

**Site Condition and Vandalism Assessment
of Archaeological Sites,
Lower and Middle Arch Canyon,
San Juan County, Utah**

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Introduction

For more than a century, the impressive cultural resources of the Cedar Mesa region of southeastern Utah have been of keen interest to professional researchers, amateur enthusiasts and predatory individuals who have sought to acquire valuable Pre-Columbian artifacts. Indeed, the looting of artifacts in this region has a long tradition rooted in the early museum expeditions of the late nineteenth century and early twentieth century (Blackburn and Williamson 1997; Phillips 1993). 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.

Arch Canyon, located on the northern periphery of Cedar Mesa, has two qualities that, in tandem, are particularly rare to this region: (1) A perennial water source that appears to have been the focus of intense prehistoric occupations by Ancestral Puebloan farmers, resulting in spectacular architectural remains along the canyon bottom and at various higher cliff levels, and (2) a route through the bottom of the drainage that provides easy vehicular access to many of these archaeological sites. The abundance of visually impressive archaeological sites combined with vehicular access has precipitated greater levels of public visitation than is evident elsewhere in the region, and this in turn appears to have resulted in much greater levels of adverse impacts to cultural resources, including wanton vandalism, illegal collecting of artifacts and inadvertent damage by visitors unaware of proper site etiquette.

It is also apparent that current U.S. Bureau of Land Management (BLM) enforcement of federal statutes and regulations to protect cultural resources is inadequate. Cultural resources in Arch Canyon area will continue to deteriorate without an aggressive management plan that includes public outreach, limitations on vehicular access, site stabilization and better management of pedestrian traffic on and around significant sites. Current BLM management strategies are predicated on previous research that was clearly inadequate, and little effort has been expended to determine the nature, density and distribution of sites throughout the canyon. The degradation of significant sites clearly eligible for the National Register of Historic Places remains a serious problem that warrants aggressive management.

In April 2006, the Colorado Plateau Archaeological Alliance (CPAA) revisited nine previously recorded sites in the lower and middle Arch 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 and any other recreation impacts evident on the site surface. Archaeological sites were also analyzed based on their visibility, accessibility and potential for adverse effects. During the course of identifying nine previously identified sites, five additional sites were documented. All 14 sites, located on lands administered by the BLM (11 sites) or the Utah School and Institutional Trust Lands Administration (3 sites), were recorded to IMACS standards and with a level of detail to assist land managers monitoring the cumulative effects of public visitation in the future. This effort

involved only site documentation, and no surveys of any kind were conducted at that time and no artifacts were collected.

In October 2006, CPAA returned to Arch Canyon to revisit selected sites to determine whether additional adverse impacts have occurred since the April documentation. Due to adverse weather conditions that made vehicular access impossible, CPAA instead chose to conduct an intuitive survey of a section of the canyon between []. An additional nine new sites were documented on both sides of the canyon in this spatially restricted area, and previously undocumented features were identified at 42Sa5216 and 42Sa5217. No artifacts were collected, but in some cases artifacts susceptible to surface collecting were cached out of view. The location of lower and middle Arch Canyon sites examined by CPAA is indicated in Figure 1.

Based on evidence observed at these sites, it can be concluded that (1) Most but not all sites identified are located on cliff ledges or in sheltered areas above the floodplain and are not directly accessible to wheeled vehicles. (2) Off-road vehicle (ORV) trails may be damaging potential middens at the bottom of slopes and floodplain areas that were likely the focus of prehistoric agricultural activities. (3) Most sites visible from the existing route have suffered significant vandalism, site degradation and illegal surface collecting from canyon visitors, although there is no way to determine when these activities occurred or who initiated them. (4) Sites not visible from the route exhibit less evidence of adverse impacts from visitation, although these sites are being visited. (5) There is an extremely high potential for unidentified sites along the main route that would be accessible to ORV activities, and direct impacts to these sites in the future should be considered inevitable in the absence of more aggressive management strategies. And (6) BLM efforts to minimize damage to archaeological sites and potential subsurface deposits are inadequate given the current level of motor vehicle use in the canyon. It is also possible that the high level of ORV use, much of it facilitated by spur trails from the main route, has accelerated adverse effects to cultural resources in the canyon. It is probable that individuals with a disregard of rules and regulations regarding proper ORV use will similarly disregard laws protecting cultural resources.

Previous Research

Despite a wealth of research conducted in the Cedar Mesa region generally, the Arch Canyon corridor has not been subjected to quantitative or qualitative scientific inquiry. The earliest research conducted in the canyon appears to be the 1958 San Juan Triangle intuitive survey conducted by the University of Utah during the course of the Glen Canyon Archeological Project. A handful of sites were recorded near the mouth of Arch Canyon, as was Lewis Lodge (42Sa256), located near the canyon rim, which was later excavated. However, the report of investigations (Weller 1959) makes only passing references to sites at the mouth of Arch Canyon, offering brief descriptions of 42Sa277 and 42Sa278. However, other sites recorded by university crews (e.g., 42Sa256 and 42Sa260) were not included in their tabulations or site descriptions, and no report of those findings was located.

Most of the recorded sites in the middle/lower portion of the canyon (all located on the Hotel Rock 7.5 minute provisional quadrangle) were formally documented in 1965 by Leon Buist and Alfred Woolsten as part of a BLM reconnaissance that involved at least some observations from a helicopter. No report of their findings was located for this analysis. Their site descriptions generally included one or two lines of text, and rarely did these site forms provide significant details pertinent to an analysis of the cumulative effects of site degradation. Of more value are photographs that allow some level of visual comparison.

A review of reported data currently on file with the Antiquities Section of the Utah Division of State History revealed no significant scientific research projects or cultural resource management initiatives conducted in the middle and lower portions of Arch Canyon. No Class II or comprehensive Class III surveys have been conducted to determine actual density, nor has any effort been initiated to determine the suite of site types, the nature of prehistoric adaptations in the drainage specifically or the relationship of these adaptations to others on the Cedar Mesa generally.

In fact, the only significant research conducted to date in the lower/middle canyon corridor resulted from BLM efforts through the Cedar Mesa Project to re-document and stabilize 42Sa5271, a major Ancestral Puebloan architectural site commonly referred to as Arch Canyon Ruin, located 0.2 miles inside the mouth of Arch Canyon. This site was described as a complex of perhaps more than 50 rooms, including at least four kivas, three plazas and a large depression. Ceramic evidence “clearly identify either serial or continuous occupation during the Pueblo I, Pueblo II and Pueblo III periods,” whereas the rock art indicated a temporal range of Archaic or early Basketmaker through Numic and historic Anglo times (Hurst, Phillips and Shearin 2001).

This site was initially assigned a site number of 42Sa278 by the University of Utah in 1958, and was later re-recorded in 1965 as 42Sa5271 by the BLM, a year after the agency constructed a fence to discourage looting and climbing on structural walls, and to prevent cattle from knocking over standing walls. The Cedar Mesa Project re-documentation offers exceptional site descriptions and observations of adverse impacts from site visitation, including vandalism, graffiti and surface collection. Due to the quality of the re-documentation, conducted over a five-year period in the late 1990s and early 2000s, this site was not reexamined during the course of CPAA investigations. Winston Hurst has continued site documentation efforts of sites around the mouth of Arch Canyon, including 42Sa5215 and 42Sa260 described here, but these efforts were extended into Arch Canyon to a distance of not more than 1 kilometer (personal communication, October 2006).

Figure 1: Location of sites recorded in middle and lower Arch Canyon.

The only other investigation conducted in the lower/middle portion of the canyon was a clearance “survey” conducted in 1989 in anticipation of a Jeep safari through the canyon. The archaeologist conducting the clearance indicated a pedestrian survey was conducted along some areas of the route, but the report does not indicate where the surveys were conducted, only that less than 5 acres were investigated. In other areas impacted by the creek or judged to have little potential for cultural remains, the survey involved driving a vehicle “at a slow enough speed to observe for potential areas of cultural resources.” No archaeological sites were observed (Davidson 1989).

There is also a paucity of research conducted in the upper/middle portion of Arch Canyon and its tributaries, although the U.S. Forest Service has made a better effort to identify sites and determine potential effects that “could be a concern during ordinary hiking trips and camping” (Saunders 1993). In 1994, the Forest Service conducted additional site monitoring and stabilization assessments of sites in upper/middle Arch Canyon to develop a procedure for regular monitoring of sites impacted by recreational visitation. This report includes detailed assessments of scores of individual features, and also indicates the Forest Service had been accumulating an extensive photographic record for use in site monitoring and criminal prosecutions, and that law enforcement was regularly monitoring the sites (Hunt 1994:3).

No such efforts have been formally reported by the BLM on sites in the lower/middle part of the canyon, although the agency is clearly aware of the cultural resources in the canyon. However, in a 2005 environmental assessment, the agency determined, and the State Historic Preservation Officer concurred, that cultural sites located within an Area of Potential Effect (APE) would not be further impacted by a proposed Jeep safari, and that “there is no indication of direct or indirect impacts to cultural resources from permitted motorized use.” There is no indication how the BLM arrived at that determination. The EA admitted that sites located adjacent to routes could be impacted by inappropriate passing, parking off the road bed or illegal artifact collecting, and that the potential for impacts was greater in Arch Canyon where the density of sites was greater (2005:33-34). The EA also indicated that Arch Canyon is undergoing additional evaluation as part of the Monticello Resource Management Plan travel plan decisions (2005:45), but these evaluations were not available for this analysis. The BLM did not respond to CPAA requests for additional information regarding these evaluations or other management strategies specific to Arch Canyon cultural resources.

Summary. No comprehensive or systematic efforts have been initiated to identify sites within the Arch Canyon drainage, nor have previous researchers attempted to integrate those sites within broader discussions of prehistoric human behavior in the region. Previous archaeological research in the lower/middle Arch Canyon area is limited to a handful of sites initially recorded by the University of Utah in 1958 (Weller 1959) and several additional sites documented in 1965, presumably as part of an intuitive survey by the BLM (see individual sites forms 42Sa5215 to 42Sa5221). Both of these efforts lacked a systematic approach to archaeological survey, and it appears that only sites clearly visible from the road were documented. A subsequent clearance survey, apparently conducted largely from a moving vehicle, identified no additional sites (Davidson 1989). These surveys are inconsistent with acceptable systematic survey techniques (e.g., Banning 2002) and they are clearly inadequate. It appears that

subsequent land management decisions, as they apply to cultural resources, have been based on this inadequate research and a near absence of baseline data as to the location, density and nature of cultural resources that could be impacted.

Site Re-Documentation

At the request of the Southern Utah Wilderness Alliance, CPAA revisited previously recorded sites[]. Seven sites (42Sa5215 to 42Sa5221) had previously been recorded in that spatial range, all of the north side of the canyon. []Because these sites had not been documented since 1965, all previously recorded sites were recorded on standard IMACS forms and photographs were obtained to assist land managers with future management strategies and site condition assessments.

During the course of re-documentation, conducted from April 22 to April 24, 2006, and after consultation with the Antiquities Section of the Utah Division of State History, the lower portion of 42Sa5215 was reassigned its original site number of 42Sa260, whereas the upper portion retained the designation 42Sa5215. This was based primarily on the horizontal and vertical separation of the two clusters of architecture, and the fact duplicate site numbers had been assigned. Additionally, site 42Sa5220 was separated into two sites (the second was assigned the number 42Sa26614) due to the horizontal separation and differing aspects of the two primary features. For the purposes of this discussion, the splitting of two previously recorded sites brought the total number of previously identified sites in the study area to nine.

Nine previous recorded sites documented during the April 2006 CPAA site assessment, from southeast to northwest, include:

42Sa260. []his site consists of a cluster of 15 to 20 structures of stone and adobe construction, all of which are surface structures situated on a narrow ledge[]. The site extends for about 75 meters northwest to southeast. Most of the structures appear to be storage facilities with no evidence of smoke staining or fire scarring on the cliff surface or shelter ceiling. However, at least two structures have evidence of interior fires suggestive of residential structures. The site is heavily impacted by erosion and pedestrian traffic, and many rooms are defined only by small wall remnants or traces of adobe on the back wall of the sheltered area. Rock art images are found along the cliff face above several architectural structures. These include pecked images and painted hands and feet. This site was revisited on October 7, 2006.

42Sa5215. [], this site consists of a cluster of eight to nine structures []. The structures are predominantly rectangular or square, and they

feature unmodified sandstone and adobe construction (Figure 2). The ceiling of the sheltered area is commonly the ceiling of the structure and the back wall of the shelter is frequently the back wall of the structure. There is no evidence of smoke staining on the ceiling, and artifacts are minimal, suggesting this cluster was primarily a storage locus. One large circular stone alignment in front of the room block and outside the drip line could be remnants of an eroded residential structure, although corroborative material culture evidence was sparse. This site was revisited on October 7, 2006.



Figure 2: Stone and adobe storage units at 42Sa5215, a heavily visited site 0.4 miles inside the canyon.

42Sa5216 this site consists of a cluster of four stone-and-adobe rooms (Figure 3). At least one of the structures is a large D-shaped residential structure, as evidenced by smoke staining on the shelter ceiling. Attached to the west side of the residential structure is a small antechamber that was probably used for storage. About 4.5 meters to the north are two contiguous rooms, both of them square or rectangular, one with associated smoke staining and the other without. Both of these rooms are consistent in size and shape with storage facilities. Artifacts are extremely rare at this site, consisting of a few primary and secondary flakes, a burned beam, a corncob and bedrock grinding surfaces on a boulder that comprises part of the north wall of the residential structure. This site was revisited on October 7, 2006, and a petroglyph panel consisting of parallel rows of dots was documented about.



Figure 3: View to the south of 42Sa5216, among the most heavily visited sites in Arch Canyon.

42Sa5217. [] this site consists of wall remnants set perpendicular to the back of a shallow, south-facing sheltered area. There are also remnants of a front wall and possibly a third wall, also perpendicular to the back of the shelter. The intact wall (east side) features irregular, unmodified sandstone slabs and blocks interspersed with smaller amounts of reddish-tan adobe. The wall appears to be slightly curved. The front (south) wall has mostly collapsed, although some traces of unmodified sandstone and adobe remain at the base and in the finely sorted fill behind the wall. The wall is located just inside the drip line of the shelter and has suffered heavily from erosion. It measures 4 meters long and is less than 20 centimeters high at the highest point. The west wall is ephemeral, consisting of two to three courses of tabular sandstone and eroded adobe. Given the absence of fire scarring and smoke stains, the walls could be remnants of a storage facility.

This site was revisited on October 8, 2006, and three additional features were documented. The previously described structure was labeled Feature A. Feature B consisted of a stone and adobe wall, located on a ledge above Feature A and within a small shelter. The wall remnant is two to three courses high, but is in poor condition due to natural erosion. Panel A is a small petroglyph of a bighorn sheep measuring 35 centimeters wide by 24 centimeters [] Panel B is a much larger and more elaborate rock art panel located just southwest of Panel A that features more than a dozen petroglyphs and pictographs, although most are faded and indiscernible (Figure 4). This panel is clearly visible from the floodplain.

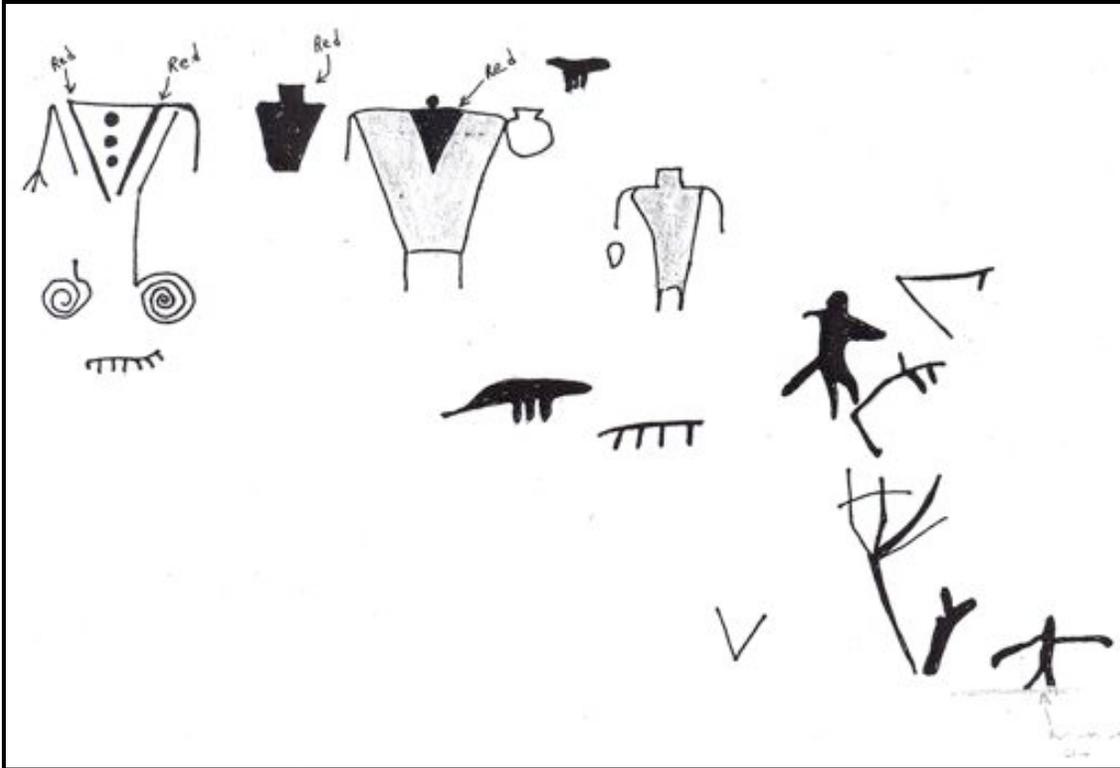


Figure 4: Sketch drawing of unrecorded rock art panel (B) at 42Sa5217.

42Sa5218 [] this site consists of a cluster of residential and storage rooms [] At least five features are evident. The structures were constructed of modified and unmodified sandstone slabs and blocks interspersed with courses of adobe. Collectively, the structures suggest occupation by a single or extended family with abundant storage attached to and slightly removed from the residence. The large and impressive architecture on the cliff ledge is clearly visible from the vehicle route and appears to be the focus of considerable public visitation. The adjacent storage units (Figure 5) at ground level are not mentioned in the original site report.

42Sa5219. []this site consists of a single D-shaped room abutting the cliff face at the base of the first cliff level above Arch Canyon Creek. Only two of the three original walls remain. The stone and adobe masonry construction features courses of thin sandstone slabs laid horizontally amid courses of reddish tan adobe with additional adobe pressed into the interior cracks. One entire hand print is visible on the interior. The north side of the structure consists of the cliff wall. The south wall visible from the vehicle route measures 2 meters east to west and is 1.4 meters high at the highest point and 1.25 meters high at the lowest point. From the southwest corner of the room, a remnant of a small second wall extends to the west another 1.4 meters and consists of larger sandstone blocks and comparatively little adobe. Artifacts are extremely rare. The paucity of artifacts and the absence of fire-scarred stone or charcoal staining may indicate this structure was utilized as a storage unit.



Figure 5: View of previously unrecorded Feature A storage unit at 42Sa5218.

42Sa5220. [] this site consists of a large and exceptionally well constructed remote cliff structure []with no obvious means of access. The structure, which encloses a deep alcove, appears to be about 2 meters across with intact walls that extend at least 1 meter high. The wall spans from east to west across three-fourths of the shelter opening. The construction appears to be of unmodified sandstone blocks, larger at the bottom than at the top, all set in copious amounts of adobe mortar. At least three vertical poles are visible extending above the south wall and may be part of the construction matrix of the wall or part of an interior feature. The poles extend above the top of the wall to the ceiling of the sheltered area about 1 to 1.5 meters. They appear to be about 10 centimeters in diameter. The sheltered area appears to extend a considerable distance into the cliff face, but dimensions could not be determined.

42Sa26614. [] this site was originally recorded as a "cave dwelling" about 1,000 feet above the floodplain. However, it appears this structure is likely a remote storage facility, []. The structure is readily visible from the vehicle route below and it appears to consist of a single chamber with an outer wall enclosing a deep cave or alcove. The outer south-facing wall is about 2 meters wide by 1.5 meters high, and it features construction of sandstone slabs and blocks set in adobe. About 10 poles extend vertically from the top of the wall to the ceiling of the sheltered area. This site was originally included in the

description for 42Sa5220, but was reassigned a new site number at the recommendation of the Utah Division of State History.

42Sa5221. [] this site consists of two storage structures [] The easternmost structure consists of a square structure of unmodified sandstone blocks and slabs with courses of thick adobe. The west wall remains intact, but most other walls are deteriorated, resulting in considerable fill inside the structure. The second structure, located about 3 meters to the west, is smaller and features an outer south-facing wall conforming to the shape of the irregular cliff ledge. It features tabular sandstone slabs laid horizontally with smaller amounts of adobe. The south wall has a square-shaped doorway defined by two parallel vertical thin stone slabs and a lintel of two wooden sticks (Figure 6). The south wall is about 85 centimeters high at its highest point and is about 3 meters long.

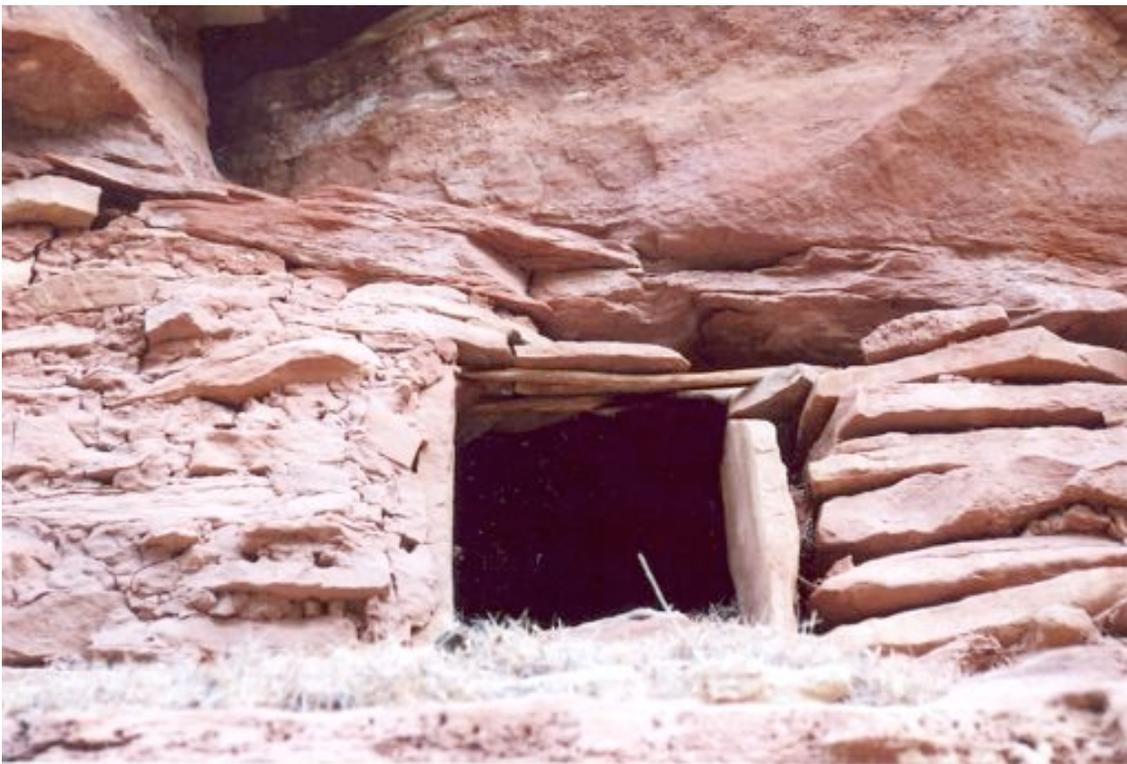


Figure 6: Close-up view of pole, stone and adobe construction at 42Sa5221, Feature B.

Previously Undocumented Sites

The location and documentation of previously unrecorded sites occurred in two phases. In April 2006, five sites were identified during the course of walking to previously recorded sites, or they were clearly visible from vehicles while en route to previously recorded sites. This involved no survey and the discovery of new sites was entirely accidental. In October 2006, a CPAA crew of four returned to Arch Canyon and selected for an intuitive survey an area []

The intuitive survey involved walking the floodplain in random non-systematic transects, walking along the base of the first cliff level abutting the floodplain and walking along the first bench level or ledge above the floodplain. The north side of the canyon was investigated on October 8, 2006, and the south side on October 9, 2006. A total of nine additional sites were documented during this period of time, all located at the base of the first cliff level or on the first bench or ledge above the canyon bottom.

New sites documented by CPAA, []:

42Sa26865. []this site consists of a dispersed lithic scatter and discrete concentration of charcoal, probably an eroding hearth, located on the first bench level on the north side of Arch Canyon. Artifacts were noted over an area 30 by 50 meters. No diagnostic artifacts were observed.

42Sa26869. []this site consists of a petroglyph panel with an unusually small anthropomorph with splayed legs and upraised arms and hands, located on the first cliff level on the south side of the canyon. The figure is exceptionally detailed despite being only 7 centimeters high and 9 centimeters wide. Individual toes and fingers are represented (Figure 7). A faint zigzag line extends across the top and to the right of the anthropomorph about 1 meter.



Figure 7: View of finely detailed anthropomorph at 42Sa26869.

42Sa26870. [] this site consists of a single-room structure located [] The structure is about 3 meters across the front, about 0.5 meters high and appears to be drylaid, although remnants of eroded mud or adobe are visible between the unmodified stones. The wall stands four to six courses high, although the top course appears to have been restacked. Additionally, numerous long timbers have been placed over the wall, some perpendicular to the wall and others horizontal. At least 12 timbers extend from the back of the shelter to the front wall; most are 2 to 3 meters long. Smaller bent braches are incorporated into the matrix, measuring 58 centimeters to 2.5 meters long. These timbers and branches are placed loosely across the top of the outer wall. This site likely represents a prehistoric storage unit.

42Sa26866. [] this site consists of a three-chambered storage facility [] The large visible wall across the front of the shelter appears to be an interior wall partitioning the sheltered area into outer and inner chambers. The outer chamber, probably circular, is severely eroded. The large visible wall constructed of adobe and stone measures 1.8 meters wide, 90 centimeters high and 30 centimeters thick, and it features a small ground-level doorway. This wall intersects with a thick stone and adobe wall that runs perpendicular from the back of the shelter to 55 centimeters in front of the large lateral wall, extending behind the lateral wall 1.7 meters (Figure 8). Additionally, remnants of another wall on the west side of the perpendicular wall suggest the presence of a third chamber.



Figure 8: View of 42Sa26866, previously unrecorded three-chambered storage facility.

42Sa26612. []this site consists of a wall remnant constructed of stone and adobe masonry[]. The remnant is only 7 courses high with thin layers of reddish brown adobe. Its original size and shape could not be determined. The remnant measures 70 centimeters high by 47 centimeters long by 27 centimeters thick. The wall is located within the erosion channel created by runoff from further up slope. Associated with the site are two deep, narrow grooves in the cliff face, a single potsherd and a single primary flake.

42Sa26871[]this site consists of a mostly intact stone and adobe granary[]. The structure is predominantly adobe with only a few pieces of stone incorporated into the matrix (Figure 9). The structure measures 80 centimeters tall by 84 centimeters wide and at least 95 centimeters deep. The walls are 9 centimeters thick. The structure extends from the dirt floor of the shelter to the ceiling and has a front lateral doorway. The doorway has a stick lintel across the top and a mud collar around the exterior of the opening that exhibits different colors, suggesting re-use of the site or ongoing maintenance with different source materials. The structure is intact except for the eastern wall, which has collapsed due to natural erosion. The site is located just above the vehicle route, but is not easily visible from the route.



Figure 9: View of 42Sa26871, well preserved granary next to Arch Canyon vehicle access route.

42Sa26872.[] this site consists of elaborate pictographs and associated organic

artifacts, []The rock art has two discrete clusters of figures,[]The figures, mostly anthropomorphs, are executed in various shades of red, with smaller numbers depicted in white and black (Figure 10). Two corncobs were observed on the floor of the shelter. Another corncob[] were observed down slope to the north of the shelter within packrat debris, and another 10 meters down slope was a concentration of four small, modified sticks, one with a carved effigy on the end that appears to be a duck (Figure 11). The sticks range from 32.5 centimeters long to 44 centimeters long, and all are 1.5 centimeters in diameter. []



Figure 10: Elaborate pictograph panel (A) at 42Sa26872.

42Sa26867.[]this site consists of adobe wall remnants[] At least three concentrations of adobe remain, but no building stone or construction detritus remain on the ledge. The largest concentration measures 27 centimeters high by 40 centimeters wide and is 10 centimeters thick. Toward the back of the ledge are two concentrations of adobe, one pressed in to a crack at the back of the ledge and a larger one, likely a wall remnant, still clinging to the ceiling of the sheltered area and 2-3 centimeters above the floor of the ledge. Given the small area on the ledge, these are likely remnants of a storage facility.



Figure 11: View of small stick with effigy of a “duck” carved on one end, from 42Sa26872.

42Sa26868 [] this site consists of two stone walls set perpendicular []. The east wall extends about 1.15 meters north-south whereas the west wall is more poorly defined but extends at least 1 meter north-south. The east wall has a maximum height of 54 centimeters and the west wall a maximum height of 56 centimeters. The space between the two perpendicular walls measures 3.5 meters wide, but this area has deflated due to erosion caused by runoff through the center of the site. The east wall consists of unmodified sandstone slabs, whereas the west wall was constructed mostly of limestone blocks. Remnants of adobe are visible in the east wall but these are badly eroded. There is no remaining adobe on the west wall. Two large black-on-white potsherds were observed lying on the east wall.

42Sa26873. [] this site consists of a probable storage facility [] Numerous black-on-white and grayware potsherds []. The structure is defined by two or three large horizontal beams spanning the width of the cleft and comprising the ceiling. These measure about 1.25 meters long by 15 to 25 centimeters in diameter. A possible mud matrix is visible around the beams. There also appears to be mud remnants defining the east and west walls, although the front wall appears to have collapsed. The east wall is about 1.5 meters high and 30 centimeters thick and it extends back into the cleft an unknown distance. The west wall appears to be about the same size but is more eroded.

42Sa26613. []this site consists of a wall remnant []Alternating courses of tabular sandstone are set in reddish tan adobe. A horizontal hole in the cliff face may have been constructed as part of the original superstructure. There are three courses of horizontal sandstone slabs at the bottom of the ledge that are separate from the wall fragment, suggesting the wall may have originally extended about 2 meters high. There are also traces of adobe on the east edge of the ledge, but no other wall fragments or construction detritus. This implies that the original building stones were removed, either prehistorically for use elsewhere or by vandals who destroyed the site sometime in recent history. The west wall fragment measures 70 centimeters high by 60 centimeters wide and it encloses the top western portion of the ledge. Ceramic artifacts were located on the slope below the ledge.

42Sa26615. []this site consists of a long, L-shaped drylaid limestone masonry wall, apparently a retaining wall[], and a large circular depression of a size and shape consistent with a kiva, all located on the north side of the canyon. The wall appears to have prevented erosion into an area with the depression. The L-shaped wall is 20 meters east to west, and the shorter wall on the east side extends north to south 5.7 meters. There is also a rock alignment near the west terminus of the longer wall with associated groundstone tools. The large circular depression measures 14.7 meters east-west by 13.5 meters north-south, and is about 1 meter deep in the center where a large juniper tree is growing. Artifacts are comparatively abundant on this site, consisting of lithic debitage in all stages of reduction, ceramics (grayware, corrugated, black-on-white) and groundstone tools. []

Figure 12: View of a portion of the limestone retaining wall at 42Sa26615 (depression to the left).

42Sa26616 [] this site consists of a circular or D-shaped masonry storage structure [] The structure appears to be perfectly intact and may even have an intact roof superstructure. The construction consists of medium and large sandstone slabs and blocks laid horizontally with minimal evidence of remaining mortar. It appears to be about 1.25 meters high and the south-facing outer wall appears to be about 1.5 meters wide. The east and west perpendicular walls extend from the cliff face about 1 meter. The stones are of the same color as the surrounding cliff, creating a camouflage effect. []

42Sa26617. [] this site consists of a cluster of residential and storage structures [] Many of the structures are in remarkably good condition with exterior plastering still evident. The structures extend along the ledge south to north about 75 meters. There are at least 12 structures on this ledge, three or four of which appear to be in excellent condition. The structures are of a size consistent with residential occupations with attached smaller storage units. Some of the structures may have originally been two stories high. Remnants of one other structure and possibly a second are located on a ledge above the primary cluster. All structures appear to be located to a greater or lesser degree within protective overhangs.

Summary

Based on the limited amount of site documentation conducted by CPAA, it would appear that Arch Canyon has a particularly high density of sites, including sheltered residential areas, some with contiguous storage, storage sites and wall remnants suggestive of storage facilities, rock art sites, special use localities and at least one large circular depression, possibly a ceremonial site. These sites are located on both sides of Arch Canyon, predominantly at the base of the first cliff level above the floodplain or on ledges associated with the first cliff level. Generally, these sites do not reflect defensive posturing, but instead reflect expedient access to the floodplain area.

Only one site was observed on the floodplain itself, although this site (42Sa26615) is particularly significant. Collectively, these sites appear to reflect adaptations by prehistoric farmers who produced surplus amounts of domestic grains that were stored in nearby facilities for expedient access. All residential sites identified during the CPAA reconnaissance have on-site storage units, but not all storage sites are clearly associated with nearby residential sites. This suggests the possibilities that (1) nearby residential sites have not yet been identified or are obscured by alluvial deposits on the valley floor, or (2) prehistoric farmers were, at times, transient residents of the canyon who engaged in episodic caching and retrieval strategies. A smaller number of sites (3) appear to have been situated in defensive locations more than 100 meters above the floodplain were observed. Additionally, two sites are located on ledges near the valley floor, but were situated as to be extremely difficult to access. These may or may not be

defensively oriented. Sites examined by CPAA are summarized in Table 1 (sites observed only by binocular are omitted).

Table 1: Site attributes and summary

Site No.	N/S	Site Type	No. Feature	Rock Art	Lithics	Ceramics	Organic Remains	Ground Stone
42Sa260	N	R,S,A	15-20	X	X	X	CC, WD	X
42Sa5215	N	S, RM	9	X	X	X	WD	X
42Sa5216	N	R,S	5	X	X	-	CC, CH	X
42Sa5217	N	S, RA	4	X	-	-	-	-
42Sa5218	N	S, SR	9	-	X	X	WD	-
42Sa5219	N	SR	1	-	-	X	-	-
42Sa5221	N	S	2	-	-	-	WD	-
42Sa26612	N	W	1	-	X	X	-	X
42Sa26613	N	W	1	-	-	X	-	-
42Sa26615	N	D,W,A	3	-	X	X	-	X
42Sa26865	N	LS,H	1	-	X	-	CH	-
42Sa26866	N	S	1	-	-	-	-	-
42Sa26867	N	W	1	-	-	-	-	-
42Sa26868	N	W	1	-	-	X	-	-
42Sa26869	S	RA	1	X	-	-	-	-
42Sa26870	S	SR	1	-	-	-	WD	-
42Sa26871	S	S	1	-	-	-	WD	-
42Sa26872	S	RA,M	2	X	-	-	WD, CC	-
42Sa26873	S	S	1	-	-	X	WD	-

Note: R= Residential Structure, S=Storage Units, A= Rock Alignment, RM=Rubble Mound, SR=Unknown Single-Room Structures, D=Depression, H=Hearth, M=Midden, W=Unknown Walls, LS=Lithic Scatter, RA=Rock art, CC=Corncoobs, CH=Charcoal, WD=Wood

The density of sites was considerably greater than anticipated, based on the level of sites previously documented in the canyon. The results of CPAA site re-documentation and new site documentation [] demonstrated the presence of 12 prehistoric sites in this area (only two previously documented). Although the survey was intuitive and not rigorously systematic (e.g., Banning 2002), these data suggest the potential for a site density of 17 prehistoric sites per linear mile throughout Arch Canyon, and that sites will be found on both sides of the canyon in relative proximity to the canyon floodplain. This presents the possibility that about 100 sites could be located on BLM and SITLA lands, the majority located along the base of the first cliff level and first bench or ledge area above Arch Canyon. This assessment is based on the assumption that the area selected for intuitive survey is reflective of the canyon as a whole.

It should also be noted that previously recorded sites are often much more complex than the descriptions noted on the original site forms. For example, at 42Sa5216, a previously unmentioned rock art panel was documented [] of the architectural features; at 42Sa5217, an additional structure and two rock art panels (one quite elaborate) were documented[]; and at 42Sa5218, two additional features with multiple storage units were described[]. None of these features were described in the initial site forms yet are important components of the overall character of the sites.

Site Condition Analyses

Each of the sites visited by CPAA were examined for surface evidence of adverse impacts, both natural and those resulting from modern human activities. Five of the 23 sites were located in topographic settings such as cliff faces or cliff ledges that made access impossible or impractical (these are factors that likely contribute to their long-term preservation). Because of time constraints and inadequate climbing gear, CPAA did not attempt to access these sites, and observations instead were recorded with the assistance of binoculars. However, the presence or absence of adverse impacts could not be determined with this method and it remains unknown if or how these sites have been impacted. These sites include 42Sa5220, 42Sa26614, 42Sa26616, 42Sa26617 and 42Sa26873. These sites are not discussed further in this section.

The other 19 sites were examined for evidence of vandalism, graffiti, suspected surface collection of artifacts, improper camping activities on or near the site, ORV routes near or through potential cultural deposits, litter on or around the sites, pedestrian trails, livestock impacts, site modifications, artifact piles and other impacts observable on the site surface. This evidence, as observed in 2006, is summarized in Table 2, along with data reported from 42Sa5271 by Hurst, Phillips and Shearin (2001). For the purposes of this report, direct ORV impacts are considered to be vehicular tracks within the site parameters, whereas indirect impacts include vehicular tracks near sites that potentially could affect undocumented middens or associated subsurface features and deposits. It is also recognized that vehicles provide access to sites whereby individuals operating those vehicles may engage in activities that directly impact cultural resources.

Archaeological sites found in the lower and middle portion of Arch Canyon have been degraded to varying degrees over time and through a variety of natural processes, inadvertent human and animal behavior, and malicious acts. Those sites most susceptible to erosion are those at the base of cliffs, often constructed on slight slopes that provide a conduit for water runoff during convectional thunderstorms. In some instances, prehistoric structures were observed directly within the runoff channel, resulting in significant erosion of structural integrity (Figure 13). In these cases, only small wall remnants remain, rendering it difficult to determine the original size or function of the site. This erosion may also have erased evidence of vandalism, and it has the potential to expose material culture evidence to surface collecting. Convincing evidence that erosion has exposed cultural materials to potential surface collection was not observed.

Impacts from animals are evident at several sites. At least six sites have rodent disturbance, and there is limited evidence that domestic livestock may have impacted the integrity of archaeological sites in the past. At least four sites have evidence (not recent) of cattle dung where animals once bedded down, and collapsed architecture at two of these sites may be attributed in part to cattle rubbing against standing walls.

Table 1
Adverse Impacts Observed at Sites in Lower/Middle Arch Canyon

<i>Site No.</i>	<i>Vandalism</i>	<i>Graffiti</i>	<i>Surface Collection</i>	<i>Camping</i>	<i>ORV Impacts</i>	<i>Other</i>
42Sa260	Yes	No	Yes	No	Nearby	Restacking
42Sa5215	Yes	Yes	Yes	Yes	Nearby	Restacking
42Sa5216	Yes	Yes	Yes	Yes	Nearby	Litter
42Sa5217	No	No	Yes	No	Nearby	No
42Sa5218	Yes	Yes	Yes	Yes	Nearby	No
42Sa5219	No	No	Yes	Yes	Nearby	Livestock
42Sa5221	No	No	Yes	No	Nearby	No
42Sa5271	Yes	Yes	Yes	Yes	Nearby	Livestock
42Sa26612	No	No	Yes	No	No	Bolt, Livestock
42Sa26613	No	No	No	Yes	Nearby	No
42Sa26615	No	No	No	Yes	Nearby	Livestock
42Sa26865	No	No	No	No	No	No
42Sa26866	No	No	No	No	No	Livestock
42Sa26867	No	No	No	No	No	No
42Sa26868	No	No	Yes	No	No	Artifact pile
42Sa26869	No	No	No	No	No	No
42Sa26870	No	No	Yes	No	No	Restacking
42Sa26871	No	No	No	No	No	No
42Sa26872	No	No	No	No	No	Livestock
42Sa26873	No	No	No	No	No	No

Note: Vandalism is defined herein as evidence of earth disturbance in modern times in direct association with cultural features. Surface collecting is implied by a paucity of artifacts at major sites where they would be expected. Camping impacts include camping inside shelters within sites and on flat areas below potential middens. ORV impacts include trails leading to sites, especially in areas with potential midden materials or proximity to such areas.

Human Impacts

Human impacts vary from site to site, but most of the 19 sites examined in 2006 exhibit two consistent characteristics: (1) Artifacts are extremely rare at all but four sites examined (all previously unrecorded and not visible from the vehicle route), suggesting surface collection is a major problem at sites that are subjected to heavy visitation. And (2) malicious activities are evident primarily at large, easily accessible sites that are readily visible from the vehicle route below. Given the paucity of comparative photographic data, it is not possible to ascertain whether much of the structural degradation evident at these sites has been caused by natural erosion or human activities, whether malicious or inadvertent. Adverse impacts are discussed for each of the sites examined by CPAA in 2006.



Figure 13: Severe erosion at 42Sa5219 has impacted the structural integrity and could expose subsurface cultural materials.

42Sa260: This site has been heavily impacted by visitation and looting, probably due to its visibility from the vehicle route below, and its easy accessibility from the mouth of canyon and associated camping areas. The structures are located at the top of a short slope that is easily accessible. Artifacts are extremely rare, suggesting this site has been severely impacted by surface collecting. Evidence of looting (not recent) is visible on the northwest periphery of the site (Figure 14) and perhaps inside some structures where deposits appear to be disturbed. A suspected looter's pit is also located next to Feature H and Feature I. In addition, it appears that several walls appear to have been reconstructed in recent times. There are well worn footpaths leading to the site from directly below the structures (and through potential middens). There is evidence that ORVs have, at some point in the past, been driven through the creek and willows, forging a trail from the road to the base of the slope below 42Sa260 and to the foot trails leading to 42Sa5215.

It is recommended this site, one of the most visited in the canyon, be monitored for future vandalism and artifact collecting, and that BLM post advisories about proper site etiquette, including collecting, restacking stones, climbing on walls and attempting to climb through narrow openings. It is also recommended that the various foot trails leading to the site be investigated to determine the potential for affected subsurface deposits, and to establish a preferred route that avoids potential cultural deposits. Given the high level of visitation, there is significant potential for public outreach opportunities at this locality.



Figure 14: Feature J on northwest periphery of 42Sa270, exhibiting possible evidence of looting.

42Sa5215: This visually impressive site has been heavily impacted by visitation and looting, probably due to its visibility from the vehicle route below. The steep ascent has not been a deterrent to visitation inasmuch as several well worn pedestrian paths are visible on the talus slope and along the base of the cliff leading from 42Sa260 to 42Sa5215. Artifacts are extremely rare here, suggesting this site has been severely impacted by surface collecting. And looters' holes are visible on the southeast edge of the site and between Features E and F. Interior deposits inside the structures appear to be disturbed. In addition, it appears that at least one wall has been reconstructed in recent times (Figure 15). It is also possible that original timbers were removed for firewood inasmuch as it appears that modern campfires have burned inside the shelter. Camping activities may be associated with a 1940 inscription on a boulder with bedrock grinding slicks. Charcoal chunks are ubiquitous, but they exhibit little erosion, suggesting they resulted from modern campfires. There are well worn footpaths leading to the site along the west side of an ephemeral wash to the base of the cliff below the structures (and away from potential middens). There is also evidence that ORVs have at some point in the past been driven through the creek and willows, forging a trail from the main route to the base of the slope below 42Sa260 and the foot trails leading to 42Sa5215.

It is recommended this site, certainly one of the most visited in the canyon, be monitored for future vandalism and site collecting, and that BLM post advisories (in association with nearby 42Sa260) about proper site etiquette, including artifact collecting, restacking stones, climbing on walls and attempting to climb through narrow openings. It is also recommended that the various foot trails leading to the site be investigated to determine the potential for subsurface deposits, and to establish a preferred route that

avoids potential cultural deposits. In conjunction with 42Sa260, this site would be appropriate for public outreach efforts.



Figure 15: Possible reconstructed stone wall at Feature C at 42Sa5215.

42Sa5216: Adverse impacts at this site include erosion and rodent activities, as well as heavy recreational visitation. A well-worn ORV spur trail from the main route leads directly to pedestrian trails, which in turn lead through potential midden areas. Another ORV spur route has been forged through vegetation at the base of the slope below the structures (Figure 16). A campfire ring at the terminus of the spur route suggests some visitors are remaining at the site for considerable periods of time. The scarcity of artifacts of any kind suggests this site has been severely surface collected. The presence of aluminum foil in the fire pit of Feature C suggests some individuals have been camping inside the sheltered area and may have contaminated subsurface deposits. A hearth inside Feature A, described in 1965, is no longer clearly visible and may have been damaged by repeated foot traffic through the residential structure. This hearth feature is no longer easily discernible to the naked eye, but it is evident in photographs (Figure 17).

The BLM does have a sign indicating "please don't erase the traces of America's past," but this sign is located on the main route where the spur route intersects. Given the potential for intact midden deposits below the site, it is recommended the BLM establish a preferred pedestrian route away from the midden area that would deter surface collecting and help preserve intact subsurface deposits. Camping should be discouraged within the site parameters and near the potential midden. Given the damage being caused



Figure 16: ORV route leading to the base of the slope below 42Sa5216.

by visitors to the subsurface hearth (and potentially other subsurface deposits) inside Feature A, access to the interior of the primary residential feature should be restricted. Given the high level of visitation, this site would be appropriate for interpretation and public outreach to reinforce messages of site etiquette.



Figure 17: Clay-rimmed hearth at 42Sa5216 visible in lower center frame.

42Sa5217: The structure at this site is badly deteriorated, although it does not appear this site has suffered extensively from vandalism or recreational visitation. There are no well beaten trails to the site, and the steep, boulder-strewn slope below may deter casual visitors unimpressed by the few remaining standing walls. No footprints or discarded trash were observed at the site or on the slope below. In April 2006, incipient ORV tracks were observed in the sagebrush and grass flats leading from the main vehicular access route to the base of the slope below the site. The site should be monitored for future impacts and a more thorough examination of the slope below the site should be conducted to determine the presence or absence of cultural materials.

42Sa5218: This site has been heavily impacted by recreational visitation. At the turn-around at the end of the spur route off of the main vehicle route are remnants of campfires, indicating longer-term visitation that may result in surface collecting or other site damage. Numerous trails (Figure 18) lead from this point to the base of the cliff below Features C, D and E, and across the drainage on the east toward Features A and B. []



Figure 18: One of many foot paths leading to features at 42Sa5218.

[] Several initials are evident on the back wall of the sheltered ledge,

indicating that even though the access to the structures is precarious that some individuals have gained access and left their mark (at least some of these were evident during initial site documentation in 1965). The narrow ledge limits mobility and requires anyone accessing structures on the ledge to squeeze through narrow openings, thereby applying outward pressure to structure walls and holding onto walls for support. Access to Features A and B (not documented in the original site form) is quite easy and the structural integrity appears to be less intact, probably due to individuals sitting on walls. Footprints inside the features suggest visitors are climbing over and through them.



Figure 19: Potsherd currently visible on footpath leading to 42Sa5218.

Given the high level of public visitation, it is recommended the BLM establish a single preferred path that avoids cultural deposits now eroding, and that other pedestrian routes be closed and re-vegetated. Access to the impressive structures on the cliff ledge should be closed as a safety hazard and to avoid damage to structural integrity. Because access to Features A and B is easy, a reminder should be posted at this point urging visitors not to climb on or into structures, and to take their trash with them. And cultural deposits and structural integrity should be monitored consistently to determine the cumulative impacts of heavy visitation. This site would also be appropriate for public outreach and reinforcement of site etiquette messages.

42Sa5219. Abundant charcoal at this site is indicative of modern campfires, suggesting the site has been utilized by cowboys or recreational visitors who camped within the shelter. There is some cattle dung, but it is not recent. There is no evidence of recent looting at the site (no obvious pot holes) and there are no well beaten trails to the site even though it is visible from the main route. Structural integrity has likely been maintained because it is not readily accessible from the main route. However, ORV trails

are evident leading from the stream crossing to the base of the slope below the site and then looping back toward the main route, a distance of about 300 meters. It appears the off-road trail offers direct access to the site, and if developed further could provide easy access that could result in adverse impacts. Site should be monitored for future impacts, including the severe erosion that could expose artifacts or subsurface features.

42Sa5221: Evidence of vandalism at this site could not be clearly ascertained, although it remains possible the dilapidated condition of Feature A is attributed to visitors climbing on and through the structure. Both structures are located on a narrow ledge that can be accessed, but there is little room to maneuver without leaning or holding on to the structures for support. There are no obvious signs of recent digging in the fill inside Feature A. There is evidence of ORV trails leading from the main route in the canyon bottom about 30 meters into the flats below the site. There remains a potential that ORV use in this area will impact unidentified cultural deposits in the slope area below the site, and should be discouraged.

This site is among the most visited in the canyon and the individual structures are accessible with little effort. It is recommended that this site be monitored consistently for structural integrity. Although not observed, there remains a potential for intact subsurface deposits on the slope and flats below the site. Given the high degree of public visitation to this site, public outreach as to proper behavior on and around structural sites would be appropriate at this locality. However, this site is located on state lands administered by SITLA and it remains beyond the scope of BLM management efforts.

42Sa26612. This site is partially visible from the main vehicle route, is easily accessible and appears to receive at least some visitation. The single potsherd was found on top of a small boulder where it had obviously been placed. Heavy erosion has destroyed much of the site, including any evidence of past vandalism. There is also a climbing bolt in the cliff face above the site, suggesting that recreational rock climbers have utilized the site as a beginning point for their ascent (Figure 20). There is no evidence of ORV use leading to the site, probably due to the large boulders in the stream bed below that would impede vehicular access. Given the small architectural remnants and its inconspicuous nature, this site has likely escaped serious damage from looters. However, inadvertent damage from recreational use is evident. This site should be consistently monitored to ensure that heavy erosion does not expose subsurface deposits or features that could be targeted by surface collectors or looters. Furthermore, the climbing bolt should be removed from the cliff face above the site to discourage additional climbing in cultural sensitive locations.



Figure 20: Climbing bolt hammered into the cliff face above 42Sa26612.

42Sa26613: Only small remnants of the original structure remain, although wall remnants are visible from the main vehicle route. The apparent insignificance of the remnant (compared to other nearby structures), may have deterred heavy visitation. There are no beaten trails to the site and no footprints in the shallow residual deposits. The steep access may deter most casual visitors. The dilapidated condition of the structure may be the result of vandalism inasmuch as the construction stones appear to have been removed from the ledge (there is no rubble pile inside the sheltered area suggesting natural erosion). Directly below the site is evidence of an ORV trail cutting from the main route to a fire ring. The abundance of painted ceramics (Figure 21) on the terrace below the structure implies that visitation, while not frequent, may be focused on the structure remnants above, and that the easiest access to the ledge prompts visitors to skirt the terrace to the east. These artifacts appear to be eroding down slope to the south toward the floodplain (e.g., areas of access) where they could become visible to visitors, who could then discover the artifact cluster on the terrace just above the floodplain.

Given the [] at this site and the erosion pattern that could transport artifacts toward the base of the slope, it is recommended that the BLM discourage camping in the area below or near this site. The ORV spur route to the campfire ring should also be closed. BLM personnel should periodically monitor the ceramic deposits on the terrace below the structure (and above the camping area) to determine if the site is being subjected to surface collection.



Figure 21: Cluster of potsherds at 42Sa26613. Artifacts are extremely rare at all but four sites.

42Sa26615: This site appears to be in remarkably good condition without obvious evidence of looting or vandalism. There is some evidence of camping during historic times, and cattle have grazed on the site sometime in the past. There is no evidence of ORV trails through the site, which sits directly next to the main route. The comparative abundance of artifacts suggests surface collecting is not a serious problem at this site, and that it has avoided detection. However, the proximity of this site to the main route has the potential to result in vandalism, surface collecting and other adverse effects. Most artifacts were observed eroding down slope from the depression to within about 5 meters of the road. If these artifacts continue to erode toward the main vehicle access route, they will become visible to those traveling the route and the artifact trail could then be followed to the features currently hidden by pinyon-juniper.

Unlike other sites examined as part of this assessment, features at this site are adjacent to the main route and are susceptible to motor vehicles traveling the bottom of the canyon. This site should be monitored consistently to ensure that artifacts are not visible to passersby and that site accessibility does not precipitate more ORV trails that could damage subsurface deposits and otherwise result in vandalism, surface collecting or other damage. Given the potential that the large depression could be remnants of ceremonial architecture, site protection and avoidance should be given highest priority.

42Sa26865: This site is a dispersed lithic scatter without diagnostic artifacts located on a bench area that is not easily accessible and likely does not receive significant visitation. However, the area where the site is located has been visited sometime in the past as a broken Mason jar was observed about 40 meters to the southwest. The presence of an eroding hearth suggests the possibility of significant subsurface deposits, and site

avoidance and monitoring is recommended. The location of this site[] will likely deter malicious damage to the integrity of the site.

42Sa26866: This site is an easily accessible storage site that has suffered from erosion and livestock damage sometime in the past. There is no obvious evidence of vandalism, and it is likely that the deteriorated condition of the eroded granary chambers is due to natural erosion. There is no evidence of ORV trails on or near the site, which is located about [] from the main access route. The paucity of artifacts suggests the possibility the site has been surface collected, although it is also possible the artifacts have been lost to erosion. The site is obscured by vegetation and is not visible from the main vehicular route. However, it is easily visible while walking along the base of the cliff and it likely receives some visitation. Consistent monitoring of this site is warranted.

42Sa26867: This site consists of small remnants of adobe walls that may not be recognizable to casual visitors. Neither the site itself nor the site location is clearly visible from the main access route about 75 meters to the south. There are no artifacts associated with the site and no evidence that it has received any visitation. There are no footpaths near the site, no ORV tracks on the slope leading to the site, no litter and no evidence of any other adverse impacts. Given the paucity of architectural remains, interior deposits and artifacts, the potential for adverse impacts to this site are considered negligible.

42Sa26868: This site consists of two poorly preserved wall remnants set perpendicular to the cliff face and associated with ceramics. Although the site is not visible from the main access route about []. Access to the site, [], is easy. There is no obvious evidence of vandalism, graffiti or litter on or about the site, and there is no evidence of camping activities or ORV use on or around the site. Damage to the site appears to be from severe natural erosion (it was constructed over the drip-line). However, the site does receive visitation, as evidenced by two large black-on-white potsherds that were stacked on the eastern wall in clear view (Figure 22). Given the large size and aesthetic quality of the potsherds, it is remarkable they have not been removed. Regular monitoring of this site is recommended, and artifacts currently visible should be cached to deter surface collecting.

42Sa26869: This site is a diminutive petroglyph of an anthropomorph remarkable for its small scale detail. There is no evidence this site, despite its proximity to the existing ORV route in the canyon bottom and []. Footprints indicate it has been visited in recent times, but given its small size it could easily escape detection. There is no obvious evidence of vandalism, no litter on or about the site, and no evidence of camping activities, graffiti or other adverse impacts, and there is no evidence of ORV use on or around the site. Regular monitoring of this site is recommended.



Figure 22: Large black-on-white potsherds stacked on top of [].

42Sa26870: This single-room structure is located []. There are no ORV or pedestrian trails leading from the road to the site, and there is little evidence the site has received recent visitation. The site is obscured by vegetation, although the sheltered area where the site is located is visible from the floodplain below. There is no obvious evidence of vandalism, although it appears the site has been modified in modern times. The top course of wall stones appears to have been loosely laid, and the matrix of long poles overlying the front wall also appears loose and in positions that would not be expected through natural erosion processes (Figure 23). More likely, the site was “reconstructed” by modern visitors who stacked interior stones along the top wall and placed the beams over the top. No litter, graffiti, pedestrian trails or camping activities were observed on or near the site. Regular monitoring of this site is recommended.

42Sa26871: This relatively intact granary is not clearly visible from the ORV access route [] but it is visible from any slightly elevated position nearby. One wall appears to have collapsed due to natural erosion, and there is no obvious evidence of vandalism, and no evidence of ORV spur routes leading toward the site. It is likely the site receives some visitation, as evidenced by an ephemeral pedestrian trail leading to the site. The paucity of artifacts suggests the possibility of surface collecting. However, there is no evidence of litter, graffiti, camping or other adverse impacts to suggest this site receives consistent visitation. Given the fragile nature of the remaining architecture and easy access, visitation to this site should be discouraged. Regular monitoring of the site for ongoing structural degradation is recommended.



Figure 23: Possible wall and roof reconstruction by modern visitors to 42Sa26870.

42Sa26872: This site, a spectacular rock art site with elaborately detailed anthropomorphs and associated organic artifacts, []. The site itself is not visible from the road and it likely receives minimal visitation. There is no obvious evidence of vandalism, although a campfire ring is located about 75 meters north of the site suggesting longer-term visitation to the area. Footprints of one or two individuals were observed at the site, suggesting there some level of recent visitation. But there are no ORV spur trails leading toward the site, no pedestrian trails, no litter and no other evidence of adverse impacts caused by human visitation. Livestock dung, none of it recent, along the base of the cliff suggests the possibility of damage to subsurface deposits in the past. []and visitation to it strongly discouraged. []



Figure 24: Unusual artifacts observed on the surface at[.]

Summary of Adverse Impacts

Archaeological sites in the Cedar Mesa region have long been the target of malicious destruction of architecture and illegal excavations in search of valuable artifacts. Given the ORV route that provides easy access to Arch Canyon, it would be expected that sites in this drainage have suffered significantly from these illegal activities. The CPAA analysis found that four of 19 sites examined had evidence of looter's holes, all of them small and none of them impacting overall site integrity or National Register eligibility. These looter's holes range from 20 to 50 centimeters in diameter and typically range from 10 to 30 centimeters in depth, suggesting that looting activities occurred in the past and the holes have largely filled through natural erosion. It should be noted that only one of the eight sites directly examined in 1965 exhibited evidence of vandalism, and even that evidence was considered to be marginal. This suggests the vandalism observed in 2006 has occurred over the past four decades.

Given the paucity of photo-documentation from these sites, it is impossible to ascertain whether these sites have suffered from intentional destruction (e.g., dismantling or toppling of walls). Based on the limited number of photographs available, it does not appear that overall structural integrity has been severely degraded. Additional photographs taken over the past four decades may well provide contradictory evidence. Photographs taken by CPAA in 2006 will provide baseline data for future examination of this issue, and it is recommended the BLM conduct periodic photo-documentation of these sites to monitor ongoing adverse impacts.

The etching of modern names and inscriptions at archaeological sites is common throughout the greater Southwest. However, evidence of this practice in Arch Canyon is

confined to three sites. At 42Sa5215, the inscription “Wilbur Law 3/3/40” is located on a boulder (Figure 25), several undated inscriptions are located in the cliff face above 42Sa5216, and at 42Sa5218 several undated inscriptions are located on the cliff wall behind several architectural structures. Inscriptions at 42Sa5218 were noted when the site was first described in 1965, but it is unknown if additional names were added later. No recent names or dates were observed to suggest graffiti is an ongoing problem.

Without a detailed catalog of artifacts on any given site, any determination of the extent of illegal surface collecting becomes an intuitive exercise. However, two lines of circumstantial evidence suggest that surface collecting is a serious problem in the Arch Canyon area. First, artifacts are extremely rare at 15 out of 19 sites documented by CPAA, even at the exceptionally large and complex sites that should contain abundant middens. The paucity is both striking and puzzling. These are mostly sites with architecture consistent with late Pueblo II or Pueblo III occupations when abundant ceramic and stone tool production was a fundamental part of local lifeways. These artifacts are typically concentrated on the slopes directly below residential occupations. In the Cedar Mesa generally, these middens may contain thousands of individual artifacts. However, the middens at the Arch Canyon sites are extremely sparse, containing only a few lithic flakes and one or two potsherds. The areas around the structures are almost entirely devoid of artifacts, suggesting even small lithic waste flakes have been removed.



Figure 25: The inscription “Wilbur Law 3/3/40” is etched on the grinding slicks. The W is visible in the photograph.

Evidence of surface collecting is also suggested by the negative evidence observed at 42Sa26615, a previously unrecorded site []. Despite its proximity to the

route, the site is obscured by pinyon and juniper trees, and modern visitation appears to be minimal (some rusted tin cans on the site suggest it may have been a temporary campsite at one time). Compared to the sites that are clearly visible from the ORV route that all have a paucity of artifacts, site 42Sa26615 contains an abundance of chipped stone, groundstone and ceramic artifacts, []. Ceramic evidence is also abundant at 42Sa26613, a structure that is visible from the road. However, the artifacts are not located in direct association with the structure and appear to have escaped detection. Also, at least four highly unusual wooden artifacts,[]and corncobs were observed in plain view at 42Sa26872, which is also not visible from the road. The presence of collectible artifacts at these three sites implies that recreational visitation and its co-occurring problem of surface collecting is directed at easily visible sites, but that sites not readily visible remain relatively intact.



Figure 26: Black-on-white potsherds observed at 42Sa26615.

Despite the impressive architecture, it also remains possible that prehistoric occupations in Arch Canyon were never substantial or of long duration, and that the paucity of artifacts reflects temporary or seasonal occupations by small groups of farmer-foragers who left behind little residential detritus. The initial documentation of the 1965 sites also noted that artifacts were “sparse” at sites visible from the access route, despite the near absence of evidence at that time to suggest looting. It would also seem unlikely that every site visible from the vehicle route would have been systematically surface-collected of almost every artifact. Furthermore, even if all artifacts were removed natural erosion should have exposed additional artifacts over the course of time. This does not appear to be the case at major sites along the Arch Canyon corridor.

Arch Canyon has long been a popular destination for recreationists, many of whom have camped overnight. Evidence modern campfire rings are ubiquitous along the

edges of the floodplain (Figure 27). There is some evidence that recreational users have also built campfires inside sheltered areas in and adjacent to archaeological sites. At least three sites have copious evidence of large chunks of dark black charcoal that appears to be of recent origin, and in one instance a piece of aluminum foil was observed inside a small hearth remnant within small a structure at 42Sa5216 (Figure 28). On the slope below this site is a burned beam fragment that could have been scavenged from the construction matrix for firewood.



Figure 27: Modern campfire ring near foot path leading to 42Sa5216.

Indirect impacts from camping were observed at three other sites, two of which had campfire rings located contiguous to potential midden areas and another that had rusted tin cans scattered about (but no evidence of a campfire ring). The presence of campfire rings adjacent to archaeological sites suggests some campers are remaining at these sites for a considerable period of time (12 to 24 hours), thereby extending the opportunities to identify and collect artifacts, or to engage in other inappropriate or illegal activities. The restriction of camping activities to suitable areas of non-impact to cultural resources should be given high priority.



Figure 28: Evidence of campfire within Feature C at 42Sa5216. Aluminum foil was observed in the hearth.

Off-road vehicles are mechanically capable of providing easy and efficient access to areas without official road access. Their impact on archaeological sites is typically confined to open sites on knolls, dunes and slopes, and along alluvial plains in canyon corridors like Arch Canyon. ORV use is clearly one of the most preferred means by which recreational users visit Arch Canyon, and evidence of ORV tracks are ubiquitous. However, there is limited evidence that ORVs are causing direct damage to cultural resources inside Arch Canyon (as mentioned above, the individuals utilizing ORVs to access sites may be causing additional adverse impacts). Twenty-three of 24 sites documented by CPAA are located on cliff ledges or at the base of cliffs in settings that are inaccessible to ORVs (the remaining site is obscured by vegetation and remains largely undiscovered, although it is susceptible to ORV damage).

The peripheral impacts of ORVs on archaeological sites are substantially greater. At least eight sites have ORV routes leading from the main route to the base of the slope directly below the sites (Figure 29). These routes vary from rarely used trails where crushed vegetation is slowly recovering to major spur routes leading to campfire rings. All of these routes terminate at topographical features that have a moderate to high potential to contain buried cultural deposits (e.g., potential midden areas). In at least two instances, artifacts were observed within 5 meters of a vehicular access route. As was observed in October 2006 after a series of rainstorms, these ORV routes facilitate severe erosion that could seriously erode subsurface cultural deposits along the alluvial floodplain (Figure 30). It should also be noted that no systematic surveys have been conducted of the alluvial areas now being impacted by ORV use, and the little is known of the spatial relationship of alluvial areas to adjacent residential and storage sites.



Figure 29: ORV trails leading from main route to the base of the slope below 42Sa260 and 42Sa5215.



Figure 30: Eroded ATV spur route at 42Sa5316 (compare to Figure 16).

Archaeological sites in middle Arch Canyon have experienced additional but relatively minor impacts from other recreational activities. A bolt used by rock climbers has been driven into the cliff face above one site, and potsherds at two other sites have been stacked on stones where they were visible to individuals who could have removed them. And at least three sites, probably more, have clear evidence that building detritus has been reassembled into crude, drylaid walls. These impacts do not appear to reflect malicious behavior, but rather are indicative of ignorance of proper site ethics. This is further indicated by the spider-web of pedestrian trails leading to and from large and aesthetically pleasing sites most popular among canyon visitors. In most instances, these foot trails appear to transect areas that should contain abundant midden materials, and in at least one case, artifacts are visible along the trail. As observed following an October 2006 rainstorm, these pedestrian trails also facilitate series erosion of potential midden areas (Figure 31).



Figure 31: Eroded pedestrian path at 42Sa5216.

There is some evidence of malicious behavior in Arch Canyon that appears to be targeted at cultural resources. Evidence of illegal digging was observed at 42Sa260 and

42Sa5215, and graffiti was noted at 42Sa5215 and 42Sa5218. These malicious activities do not appear to be widespread. BLM attempts to foster protection of archaeological sites and promote ethics at various locales in the canyon have been deterred by the persistent theft and destruction of signage (Nancy Shearin, personal communication, May 2006). Individuals who steal and destroy signs encouraging the protection of heritage resources would also seem predisposed to ignore laws protecting cultural resources.

Site Eligibility Recommendations

Although many of the sites are badly deteriorated, all of the sites examined during the course of the CPAA site analysis appear eligible for the National Register of Historic Places under one or more criteria. All 24 sites are eligible under Criterion A inasmuch as they collectively contribute to an broad understanding of Ancestral Puebloan prehistory during Pueblo II and Pueblo III times, particularly as it relates to human adaptations in the Cedar Mesa and Cockscomb areas. This adaptation was characterized by small agricultural groups who exploited the limited sources of permanent water and arable lands, and who aggregated and dispersed through time in response to various social and environmental variables. Most sites in Arch Canyon reflect occupations by small nuclear or extended family units living in close proximity to Arch Canyon Creek. However, other sites, like 42Sa26617, reflect population aggregations into defensive postures [], and the protection of food resources in inaccessible localities, as indicated by 42Sa5220 and 42Sa26614.

All but three sites are also eligible under Criterion C inasmuch as these sites reflect the distinctive characteristics of Ancestral Puebloan architecture evident throughout the region from about A.D. 1100 to 1300 (Pueblo II to Pueblo III times). These high architectural values, characterized by exceptional stone and adobe masonry construction that has survived more than seven centuries, are particularly evident at 42Sa260, 42Sa5215, 42Sa5216, 42Sa5218, 42Sa5220, 42Sa5221, 42Sa26614 and 42Sa26617. Furthermore, the [] could be reflective of an organized system of beliefs, practices and traditions representing mankind's relationship to perceived supernatural forces. This relationship may be further represented by rock art panels []. Although some sites are badly deteriorated, these remnants are likewise significant in that each of them represents a significant and distinguishable entity whose components lack individual distinction, but which collectively contribute to a broader perspective of land use patterns through time.

Most importantly, all 24 sites are eligible under Criterion D inasmuch as they have significant potential to yield information important in prehistory. As discussed above, extremely little research has been conducted into prehistoric manifestations in the Arch Canyon drainage, and little is known about how prehistoric agriculturalists adapted to this arid environment. Most evidence, based on architectural and ceramic cross-dating, is indicative of a population florescence during Pueblo II and Pueblo III times, a period of tremendous social and environmental stress that prompted widespread population aggregation and dispersal, eventually culminating in abandonment of the area in the decades prior to A.D. 1300. Sites in Arch Canyon offer significant potential to researchers attempting to explain how prehistoric groups responded to social and

environmental changes through time, and to explain why agricultural lifeways were abandoned after thriving for many centuries. It is highly probable that subsurface deposits in this locality will also yield new insights into prehistoric groups who occupied the canyon prior to the Pueblo II-Pueblo III florescence, and later hunter-gatherers who superseded them.

General Recommendations

Given that all of the sites discussed in this report should be considered eligible for the National Register, federal land management strategies should reflect the agency's commitment to preserve cultural resources of significance to all Americans and to protect inherent values of spatial context and aesthetics in a manner that does not "diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association" (36 CFR 800.5.1). These efforts should include more comprehensive efforts to document the cultural resources that could be impacted; more aggressive planning efforts to avoid, minimize and mitigate adverse effects to historic properties; and a more detailed analysis of direct and indirect impacts. Although the BLM is currently revising its Resource Management Plan, it is imperative the agency take interim steps to protect the outstanding cultural resources of Arch Canyon and to prevent further adverse impacts to these resources. To this end, CPAA offers the following recommendations:

- 1) Given the potential for significant numbers of undisturbed archaeological sites of National Register significance in the Arch Canyon drainage, the BLM should restrict vehicular access in Arch Canyon to administrative, law enforcement and research purposes only as an appropriate strategy to protect the long-term integrity of sites in all areas above 42Sa5271 at the mouth of the canyon. All trails, especially those into sensitive areas with potential cultural deposits, should be closed and the closures enforced. The archaeological values evident on the slopes below architectural sites and along the edges of the floodplain – all areas accessible to mechanized vehicles – remain poorly understood and have not been adequately documented. There remains a high potential that at least one major site with National Register eligibility could be directly impacted by off-road activities in the future []. It is anticipated that additional sites will be located along the existing ORV route and could be directly impacted by vehicular activities.

As demonstrated by vandalism research in Range Creek Canyon in eastern Utah (Spangler, Arnold and Boomgarden 2006), there is a direct relationship between unrestricted vehicular access and site vandalism. Areas inside the Range Creek controlled access points had significantly less evidence of adverse impacts caused by illegal or inappropriate human activities, whereas cultural sites located outside controlled access points have been seriously damaged and in some cases destroyed. These data suggest that individuals engaged in illegal activities use mechanized vehicles to arrive at their targeted sites, and that illegal activities typically occur within 200 meters of an existing road.

- 2) The BLM should implement a permit system that requires Arch Canyon visitors to identify themselves by name and address and/or limiting the number of visitors in the canyon on any given day. A similar permit system has been employed in other areas of southeastern Utah, and both strategies were recently employed in Range Creek Canyon where they have produced notable results. Visitors are less likely to engage in illegal or inappropriate behavior if their names are on an official register. And in Range Creek, the limited access has promoted a greater awareness among visitors as to the sensitive nature of cultural resources, and it has also afforded law enforcement an opportunity to disseminate appropriate information about site etiquette. It should be noted that the success of this effort in Range Creek Canyon is predicated on a consistent law enforcement presence in the canyon (Spangler, Arnold and Boomgarden 2006).
- 3) The BLM should clearly identify preferred pedestrian routes to archaeological sites that avoid potential midden areas and exposed artifacts. Several heavily visited sites have multiple foot trails, many in areas of potential sensitivity for cultural resources. Ceramic artifacts are visible on or near two of these foot trails, suggesting the potential for degradation of subsurface deposits is significant. Preferred pedestrian routes should include signage regarding surface collecting, restacking walls, concentrating artifacts into piles and climbing on or through architecture. Access to structures on narrow ledges should be prohibited inasmuch as access to these features poses serious safety risks and potential for structural degradation due to leaning against or pulling on walls for support.
- 4) A greater BLM presence in the canyon would promulgate a greater public awareness of the importance of site preservation. Given the agency's budgetary restrictions, the BLM should seek the assistance of commercial tour operators, site stewards and volunteer organizations with a vested interest in the long-term preservation of the canyon's resources. This should include training requirements for commercial tour operators and outfitters to ensure proper site etiquette, and written materials should be disseminated to all canyon visitors as a means to promulgate the importance of these resources to all Americans.
- 5) A consistent and clear message of site preservation and ethics must be implemented to promulgate proper protection of cultural resources for future generations. BLM efforts toward this end have been thwarted by the theft of signage, and although deplorable, it does not exonerate the agency of its responsibility to promote the preservation and protection of cultural sites. Appropriate educational and preservation messages should be disseminated at selected locations of high visitation, including but not limited to the trail heads at major sites (e.g., 42Sa260, 42Sa5215, 42Sa5216, 42Sa5218 and 42Sa5221). Currently, a checklist of intended activities filled out by visitors at the BLM kiosk at the mouth of the canyon includes a generic "collecting" category. This is confusing and could be construed by some to mean that surface

collecting of cultural materials is an appropriate activity. Appropriate activities should be clearly specified, and the “collecting” category deleted.

- 6) The BLM should initiate consistent site monitoring to better determine the nature of illegal collecting and the cumulative effects of site degradation. The apparent absence of a photographic database and detailed IMACS forms has inhibited detailed assessments in the past. A regular monitoring program could assist land managers in the development of strategies to quantify site degradation and to develop strategies to mitigate and repair damage to sites.
- 7) Previous efforts to document the spatial distribution of archaeological sites in Arch Canyon are clearly inadequate and the quality of this research does not reflect current scientific standards. During the course of relocating nine previously recorded sites, five additional sites were identified by CPAA in April 2006, and nine additional sites were identified in October 2006 in a concentrated area of the canyon. Additionally, at least three previously recorded sites had significant features that were not mentioned in the initial site forms. The identification of new sites and additional features was made with little effort, suggesting a more comprehensive effort (Class III) will identify significant numbers of additional sites within the canyon corridor. It is further anticipated that closer inspection of the floodplain and adjacent slopes will identify agricultural features, middens and special use locales that will provide a broader understanding of human adaptations in the region. BLM land management decisions should be predicated on a scientifically sound database, although such a database currently does not exist. The BLM cannot properly take into account potential adverse effects if it does not know what those resources are (see 36 CFR 800.4.1).
- 8) Four of the sites discussed above are located high above the canyon bottom or on inaccessible cliff ledges. This inaccessibility has likely contributed to the preservation of these sites. However, determined looters (and others) will view these sites as a challenge, as well as an opportunity to engage in inappropriate activities without detection by other visitors on the canyon bottom. A more comprehensive effort should be initiated to gain access to these sites [] to accurately document and photograph these features, and to establish a baseline for future monitoring activities. This effort should include complete documentation of all negative impacts resulting from site visitation and vandalism.

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Jerry D. Spangler is a registered professional archaeologist (RPA) and current executive director of the Colorado Plateau Archaeological Alliance, an organization that works collaboratively with governments, private entities and conservation organizations to develop strategies that will further the protection and preservation of historic and archaeological sites on public lands to ensure their scientific and aesthetic values are retained for future generations. CPAA advocates for the preservation of cultural resources through sound scientific research, analyses of potential adverse effects that are independent of government or private interests, and active participation in the Section 106 process of the National Historic Preservation Act. Spangler has devoted the past 15 years to archaeological research and public outreach with the expressed purpose of furthering the protection and preservation of cultural resources in the western United States. He is a recognized expert on prehistoric peoples of the northern Colorado Plateau, having published widely in peer-reviewed journals, monographs and books. His research is frequently cited in technical publications, college texts and highly respected peer-reviewed journals. He has also lectured widely on archaeology and archaeological preservation issues, and is currently an adjunct professor of archaeology at the College of Eastern Utah in Price.

Education

1993 Master's of Arts, Anthropology. Brigham Young University, Provo, Utah. Magna cum laude.

Professional Experience

As executive director of the Colorado Plateau Archaeological Alliance since December 2005, he has been principle investigator on numerous field research projects throughout the northern Colorado Plateau, including BLM-funded statewide research into vandalism of cultural sites and the development of public land management strategies to better protect cultural resources for future generations. He currently holds statewide archaeological permits issued by the state of Utah and the U.S. Bureau of Land Management. He is also appointed by the Secretary of the Interior as a member of the Bureau of Land Management Resource Advisory Council for the state of Utah.

Through Uinta Research, a LLC legal partnership, he has conducted research throughout the northern Colorado Plateau, usually on a reduced-cost or pro bono basis. Through the course of research activities, Uinta Research has consulted on and participated in research and exhibit grant proposals for the College of Eastern Utah and Utah Museum of Natural History related to the archaeology of the Tavaputs Plateau area (1998 to present); completed four comprehensive overviews of previous archaeological research in the Uinta Basin, Tavaputs Plateau, San Rafael Swell, Henry Mountains, Kaiparowits Plateau, Grand Canyon, Glen Canyon and Grand Staircase areas; and volunteered resources and expertise on dozens of archaeological research and preservation projects.

Major Research Projects:

- ◆ 2005-2006 – Lead investigator of a groundbreaking study into the factors related to the vandalism of archaeological sites in east-central Utah. To provide land managers with strategies to better deter future damage to cultural sites.
- ◆ 2002-2006 – Field supervisor directing survey crews, students and volunteers during an intuitive survey of middle Range Creek Canyon, in cooperation with the BLM, Utah Museum of Natural History and Utah Division of State History, to provide baseline data for a management plan that addresses public access and resource protection.
- ◆ 2004-2006 – Principle investigator in a ground-breaking study of the impacts of vandalism of archaeological sites as they relate to unregulated road access. Research has focused on impacts to Range Creek Canyon, Nine Mile Canyon and Desolation Canyon.
- ◆ 1998-2003 -- Synthesized radiocarbon databases for the entire northern Colorado Plateau, resulting in acclaimed peer-reviewed professional journal articles and monographs.
- ◆ 1995-1996 – Survey and test excavations in Desolation Canyon, as part of ongoing efforts to explain human adaptations in exceptionally harsh desert environments.
- ◆ 1989 to 1993 – Intensive archaeological survey of Nine Mile Canyon. The subsequent analyses defined prehistoric settlement patterns in the West Tavaputs Plateau.

Teaching Experience:

- ◆ 2002-2006 – Project coordinator for the Range Creek Archaeological Project, a cost-sharing endeavor with the Utah Museum of Natural History, the University of Utah, College of Eastern Utah, Salt Lake Community College and others.
- ◆ 1994-2006 – Adjunct instructor of anthropology, College of Eastern Utah, Price, Utah. “The Archaeology of the Northern Colorado Plateau” and “Introduction to Archaeological Survey.”
- ◆ 1990 to 1991 – Graduate assistant/instructor at Brigham Young University, and crew chief and field supervisor on two consecutive Brigham Young University field schools in lower Nine Mile Canyon, responsible for coordinating and implementing survey method and theory, instruction of undergraduate students and camp management.
- ◆ 1990 to present – Volunteer instructor/lecturer to various chapters of the Utah Statewide Archaeological Society and the Utah Rock Art Research Association, as well as community and school groups.

Publications:

- ◆ 2006 – Chasing Ghosts: An Analysis of Vandalism and Site Degradation in Range Creek Canyon, Utah. *Utah Museum of Natural History Occasional Papers* 2006:1. Salt Lake City. (coauthor)
- ◆ 2006 – Migrations of Western Native Americans and the Fall of Cahokia: Responses to Early-Eleventh, Middle Twelfth and Late-Thirteenth Century Droughts. Manuscript under review. (coauthor)
- ◆ 2004 – Categories and Conundrums: The Rock Art of Lower Nine Mile Canyon, in *New dimensions in Rock Art Studies*, edited by Ray T. Matheny. *Museum of Peoples and Cultures Occasional Papers Series* No. 9. Provo, Utah.
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- ◆ 1995 – Paradigms and Perspectives: A Class I Overview of Cultural Resources in the Uinta Basin." Monograph prepared for the Bureau of Land Management, Vernal.
- ◆ 1993 – Continuity and Change: A Cultural Resource Class I Inventory of the Price River Resource Area, Bureau of Land Management. Monograph prepared for the Price River Resource Area, Price, Utah.
- ◆ 1993 – Site Distribution and Settlement Patterns in Lower Nine Mile Canyon: The Brigham Young University Surveys of 1989-91. Master's thesis on file, Department of Anthropology, Brigham Young University, Provo, Utah.
- ◆ 1990-present – Authored dozens of popular articles on cultural

resources and their preservation, Native American rights under cultural resource protection laws, and various management approaches to preserve cultural resources.

Invited Lectures:

- ◆ 2002 -- Categories, Conundrums and Radiocarbon Dates: Temporal Perspective for the Northern Colorado Plateau. Paper presented at the 63rd annual meeting of the Society for American Archaeology, Denver, Colorado. Paper to be included in upcoming peer-reviewed monograph to be published by Northern Arizona University and/or the Grand Staircase-Escalante National Monument.
- ◆ 2002 – Living on the Edge: Late Formative Storage Strategies and Their Implication for Societal Conflict. Paper presented at the Great Basin Anthropological Conference, Elko, Nevada.
- ◆ 1997 – Invited lecture, “Reinterpreting Chronological Sequences on the Northern Colorado Plateau,” Utah Humanities Council/Brigham Young University Symposium, Provo, Utah.
- ◆ 1995 – Old Paradigms and New Perspectives: A Reinterpretation of Cultural Chronology in the Uinta Basin. Paper presented at the Rocky Mountain Anthropological Conference, Steamboat Springs, Colorado.
- ◆ 1994 – One Pot Pithouses and Fremont Paradoxes: A Case for Itinerant Aceramic Fremont Horticulture in Northeastern Utah. Paper presented at the Great Basin Anthropological Conference, Elko, Nevada.
- ◆ 1993 – Site Distribution in Lower Nine Mile Canyon, Paper presented at the Rocky Mountain Anthropological Conference, Jackson, Wyoming.
- ◆ 1993 – The Tavaputs Adaptation: Additional Evidence for Cultural Variability Among Formative Peoples of the Northern Colorado Plateau. Paper presented at the Rocky Mountain Anthropological Conference, Jackson, Wyoming.

Other Experience

- ◆ 2006 – Was a technical consultant to the Utah Museum of Natural History, writing the text for the perpetual Range Creek Canyon Exhibit.
- ◆ 2004-2006 – Assisted non-profit organizations in the development of National Register nominations for two archaeological districts, under provisions of the National Historic Preservation Act of 1966.
- ◆ 1994-2002 – Technical consultant to the College of Eastern Utah Prehistoric Museum in connection with the procurement of National Endowment for the Humanities, National Science

Foundation and State of Utah grants.

- ◆ 1994-present – Consulted with conservation groups, historical societies and other advocacy groups on means to ensure that cultural resource protection laws are followed.

Honors

- ◆ 2004 – The Utah State Historical Society awarded “Horned Snakes and Axle Grease” its annual book award, commending it for message of preservation and respect for prehistoric and historic resources.
- ◆ 1993 – Ongoing archaeological research in Nine Mile Canyon was honored by the Scientific Research Society (Sigma Xi) as one of three outstanding scientific research projects from the state of Utah (and the only anthropological research so honored).

Professional Affiliations

Society for American Archaeology, Washington D.C.
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