although the sample is admittedly small, these data suggest that cultural deposits in large alcoves are vulnerable to looting *regardless* of visibility, and that pedestrians will haul equipment to a non-visible site when vehicular access is difficult. It is also probable that vehicles were used to transport excavation equipment into Tenmile Canyon to an access point in close proximity to the alcoves.

These findings are consistent with Spangler, Arnold and Boomgarden (2006) that visible alcove sites are particularly vulnerable to looting regardless of distance from a controlled access point or vehicle route. Indeed, distance from an access route was not a determining factor in site vandalism in Tenmile Canyon. Rather, looters appear to have focused their efforts on those alcoves visible from an access route with interior deposits. These observations are admittedly biased by the paucity of sites identified that are not visible from the access route. It is noted that all rock art sites visible from the main access route, including those in visible alcoves without cultural deposits, have not been vandalized. This also indicates that malicious vandalism was focused on those localities with a potential for subsurface cultural deposits.

The looting of surface deposits within alcoves and rockshelters appears to have been comprehensive and systematic. Large alcoves commonly feature 20 or more looters' pits, whereas small shelters feature one to five pits. The pits range in depth up to 1 meter, although most have refilled with aeolian sands and the original depth could not be determined. Given the unstable nature of the aeolian deposits, the depth of the pits is unlikely to have exceeded 1 meter before the side walls collapsed. Those pits with evidence of greatest depth (ca. 1 meter) are typically located in compacted clay and gravel deposits. The width of the pits ranges from less than a meter in diameter to trenches as long as 14 meters. The back dirt piles typically feature abundant charcoal, processed animal bone and bifacial thinning flakes, as well as occasional groundstone tool fragments and potsherds.

The relationship of vandalized sites to vehicular access is problematic given the absence of historical data related to when vehicular access into Tenmile Canyon was initiated. Circumstantial evidence suggests that vehicle access to the general area was initiated at about 1930 when several names and dates of several young adult males and females were incised into boulders inside alcoves. Given the distance of the drainage from Moab and Green River, it would seem unlikely that young adults on holiday outings would have ridden horses more than 30 kilometers to Tenmile Canyon for the express purpose of looting alcoves. It is also unlikely that primitive vehicular traffic would have been possible in the bottom of Tenmile Canyon given the episodic flooding and absence of modern four-wheel-drive technology and equipment to remove obstructions. It is more likely that vehicles traversed the relatively flat Green River Desert to the rim of Tenmile Canyon, and that individuals descended into the canyon bottom on foot.

Anecdotal evidence suggests vehicular access into the bottom of Tenmile Canyon was initiated in the 1960s (Donna Turnipseed, personal communication 2007). This is consistent with the dateable characteristics of the considerable trash left behind during the course of looting activities. This trash includes an abundance of aluminum "pop top" beverage cans, short-necked beer bottles and rusted metal items consistent with 1960s manufacture, although some of the litter clearly dates prior and subsequent to that time. Collectively, these data suggest that the opening of Tenmile Canyon to vehicular traffic precipitated considerable vandalism, including individuals who brought equipment for the express purpose of systematically looting sites (e.g., screens and shovels). This activity continued through at least the 1990s, as evidenced by inscriptions and a rubber-coated metal hook for hanging a light or screen from the ceiling of an alcove at 42Gr3838.

Some vandalism appears to have been incidental to other activities, probably the tending of livestock. The two Hispanic names inscribed at 42Gr3827 could be associated with livestock activities, although this is conjectural. More convincing is evidence at 42Gr3842, an alcove site that features a constructed horse railing and numerous rusted tin cans, probably milk and coffee cans, that are consistent with those used during the first half of the twentieth century. These data suggest that alcoves may have been used as

“cowboy camps” and that looting of cultural deposits occurred during the course of tending livestock.

Table 5: Summary of vandalism/looting evidence

Site No.	Site Type	Site Location	Looters Pits	Looter Detritus	Earliest Dates of Occurrence	Site or Alcove Visible
42Gr583	Lithic Scatter	Bench	None	No	N/A	No
42Gr660	Residential	Alcove	7	Trash	Unknown	Yes
42Gr661	Structures	Alcove	2	No	Unknown	Yes
42Gr3354	Artifact Scatter	Bench	None	No	N/A	Yes
42Gr3829	Rock Art	Cliff	None	No	N/A	Yes
42Gr3830	Rock Art	Cliff	None	No	N/A	No
42Gr3831	Residential	Alcove	1+	Trash	Unknown	Yes
42Gr3832	Residential	Alcove	20	Trash	1960	Yes
42Gr3833	Residential	Alcove	1	No	Unknown	Yes
42Gr3834	Residential	Alcove	2+	Trash	Unknown	Yes
42Gr3835	Artifact Scatter	Bench	None	No	N/A	No
42Gr3836	Residential	Alcove	2	Shovel	Unknown	Yes
42Gr3837	Residential	Cliff	4	Trash, Trophy Piles	1933	Yes
42Gr3838	Rock Art	Alcove	7	Metal hook	1997	No
42Gr3839	Lithic Scatter	Bench	None	Trophy pile	N/A	No
42Gr3840	Residential	Alcove	25	Trash	1930	Yes
42Gr3841	Residential	Alcove	None	No	N/A	No
42Gr3842	Residential	Alcove	27	Trash	1930	Yes
42Gr3843	Storage Cists	Alcove	5*	No	Unknown	Yes
42Gr3844	Granary	Alcove	None	No	Unknown	Yes
42Gr3845	Residential	Alcove	22	Screens	1930	No
42Gr3846	Rock Art	Cliff	None	No	N/A	Yes
42Gr3991	Special Use	Alcove	None	No	N/A	No
42Gr3992	Storage Cists	Alcove	4*	No	Unknown	Yes
42Gr3993	Lithic Scatter	Bench	None	Trophy Pile	Unknown	No
42Gr3994	Special Use	Alcove	1	Obliteration	Unknown	Yes
42Gr3995	Lithic Scatter	Bench	None	No	N/A	No
42Gr3996	Lithic Scatter	Bench	None	No	N/A	No
42Gr3997	Lithic Scatter	Bench	None	No	N/A	No
42Gr3998	Lithic Scatter	Bench	None	No	N/A	No
42Gr3999	Lithic Scatter	Bench	None	No	N/A	No
42Gr4000	Rock Art	Alcove	None	No	N/A	No
42Gr4001	Rock Art	Alcove	None	No	N/A	No
42Gr4002	Lithic Scatter	Bench	None	No	N/A	No
42Gr4003	Lithic Scatter	Bench	None	No	N/A	No
42Gr4004	Lithic Scatter	Bench	None	No	N/A	No
42Gr4005	Lithic Scatter	Bench	None	No	N/A	No
42Gr4006	Lithic Scatter	Bench	None	No	N/A	No

*Sites 42Gr3843 and 42Gr3992 feature hardpan cists that have been dismantled and emptied of cultural deposits. These were defined as looters’ pits for the purposes of this study. Site visibility is defined as to whether the site or the alcove where the site is located is visible from the legal ORV route in the bottom of Tenmile Canyon. By this standard, most lithic scatters are not visible even if the bench area where they are located is visible.

There is no convincing evidence that any of the 38 sites examined have been subjected to illegal excavations within the past five years. The only possible evidence is a discarded polyester strap with no weathering found at 42Gr3842, although there is nothing to link the strap to specific looting activities at the alcove. None of the other sites examined had trash that appeared to have been discarded during the past five years, although some aluminum cans observed on and around sites could be of recent vintage. It is assumed that either (1) looting of cultural deposits has diminished in recent years, (2) looters are more careful not to leave behind incriminating evidence in light of highly

publicized prosecutions, or (3) the absence of empirical evidence is a reflection of a small sample size.

The evidence from these 38 sites also indicates that unrestricted vehicular access has resulted in greater access to archaeological sites, and that this access has facilitated vandalism since at least the 1960s. It remains equivocal as to whether vehicular access influenced the prevalence of vandalism prior to that time. It is also evident that by the mid 1970s, when the area was under consideration for uranium development, that significant numbers of access routes were in existence throughout the area, including possibly the bottom of Tenmile Canyon, and that large alcove sites documented at that time had all been vandalized. It is highly probable, given that all alcove sites with depth to the cultural deposits have been looted and vandalized that the vandalism was facilitated by individuals arriving at site locations in vehicles to transport screens, shovels, beverages and other items.

ORV Impacts

Direct and indirect impacts from motorized vehicles are evident at a majority of the 38 sites investigated by CPAA. These impacts include multiple ATV (two-track) and motorcycle (single-track) tracks through open artifact scatters with potential for buried cultural deposits, and the establishment of spur routes leading from the BLM-signed route in the bottom of the canyon to alcove sites where there is a high likelihood of buried cultural deposits in front of the shelters. In the case of vehicle tracks through cultural deposits, sites located in open bench settings are vulnerable to direct impacts, and in the case of alcove sites the impacts are predominantly indirect.

Fifteen of the 38 sites (40 percent) documented by CPAA are open sites, all of them artifact scatters of varying degrees of complexity, from single-event scatters with a few dozen non-diagnostic lithic flakes, to scatters with more than 500 lithic flakes, chipped-stone and groundstone tools, and potsherds. Of the 15 open sites, 10 sites had been directly impacted by vehicles (tracks through cultural deposits or within 10 meters of cultural deposits), and another three open sites had indirect impacts, or vehicle tracks within 50 meters of the deposits. In effect, 87 percent of open sites had been directly or indirectly impacted by vehicles.

Nineteen of the 38 sites (50 percent) documented by CPAA are located in alcoves or rockshelters with evidence of human occupation, storage facilities or special-use activities. Cultural deposits often extend in front of the shelter some distance, although cultural materials are rarely located more than 20 meters in front of a sheltered area. An analysis of the proximity of vehicle tracks to alcove sites revealed one of 19 sites (6 percent) had cultural deposits that had been directly impacted by vehicles. By comparison, 13 sheltered sites (68 percent) had vehicle tracks within 10 to 50 meters of cultural deposits. These data suggest that vehicles are being used to gain closer access to the alcoves and rockshelters, but that the location of the shelters is such that vehicles cannot (or have not) obtained direct access to interior deposits.

Only 4 of the 38 sites (ca. 10 percent) investigated are located on cliff faces. These are all rock art sites, and in one instance a rock art site with associated residential detritus. All four cliff sites are in topographic settings where vehicular access would be difficult and there is no evidence at this time of any direct vehicular impacts. One rock art site (42Gr3846) had vehicle tracks to within 40 meters, but was otherwise protected from direct access by vehicles by vertical outcrops. The rock art site with residential detritus (42Gr3837) is currently protected from direct vehicular access by a deep arroyo about 70 meters to the northeast.

When the 38 sites are considered collectively, 11 sites, or 29 percent of all sites investigated, had been directly impacted by vehicles. In most instances, these impacts are considered to be recent and/or ongoing, and these adverse impacts continue to degrade the National Register eligibility of these sites. Another 17 sites, or 45 percent of all sites investigated, had been indirectly impacted by vehicles, or had evidence of vehicle tracks and trails from 10 to 50 meters of cultural deposits or features, but were otherwise outside the parameters of the site itself. There is significant potential these indirect impacts could become direct impacts in the future through expanded vehicular traffic closer to archaeological sites, and/or subsequent exposure of cultural materials within those areas already disturbed by vehicle travel.

It is emphasized that direct and indirect impacts have been precipitated by inappropriate ORV use, and that proper adherence to existing rules and regulations restricting vehicular travel to the bottom of the canyon would, with one exception, not have resulted in any adverse impacts to cultural sites. Only site 42Gr3354, an artifact scatter near Dripping Springs, is located along the legal access route. Cultural deposits at this site have suffered direct impacts from vehicles traveling off the established ORV route (artifacts were observed within the ORV route and within vehicle tracks adjacent to the ORV route). This site has also been impacted by the installation of a cattle guard, fence and ORV route along the western periphery of the site. Vehicular impacts are summarized in Table 6.

Although many of the sites are badly vandalized or damaged by vehicle traffic, all 38 sites examined during the course of the CPAA site analysis are recommended as eligible for the National Register of Historic Places under one or more criteria. Some of the sites discussed above may not be individually eligible due to the lack of depth to the cultural deposits (e.g. 42Gr3991 and 42Gr3998). However, even these sites, when examined collectively within the spatial context of broad Tenmile Canyon land-use patterns, have considerable potential to contribute important new understandings into prehistoric lifeways. In particular, special-use sites (open lithic scatters and alcoves with evidence of a single activity), when examined holistically can contribute insights into lithic procurement strategies, hunting and gathering throughout various millennia and in response to changing climatic conditions, social structure and gender dynamics, and mobility versus sedentism among otherwise mobile populations.

Table 6: Summary of vehicular impacts to cultural sites

Site No.	Site Location	Distance to Legal Trail	Closest ORV Tracks	Vehicle Impacts	Deposits Vulnerable to Vehicles
42Gr583	Bench	50 meters	30 meters	Indirect	Yes
42Gr660	Alcove	80 meters	25 meters	Indirect	Yes
42Gr661	Alcove	300 meters	50 meters	Indirect	No
42Gr3354	Bench	1 meters	On Site	Direct	Yes
42Gr3829	Cliff	60 meters	60 meters	None	No
42Gr3830	Cliff	80 meters	80 meters	None	No
42Gr3831	Alcove	100 meters	40 meters	Indirect	Yes
42Gr3832	Alcove	80 meters	40 meters	Indirect	Yes
42Gr3833	Alcove	120 meters	25 meters	Indirect	Yes
42Gr3834	Alcove	100 meters	50 meters	Indirect	Yes
42Gr3835	Bench	40 meters	On Site	Direct	Yes
42Gr3836	Alcove	250 meters	30 meters	Indirect	Yes
42Gr3837	Cliff	100 meters	70 meters	None	No
42Gr3838	Alcove	260 meters	260 meters	None	No
42Gr3839	Bench	180 meters	On Site	Direct	Yes
42Gr3840	Alcove	280 meters	25 meters	Indirect	Yes
42Gr3841	Alcove	300 meters	50 meters	Indirect	Yes
42Gr3842	Alcove	360 meters	30 meters	Indirect	Yes
42Gr3843	Alcove	440 meters	On Site	Direct	Yes
42Gr3844	Alcove	340 meters	75 meters	None	No
42Gr3845	Alcove	400 meters	40 meters	Indirect	No
42Gr3846	Cliff	140 meters	40 meters	Indirect	No
42Gr3991	Alcove	450 meters	20 meters	Indirect	No
42Gr3992	Alcove	200 meters	100 meters	None	Yes
42Gr3993	Bench	200 meters	200 meters	None	Yes
42Gr3994	Alcove	200 meters	200 meters	None	Yes
42Gr3995	Bench	160 meters	75 meters	Indirect	Yes
42Gr3996	Bench	80 meters	On site	Direct	Yes
42Gr3997	Bench	100 meters	10 meters	Indirect	Yes
42Gr3998	Bench	60 meters	100 meters	None	Yes
42Gr3999	Bench	140 meters	On site	Direct	Yes
42Gr4000	Alcove/Cliff	250 meters	75 meters	None	Yes
42Gr4001	Alcove	250 meters	25 meters	Indirect	Yes
42Gr4002	Bench	120 meters	On site	Direct	Yes
42Gr4003	Bench	100 meters	On site	Direct	Yes
42Gr4004	Bench	150 meters	5 meters	Direct	Yes
42Gr4005	Bench	400 meters	On site	Direct	Yes
42Gr4006	Bench	250 meters	On site	Direct	Yes

Note: For the purposes of this analysis, the legal access route was determined to be the center point of Tenmile Creek, although it is acknowledged that the route changes from one side of the stream to the other. Distance in meters from the legal access route to the site was determined from U.S. Geological Survey quadrangles; distance in meters from the site to the nearest ORV tracks was estimated from on-site inspection. When possible, distances to the legal access point were measured from a known access point in the canyon bottom where a spur route left the main route and ascended the bench area. For the purposes of organizing the data, impacts to cultural deposits were considered to be “direct” if vehicle tracks were visible among or within 9 meters of cultural deposits or features. Impacts were considered to be indirect if vehicle tracks were observed from 10 to 50 meters from cultural deposits or features.

Eligibility Summary

In particular, these deposits offer significant potential to researchers attempting to explain how prehistoric groups responded to environmental changes through time. Because Tenmile Canyon is a transition zone between groups living south and east of the Colorado River and those living to the north and west, this drainage also offers considerable potential to provide important information related to socioeconomic interactions through time, including the introduction of cultigens to forager lifeways, the appearance and demise of various lithic and ceramic technologies, and the poorly understood relationship between the Fremont and Ancestral Puebloan cultures and the deterioration of ethnic boundaries after A.D. 1000 (cf. Madsen and Simms 1998).

Consequently, all 38 sites are eligible under Criterion D inasmuch as they have significant potential to yield information important in the prehistory of the northern Colorado Plateau. As discussed above, extremely little research has been conducted into prehistoric manifestations in the Tenmile Canyon drainage, and little is known about how prehistoric foragers and agriculturalists adapted to this especially arid environment. Although surface deposits have been disturbed at many sites, it is highly probable cultural deposits extend a considerable distance below the zone of disturbance, and that these deposits will yield new insights into prehistoric groups who occupied the canyon during Paleoindian, Archaic and Formative times.

Many of the 38 sites are also eligible under Criterion A inasmuch as they collectively contribute to a broad understanding of prehistoric lifeways during Archaic and Formative times on the northern Colorado Plateau. These adaptations were characterized by small groups of hunter-gatherers who utilized plant and animal resources concentrated along a riparian corridor in an otherwise arid environment. During Formative times, some foragers also engaged in the cultivation of maize on the Tenmile Canyon floodplain where they appear to have been part of a larger Fremont Complex of farmer-foragers. Most sites in Tenmile Canyon reflect occupations by small nuclear or extended family units living in close proximity to permanent water.

Nine sites with rock art are recommended as eligible under Criterion C inasmuch as they are remarkable examples of prehistoric aboriginal rock art that embodies distinctive characteristics of different styles, periods of time and methods of construction. Some of these rock art sites possess high artistic values attributed to Fremont and Archaic peoples who occupied the northern Colorado Plateau from ca. B.C. 2000 through A.D. 1300. Other rock art images represent a significant and distinguishable catalog of images whose components may lack individual distinction but which collectively contribute to a broader perspective of land use patterns through time. In addition to the aesthetic qualities, these images offer clues as to spatial and temporal relationships between prehistoric populations, as well as insights into prehistoric communication and ceremonialism.

Summary and Recommendations

The above discussion constitutes a final report of findings of intuitive surveys conducted by CPAA in the Tenmile Canyon area in 2007 and 2008. Tentative conclusions offered here as to site types, site densities and the nature and scope of adverse effects will be further tested through additional intuitive surveys in the lower part of Tenmile Canyon at an undetermined point in the future. Based on the brief field observations (seven days in the field), it appears that Tenmile Canyon was the focus of intense human foraging throughout the Archaic period, and farming and foraging during the Formative period. Human exploitation of the drainage was focused on residential activities in and around large alcoves and on lithic procurement focused on the bench areas above Tenmile Creek. In that portion of the canyon examined below Dripping Springs, site density ranges from 12 to 15 sites per linear kilometer along the canyon bottom. This density is expected to remain consistent in those un-surveyed areas of Tenmile Canyon that feature similar environmental variables, including large dry alcoves with interiors suitable for human occupation, alluvial benches with abundant chert, chalcedony and quartzite nodules suitable for stone tool manufacturing, and relatively easy access to reliable water. It is anticipated that Class III surveys of the Tenmile Canyon drainage would identify more than 300 sites.

The cultural resources of Tenmile Canyon are remarkable in that they constitute a full suite of human foraging and perhaps farming activities within an environmentally discrete ecosystem defined by the parameters of the canyon drainage. The spatial distribution of these sites offers important insights into human responses to climatic and socioeconomic conditions throughout many millennia of human occupation. As such, even sites that appear insignificant due to a paucity of diagnostic artifacts or depth of cultural deposits assume great significance when examined holistically within the constructs of broader human landscapes. Although some sites may not be individually significant, all sites documented to date are considered eligible for National Register listing under one or more criteria in that they are representative of spatially distinct adaptations to the Green River Desert generally and Tenmile Canyon specifically, and that the spatial patterns evident here have significant potential to contribute important insights into the cultural interface between Ancestral Puebloan peoples to the south and the Fremont Complex to the north. As such, the nomination of the entire drainage as an archaeological district of regional or national significance may be appropriate.

Research conducted by CPAA has also demonstrated that the integrity of archaeological sites in Tenmile Canyon continues to deteriorate through episodic vandalism and looting that has continued through at least the 1990s. Cultural resources have also suffered direct degradation due to thoughtless ORV users who willfully disregard travel restrictions limiting travel to the bottom of the canyon. Recent vehicle tracks away from BLM's signed trail is evidence that illegal riding continues and such practice is likely to continue absent increased law enforcement and physical barriers (such as fences) to preclude such illegal riding. The failure or inability of the BLM to enforce existing ORV regulations would appear to be an abrogation of agency's mandate as articulated in Executive Order 11989.

FLPMA obligates the Bureau of Land Management (BLM) to protect cultural, geologic and paleontological resource values (43 U.S.C. §§ 1701(a)(8) 1702(c)), whereas the National Historic Preservation Act of 1966 (“NHPA”) (16 U.S.C. § 470 et seq.) provides for enhanced consideration of potential impacts to these resources through a cooperative federal-state program for the protection of historic and cultural resources. In particular, Section 106 (16 U.S.C. § 470f) obligates the BLM to consider the effects of management actions on historic and cultural resources listed or eligible for listing to the National Register of Historic Places, as provided under NHPA. Section 110 of the NHPA requires the BLM to assume responsibility for the preservation of historic properties it owns or controls (16 U.S.C. § 470h-2(a)(1)), and to manage and maintain those resources in a way that gives “special consideration” to preserving their historic, archaeological and cultural values. Section 110 also requires the BLM to ensure that all historic properties under the jurisdiction or control of the agency are identified, evaluated, and nominated to the National Register of Historic Places. *Id.* § 470h-2(a)(2)(A).

Many other federal laws, regulations and executive orders have articulated the BLM’s responsibility to protect properties of cultural and religious significance. This responsibility was reaffirmed by President Bush’s “Preserve America” initiative (See Exec. Order 13287, March 3, 2003) that requires the BLM to advance the protection, enhancement, and contemporary use of its historic properties. It states the BLM must ensure that “the management of historic properties in its ownership is conducted in a manner that promotes the long-term preservation and use of those properties as Federal assets.” It is within that context that the Moab Field Office must carefully consider the effects of its decision-making on archaeological and cultural values of significance to all Americans.

CPAA has been unable to identify any meaningful effort on the part of the BLM to identify, evaluate or nominate historic properties in the Tenmile Canyon area to the National Register. Previous archaeological inventories in the area certainly do not comprise a meaningful and statistically valid sample in that these investigations were driven by the location of natural resource extraction projects and did not result in the investigation of all environmental and ecological ranges where cultural resources are likely to occur. The sites previously identified in the Tenmile Canyon drainage are actually a reflection of the amount of Section 106 Class III survey work that has been done. As demonstrated by CPAA’s limited surveys in 2007 and 2008, and the earlier Challenge Cost Share program reconnaissance, the previous research here does not reflect actual site density, site distribution or site significance.

Past archaeological surveys within the canyon drainage have been limited and piece-meal, focusing exclusively on small areas subject to developments that precipitated Section 106 compliance activities, and in a single instance a brief BLM monitoring survey. A review of archaeological site data on file with the Utah Division of State History reveals a virtual absence of archaeological block surveys within the Tenmile Canyon area that would contribute to an understanding of potential site densities or to an understanding of the distribution of archaeological sites across an entire landscape. In

fact, these data reveal astonishingly few Class III surveys of any kind. Consequently, the paucity of scientifically sound surveys has resulted in BLM management decisions that are based on inadequate data as to the nature, distribution and density of eligible sites within the canyon.

This has created a scenario wherein the BLM cannot effectively manage eligible properties the agency does not know are present there or that would be impacted by management decisions. Furthermore, the prevalence of vandalism over a considerable period of time suggests the BLM historically has done little to embrace its responsibilities under the Archaeological Resources Protection Act (ARPA). As a consequence, the integrity of National Register-eligible sites is being compromised by the inability or unwillingness of the BLM inaction to embrace its Section 110 obligations.

The failure of the BLM to identify potentially eligible properties is aggravated by an explosion in recent years of improper ORV use that constitutes perhaps the greatest single threat to the long-term preservation of cultural resources. There can be little dispute that ORVs have greatly enhanced the ability of the public to gain access to and enjoyment from cultural resources that have previously been protected by their isolation, lack of visibility or distance from an improved road. There is also little dispute that some individuals have utilized ORVs to facilitate damage to cultural resources, whether directly or inadvertently. CPAA has been unable to identify any public outreach effort by the BLM in Utah to educate ORV users as to the fragile and irreplaceable nature of cultural resources or to promulgate proper etiquette among ORV users who visit these resources.

The BLM also appears to have ignored its directives as articulated in Executive Orders 11644 and 11989 that mandate federal land managers “protect the resources of (federal) lands” and that agency heads who determine that the use of off-road vehicles is causing or will cause adverse impacts to cultural or historical resources shall immediately close such areas or trails to the type of off-road vehicle causing such effects, until such time as he determines that such adverse effects have been eliminated and that measures have been implemented to prevent future recurrence (Executive Order 11989). There is little evidence the Moab Field Office is aggressively managing ORV use in Tenmile Canyon to eliminate the adverse effects of ORV travel to cultural resources.

It is noted that the BLM elsewhere has developed detailed plans to accommodate ORV use in archaeologically sensitive areas. For example the Tangle Lakes Archaeological District (TLAD), a BLM-managed National Register district in Alaska, encompasses 185,321 acres and more than 600 archaeological sites. Since the 1980s, the Glennallen Field Office designated ORV routes with the express purpose of protecting the high density of archaeological sites. A subsequent draft travel plan calls for seasonal restrictions on designated trail use, prohibits off-trail travel for game retrieval with some exceptions, imposes weight restrictions on vehicles, expands efforts to provide educational materials to trail users about the archaeological significance of the region, provides suggestions for best trail-use practices, provides for a heightened law enforcement presence during high-use periods, and calls for expanded monitoring of

trails. The plan also defined the area of impact due to motorized use to be one-half mile on either side of a designated trail (BLM 2006).

The TLAD three-part management approach clearly acknowledges the potential conflicts between ORV users and the protection of archaeological resources listed on the National Register. First, ORV travel was restricted to those routes where impacts to resources would be minimized and archaeological sites avoided. Second, these restrictions are being augmented with proactive efforts to educate trail users about the sensitivity and significance of archaeological resources, as well as rules, regulations and best practices intended to protect those resources. And third, the plan calls for enhanced law enforcement and monitoring of potential impacts. The TLAD approach could be an appropriate strategy for the management of ORVs in other archaeologically sensitive areas such as Tenmile Canyon.

In light of the considerations discussed above, it is recommended that Tenmile Canyon be closed to vehicular traffic pursuant to Executive Order 11989 until such time that the BLM:

- Conducts a thorough Class III investigation of all areas being impacted to determine the location, nature, density and eligibility of historic properties impacted by or vulnerable to ORV travel to a distance of at least one-half mile from an existing ORV route, as well as an investigation of all alcoves regardless of distance from the ORV route. Given the capabilities of some ORVs, these areas should include the canyon bottoms, slopes, canyon sides and canyon rims on both sides of the Tenmile Canyon drainage from at least Dripping Springs to the confluence with the Green River.
- Develops management strategies that specifically address the impacts of ORV travel and pedestrian impacts at archaeologically sensitive areas, including the clear designation of vehicle and pedestrian trails that will not adversely effect eligible properties. The three-tiered model developed for the Tangle Lake Archaeological District in Alaska would be appropriate.
- Develops and implements a proactive public education strategy to inform all trail users about the sensitivity and significance of archaeological resources, as well rules, regulations and best practices intended to protect those resources.
- Demonstrates its commitment to enhanced law enforcement, particularly during seasons of high use. Aggressive deterrence of ORV violations and prosecution of those who damage or destroy cultural resources are fundamental components of this approach. This strategy should not be limited merely to the posting of signs, but through aggressive contact with visitors.
- Exhibits a willingness to comply with its Section 110 responsibilities and identify, evaluate and nominate sites in the Tenmile Canyon drainage to the National Register of Historic Places. Based on limited intuitive surveys, the entire drainage may be eligible as an archaeological district.
- Initiates a campaign to mitigate the effects of past vandalism, including the removal of trash left behind by looters; the removal of screens, hooks and

shovels used by looters; and where appropriate fill in looters' pits to deter any perception that looting is an acceptable practice.

- Implements a consistent monitoring campaign that will ensure the protection of cultural resources for future generations, as articulated in existing laws, regulations and executive orders.
- Immediately consults with interested tribes regarding all management decisions affecting Tenmile Canyon, as per Executive Order 13175 requiring "timely input by tribal leaders," and with 36 CFR 800.2(ii)(A), that states "Consultation should commence early in the planning process, in order to identify and discuss relevant preservation issues and resolve concerns about the confidentiality of information on historic properties."

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