

# **Desolation Canyon Baseline Site Condition and Vandalism Assessment: October 2007 Survey**



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## **Abstract**

From Oct. 3 to Oct. 9, 2007, the Colorado Plateau Archaeological Alliance, the Bureau of Land Management and Utah Division of State History, with Challenge Cost Share Program assistance from the National Park Service, conducted intuitive surveys along the Green River corridor, mostly within the boundaries of the Desolation Canyon National Historic Landmark. These surveys, which were focused in the Peters Point, Cedar Ridge Canyon, Rock Creek, Wire Fence Canyon and Price River areas, were intended to document the nature and distribution of cultural resources in this poorly understood region, and to determine the nature of visitor impacts on cultural resources. Twenty-one sites were documented, among them 10 previously recorded sites that were documented to current professional standards. These 21 sites included rock art sites, possible pithouses, surface architectural structures, granaries, cists, temporary encampments inside rockshelters, more sedentary occupation of rockshelters, encampments on dunes, rock alignments, a cache of historic artifacts, a historic road and a site with prehistoric rock art and historic inscriptions. An assessment of all 21 sites revealed that several had been impacted to some degree by graffiti, illegal excavations and vandalism, but that most of observable damage to cultural sites was minor and did not impact the integrity of the sites. These impacts appear to have occurred intermittently from 1894 through at least 2000. This report, the fourth resulting from the collaborative partnership, constitutes preliminary findings.

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## **Introduction**

The Desolation Canyon Site Condition and Vandalism Assessment is a multi-phased, two-year research project initiated by the Colorado Plateau Archaeological Alliance (CPAA), in collaboration with the Utah Division of State History, the Bureau of Land Management, the Utah Museum of Natural History and the National Park Service. This project has two broad objectives: (1) Document the nature of cultural resources in the Desolation Canyon and Gray Canyon corridors to better understand the spatial and temporal nature of prehistoric adaptations in this region, and (2) to determine baseline site conditions to measure the nature and extent of adverse impacts precipitated by human activities. The intent of both objectives is to increase our understanding of the archaeological record of this under-documented region, thereby providing federal land managers with data on the nature, distribution and current condition of cultural resources, thereby facilitating proactive management of those resources in a region subjected to significant recreational visitation.

The first phase of the study (Spangler, Davis et al. 2007) was conducted in September 2006 and consisted of intuitive surveys conducted primarily near the confluences of Rock House Canyon, Flat Canyon and Steer Ridge Canyon. This research, conducted in partnership with the Utah Division of State History, identified a spatial pattern consisting of masonry storage structures and rock art sites located near the confluences of these side drainages, but without convincing evidence of nearby residential occupations. The distribution of these sites could imply that prehistoric farmers occupied the Green River corridor only seasonally, perhaps during spring planting and fall harvests, and that they were never there in significant numbers or for any significant length of time. Two radiocarbon dates suggested this occupation occurred at about A.D. 1000 to 1050. There was also minimal evidence of recent adverse impacts from human activities.

CPAA revisited Desolation Canyon in May 2007 in partnership with the Bureau of Land Management (BLM), Utah Division of State History and the Utah Museum of Natural History and with the same objectives as those in September 2006. However, the project had two additional, more specific goals: (1) Investigate Jack Canyon, a western tributary of the Green River with a consistent water source, to determine if the spatial pattern of archaeological sites was similar to that observed in Flat Canyon, also a western tributary with consistent water much of the year. (2) Document sites the BLM knows receive significant public visitation, or were at risk of future visitation, to establish a baseline through which future management decisions could better protect those sites. These investigations (Spangler, Boomgarden et al. 2007) revealed no archaeological sites around the mouth of the canyon, but they found increasing density of sites beginning about 4.6 kilometers up Jack Canyon. The spatial distribution of archaeological sites in Jack Canyon is inconsistent with that observed in Flat Canyon.

Throughout the Green River corridor, the prevalence of adverse impacts noted in May 2007 – primarily vandalism and graffiti – was much greater than had been observed during the 2006 investigations. That damage appears to have occurred intermittently from



about 1900 to 2006. This observation may be biased by the fact that crews focused significant efforts on documenting sites known to river rangers to receive significant and repeated visitation.

In July 2007, CPAA, at the request of BLM river managers, examined sites around the Sand Wash boat launch to determine the nature of adverse impacts resulting from camping, and to document known but undocumented historic sites in the area. During a three-day period, 10 historic and two prehistoric archaeological sites were documented. No surveys were conducted and the identified sites were known to the BLM or were discovered during the course of documenting known sites (Spangler, Aton and Spangler 2007).

With the assistance of Challenge Cost Share Program funding, CPAA returned to Desolation Canyon in October 2007 in partnership with the Utah Division of State History, the Utah Museum of Natural History, the Bureau of Land Management and the National Park Service. [REDACTED]

[REDACTED] all on the west side of the Green River. With the exception of Price River, all areas investigated are located within the boundaries of the Desolation Canyon National Historic Landmark. A total of 21 sites were identified and documented.

This report constitutes preliminary findings of the October 2007 reconnaissance and is not intended to be a comprehensive discussion of findings from previous CPAA investigations, or those reported by earlier researchers. For a discussion of local environments, geology and previous research, see the preliminary report for the September 2006 expedition (Spangler, Davis et al. 2007). For a discussion of the geomorphology of Jack Canyon with relevance to other Desolation Canyon drainages, see the preliminary report for the May 2007 expedition (Spangler, Boomgarden et al. 2007). A more detailed discussion of Desolation Canyon environments, geomorphology, history and early archaeological research will be presented in a final report anticipated later in 2008.

### **Survey Methods**

The October field research was conducted over a seven-day period by a team of six experienced archaeologists, along with four BLM river rangers with a significant knowledge of the location of cultural resources along the Green River and five volunteer crew members. [REDACTED]

The expedition had intended to proceed to Three Canyon where a base camp would be established to conduct extended examination of that drainage. Contrary winds forced the crews to establish camp on October 5 just down river from [REDACTED]

[REDACTED] Three previously recorded sites were re-documented and seven new sites were identified and documented. After camping the evening of October 7 at the mouth of Wire Fence Canyon, an additional site was identified and documented the following morning while attempting to find a previously identified lithic scatter (it was not located during the cursory investigation). The crews then proceeded to a camp at Nefertiti Rapids. On the morning of October 8, crews re-documented a major rock art site at the mouth of Price River. [REDACTED]

In all instances, the surveys were intuitive in nature with three crews of three to five individuals each examining areas around the mouths of side canyons and other topographic features suspected to contain cultural resources. The intensity of these intuitive surveys varied greatly (from less than 2 hours of survey to a day and a half of survey), depending on time constraints. At least one previously recorded site had been identified in all of the areas investigated, and with the exception of [REDACTED] Canyon, the investigation of these known sites led to the identification of additional sites that were previously unknown. Additionally, crews used 1931 field notes to identify two sites in [REDACTED] initially described by the Claflin Emerson Expedition from the Peabody Museum at Harvard University.

### Survey Results

The 21 sites identified by crews during the October 2007 expedition represent an entire suite of site types, including rock art localities, granaries, subsurface storage cists, open architectural features suspected to be residential sites, large open surface architectural sites of unknown function, open camps, sheltered camps, rockshelters with walls and unidentified features, rock alignments, a historic cache and a historic road. These sites range from simple (single component) to extremely complex with multiple storage facilities, rock art and suspected residential features. The spatial distribution of these sites suggest (1) sites will be located around the mouths of side canyons regardless of whether or not the drainage has permanent or intermittent water, (2) sites are sparse in those drainages without running water, springs or seeps, (3) the [REDACTED] area appears to have been a locus of substantial prehistoric occupation focused on a long, broad alluvial floodplain (ca. 3.2 kilometers long), and (4) areas within at least 2 kilometers of the mouth of [REDACTED] feature a dense concentration of prehistoric sites of all types.

[REDACTED]

[REDACTED]  
[REDACTED] as traditionally defined on Desolation Canyon river guides.

Another small unnamed dry canyon enters from the northwest at the northern periphery of the floodplain, and another unnamed dry canyon enters about 0.8 kilometers further down river toward the middle of the floodplain. Two sites were documented on the northern edge of the floodplain, two in the middle portion and one on the southern edge of the floodplain.



**Figure 1: Broad floodplain opposite [REDACTED], looking north.**

The concentration of storage, residential and rock art sites in this area (see Figure 2) is puzzling given the nature of the local environment. None of the side drainages have flowing water (one has a spring), and all are short and narrow with steep canyon walls and canyon bottoms choked with debris flows. However, the area does feature a broad, relatively flat floodplain along the Green River that could have been suitable for cultivation of maize or other domestic foods during optimal climatic conditions. This slightly sloping floodplain is covered in thick greasewood and the ground surface was not clearly visible. However, its appearance is similar to the Green River floodplain at the mouth of Flat Canyon, which also features a high density of sites. Unlike the Flat Canyon



floodplain, there is no obvious evidence of a high water table [REDACTED] that could have facilitated sub-irrigation of crops.

In general, the [REDACTED] area exhibits evidence of an oval surface structure near the base of a cliff; at least three stone and mud masonry granaries in the cliff face above the residential structure; additional storage structures in shelters far removed from the residence; a second circular stone structure on an outcrop with a commanding view of the entire floodplain; and rock art panels in three or more locations near the residence. These sites are similar to those typically attributed to Fremont peoples of the Tavaputs Plateau (cf. Spangler 2002; Spangler, Barlow and Metcalfe 2004; Spangler, Davis et al. 2007; Spangler, Boomgarden et al. 2007). The depiction of a horse and rider at one rock art panel suggests the area was later occupied during early historic times, perhaps by Ute hunters and/or gatherers.

**42Cb2663.** Located in a prominent rockshelter above the [REDACTED] in the northern [REDACTED] area, this storage site consists of five upright sandstone slabs set in a roughly rectangular shape (Figure 3). It measures 95 centimeters long by 72 centimeters wide and is situated against the back wall of a 2-meter deep rockshelter. The slabs range in size from 25.5 by 5.5 centimeters to 66 by 7 centimeters. They have been partially covered by roof spall and aeolian sand deposits. The structure is probably a subsurface or semi-subterranean storage cist. A probe with a pin flag determined it has a depth of more than 30 centimeters. The slabs seem to be placed at an angle, sloping toward the center of the feature.



Figure 3: Remnants of slab-lined cist at 42Cb2663.



**42Cb217.** This rock art site consists of two petroglyph panels located on a cliff face at the western edge of an unnamed canyon drainage [REDACTED]. Panel 1 consists of two sheep figures and one anthropomorph (Figure 4). The panel of solidly pecked figures measures about 14 centimeters high by 40 centimeters wide. The panel faces southeast toward the river. Panel 2 consists of two indistinctly pecked figures that are located around the western corner and 15 meters up a talus slope from Panel 1. They are also located on a sheer sandstone cliff face, but are facing southwest. These figures occupy an area about 40 centimeters wide by 15 centimeters tall.



**Figure 4: Panel 1 at 42Cb217 (Two Sheep and a Dude).**

**42Cb2664.** This storage site consists of two drylaid structures, probably granaries, located in two different rockshelters on the west side of an unnamed canyon [REDACTED]. There is also a third rockshelter with lithic detritus. All are located 30 to 40 meters above the floodplain in the first cliff level just below the first terrace. Feature 1 is the uppermost of the three features, consisting of two sections of drylaid stone walls that enclose a small sandstone alcove measuring 3 meters wide by 78 centimeters high by 1.55 meters deep (Figure 5). Two sections of wall are remaining on the north and south ends of the alcove, the back wall of the alcove functioning as the back wall of the structure. The front portion of the wall has collapsed, and remnants are found lying on the small, roughly 1-meter-wide ledge immediately outside of the alcove. The north wall section is made up of 24 unmodified sandstone slabs that is eight courses high. There is no evidence of mud or mortar as a binding agent. The wall measures 1.55 by 0.5 meters. The south wall consists of 15 unmodified sandstone slabs stacked up to seven courses high. There is no evidence of any mud or mortar. The wall is 77 by 62 centimeters in size and is situated on a bedrock surface.



**Figure 5: Feature A drylaid stone wall and shelter at 42Cb2664.**

Feature 2 is located directly below Feature 1 within an overhang. It consists of a very roughly constructed wall enclosing an area 1.12 meters north-south by 1 meter deep by 49 centimeters high. The feature is drylaid with unmodified, angular stone slabs that have been laid flat, on end and on edge (Figure 6). There is some packrat debris inside. It is not clearly evident that this feature is prehistoric. Sandy deposits overlay the bedrock interior, along with sticks and other detritus deposited by packrats. Feature 3 is a shelter below Feature 2 that contains lithic flakes.



**Figure 6: Feature B, drylaid wall enclosing sheltered area at 42Cb2664.**



**42Cb233.** This complex site is located on the northern periphery of a long, broad floodplain [REDACTED]. It consists of three granaries on cliff ledges and one open feature on a shoulder area below the cliff. Granary 1 is about 50 percent intact and is located on a 1 meter wide ledge about 10 meters above the valley floor (Figure 7). It is constructed of sandstone slabs and mud with wooden supports. One pole is still standing vertical and extends about 50 to 75 centimeters above the top. The oval-shaped wall stands 12 to 15 courses tall and is perhaps 1.2 meters in diameter. The back wall of the sheltered area functions as the back wall of the structure. There is no intact roof, and part of the front and west walls have collapsed. Granary 2 has largely collapsed. All that remains are two courses of stone defining one wall. This structure is located about 2 meters west of Granary 1 at the same level. Granary 3 is located on the next cliff level about 60 meters above Granaries 1 and 2. All that remains of this structure are two sticks extending from an inaccessible ledge and possible construction timbers on the talus slope below the feature. Access to the features was not possible.



**Figure 7: Granary 1 (center) and remnants of Granary 2 (left) at 42Cb233.**

The open structure consists of a single-room structure with 30 to 40 irregular and unmodified sandstone slabs arranged in an oval pattern (Figure 8). The largest slab is 1.3 meters by 95 centimeters and is lying flat on the ground surface. The slabs are currently stacked two courses high to a maximum height of 55 centimeters. However, there is considerable stone rubble to suggest that the structure may have been 3 to 4 courses high at one time. There are four upright slabs on the south-east wall with a maximum height of 45 centimeters. The fill appears intact but with a slight depression. The structure measures 4 meters east-west by 2 meters north-south. It is situated along a rock outcrop, and the side walls have collapsed down slope to the north and south.





**Figure 8: Oval-shaped open structure at 42Cb233.**

This site was initially described in 1931 by William Bowers of the Claflin Emerson Expedition as:

*ER5-2: On the west bank of Green River [REDACTED], were found three granaries and a dwelling site (?). Two of the granaries are on a small shelf 25 feet above the valley floor under a small overhang; accessible with difficulty. The third is 75 feet up, accessible under (an) overhang of water course; also difficult of access. The living site is on the shoulder 20 feet above floor of (the) canyon. It consists of apparently circularish room about 3 to 3.6 meters in diameter. The walls are of longish stones and slabs as large as 75 by 30 by 15 centimeters, much demolished. The possibility of some rough sort of coursing is indicated. No mud is visible. Inside the wall is a shallow dirt floor through which the ledge is visible in spots. This site and ET5-1 both look down upon considerable flat land in the canyon bottom, commanding an area of 1 mile long by 200 yards wide. Granary A (is) small, rectangular granary, 1 meter by 75 centimeters. The walls are thin pieces of shale set with large quantities of mud in rough courses. Some traces of roof may be found in thin poles 4 centimeters in diameter, one above the other, parallel to cliff face to a height of 60 centimeters. Granary B (is) Semi-circularish wall of rough rectangular slabs set in much mud. Poor, rough, irregular wall and no coursing. Room in diameter is 1.5 meters, height 1.35 meters. Poles lying about*

*may be traces of roof, could not distinguish the structure. Granary C (is) about the same size as B but masonry without mud at all, very rough projecting poles were perhaps what held part of roof. Observations of all three granaries were made by aid of binoculars [Bowers 1931].*

**42Cb218.** This rock art site is located on the northern periphery of a long, broad floodplain [REDACTED]. It consists of two panels of petroglyphs (Figure 9) on a sandstone outcrop at the south edge of an unnamed dry canyon entering Desolation Canyon. Panel 1 consists of a canine-like figure solidly pecked into dark patina on a south-facing cliff wall. It measures 22 centimeters wide by 13 centimeters high. Panel 2 consists of two solidly pecked sheep figures facing away from each other with their hind quarters touching. The panel measures 23 centimeters wide by 12 centimeters high and it faces southeast.



**Figure 9: Petroglyph Panels 1 and 2 at 42Cb218.**

**42Cb81.** This rock art site is located toward the center of the long, broad floodplain [REDACTED], on a cliff face on the north side of an unnamed side canyon. It consists of a series of at least three (perhaps five) dispersed and relatively informal rock art panels and graffiti. Panel 1 is the westernmost of the panels, consisting of two indistinct pecked figures on a south-facing cliff face. To the west of these figures are indistinct modern scratches, the name "Adair" and the letter "E." Panel 2, also on a south-facing cliff face, is located 12 meters to the east of Panel 1. It consists of several roughly pecked figures of possible bighorn sheep near the base of the cliff, and one bighorn sheep and several indistinct figures on a cliff face about 5 meters above present



ground surface. Associated with this panel is a modern/historic inscription of "C 93." Panel 3 is located about 5 meters east of Panel 2 at the mouth of the side drainage. This panel has been heavily vandalized and some aboriginal images have been modified with scratches. Panel 3 (Figure 10) appears to depict humans on horseback, suggesting possible affiliation with early historic Ute peoples.



**Figure 10: Panel 3 at 42Cb81, possibly historic Ute (note rider on horseback).**

Another possible panel is located about 25 meters to the north of Panel 3 on an east-facing cliff face where there is a scratched image of a horse or other quadruped, a crude stick figure and another quadruped. These figures appear to be modern additions. Another 20 meters to the north are indistinct stipple pecks in a C pattern, along with names and dates. On the southern edge are possible prehistoric peck marks, but these are highly eroded and are indistinct. These include possible rows of small dots and one human stick figure. These were not assigned panel numbers. Possible rock alignments were observed in the floodplain, but these could be natural deposition from periodic flooding. A noticeable depression in front of Panel 2 is also suspicious, but no cultural materials were observed and this also could be natural.

**42Cb234.** This rock art site is located on the south side of the mouth of an unnamed side canyon, [REDACTED] This site consists of seven pecked bighorn sheep figures (Figure 11), one additional quadruped painted in red (faded), one pecked anthropomorph shooting a bow and arrow, and one pecked and painted anthropomorph, also shooting a bow and arrow. The pecking styles exhibit both solid and stipple pecking. The panel extends along the base of the first cliff level about 4 meters from north to south and is about 2 meters high.



Figure 11: Bighorn sheep petroglyphs at 42Cb234 (note faded red pigment upper center).

**42Cb2665.** This open architectural site is located on a bedrock outcrop on the southern periphery of the long, broad floodplain [REDACTED]. It was initially described by the 1931 Claflin Emerson Expedition as:

*ET5-1 Open Site: On the Green River, west bank, [REDACTED] is a circular wall on a small shoulder 30 feet above valley bottom. The wall includes a room 2.1 meters in diameter. The highest part of the wall now standing is 1.05 meters. Masonry (is) of thin, rectangular slabs in rough courses chinked with small fragments of rock and mud. Mud not used for mortar. That is, the rocks were not set in mud but the mud was administered to fill the crevices between the rocks as they had been paid in place. There is a floor 20 centimeters deep composed of earth and pieces of mud. No charcoal was found [Scott 1931].*

This site was revisited in 2007 and was found to be located on a flat-topped outcrop about 10 meters above the top of a short slope. The site consists of a single-room roughly circular structure that occupies the outer edge of the outcrop (Figure 12). Thin stone slabs were laid horizontally, and no remaining traces of mud mortar were observed, either on the walls or in the interior deposits. Most of the stones are rather small, ranging from 5 to 8 centimeters thick to 20 to 40 centimeters long, although some larger stone slabs were incorporated into the wall matrix. There is no evidence the stones had been modified in any way. The interior of the structure measures 2.3 meters east-west by 1.8



meters north-south. The north wall has collapsed off the ledge. There is a possible doorway entrance at ground level on the south. The maximum height of the west wall is 97 centimeters. The walls range in size up to 35 centimeters thick. To the east and south of the structure is an ephemeral rock alignment along the south edge of the outcrop with one to two courses of poorly articulated stone slabs. The alignment is about 5 meters long. A single gray chert thinning flake was observed against the interior south wall of the structure, and a looters hole is located in the center (this may actually be a 1931 test pit, but no mention is made in the 1931 notes as to testing the site).



Figure 12: Single-room drylaid surface structure at 42Cb2665 (see also Figure 1).

## Canyon

██████████ Canyon is a major western tributary of the Green River located opposite the east-to-west trending ██████████

██████████ Canyon is moderately broad at the mouth but narrows rapidly further up canyon where it is characterized by steep canyon walls and substantial debris flows. No archaeological sites were identified within the interior of the canyon. The canyon does not have permanent water, and stream flows are limited to the early spring during periodic snowmelt and episodic summer and fall monsoonal thunderstorms. The stream channel in the bottom of the canyon is severely down-cut by periodic flooding, exposing gravel sediments at the mouth of the canyon. There is a general paucity of floodplain areas with soils suitable for agriculture. There is a broad, flat floodplain at the mouth of the canyon, about 500 meters long by 200 meters wide that would seem suitable for agriculture, but no such evidence was identified during a cursory inspection of the area.

Of note, on the east bank of the Green River at this point and slightly north is a floodplain about 1,000 meters long by 200 meters wide. This area was not investigated.

**42Cb219.** This rock art site is located on a cliff face [REDACTED] [REDACTED] This site consists of a single rock art panel with four figures that have been solidly pecked in a south-facing cliff face (Figure 13). These figures include three sheep and one anthropomorph in an area 1.35 by 1.4 meters. One of the central bighorn sheep figures has been vandalized in an attempt to remove it. The top and sides of the figure are outlined by three cut marks from some kind of rock saw.



Figure 13: Location of 42Cb219. Note the cut marks around rock art figure center frame.

[REDACTED]

[REDACTED]

[REDACTED]



[REDACTED]

**42Cb2666.** This cache site is located within a small sheltered area around a boulder outcrop about 5 meters above the Desolation Canyon floodplain, [REDACTED]. It consists of two features, one a historic cache of artifacts presumably associated with historic ranching activities in the area and the other a hearth feature with no associated artifacts. Feature 1 consists of a cache of metal tools, wooden items, a metal ring with rolled leather attached, remnants of a leather harness, a wooden box, and three intact bottles (one has a lid still on it). Just outside the sheltered area and eroding down slope are one metal ring and one broken bottle. The most prominent artifact at this site is a wood and metal device constructed on galvanized wheels. A platform area features three metal "bowls" arranged in a triangle (Figure 15). The purpose of this device is unknown. Feature 2 consists of a hearth area located in a sheltered area on the north side of the same boulder outcrop. The hearth area features chunks of charcoal and burned bone. This feature could be prehistoric, but given the absence of convincing evidence and the proximity to the historic cache, it was assumed to be historic for the purposes of site documentation.



Figure 15: Unknown wheeled device with three metal bowls at 42Cb2666.

**42Cb2667.** This historic road site is located along a ridge and talus slope on the [REDACTED]. It consists



of an old wagon trail or two-track road that extends from the floodplain up a talus slope and along a ridge [REDACTED] (Figure 16). The trail makes numerous S-curves as it ascends the slope. The trail is largely overgrown and is not readily visible in many locations. At one point, there is loose barbed wire on the north side and barbed wire wrapped around the base of a cedar stump on the south side, suggesting a fence was constructed across the road. About 2 meters east of the northern barbed wire is an alignment of at least 12 unmodified stones that appear to define the northern edge of an S curve. The alignment measures 4 meters long by up to 50 centimeters wide. The road is about 3 to 4 meters wide in most places.



Figure 16: Remnants of old wagon road (42Cb2667) on ridge [REDACTED].

**42Cb2668.** This rockshelter site is located just above the Green River floodplain and [REDACTED]. It consists of a small shelter with a sparse scattering of cultural materials. The shelter measures 8 meters north-south with a maximum height of 2 meters and maximum depth of 2 meters (Figure 17). On the north edge of the shelter is a natural stone bench or shelf with abundant packrat midden and roof spall. The bench area measures about 2 by 2 meters. Five chunks of charcoal, five burned and fragmented animal bones, and several gray stones that may be evidence of charcoal staining were observed in the bench area where they were likely deposited by packrats. No diagnostic artifacts were observed.



**Figure 17: Sheltered area with charcoal and bone (42Cb2668). Note bench area center left.**

**42Cb2669.** This site is located in a large rockshelter on a slope above the Green River floodplain [REDACTED]. It consists of a sheltered area with sparse artifacts (groundstone, animal bones) and remnants of a drylaid stone wall (Figure 18). The shelter undulates about 20 meters east to west and has a maximum height of 2 meters and a depth of 3 meters. The area with the stone wall and artifacts is in the least protected area of the shelter. The stone wall was erected somewhat perpendicular to the back wall of the shelter and consists of unmodified stones loosely stacked two to four courses high. The wall measures about 70 centimeters long by 40 centimeters high. To the west of this wall is a small rubble mound of unmodified sandstone slabs (about 10) that may be remnants of a second wall. About 1 meter due south of the rubble mound is a large patinated boulder on which were placed two mano fragments. Animal long bones were observed in a packrat nest about 1.5 meters east of the drylaid wall. These had been cut laterally and split lengthwise.

**42Cb2670.** This site is located in a small rockshelter on the slope [REDACTED]. It consists of a narrow sheltered area about 5 meters long by 1.5 meters deep by 0.75 meters high but diminishing in height to the back of the shelter (Figure 19). The interior is filled with plant residue, aeolian sands, packrat debris and copious amounts of burned bone, all fragmented and some split length-wise. At least one burned condyle had been fractured. Some bones had been heavily burned and others were only lightly discolored. The ceiling of the shelter appears to be discolored red and orange, perhaps by fire. The only other artifacts observed were small pieces of charcoal.





**Figure 18: Wall remnants (center and center right) at 42Cb2669.**



**Figure 19: Small sheltered area with bone and charcoal (42Cb2670).**

**42Cb416.** This storage site is located in a large rockshelter [REDACTED]  
[REDACTED] It consists of a subterranean slab-lined cist (Feature 1) in



a larger shelter visible from the floodplain below, and a stone, pole and mud granary (Feature 2) in a smaller shelter above the larger one. Feature 1 is a rectangular cist constructed of mud and branches with interior evidence of wattle-and-daub construction (Figure 20). The top had been covered with a large flat unmodified stone. The interior had largely refilled with rock, soil and packrat midden. The lower portion of the cist appears to be wider than at the top entrance. A piece of willow used to bind the roof matrix was collected for radiocarbon analysis and returned a conventional radiocarbon date of  $340 \pm 40$  years B.P. (A.D. 1450 to 1650 calibrated, sample B-237355). In addition to the willow, this feature also yielded a modified stick and piece of S-twist juniper bark cordage that were collected.



**Figure 20: Feature 1 subterranean cist at 42Cb416.**

Feature 2 is located about 4 meters above and 4 meters west of Feature 1 and consists of a stone and mud surface granary and remnants of a pole superstructure in a small sheltered area (Figure 21). The granary is D-shaped and has mostly collapsed, although the lateral walls are still largely intact. The walls were constructed of unmodified stone slabs and blocks set into reddish mud. Loose wooden poles were observed on the interior, leaning against the interior walls. One juniper beam remained in its mud matrix and spanned both lateral walls at the back of the structure next to the shelter wall, which functioned as the back wall of the structure. The interior deposits

exhibited exposed juniper bark. To the west of the structure are copious amounts of shredded juniper bark on top of a circular, thin stone slab, probably a capstone for surface entry to the granary. Rice grass stems were observed on the interior of the shelter. Three one-half-inch core samples were obtained from three of the wooden elements for further chronological and environmental analysis.



**Figure 21: Interior view of Feature 2 granary at 42Cb416. Note intact pole upper frame.**

**42Cb2671.** This sheltered residential area is located in a large rockshelter just above the Green River floodplain [REDACTED]. The site consists of one rock art panel and two sheltered areas with defined walls and residential detritus. The petroglyph panel (Feature 1) features two pairs of bighorn sheep with noses touching ("kissing sheep") and several other indistinct figures. The panel measures 1.07 meters wide by 60 centimeters high. Feature 2, the uppermost of the two sheltered areas, is roughly D-shaped with a stone and mud wall defining the east side of the enclosed area (Figure 22). The pile of stone artifacts and potsherds is located on the west side of the enclosed area, presumably stacked there by visitors. The wall is about 1.4 meters long. Feature 3 is the lower sheltered area. It also features a somewhat D-shaped enclosed area with a stone and mud wall defining the west side and a drylaid stone wall defining the east side. The stone and mud wall is four courses high. A corncob collected from the site surface subsequently returned a conventional radiocarbon date of  $950 \pm 40$  B.P. (A.D. 1010 to 1170 calibrated, sample B-237356).

**42Cb417.** This granary site is located on the north wall of a small unnamed side canyon [REDACTED]. The site consists of a single two-chambered granary constructed from mud, masonry and wooden beams



(Figure 23). One chamber is roughly square and one is beehive-shaped, although the features could not be accessed to obtain a more detailed description. The structure is located about 10 meters above the canyon bottom on a ledge that is protected by an overhang. The sheltered area measures about 4 by 4 meters and the granary occupies the entire sheltered area. The construction features a base of Douglas fir logs with alternating stone slabs and mud/mud on the east side and stacked stones on the west side. Two large logs make up the base. A third log is protruding upright on the east side. The roof has a single beam across the front with smaller beams resting perpendicular across the walls and front beam. A sandstone trough metate fragment and one lithic flake were observed at the bottom of the cliff wall.



Figure 22: Close-up view of stone and mud wall remnants and artifact pile at 42Cb2671.



Figure 23: View of granary at 42Cb417.



**42Cb2672.** This open residential site is located on an alluvial fan at the mouth of a small side canyon [REDACTED]. The site consists of three rock alignments, two of them simple alignments without a coherent shape, and the third a complex oval alignment with several upright stone slabs and large natural boulders that had been incorporated into the alignment. The complex alignment (Figure 24) is consistent in size and shape with a pithouse. It measures 2.19 meters north-south by 3.1 meters east-west. The site encompasses an area 36 by 30 meters. One complete mano was observed resting on the surface near the rock alignment and lithic debitage was eroding from a cut bank on the south side of the site. The debitage includes nine tertiary flakes of obsidian and chert. A complete slab metate was found in the drainage on the south side of the site.



**Figure 24: Complex oval stone alignment at 42Cb2672.**

**42Cb76.** The site consists of a dispersed artifact scatter spread along a sand dune that parallels the Green River [REDACTED]. Most artifacts were found along the northern edge of the site and eroding down slope toward the river. Additionally, there is a large depression in the dune that may be indicative of a subsurface feature. There is also a large charcoal stain. This site features a dispersed scattering of lithics, groundstone, burned bone, stone beads and hammerstones. The lithic materials are sparse, consisting of only 20 to 30 tertiary chert flakes. The groundstone assemblage included five manos, one complete metate, two metate fragments and one groundstone tool of unknown function. Bone artifacts include a few pieces of burned long bones, probably deer. Eleven square and circular stone beads were observed, two of them fragments of beads (Figure 25).

They measure about 1 centimeter in diameter by 1 millimeter thick. They were constructed of laminated gray shale or silt stone.



Figure 25: View of 10 of 11 stone beads at 42Cb76, an open dune encampment.

[REDACTED]

[REDACTED]

**42Em3877.** This lithic reduction site is located on a ridge on the south side of [REDACTED]. The site consists of a dispersed lithic scatter and rock wall that may be a remnant of a hunting blind. The lithic scatter is comprised of more than 100 primary and secondary early-reduction-stage flakes and numerous tested river cobbles (Figure 26). The scatter covers an area roughly 70 by 70 meters. Tool stone materials are primarily quartzite, although some chert was



observed. Two stone tools were identified, a side scraper and a quartzite river cobble that had been bifacially flaked along one of the lateral edges. The small drylaid rock wall was situated next to a boulder and arcs in a quarter-circle from the edge of the boulder (Figure 27). [REDACTED]



Figure 26: Tested river cobbles and primary flakes at 42Em3877.



Figure 27: Drylaid wall at 42Em3877.

[REDACTED]

[REDACTED]

**42Em723.** This site is located on and around boulders [REDACTED] [REDACTED] Site consists of a series of seven prehistoric petroglyph panels, one panel of historic inscriptions, a lithic scatter with stone tools and one possible hearth feature. The petroglyph panels are located on separate boulders that extend from the floodplain up slope about 50 meters. Additional panels may be located on other boulders that extend up slope about 150 meters. The figures are all solidly pecked and feature repatination ranging from slight to about 50 percent. There are several trapezoidal anthropomorphs that are considered hallmarks of Fremont rock art in this region.

Panel 1 is located on a boulder next to the pedestrian trail and is easily visible to passersby. It is the most southerly and eastern of the panels. At some point since the images were rendered the boulder has tipped onto its side, and the figures are now lying horizontal. The panel includes a complex array of dot matrices, bighorn sheep, trapezoidal anthropomorphs and abstract figures (Figure 28). The panel faces south and measures about 5 meters long by 2 meters high.

Panel 2 is about 25 meters up slope to the north and is situated on a large tilted boulder with a 220-degree aspect. It is also visible from the pedestrian trail below. The panel (Figure 29) includes circles, abstract figures and lines, with the dominant figure being a circle with dots on the interior (this figure is popularly referred to as the pepperoni pizza). This panel suffers from extreme erosion and the lower west portion is barely discernible. It measures about 2 meters wide by 3 meters high.

Panel 3 is located about 3 meters to the east on a small boulder that has split diagonally in two, thereby splitting the panel into two segments (Figure 30). The figures include two anthropomorphs, one with a headdress with lines projecting out of it, two undulating lines, dots and other abstract or unrecognizable images. The panel faces south and measures about 1.5 meters wide by 1 meter high. Panel 4 is located about 8 meters further upslope to the northwest and is situated on two sides of a boulder. The images on the east-facing side of the boulder include a small anthropomorph, a circle, dots and



unknown images. The west-facing side of the boulder features undulating lines and a wish-bone shape.



Figure 28: Panel 1 at 42Em723 (Petroglyphs).



Figure 29: Panel 2 at 42Em723 (Petroglyphs).

Panel 5 is located about 3 meters west of Panel 4 on a sloping boulder face. The figures include dots, lines, a sheep figure and other eroded figures. The panel faces south and measures about 1.5 meters high by 1.25 meters wide. Panel 6, located along the pedestrian trail about 30 meters west of Panel 1, consists of historic names and images



(Figure 31), although it is possible some of the images could be prehistoric. Among the possible prehistoric images are a circular anthropomorph in outline, a quadruped in outline and lines. These figures are executed in the same pecking style as the modern inscriptions and are likely not prehistoric. It measures 1.5 meters wide by 1 meter high.



Figure 30: Panel 3 at 42Em723 ( [REDACTED] Petroglyphs)



Figure 31: Historic inscriptions and images at Panel 6 ( [REDACTED] Petroglyphs).

Panel 7 is located 4 meters to the northwest of Panel 6 and is visible from the trail. It features the remnants of a large circle bisected by a vertical line and a horizontal line. The west half of the image has eroded away (Figure 32). It measures about 1 meter high by 0.5 meters wide. Panel 8 is located about 20 meters to the west and slightly up slope from Panel 7. It consists of a single vertical undulating line about 15 centimeters long by 5 centimeters high. The panel faces west.



Figure 32: Panel 7 at 42Em723 (Petroglyphs).

This site also contains a possible hearth feature and surface scatter of lithic debris extending along the lower portion of the slope along the south edge of the entire site (about 70 meters). The lithic assemblage consists of debitage and flaked stone tools. A cursory examination identified 27 flakes, although it is estimated that 100 to 500 flakes are present. All stages of lithic reduction were observed, with tertiary middle-stage-reduction flakes dominating. Tool materials consisted of red/yellow banded chert, red chert, gray chert, quartzite, gray siltstone, white-to-clear chalcedony and pigeon-blood chalcedony. Four flaked stone tools were observed, including three biface fragments and one complete drill. Remnants of a possible historic water pipe were also identified (discussed in the section on impacts).

### Discussion

The data collected during the course of the intuitive surveys in September 2006, May 2007 and October 2007, when augmented by future research, will contribute to a better understanding of prehistoric adaptations along the Green River corridor by farmer and foragers and hunters and gatherers. The data presented here is extremely preliminary,



and this discussion is not intended to be a comprehensive discussion of prehistoric lifeways in the region. Rather, it is a description of findings to this point within the context of five working hypotheses that have provided the framework for all three intuitive surveys in Desolation Canyon:

- We expect that prehistoric Formative populations in the Desolation Canyon area were seasonal maize farmers who were tethered to those areas with predictable sources of permanent water. Hence, prehistoric sites will be located in those drainages with permanent water and sufficient arable lands to accommodate small-scale horticulture, including the Green River corridor and Rock Creek.
- We expect that prehistoric farming in the Desolation Canyon side drainages was limited by the paucity of arable lands. This would have mandated small and dispersed farmsteads situated in environmentally suitable niches, but the overall population would likely have been small. Population clusters will occur only in those areas with an optimal combination of permanent water and arable land.
- We expect that Formative prehistoric occupations of the Desolation Canyon area were temporary, reflecting seasonal migration of small farming groups into the area from Range Creek or Nine Mile Canyon in the spring, and out-migration after the harvest in the fall. Sites will be largely seasonal occupations with minimal expenditure of energy to construct residential architecture, and these ephemeral occupations will be represented by a paucity of artifacts and middens.
- We expect that storage strategies will reflect seasonal abandonment of the area, e.g., the location of energy-expensive storage facilities on inaccessible cliff ledges is evidence of human predation and the absence of a local population to protect stored resources. The capacity of the storage facilities should reflect adequate caloric return to accommodate resident farming populations prior to the fall harvest.
- Large scale surveys of the Flaming Gorge and Glen Canyon corridors during the 1950s and early 1960s demonstrated that major river corridors were not the focus of major prehistoric occupations. Rather, human adaptations were focused to a greater degree on side drainages. Consequently, evidence of more semi-permanent occupations should be located within major side canyons like Flat Canyon and Rock Creek, but the canyon corridor itself would reflect ephemeral occupations, mostly campsites and special use sites.

The 19 prehistoric sites documented during the October 2007 reconnaissance do not constitute an adequate sample size to allow a detailed discussion of prehistoric adaptations within the context of these working hypotheses. However, a limited discussion is possible if these sites are placed within the context of the seven areas that have been examined and the more than 50 sites now documented during the course of this project in 2006 and 2007.

**September 2006 Results.** The initial reconnaissance in 2006 focused on the mouths of Rock House Canyon, Flat Canyon and Steer Ridge Canyon (Spangler, Davis et al. 2007). Investigations in Rock House Canyon revealed no permanent water, arable land or significant pinyon-juniper resources. Indeed, a quick, non-intensive reconnaissance of the canyon to a distance of about 2 kilometers west of the confluence revealed no

evidence of residential sites, either substantial or ephemeral. Rather, a single storage site was located [REDACTED] that is well within the spatial range of individuals living along the Green River corridor. Two rock art sites were also located at the mouth of the canyon, one of them quite substantial. No artifacts of any kind were observed.

In Flat Canyon, 15 sites were identified, [REDACTED]

[REDACTED] These included seven sites with storage facilities (granaries or cists), five rock art sites, one rock art site with a nearby midden of corncobs and burned bone, a rockshelter site with an ephemeral stone wall and one cache where a basket was recovered. No evidence of permanent or semi-permanent occupations was identified in either the Flat Canyon corridor or around the mouth of the canyon in the Green River corridor. With the exception of burned bone and corncobs at one rock art site, residential detritus was not observed at any of the 15 sites.

The area around the mouth of Flat Canyon along the Green River floodplain appeared to be ideally suited for prehistoric agriculture. It features sparse greasewood, deep alluvial deposits of finely sorted river silt and a high water table, as evidenced by numerous seeps along the base of the first cliff level. Field preparation would have been minimal, soil qualities would have been good and crops would have had sufficient water regardless of the vagaries of local precipitation patterns. The Flat Canyon floodplain inside the mouth of the canyon, while broad enough to have facilitated prehistoric agriculture, features an irregular surface of boulders and stones that have debouched from small side canyons (i.e. debris flows). In many areas, the intermittent stream has eroded a deep channel that would have made it difficult to divert water onto the floodplain.

Two sites were identified [REDACTED] Steer Ridge Canyon, a relatively short, steep-walled canyon with no permanent water and insufficient floodplain to facilitate agriculture. One was a small storage site [REDACTED] and the other a petroglyph site [REDACTED]. A cursory inspection of the canyon revealed no additional sites. The likelihood of significant cultural remains was deemed to be extremely low, although local ranchers have indicated there are structural remains throughout the canyon. Two previously recorded sites in this area, an ephemeral petroglyph panel (42Cb227) and a sand dune encampment (42Cb226) were not relocated due to time constraints.

Collectively, the survey data from Rock House Canyon, Flat Canyon and Steer Ridge Canyon was interpreted as evidence of temporary, ephemeral occupations by prehistoric farmers who did not remain in the canyon corridor significant periods of time. Researchers hypothesized the abundance of storage structures, but the absence of evidence for residential activities, could be evidence of a remote farming strategy whereby farmers arrived in the spring, burned off the overlying groundcover along the Green River and planted crops in optimal locations with high water tables. The fields were then abandoned until the fall when individuals returned to harvest the maize that had survived, or a very small contingent could have been left behind to tend the crops.

The subsequent harvest was cached in a series of small granaries for retrieval as needed during the winter and spring.

This is undoubtedly a high-risk strategy that would have produced low yields due to the possibilities that fields would be erased by periodic flooding, early and late frosts due to cold air patterns along the Green River and persistent animal predation. It also reflects a low investment of energy in the maintenance of fields, but with some expectation of a return on that minimal investment. Given the absence of evidence that farmer-foragers remained in these localities to maintain the fields, and hence ensure greater production, the floodplain fields may have been viewed as contingency resources in the event of poor harvests elsewhere. If maize crops elsewhere (e.g., Range Creek, Nine Mile) thrived, the contingency fields might not be harvested at all. Hence, a return in the fall to harvest and cache these resources would have been predicated on the perceived need to draw upon emergency resources to ameliorate the effects of drought and predation elsewhere.

**May 2007 Results.** Investigations in May 2007 were focused to a large extent on the Jack Canyon tributary (Spangler, Boomgarden et al. 2007), which is strikingly similar to Flat Canyon. Both are major western tributaries of the Green River, both feature areas with floodplains flanked by steep escarpments, both feature consistent flowing water through most of the year that could have been exploited for horticultural purposes, both feature debris flows of boulders eroding from the canyon walls and tributaries, and broad Green River floodplains are located at the confluences of both canyons.

Given the environmental similarity of the two canyons, it was assumed that the same spatial distribution of sites would be found in Jack Canyon, that there would be a cluster of small storage structures and rock art sites located around the mouth of the canyon and extending inside the canyon a considerable distance. Based on previous research in Jack Canyon, several rock art sites and rockshelter occupation sites were known to be present in the middle portion of the canyon [REDACTED] suggesting the possibility that archaeological sites would be distributed through the entire canyon drainage. [REDACTED]

A day-long reconnaissance [REDACTED] – a site distribution pattern in stark contrast to those in nearby Flat Canyon. No evidence of storage structures or rock art panels was observed in the lower portion, despite an abundance of localities suitable for such activities. The failure to identify such sites may be attributed to the non-systematic nature of the survey in which crew members failed to select those areas where sites are located, or that they simply failed to recognize sites. Also unexpected was higher density of sites in the middle portion of the canyon [REDACTED] in areas that did not seem suitable for prehistoric agriculture.



Limited investigations were conducted in May 2007 at sites known to river rangers [REDACTED]. These investigations did not involve detailed examinations of all areas in these localities, but merely an attempt to document known sites (these areas will be the subject of future investigations). Collectively, the prehistoric components were consistent with ephemeral, perhaps seasonal occupations by semi-sedentary populations that constructed temporary residences at the base of cliffs within sheltered overhangs. At least seven sites had evidence of residential activities, although the paucity of middens suggested these occupations were of short duration. Substantial investment in architecture was evident at only one site that otherwise exhibited a paucity of residential detritus indicative of longer-term occupations. One suspected pithouse was identified, and this site also yielded few artifacts.

This evidence suggests that original observations made at Flat Canyon (e.g., the absence of residential sites suggested seasonal abandonment) were not applicable to Desolation Canyon as a whole. Suspected pithouses and surface structures inside protective rockshelters contained evidence of residential activities (e.g., potsherds, lithics and groundstone tools), but that middens were insubstantial, suggesting occupations were temporary or of short duration. It was also determined that prehistoric occupations were not limited to the mouths of side canyons, but could be found in the canyon corridor without nearby side drainages. In fact, relative proximity to substantial Green River floodplains appears to have been more of a determining factor in site location than the presence of side drainage (it should be noted that Green River floodplains are common at the mouths of side canyons, as well).

At least five sites were attributed to Fremont occupations based on ceramics, rock art styles and/or architectural styles, and two additional sites had both Fremont and Ute components, based on rock art styles and/or ceramics. One additional rock art site was attributed to a historic Ute occupation based on the possible depiction of a horse, a technology acquired by the Utes in the late 1700s or early 1800s (see Spangler 2002 for a more comprehensive discussion of horses among the Utes). By comparison, no temporally diagnostic ceramics or stone tools were observed during the September 2006 reconnaissance.

**October 2007 Results.** The October 2007 investigations were focused on a combination of areas at the mouths of side canyons without permanent water [REDACTED]

[REDACTED] Of the 19 prehistoric sites, six were rock art sites, four were rockshelters with cultural deposits ranging from minor artifact scatters to major occupations with architectural features; one was a surface architectural site of unknown function; one was a surface architectural site with three associated granaries; one was a suspected pithouse locality; four were storage localities with granaries or cists; one was an open dune camp; and one was an open lithic procurement site with stone tools and stone wall, possibly a hunting blind (see Table 1).

The two historic sites identified here and in the previous intuitive surveys will all be discussed in a final report in 2008 and are not discussed further in this report.

**Table 1: Summary of sites documented in October 2007**

Site No.	Site Type	Culture Affiliation	Ceramics	Lithics	Ground stone	Dateable Organics	Bone	Features	Other
42Cb76	Open Camp	Unknown	-	X	X	-	X	DE	Beads
42Cb81	Rock Art	Ute	-	-	-	-	-	PE	-
42Cb217	Rock Art	Unknown	-	-	-	-	-	PE	-
42Cb218	Rock Art	Unknown	-	-	-	-	-	PE	-
42Cb219	Rock Art	Unknown	-	-	-	-	-	PE	-
42Cb233	Complex	Fremont	-	-	-	Wood	-	AD, AP	-
42Cb234	Rock Art	Fremont	-	-	-	-	-	PE, PI	-
42Cb416	Storage	Fremont	-	-	X	Wood, cordage	X	AD, AE	-
42Cb417	Storage	Fremont	-	X	X	Wood	-	AD	-
42Cb2663	Storage	Unknown	-	-	-	-	-	AE	-
42Cb2664	Storage	Fremont	-	X	-	-	-	AD, BG	-
42Cb2665	Open Architectural	Fremont	-	X	-	-	-	AP, RA	-
42Cb2666	Historic Cache	Euroamerican	-	-	-	Charcoal	X	HE	-
42Cb2667	Historic Road	Euroamerican	-	-	-	-	-	RA	-
42Cb2668	Rockshelter	Unknown	-	-	-	Charcoal	X	-	-
42Cb2669	Rockshelter	Unknown	-	-	X	Charcoal	X	BG	-
42Cb2670	Rockshelter	Unknown	-	-	-	Charcoal	X	-	-
42Cb2671	Rockshelter	Fremont	Grayware	X	X	Corncob	X	BG, PE	-
42Cb2672	Open Residential	Fremont	-	X	X	-	-	AF, RA	-
42Em723	Rock Art	Fremont	-	X	-	Ash	-	HE, PE	-
42Em3877	Lithic Scatter	Unknown	-	X	-	-	-	BG	-

Note: Abbreviations follow IMACS Codes. AP is single-room structure, AQ is multi-room structure, RM is rubble mound, PE is petroglyph, BG is wall, AF is pithouse, AD is granary.

The results of the October reconnaissance provide additional evidence, first noted in May 2007, that residential sites of varying complexity will be located in the canyon corridor. An oval structure with coursed masonry walls at 42Cb233 [REDACTED] is consistent in size and shape with surface residential sites elsewhere in the region. Although nearby 42Cb2665 is comparatively small, it also is an open structure of coursed masonry on a bedrock outcrop that may have served a similar function. Also, evidence of a more formal semi-subterranean pithouse was documented at 42Cb2672 [REDACTED]. At all three localities, residential detritus was rare or nonexistent, suggesting temporary occupations despite the investment in architectural construction. In the case [REDACTED], site locations were chosen at the base of the first cliff level on slightly elevated bedrock outcrops with commanding views of the floodplains. The [REDACTED] site was situated on an alluvial fan at the mouth of a short, unnamed side canyon.

There also appears to have been considerable use of rockshelters of all sizes for a variety of human activities. Two rockshelters yielded evidence of temporary camps with only charcoal and burned bone; a third had evidence of bone, groundstone tools and a crude stone wall; and a fourth had evidence of two D-shaped structures, lithic debitage, grayware ceramics, a corncob and groundstone indicative of longer-term occupations. Additionally, shelters were utilized for granaries [REDACTED] and storage cists [REDACTED].

[REDACTED] were located on ledges within protective overhangs but these were not rockshelters as traditionally defined.

The rock art sites are problematic given that most of the images are not clearly diagnostic of a particular culture or period of time. Most appear to be consistent with the Northern San Rafael Style of Fremont rock art (Schaafsma 1971) in that the panels feature busy arrangements of indistinctive animals and human figures, but without precise lines and human trapezoids characteristic of Fremont trapezoids elsewhere. Only two sites [REDACTED] had rock art elements whereby crews could assign Fremont affinity with any confidence. One site (42Cb81 [REDACTED]) depicts what appears to be a horse and rider, suggesting some images may be attributed to early historic Ute hunters and gatherers.

Two sites featured site types that had not been previously observed during the 2006-2007 field seasons. Site 42Cb76 is an expansive dune field with considerable groundstone, lithics and stone beads. This open camp area may have been situated to exploit patches of rice grass growing on the dunes. Similar dune fields become increasingly common in the lower part of Desolation/Gray Canyon, and it is expected that evidence of human exploitation of these features will be ubiquitous and will provide important insights into prehistoric hunting and gathering strategies in the canyon corridor. Site 42Em3877 on a ridge overlooking the [REDACTED] appears to be an area where quartzite river cobbles were tested for suitability for stone tools. Most of the artifacts were fractured cobbles and primary flakes. However, the presence of two finished stone tools and a stone wall against a boulder, perhaps a hunting blind, suggest cobble testing may have been incidental to hunting activities.

**Summary.** A total of 66 sites have been documented through the end of the 2007 field season, reflecting an entire suite of human activities in a variety of topographic settings. [REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

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[illegible]

## Data Analysis

More than 200 artifacts were identified during the October 2007 investigations. Artifact assemblages consisted of four primary classes: lithics, ceramics, bone and organic material. These classes were further subdivided into broad, general categories such as debitage, biface, projectile point, groundstone, etc. to separate the artifacts into general groups based on material type, morphological attributes and implied function, as well as to allow for a more accurate description of each artifact. The collection of artifacts was not part of the research plan for the work reported here, except for the purpose of radiometric or dendrochronological dating. Therefore, the analysis of artifacts was conducted *in situ*.

### Lithic Artifacts

All artifacts derived from stone sources were categorized under the lithic class of artifacts. This class was further subdivided to include flaked stone tools, debitage, groundstone and stone beads.

**Flaked Stone Tools.** Flaked stone tools can be defined as stones from which flakes have been removed as a result of human intent or use (Whittaker 1994; Crabtree 1972; Odell 2003). This category includes both formal and expedient tools such as unifaces, bifaces, projectile points, and drills and is distinguished from groundstone artifacts. A total of 11 flaked stone tools were observed during the October 2007 investigations. The analysis of all flaked stone tools focused on the basic features of the tools themselves, which were examined *in situ* for signs of edge wear (either use wear or edge grinding) and were sorted by tool type.

*Unifaces* are flakes that have been shaped by the intentional removal of flakes from only one side or surface, and along one or more margins of a tool, by percussion (Whittaker 1994; Odell 2003; Crabtree 1972). Scrapers are an example of such a tool, which exhibit a steep working edge (>45 degrees). One such artifact was observed at 42Em3877, which can be described as consisting of an elongate form with one edge showing retouching and/or use.

*Bifaces* are tools that have been shaped by the intentional removal of flakes from opposing sides by percussion (Whittaker 1994; Crabtree 1972; Odell 2003). They lack hafting elements (notches or stems) that would identify them as projectile points, and have therefore been placed in their own category. The classification system used in the analysis of the October 2007 portion of the Desolation Canyon project assemblages combines the biface manufacturing stages defined by Wenker (2000) and Whittaker (1994). The stages of biface manufacture are:

*Stage 1 Bifaces.* Bifaces fitting into this category exhibit only minimal modification and may be indistinguishable from bifacial cores. These bifaces represent the initial stages of raw material procurement and/or testing.

*Stage 2 Bifaces.* This category also includes those items in the initial stages of thinning, with controlled flaking, around part or all of the tools edge. The flaking is irregular and flake scars usually do not cross the midline of the tool.

*Stage 3 Bifaces.* These items represent the stages of thinning the item's cross-section without diminishing the outline shape of the tool.

*Stage 4 Bifaces.* These items are still being thinned, but initial shaping is coming into play, and the item's final shape is started.

*Stage 5 Bifaces.* These bifaces are completely thinned, and final shaping is being performed, or is complete. Pressure flaking may also be applied. These can be classified as highly symmetrical. These bifaces exhibit well-controlled flaking and the edges are straight and regular.

Nine bifaces or biface fragments were documented, including one complete drill/perforator. Six of the bifaces match the description for Stage 5 Bifaces (3 from 42Cb76, 2 from 42Em723 and one from 42Cb2671); one for the Stage 4 Bifaces (42Em723), one Stage 2 Biface (42Em3877), and one can be classified as a drill (42Em723). Drills are bifacial tools with narrow shafts rather than broad blades. They were used in a rotary motion in order to perforate rigid items. Drill bits are usually diamond-shaped across their short axis. The specimen from the [REDACTED] is made from a purple-colored quartzite, with a diamond-shaped point and micro-flaking along the lateral edges (Figure 33).



**Figure 33. Quartzite drill/perforator found at 42Em723.**

*Projectile points* are bifacial tools that exhibit formal hafting elements at their bases, with implied use with bow and arrow or *Atl-Atl* hunting implements. The



projectile points encountered during October 2007 were photographed and placed into the commonly accepted categories for Great Basin projectile points outlined by Thomas (1981), with some additional descriptions following Holmer (1986).

A total of three clearly identifiable projectile points were observed which can be placed into the Rosegate Series type, which is common to the Fremont archaeological complex. This point class lumps together the previously defined Rose Spring and Eastgate point types (Thomas 1981). These points are characterized as small, corner-notched points with expanding (although sometimes negligibly) stems. The temporal range for this class is from roughly A.D. 700 to A.D. 1300, but since these points are commonly associated with bow and arrow hunting technology, they most likely emerged earlier (see Holmer 1986). Points fitting these descriptions were identified in the vicinity [REDACTED] at a site not recorded due to time constraints (Figure 34).



Figure 34: Two Rosegate Series points [REDACTED].

**Debitage.** An inventory of the morphological characteristics of flaked stone debitage was performed. More than 70 pieces of debitage were observed on the surface, comprised of various colors of quartzite, meta-quartzite, silt-stone, chert and obsidian. All debitage was examined macroscopically on-site for signs of use, edge grinding, or any other evidence of unnatural wear.

The analysis of lithic debitage focused on the basic features of the flakes themselves. The first step in the analysis process was to determine a flaking stage: primary, secondary, or tertiary. This was determined by the amount of cortex present on the dorsal surface of the artifact. A primary flake retains roughly 95% cortex on the dorsal surface, a secondary flake 1-94%, a tertiary flake has no cortex at all.

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

*Early-stage* flakes are those that can be classified as having been produced during the initial stages of core reduction, by hard-hammer percussion techniques. These flakes typically include broad, simple platforms with little or no platform preparation, a thick transverse cross-section, a low frequency of dorsal flake scars, and quite often have cortex remaining on the dorsal surface.

A *middle-stage* flake can be characterized as having a prepared platform, often multi-faceted, which represents a small segment of a prepared and often dulled (by grinding) bifacial tool edge. Also known as biface-thinning or biface-reduction flakes, these flakes may also exhibit some combination of the following attributes: 1) a thin, transverse cross-section, 2) an expanding, “teardrop” shape with feathered terminations, 3) multiple flake scars originating from varied directions, 4) a lipped platform, and 5) little or no cortex on the dorsal surface.

*Late-stage* flakes (i.e. - pressure flakes) are usually very small, narrow, and elongated flakes with multiple dorsal flake scars. They exhibit platforms prepared by grinding, are multi-faceted, and contain no cortex on the dorsal surface.

For those pieces that are either incomplete or do not exhibit the characteristics needed to identify which stage of reduction produced them, the category of “*Fragment*” is often used (and was in our situation).

A *utilized flake* can be defined as a flake that has not been modified after its removal from a core, but shows signs of obvious use-wear such as micro-flaking or edge rounding.

Using these criteria, all surface debitage (n=72) was analyzed on-site and *in situ*. The reduction stages of surface debitage are summarized in Table 2.

**Table 2. Analysis of lithic debitage flaking stages from the surface assemblage.**

	Early	Middle	Late	Fragment	Total	%
Primary (>95%)						
Secondary (1-94%)	2	1			3	4
Tertiary (0%)		52	7	10	69	96
Total	2	53	7	10	72	
%	3	73	10	14		100

Percentages were rounded to the nearest one-tenth of a percent.

In addition, more than 100 primary and secondary early-reduction-stage flakes and numerous tested river cobbles were discovered at 42Em3877. Due to time constraints, a comprehensive inventory was not obtained.

**Groundstone.** The groundstone items encountered consisted of complete and fragmented manos, metates and other stone items that have been ground, battered, pecked, abraded or otherwise smoothed and shaped by human use. The tool-stone material consists entirely of sandstone and fine-grained quartzite. The most common surface alterations consisted of grinding and pecking.

A total of 16 pieces of groundstone (whole or fragmentary) were identified, described, and analyzed in a manner similar to Adams (2002). Eight complete manos, two mano fragments, three metate fragments, and three complete metates (both slab-type and trough) were documented, photographed, and mapped with the GPS. Groundstone artifacts are summarized in Table 3.

**Table 3: Groundstone Tools**

Site No.	Tool Description	Tool Dimensions	Material	Surface
42Cb76	1-hand mano	13 x 8 x 6 cm	Sandstone	Ground
42Cb76	1-hand mano	10 x 8.5 x 5 cm	Sandstone	Ground and pecked
42Cb76	1-hand mano	16.5 x 6.5 x 4 cm	Sandstone	Shaped and ground
42Cb76	1-hand mano	14 x 6 x 4.5 mm	Sandstone	Shaped and ground
42Cb76	Mano fragment	7 x 6 x 4.5 cm	Sandstone	Ground and pecked
42Cb76	Slab metate	50 x 40 x 9 cm	Sandstone	Shaped and ground
42Cb76	Trough metate frag.	15 x 10 x 2.2 cm	Sandstone	Ground, pecked, shaped
42Cb76	Trough metate frag.	14 x 12 x 4 cm	Sandstone	Ground, pecked, shaped
42Cb417	Trough metate frag.	25 x 28 x 10 cm	Sandstone	Pecked and shaped
42Cb2672	1-hand mano	13.5 x 8 x 5 cm	Sandstone	Ground and pecked
42Cb2672	Trough metate	44.5 x 31 x 9.5 cm	Sandstone	Ground, pecked, shaped

Note: Groundstone tools were left *in situ*.

**Stone Beads.** Eleven stone beads were discovered at site 42Cb76 during this project. Nine complete, and two fragmented specimens of laminated grey shale (or siltstone), squarish to round in outline and flat in cross-section, and were apparently biconically drilled in the center. Both the top and bottom surfaces (in section view) have been ground and shaped. The diameters of the beads are roughly 1 centimeter, 1 to 2 millimeters in thickness, with a hole diameter of 2.5 mm. An image of 10 of these items can be found on Page 25.

## Ceramics

Twelve ceramic artifacts were identified at site 42Cb2671, all consisting of grayware body and rim sherds representing Emery and Uinta Grayware varieties (Madsen, 1977).



## Cordage

One piece of cordage was identified at 42Cb416. This artifact was a piece of two-ply, S-twist cordage made from juniper bark. It was roughly 7 centimeters in length with a flattened end. This item was collected from the fill of the cist in Feature 1 for radiometric analysis.

## Dating

Two methods were utilized to obtain dates for two sites examined during the October 2007 project: dendrochronology and radiocarbon analysis. The two sites dated were 42Cb416, in which dendrochronology and radiocarbon analysis were employed, and 42Cb2671 which relied on radiocarbon methods for obtaining a date. Following is a discussion of the dating procedures and results.

**Radiometric Dates.** Two samples of organic material were sent for radiometric analysis to Beta Analytic, Inc. of Miami, Florida (see Table 4). The first sample (Beta-237355) was obtained from the Feature 1 cist at site 42Cb416. This sample consisted of a piece of willow that was used in the interior wall construction of the feature. The second sample (Beta- 237356) was a corncob obtained from site 42Cb2671.

**Table 4**

<b>Sample Number</b>	<b>C14 Age</b>	<b>Calibrated Age</b>	<b>Sample</b>
Beta- 237355	340 ± 40 BP	AD 1450 to 1650	Wood
Beta- 237356	950 ± 40 BP	AD 1010 to 1170	Corn Cob

**Dendrochronology.** Dendrochronology can best be defined as the scientific study of the variation in the annual growth rings of trees (Stokes and Smiley 1968; Nash 1999; Towner 2002). It has been used for nearly a century in the American Southwest to: 1) reconstruct trends in past climate (LaMarche 1978; Fritts 1976); 2) to calibrate radiocarbon curves (Seuss 1970; Stuiver 1978); 3) to date prehistoric and historic structures (see Nash 1999); and 4) to explore human behavioral issues such as settlement patterns, the movement of populations, and human adaptations to arid environments (Dean 1978b; Nash 1999; Towner 2002). Through the analytical method known as cross-dating, it provides a researcher with the ability to assign absolute calendar years to the individual growth layers (rings) of trees. Unlike other dating methods, tree-rings provide a level of resolution that is accurate at the annual, often seasonal level (Stokes and Smiley 1968; Towner 2002).

The primary purpose of this investigation was to utilize dendrochronological methods to provide absolute calendar ages for three wooden elements used in the construction of a prehistoric storage facility (42Cb416) located in a small alcove above the [REDACTED]. Secondary objectives included assessing whether or not the

samples collected would cross-date with previously developed, local chronologies from Nine-Mile and Range Creek Canyons; and whether or not (based on the cross-dating results) a more intensive climatic and chronological reconstruction for this portion of the Green River is possible.

*Research Methods.* The basic, underlying premise of any tree-ring study is that a tree's growth can be monitored, analyzed, and explained by examining the markers of growth: the individual annual growth band, or ring. The primary prerequisites for whether or not a particular species can be useful to dendrochronology is that each ring represents wood formed during a single year and that only one ring is formed in any given year (Stokes and Smiley 1968; LaMarche and Harlan 1973; Fritts 1976). The annual growth rings of many species in the temperate zone are readily distinguishable, and therefore useful to dendrochronologists, because of differences in the structure of the cells formed during the early and late parts of the growing season (Stokes and Smiley 1968; Fritts 1976). Wood cells produced in the early part of the growth cycle (late spring) are generally large and thin walled, while those formed toward the end of the growing season (late summer) are smaller and thick walled. The contrast in cell size from one year to the next is visible as a sharp, clearly demarcated line.

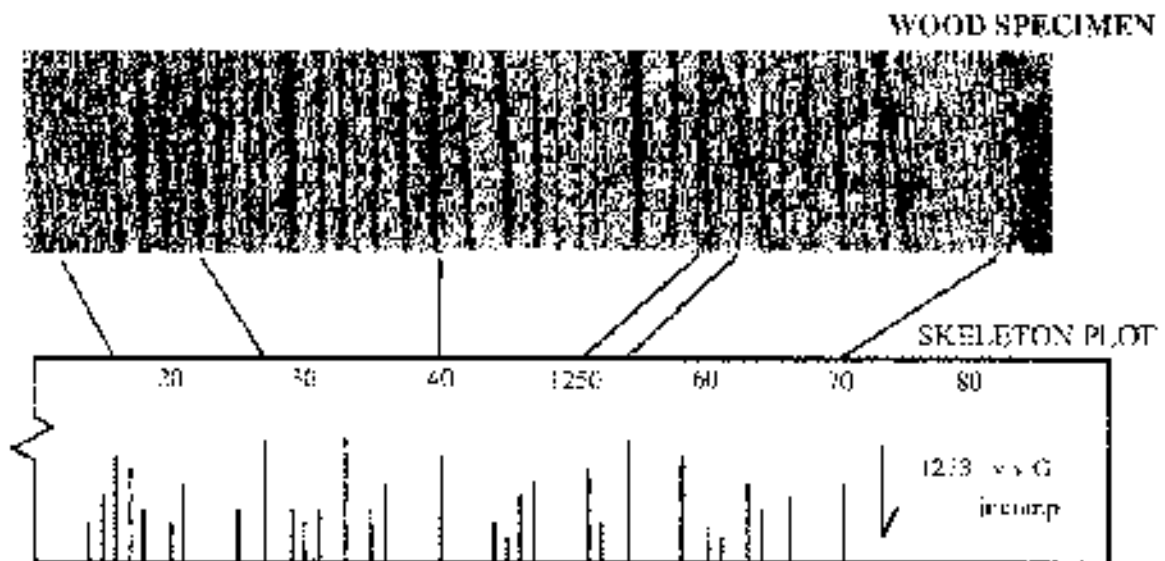
Tree-ring dating provides a higher level of resolution than any other dating method available to researchers. Obtaining dates, however, involves more than merely "counting" rings from the bark toward the center of a tree. Like all other organisms, trees adapt to their physical surroundings and have evolved specific biological processes that allow them to deal with certain environmental stresses by limiting growth. Under adverse conditions (such as reduced precipitation or temperature during the growing season) a tree's growth will be limited to certain areas on the tree. This means that a ring will not be visible over a large portion of the tree for any year under which such conditions exist, causing what is known as locally absent or "missing" rings in the sequence. In arid and semi-arid environments, such as the American Southwest, this can cause major discrepancies between ring "counts" and the actual age of a given specimen. A methodological approach that allows us to account for locally absent rings, involves a process of pattern-matching that provides an analyst with the proper tools to assign precise calendar years to each individual growth-ring (Douglas 1946; Stokes and Smiley 1968; Dean 1978a; Towner 2002). Following is a brief discussion of this process.

In mid- to upper latitudes, or where there is seasonality in precipitation and/or temperature, there are differences in the widths of the annual growth rings of trees (LaMarche 1978; Fritts 1976; Stokes and Smiley 1968). Because the same set of environmental factors influence the growth of all trees throughout a region, patterns of ring characteristics are often common from tree to tree within that region (Stokes and Smiley 1968). Scientists can use these patterns of variation to establish patterns of annual variability among local or regional tree populations (Douglas 1941). These variability patterns can then be matched between trees in a process called cross-dating, which is used to assign exact calendar years to each individual growth ring. Measured and dated rings from a number of trees within a region are combined to form a chronology (Stokes and Smiley 1968). The chronology can be used to reconstruct past

climatic variation and as a tool for dating specific structures and events (among a number of other things).

In the American Southwest, an analytic method known as the Douglas Method of skeleton plotting (Stokes and Smiley 1968) has been used successfully for nearly a century to visually represent variability patterns in the growth rings of trees (Nash 1999; Towner 2002). Skeleton plotting is a visual analog technique that reduces data to a form that is more amenable to both analysis and comparison with other specimens. The process involves reducing the ring patterns from the samples themselves to a proxy representation that is plotted on 1-millimeter graph paper. Each line on the graph paper represents an individual growth ring. Instead of measuring the precise width or density of each individual growth-ring on a sample (as is done in other cross dating methods), a vertical line drawn on the graph paper represents a proxy measure of only the small rings on the sample (Figure 35).

While the analyst is investigating the relative thickness of each individual ring, the focus is on the narrow rings, as they serve as “markers” of changes in climatic or other environmental conditions. When a ring is smaller relative to those surrounding it, a line is drawn on the graph paper. The size of the line is directly related to the relative size difference between one growth band and those surrounding it: the longer the line, the smaller the ring. “Average” and large rings, which are indicative of good growth years, are not represented. In this way, the pattern of small rings on a sample is visually represented. By precisely matching the patterns of small rings between samples (cross-dating), each ring can be assigned to a specific calendar year (Stokes and Smiley 1968; Towner 2002).



(From Dean 1978a)

Figure 35. Diagram showing the principles of the skeleton plot method.



The focus on the small rings (and lack of representation of the large and “average” rings) is due to the fact that when there are large-scale environmental impacts on flora, such as drought or cooling trends, they are typically on a much larger scale than merely local climatic shifts, and they will be represented in virtually all species within a given area or region (Stokes and Smiley 1968; Towner 2002). The variability between the large and average rings can be created by other factors such as differences in elevation, temperature, tree-to-tree competition for water and nutrients from the soil, etc. All of these factors combine to create “limiting factors” of tree growth, which can vary at the regional, local, and even stand level. What an analyst needs to do is to limit these “limiting factors” to one factor, which will allow the researcher to obtain data on a much broader scale.

By using the small “marker rings” an analyst can compare one sample to another, and then to other living trees to establish a basic pattern of variability, or chronology. By adding additional patterns from other living trees we can combine data from archaeological samples, deadwood, standing snags, and live trees into a master chronology by overlapping established patterns and pushing the chronology further back in time (Stokes and Smiley 1968; Towner 2002). Once a master chronology has been established we can use the master to assign specific dates to wood retrieved from both prehistoric and historic sites. The better the master living-tree chronology (i.e. most ecological amplitude), the more precise the dating of archaeological samples will be.

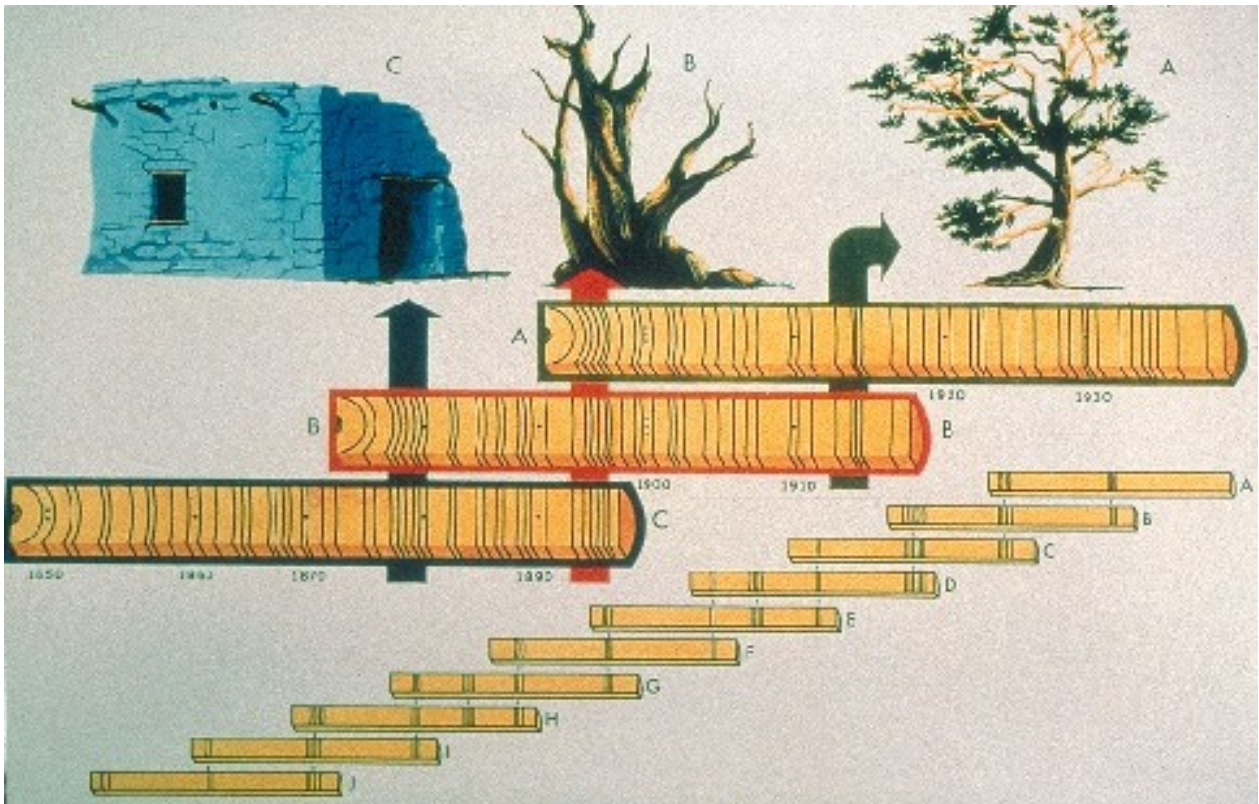


Figure 36. The chronology building process (image courtesy of the LTRR).

*Previous Research.* To date, no intensive dendrochronological investigations have been undertaken within the Desolation/Gray Canyon corridor. Various researchers from the Laboratory of Tree-Ring Research (LTRR) at the University of Arizona (Tucson), as well as researchers with the United States Geological Survey (USGS) and the National Oceanographic and Atmospheric Administration (NOAA) have visited nearby locations as part of collecting expeditions to obtain dendrochronological samples for the purposes of stream-flow and climatic reconstructions. While not exclusive, the list includes: Edmund Schulman in 1950, Marvin Stokes and Tom Harlan in 1964, Charles Stockton and Gordon Jacoby in 1972, Connie Woodhouse in 2000, Stephen Grey and Julio Betancourt in 2002, and Chris Baisan and Troy Knight in 2007. More than 400 samples have been collected, processed, cross-dated, measured, and standardized to develop a local tree-ring chronology for the Nine Mile Canyon and Range Creek areas. Local chronologies useful for studies within the Desolation/Grays Canyon corridor have been created for the Hill Canyon, Nine Mile Canyon and Range Creek Canyon areas. Combined, these chronologies span the period from approximately B.C. 322 to A.D. 2007. Published chronologies for Nine-Mile are available online from the International Tree-Ring Data Bank (ITRDB). The unpublished chronologies for Nine Mile and Range Creek are in the possession of Andrew T. Yentsch.

*Scope of Work.* This project involved the extraction of ½-inch core samples from a surface granary (42Cb416) to date the archaeological structure, and to make initial assessments as to the viability of conducting further dendrochronological studies in this area. Site 42Cb416 consists of two storage facilities located within separate rockshelters [REDACTED] A detailed description of the site has been provided earlier in this report (pp. 20-22). Feature 2 is a stone, pole and mud/adobe granary that is located in a small rockshelter approximately four meters above and west of Feature 1. The lateral walls are fairly intact, the remainder having collapsed at some unknown point in the past. Figure 37 shows Feature 2 as it appeared upon discovery.

The interior of the structure measures 1 meter east-west by 1.2 meters north-south. The exterior dimensions are 1.3 meters east-west by 1.2 meters north-south. The eastern wall rises 57 centimeters from the floor of the shelter, almost to the ceiling. The west wall has a maximum height of 55 centimeters. There are six loose logs leaning against the lateral walls within the structure, two loose logs outside of the structure, and one pole remaining in its adobe matrix at the back of the structure. The logs range from 40 to 90 centimeters in length and up to 4 centimeters in diameter. The pole embedded in the adobe matrix at the rear of the structure measures 1.2 meters in length with a diameter of up to 7 centimeters. This is the only log clearly identifiable to species (*Juniperus spp.*). The other logs are somewhat weathered, but based on remnant bark it is assumed that they are also juniper branches.

While the wooden elements are currently visible as loose logs leaning against the walls of the structure, it is likely that they were once incorporated as structural support elements for the roof of the feature. These pieces show no clearly identifiable modification such as axe-cut ends, debarking, or limb-trim. It is likely that they were either branches broken directly from a tree, or that they were remnant branches picked up

from the ground. The presence of bark on two of the samples, and the presence of patina on the third indicate that these elements were procured either while the branches were attached to a living tree, or very shortly after the tree had died.



**Figure 37: Feature 2 at 42Cb416. Samples were obtained from three loose logs.**

The sampling of these elements involved recording the exact location of each specimen with the use of a sketch map of the structure. Contextual information regarding possible function, as well as the appropriate attributes (orientation, evidence of modification, and the presence of bark, patina, or beetle galleries) of each specimen were recorded, following Grissino-Mayer (2006). A digital photograph of each specimen was also taken to visually document each sample. The archaeological samples were collected using a specially adapted, 1/2-inch diameter hole saw, powered by a cordless drill. The samples were numbered sequentially according to the order in which they were obtained, utilizing the nomenclature “DRC” to signify that the samples came from [REDACTED]

[REDACTED] The holes left by the sampling process were filled with 1/2 –inch cork that was labeled with the sample number, date and the initials of the collector. Clear plastic tubes with plastic stoppers were used to transport these samples back to the lab. A total of three samples were collected from three individual logs.



*Laboratory Sample Preparation.* Each sample was surfaced with a Makita 3" x 18" Belt Sander, which is a standard method for surfacing increment cores. The standard surfacing techniques were followed, as outlined by Grissino-Mayer (2006), in which each step uses a finer grit sand-paper: 120 grit for the first pass, 240 for the second pass, 320 for the third, and 400 by hand.

*Laboratory Analysis.* The core samples were analyzed by Andrew T. Yentsch on October 26, 27 and 29, 2007. They were examined under the magnification of a 3.5-90X Trinocular Boom Microscope to ensure clear identification of each individual ring. A skeleton plot was created for each sample, creating a proxy measure of the ring attributes for each individual specimen. Each plot was then compared to the others to determine whether or not the trees exhibited similar ring-width variability patterns, as well as to determine whether or not cross-dating was a possibility.

Dating was accomplished by utilizing the skeleton plot method of graphical cross-dating. In this process, the innermost visibly complete ring is assigned the relative year "1", after which every subsequent 10<sup>th</sup> ring is marked with a pencil. Skeleton plots were created for each sample to relatively cross-date the rings of each sequence against all others. Each series was first compared (dated) with the others to see whether or not the same signatures were present [internal cross-dating (Grissino-Mayer 2007)]. This method assigns a relative placement of each tree-ring to the exact calendar year in which that particular ring was formed (Stokes and Smiley 1968; Towner 2002). An undated (floating) chronology was then developed from the internally dated series. Finally, the floating chronology was cross-dated against a master reference tree-ring chronology for the region [external cross-dating (Grissino-Mayer 2007)]. The master chronology for Nine Mile Canyon (Utah) produced by the Laboratory of Tree-Ring Research was provided by Troy Knight of the LTRR and was used to facilitate this process. The master chronology from Range Creek Canyon created by and in the possession of Andrew T. Yentsch was also used.

*Preliminary Conclusions.* This was an initial evaluation of the cross-dating potential of three wooden structural elements from archaeological site 42Cb416 from the

Unfortunately, we have been unsuccessful in our attempts to cross-date these specimens at the time of this report. This is not an unusual occurrence. Due to biological responses to environmental and climatic pressures, it is common for juniper to produce erratic growth patterns that may not at first be datable. While the branches of trees capture the same information as the main body of the tree, they have a tendency to be more erratic in growth, exhibit a low ability to be cross-dated, and can be unreliable for chronological or climatic purposes (Glock 1936). We will try to obtain a species specific chronology (our current chronologies are created from Douglas fir and pinyon) and re-investigate these samples in the future.

## Site Condition Assessments

All 21 sites documented in October 2007 were examined for evidence of adverse impacts from various human activities, including vandalism and graffiti, pedestrian trails, roads and vehicle tracks, camping on or near cultural deposits, industrial and agricultural development, livestock impacts, and recreational activities that have degraded the integrity of the sites, such as surface collection of artifacts, stacking artifacts into piles, reconstructing walls and littering. The sites were also examined within the context of the visibility from an existing river camp and/or pedestrian trail, their accessibility to vehicles and pedestrians, and their potential to be impacted in the future.

Generally, sites were all in good to excellent condition despite a prevalence of graffiti at some rock art sites, an attempt to remove one rock art image with a rock saw and suspected vandalism of granaries and storage cists. The degradation of sites appears to be directly associated with either (1) proximity to an established river camp, (2) proximity to a camp used by cowboys, or (3) proximity to the [REDACTED]. Sites in close proximity to a major pedestrian trail exhibited a greater frequency of vandalism and graffiti, whereas sites high above trails exhibited minimal evidence of malicious activities, albeit 42Cb416 is an exception. Sites located in areas without established river camps and without pedestrian trails remain largely in pristine condition.

### 42Cb76

This site is located in close proximity to an established river camp [REDACTED] and a pedestrian trail leads to within 10 meters of the base of the site. The nearby pedestrian trail apparently connects to an established pack trail along the Green River. The dune where the site is located is visible from the river and from the two river camps within 150 meters of the site location. Despite the frequency of river visitation, this site remains in excellent condition. A few pieces of litter were observed along the river bank, and cows and horses have repeatedly grazed on the site as evidenced by copious amounts of dung. There is no evidence of vehicle or industrial impacts, and no obvious evidence of subsurface disturbance due to looting. The constant shifting of the dunes has likely obscured evidence of subsurface impacts, although vegetation growth has stabilized the dunes somewhat. The two river camps appear to be seldom used, which likely ameliorates the potential this site could be damaged by river visitors.

**Recommendations.** Given the potential for significant subsurface deposits (as well as the presence of artifacts subject to surface collection), aggressive monitoring of this site and site location should be implemented. Camping should be restricted to existing camp spots away from the actual site location, and BLM rangers should deter additional camping in the dunes beyond the current camp locations. A more comprehensive investigation of the dune fields above and below [REDACTED] should be implemented to determine the spatial extent of the site and the nature of artifacts that could be subjected to surface collection. In the event that the entire dune area is determined to have cultural deposits, the BLM may want to consider prohibiting camping at this locality. The absence of evidence of looting suggests recreational impacts

are not currently a problem, and a camping ban here is not recommended at this time. This site remains extremely vulnerable to impacts in the absence of aggressive management strategies.

#### **42Cb81**

This site is located only about 10 meters vertical distance above and about 240 meters horizontal distance from the Green River, with a slope of about 15 degrees. The rock art is not visible from the river, but the site location is visible. There are no pedestrian trails leading from the river's edge through the thick greasewood vegetation to the site location, and there is little evidence of recent or consistent public visitation. There is a small ephemeral trail at the base of the cliff where the cheat grass has been pushed down, but this may be a game trail. There is no river camp in this area, and there is no easy landing point for river rafts. Despite the absence of evidence for significant visitation, this site has been significantly impacted by individuals who have left names, dates and other inscriptions (Figure 38). These include one date assumed to be 1966 and another 1969. One 90s date could be the 1890s or 1990s. One circle figure on Panel 3 appears to have been modified into a crude stick figure with arms and legs.



**Figure 38: Representative example of graffiti (“Nedra”) at 42Cb81.**

Graffiti is located on all three panels, suggesting repeated episodes of vandalism over a long period of time. Additional inscriptions are located to the north of the aboriginal panels along 20 to 40 meters of cliff face (Figure 39). The origin of this vandalism remains speculative, but given the concentration of inscriptions here and the absence of similar inscriptions at nearby rock art sites it is possible this site location was a popular camp for cowboys. The inscription "C 93" may be a survey marker of some kind. There is no evidence of trash, agricultural or livestock impacts, or adverse effects from vehicles or industrial development.



**Recommendations.** The prevalence and possible persistence of graffiti at this site is a significant problem that warrants aggressive management in light of the probability that existing graffiti creates an impression among some visitors that it is acceptable to add their own names. This potential could be ameliorated through the dissemination of advisories to all river visitors not to add their names, initials and dates to those already present at various sites throughout the canyon, and to report such destructive activities to the BLM. The graffiti is located across all south and east cliff faces, seriously impacting the integrity of the overall site. Consequently, this site has potential to educate visitors about the deleterious effects of graffiti to rock art sites. However, given the significance and integrity of other nearby sites that could be impacted by increased visitation, the location of sites in the [REDACTED] area should not be disclosed to the public. Consistent monitoring of this and other nearby sites for future adverse effects is recommended. It is also recommended that site monitors avoid creating pedestrian trails that would facilitate increased visitation.



**Figure 39: Graffiti continues 20 to 40 meters to the north of the panels at 42Cb81.**

#### **42Cb217**

This site is not readily visible from the Green River, although site location is visible. The dense tamarisk stands along the river access point undoubtedly inhibit public visitation to this site, despite the relatively flat access once through the tamarisk. The site is about 120 meters from the river. This site remains in excellent condition with no evidence that it receives significant visitation. There are no pedestrian trails to the site, and no footprints were observed. There are no river camps in the vicinity, which probably contributes to the sparse visitation. There is no evidence of litter, no impacts from livestock or agriculture, and no adverse effects from vehicles or industrial development.

**Recommendations.** Given the small and ephemeral nature of this site, there remains a low potential that it will receive significant visitation in the future, particularly in light of the absence of river camps in the area. Periodic monitoring of this site for future adverse effects is certainly warranted. Disclosure of the site location is strongly discouraged due to the proximity of 42Cb2664 with its architectural features and potential cultural deposits that would be vulnerable to public visitation. Visitation to 42Cb217 could result in the inadvertent discovery of and damage to deposits at 42Cb2664.

#### **42Cb218**

This site is located about 240 meters horizontal distance from and 15 meters vertical distance above the closest river access point, with a roughly 10-degree slope to the site. Access from the river is relatively easy. Neither the site nor site location are visible from the river access point, and there is no evidence this site receives significant public visitation. There are no pedestrian trails leading from the river's edge to the site, nor are there footprints on or around the site. There are no river camps in the vicinity that would precipitate extended visitation to this or other sites in the same area. Likewise, there is no evidence of any modern/historic inscriptions, no remnants of litter, no evidence of agricultural or livestock impacts and no adverse effects from vehicles or industrial development. The site is in essentially the same condition as described in 1975, although suffering from natural erosion.

**Recommendations.** It appears that the area immediately west [REDACTED] was the focus of rather intense occupations by Fremont farmer-foragers and perhaps later groups. These adaptations, represented by semi-sedentary residential structures, storage structures and rock art sites, remain poorly understood in the Desolation Canyon area. Given the significance and integrity of architectural and rock art sites in this area that could be impacted by increased visitation, all site locations in the [REDACTED] area should not be disclosed to the public. Consistent monitoring of this and other nearby sites for future adverse effects is recommended. It is also recommended that site monitors avoid creating pedestrian trails to these sites that would facilitate increased visitation.

#### **42Cb219**

This site is located about 240 meters from a popular river camp [REDACTED] and major pedestrian trails lead from the camp to the mouth of the canyon. The site is visible from one major trail at the base of the talus slope leading to the site. The site is about 6 meters vertical distance above and 5 meters horizontal distance from the trail. The site has suffered significant impacts at some point in the past. Indistinct scratches suspected to be modern were observed, as well as the scratched names "Dylan" and "Jenny" to the upper left of the panel. One sheep figure has evidence of an attempt to remove the figure. Some sort of rock saw was utilized to cut grooves on each side of the figure and just above the figure. Below is evidence of chisel marks, suggesting an attempt to dislodge the figure (Figure 40). The patinated cliff surface below the figure has been removed, suggesting the possibility of additional figures here that were removed. The

vandalism occurred sometime before 2002. No mention was made in the 1975 notes as to the presence of vandalism. It cannot be stated with confidence that the vandalism was the result of river visitors camped [REDACTED], or whether it occurred decades ago during livestock operations in the area.



**Figure 40:** Evidence of an attempt to remove image with a chisel and rock saw at 42Cb219.

**Recommendations.** This site remains particularly vulnerable to future episodes of vandalism in light of the attempt to remove the figure with a metal blade. This removal could be completed with minimal additional effort. The prevalence and possible persistence of graffiti at this site is a significant problem that warrants aggressive management in light of the probability that existing graffiti creates an impression among some visitors that it is acceptable to add their own names. This potential could be ameliorated through the dissemination of advisories to all river visitors not to add their names, initials and dates to those already present at various sites throughout the canyon, and to report such destructive activities to the BLM. Given that graffiti and vandalism has already seriously impacted the integrity of the overall site, this site has potential to educate visitors about the importance of rock art sites. The popularity of the nearby river camp and the existence of major pedestrian trails to the site likely preclude any attempt to prohibit or limit public access. Consequently, this site would be appropriate for public visitation if appropriate educational outreach efforts are initiated. This site could provide an excellent opportunity for BLM rangers to engage the public in discussions of vandalism and proper site etiquette. Consistent monitoring of the site for future adverse effects is highly recommended.

#### 42Cb233

This site is located about 10 meters vertical distance above and 100 meters horizontal distance from the Green River with relatively easy pedestrian access up a slight slope. The granaries are on inaccessible cliff ledges where they are protected from direct impacts due to visitation, whereas the open structure is easily accessible on a short shoulder about 5 meters above the floodplain. There are no pedestrian trails leading to the sites, and no footprints were observed on or around the site. There is no river camp in this vicinity and there is little indication this site receives even infrequent visitation. The site is not visible from the river due to thick vegetation along the river bank. There are no agricultural or livestock impacts, no inscriptions, no litter and no evidence of any vehicular or industrial impacts of any kind. The only adverse effect observed at this site consists of possible dismantling of one granary where it appears stones have been restacked and structural timbers gathered together and stacked to one side of the structure. Pending a closer comparison of photographs from 1931, 1976 and 2007, this site appears to be in essentially the same condition as was observed at those times with little evidence of human impacts.

**Recommendations.** Despite the natural erosion that has compromised the structural integrity of some features, this site retains significance due to its ability to explain prehistoric settlement patterns in the region. Furthermore, it may constitute an example of semi-sedentary residential occupation in an area where such features are extremely rare or poorly documented to this point. Given the significance and integrity of this and other nearby sites that could be impacted by increased visitation, including architectural and rock art sites, all site locations [REDACTED] area should not be disclosed to the public. Consistent monitoring of this and other nearby sites for future adverse effects is recommended. It is also recommended that site monitors take precautions to avoid creating pedestrian trails to these sites that would facilitate increased visitation. There are no river camps in the vicinity of this site, and future camping in this area should be strongly discouraged.

#### 42Cb234

This site is not visible from the river access point, although the cliff face is visible at a distance of 200 meters. The site is located about 10 meters vertical distance above the Green River. Access from the river across the greasewood-choked floodplain is moderate, but certainly not difficult. There are no pedestrian trails leading to the site and no footprints were observed on or around the site. Also, there are no river camps in this vicinity that would facilitate extended visitation to this site or others in the vicinity. The rock art panel has been defaced in the past with light scratch marks on the south edge. These impacts are minimal. This site may also have been impacted by livestock grazing given the copious cattle dung directly below and the panel's accessibility to potential rubbing by cattle that have repeatedly bedded down in this location (Figure 41). There is no evidence of litter or impacts from vehicles or industrial development. Generally, this site appears to receive little if any visitation.



**Recommendations.** This site is part of a cluster of significant sites [REDACTED] with significant potential to contribute important insights into prehistoric human adaptations in the Desolation Canyon region. Given the significance and integrity of architectural and rock art sites in this area that could be impacted by increased visitation, all site locations in the [REDACTED] should not be disclosed to the public. Consistent monitoring of this and other nearby sites for future adverse effects is recommended. It is also recommended that rangers take precautions to avoid creating pedestrian trails to these sites that would facilitate increased visitation.



**Figure 41: Cattle dung below figures at 42Cb234. Not the proximity of the figures to surface area where cattle have bedded down.**

#### **42Cb416**

This site has likely been severely impacted by individuals associated with more than a century of ranching and by river visitors [REDACTED]. The prominent alcove where the site is located is clearly visible from the river camp about 400 meters to the east, and major pedestrian trails lead from the camp to the [REDACTED]. However, there are no trails leading from the base of the slope to the site location 100 meters vertical above. No trash or modern inscriptions were observed. It is probable that this site has been vandalized at some point in the past. At Feature 2, the circular stone lid to the granary had been placed

to one side and then covered by juniper bark (Figure 42). The origin of this bark is the interior of the structure, suggesting individuals removed the lid and emptied the contents of the structure onto the lid. The collapse of the front wall may be due to individuals leaning into the structure to dig out the deposits.



**Figure 42:** Granary capstone set to the left of granary and covered by interior bark at 42Cb416.

At Feature 1, the large thin stone overlying the cist does not appear to be the original capstone, but was placed over the opening at a later time. Interior deposits were likely disturbed. These activities could have occurred during ranching operations or since the 1960s when river visitation became commonplace. No direct impacts from livestock or vehicles were observed, although cattle dung was observed on the slope leading to the site, and an old vehicle route is located nearby to the northeast. There is no convincing evidence of recent visitation or recent impacts due to visitation. Louthan and Miller mentioned that vandalism had occurred but did not describe it. The artifacts described in the initial site report were not identified and may have been removed.

**Recommendations.** Given the current prohibition on camping [REDACTED] directly below this site, there remains a low risk that this site will be impacted by river visitors. These visitors typically make brief stops at the camp to visit [REDACTED], but they rarely stay long enough to warrant exploration of the steep slopes above. If camping is eventually allowed at this location, this site would be vulnerable to future damage by extended visitation. The large alcove is clearly visible from the camp, and access, while steep, is not onerous. The site location should not be disclosed and periodic monitoring of the site for future impacts is strongly

recommended. In the event camping is allowed, a more aggressive monitoring program of this and nearby sites will be needed.

#### 42Cb417

Despite its location inside a small lateral drainage, this site and site location is visible from the river and [REDACTED] (now closed to camping due to private property concerns). The site remains largely inaccessible without climbing equipment (e.g., ladders or ropes) and likely receives little direct impact from visitors. Its location about 10 meters above the bottom of the drainage with a 90-degree slope makes direct access difficult. Nonetheless, the site has received impacts in the past and has likely been looted. About 1 meter to the west of the granary are the inscriptions "RAP of WPI 1941" and a peace symbol scratched into the patina below. These inscriptions may be the result of historic ranching operations [REDACTED]. This granary remains a popular attraction for river visitors, as evidenced by a well-worn pedestrian [REDACTED] to the base of the site. This trail is a spur from a pack trail indicated on U.S.G.S. quadrangles.

No litter was observed on or near the site, and there is no evidence of direct impacts due to livestock or agricultural operations, and no adverse effects from vehicles or industrial development. The presence of artifacts on the bottom of the canyon drainage suggest the possibility that other artifacts have been surface collected at some point in the past, and that there is a future potential for illegal removal of artifacts. River rangers indicated that corncobs were once visible on the ground below the granary, but these are no longer evident. These were not mentioned in the 1982 site report. Generally, the site appears to be in the same condition as described in 1982, and ongoing impacts from river visitors appear to be minimal.

**Recommendations.** In light of the fact this site is located on private property, public visitation to this site should be strongly discouraged without express agreement from the land owners that visitation is acceptable. The closure of river camp sites on adjacent private lands have likely ameliorated impacts due to the reduced amount of time that visitors spend at the site. Despite "private property" postings along the river bank, it would be naïve to assume that this site no longer receives significant visitation. Consequently, consistent monitoring of this site for future adverse effects is warranted. In the event that camping is allowed in the future, this site may be appropriate for public visitation if accompanied by adequate educational outreach as to site etiquette. This site also presents significant opportunities for scientific study. With the permission of the land owners, future data recovery (e.g., tree-ring and radiocarbon analyses) is recommended.

#### 42Cb2663

This site is located about 120 meters vertical distance above the river and about 100 meters horizontal distance from the river. Access to this site involves ascending a steep 40-degree slope. Despite the visibility of this prominent alcove, there is minimal

evidence of significant or repeated visitation. There is a major pedestrian trail along the base of the talus slope and extending up hill about 30 meters. This trail does not extend to the site itself. No footprints were observed. At least three river camps are located in close proximity to this site [REDACTED] and all three are visible from the alcove. Given the visibility of the alcove and high visitation at these camps, it is quite probable this site receives some visitation. It is also possible the site has escaped detection due to erosion that has completely filled the cist with sand and roof spall. The front and north walls are covered by about 3 centimeters of fill. The site exhibits no evidence of litter, illegal excavations, agricultural or livestock impacts, or any adverse effects from vehicles or industrial development. Interior deposits appear to be intact and exhibit potential to yield important scientific information. It should be noted that major pedestrian trails at the base of the slope appear to be leading to [REDACTED]  
[REDACTED]

**Recommendations.** In light of the potential for intact subsurface deposits, visitation to this site should be strongly discouraged and site location not disclosed to river visitors. The risk of disturbance to cultural deposits is considered to be quite low, although it is possible that river visitors have and will continue to access the rockshelter. Consequently, consistent monitoring of this site for illegal excavations and other inappropriate activities is highly recommended. More aggressive management strategies may be warranted if subsequent monitoring of this site reveals significant visitation and/or ground-disturbing activities.

#### 42Cb2664

Located about 180 meters north of the Green River access point, these rockshelters are not clearly visible from the river, but they are visible from the canyon bottom access point, although access is generally difficult up a 60-degree slope. There are no pedestrian trails leading to the site, no footprints on or around the site, and no river camps in close proximity that would facilitate extended visitation. No litter was observed in the vicinity, and there is no evidence of agricultural or livestock impacts, no adverse effects from vehicles or industrial development, no inscriptions and no obvious evidence interior deposits have been disturbed. There is a paucity of any evidence that this site receives even minimal visitation. One structure features collapsed walls that could have been caused by visitors, but this collapse is more likely due to natural erosion. One feature has loosely stacked stones that may be a modern/historic addition.

**Recommendations.** This site contains features and deposits with significant potential for scientific study into human adaptations in the region. Consequently, disclosure of the site location is strongly discouraged due to the sensitive nature of the architectural features and cultural deposits that would be vulnerable to additional public visitation. Due to the absence of river pull-out points and camps in the area, there remains a low potential that this site will receive significant visitation in the future. Periodic monitoring of this site for future adverse effects is recommended. Site monitors should exercise caution to avoid creating pedestrian paths that would direct visitors to the site.



#### 42Cb2665

This site, located about 100 meters horizontal distance from and 15 meters vertical distance above the Green River, is readily visible to passersby on the Green River. Despite this visibility, there is little evidence to suggest significant or recent visitation to this site. There are no pedestrian trails from the river to the site, nor were footprints observed on or around the site. There are no river camps in this vicinity that would facilitate longer-term visitation to the site, and there are no easy pull-out points to facilitate even casual visitation. No litter was observed, and there is no evidence of impacts due to livestock or agriculture, no adverse effects from vehicles or industrial development and no modern inscriptions. The site has nonetheless been impacted at some point in the past. The south wall features loose stones that appear to have been restacked on the original wall, and a small pit is located in the center of the structure (Figure 43). The pit measures about 50 by 60 centimeters and is up to 15 centimeters deep. The pit has revegetated with grasses and globe mallow. No charcoal or artifacts were observed in the deflated back dirt pile, although a single flake was observed about 90 centimeters to the south of the back dirt. It is possible that this pit actually represents a test excavation by members of the 1931 Claflin Emerson Expedition. No mention is made in the notes of test excavations, other than there was an earthen floor 20 centimeters deep. This could imply that the deposits were excavated to a depth of 20 centimeters where the floor and mud mortar fragments were encountered.



Figure 43: Small looters pit in the center of architectural feature at 42Cb2665.

**Recommendations.** Despite the natural erosion that has compromised the structural integrity of the north wall, this site retains significance due to its ability to explain prehistoric settlement patterns in the region. Furthermore, it may constitute an example of semi-sedentary residential occupation (e.g., open surface structures) in an area where such features are extremely rare or poorly documented to this point. Given the significance and integrity of this and other nearby sites that could be impacted by increased visitation, including architectural and rock art sites, all site locations in the [REDACTED] should not be disclosed to the public. Consistent monitoring of this and other nearby sites for future adverse effects is recommended. It is also recommended that rangers take precautions to avoid creating pedestrian trails to these sites that would facilitate increased visitation. There are no river camps in the vicinity of this site, and future camping in this area should be strongly discouraged.

#### 42Cb2666

Despite its proximity to the major pedestrian trail about 20 meters to the east and 5 meters below, the site is obscured by junipers and is not visible. There is no evidence this site receives significant visitation, and the prevalence of historic artifacts suggests that it remains unknown to visitors to [REDACTED]. The site remains in good condition with no evidence of modern inscriptions, no litter and no nearby camping impacts (the closest river camp is 300 meters to the southeast but camping is no longer allowed there). No livestock impacts were observed on site, but it is accessible to large herbivores. Agricultural impacts are limited to the pasture 20 meters to the east. The Feature 2 hearth is located in a shelter that is visible from the pedestrian trail and could draw visitors to the site location where they would inadvertently discover the cache of historic artifacts. It remains unknown if historic artifacts have been collected from this site in the past. The current land owners (Tavaputs Ranch) have indicated that historic artifacts continue to disappear from this area with alarming regularity.

**Recommendations.** Given its proximity to a well-traveled pedestrian route and the portability of the historic artifacts, this site remains extremely vulnerable to surface collection of historic artifacts. The location and nature of this site should not be disclosed to the public. With the permission of current land owners, consistent monitoring of this site to ascertain the nature and extent of future surface collection is warranted. However, site monitors should take precautions not to create a pedestrian trail to the site. It is also recommended that public outreach to visitors at the Sand Wash launch point include strong advisories about federal laws prohibiting the collection of historic artifacts from federal lands, and that removal of such artifacts from private lands constitutes theft that could be prosecuted under state laws.

#### 42Cb2667

This site is quite ephemeral and is not easily recognizable as a historic feature. It is not visible from a major pedestrian trail on the floodplain below the site, and there is no evidence that pedestrians are venturing from the floodplain trail onto the ridge where

the site is most visible. There is no evidence the site is being impacted in any way by recreational visitors, ranching activities or livestock. With the exception of barbed wire, no historic artifacts were observed along the route that would be subject to surface collection. [REDACTED]

[REDACTED] but not to the general public.

**Recommendations.** Given that most of the route is on private land, disclosure of this site to the public is not recommended. However, the ephemeral nature of the site appears to present minimal risk for future site degradation from visitation. Occasional monitoring of the site is warranted to ascertain the nature of future adverse impacts. If the private properties should ever pass into public ownership, a more detailed documentation of this site is warranted.

#### 42Cb2668

This site is located only about 5 meters above and 30 meters from a well-worn pedestrian trail that parallels the west side of the pasture. [REDACTED]

[REDACTED] The nearest camp is about 200 meters to the southeast. The shelter is readily visible and accessible and it likely has received some visitation. However, cultural deposits at this site are dispersed and ephemeral, and they have likely gone unnoticed by visitors. There is no evidence of any impacts to this site from visitation (e.g., no illegal digging, no artifacts stacked on rocks, no inscriptions on the shelter walls). A minimal amount of cattle dung was observed inside the shelter, but this evidence is not recent and does not appear to be associated with the cultural deposits. The development of the adjacent pasture lands has not impacted the site, and there is no evidence of any industrial development or vehicles near this site.

**Recommendations.** This shelter is easily visible from the pedestrian trail, and consequently it remains vulnerable to illegal excavations. The deposits, however, are likely shallow, which will probably deter systematic looting of the shelter. Given the current prohibition on camping on private lands adjacent to this site, it is unlikely that this site will receive significant visitation and the risk of looting is considered to be low. Periodic monitoring of this site for adverse impacts is recommended. However, if camping is allowed on the private property in the future, more aggressive monitoring of the site for adverse effects, including vandalism, is warranted. Given that this site is located on private property, disclosure of site location to the public is strongly discouraged, although it is recognized that this site, because of its visibility from the trail, will likely receive some visitors.

#### 42Cb2669

Site is located within a large rock shelter that is visible from a major pedestrian trail about 150 meters away and 50 meters vertical distance below. The 18-degree slope is not onerous, and access is relatively easy. The prominence of the shelter has likely attracted some visitors to the site, which has likely been impacted to some extent. Two

mano fragments were observed resting on a boulder where they were likely placed by visitors at some point in time (Figure 44), suggesting artifacts may have been surface collected. There is no obvious evidence of looting, no evidence of graffiti, and no evidence of recent visitation was observed. There are no trails leading to the site, and no footprints were observed on the interior. There are no impacts from livestock or agricultural activities, no industrial or vehicular impacts, and camping impacts are limited to the river camp about 300 meters away.



Figure 44: Two groundstone fragments on a boulder next to 42Cb2669.

**Recommendations.** Given the current prohibition on camping on private lands adjacent to this site, it is unlikely that this site will receive significant visitation. Periodic monitoring of the site is recommended. However, if camping is allowed on the private property in the future, more aggressive monitoring of the site for adverse effects, including vandalism, is warranted. Given that this site is located on private property, disclosure of site location to the public is strongly discouraged, although it is recognized that this site, because of its visibility from the trail, it will continue to receive some visitors. It is also recommended that artifact piles now evident at the site be dispersed or cached to ameliorate the possibility of illegal collecting.

#### 42Cb2670

This site is located only about 10 meters vertical distance above and 50 meters from a well-worn pedestrian trail that parallels the west side of the pasture. [REDACTED]

[REDACTED] The closest river camp is about 200



meters to the east. The shelter is visible and accessible, but there is no evidence of recent or past visitation. Cultural deposits at this site are dispersed and ephemeral, and they have likely gone unnoticed by visitors. There is no evidence of any impacts to this site from visitation (no illegal digging, no artifacts stacked on rocks, no inscriptions on the shelter walls). The development of the adjacent pasture lands has not impacted the site, and there is no evidence of any industrial development or vehicles near this site.

**Recommendations.** This shelter is visible from the pedestrian trail, and consequently it remains vulnerable to illegal excavations. The deposits, however, are likely shallow, which will probably deter systematic looting of the shelter. Given the current prohibition on camping on private lands adjacent to this site, it is unlikely that this site will receive significant visitation. Given the potential for future episodes of vandalism, periodic monitoring of this site for adverse impacts is recommended. However, if camping is allowed on the private property in the future, more aggressive monitoring of the site for adverse effects, including vandalism, is warranted. Given that this site is located on private property, disclosure of site location to the public is strongly discouraged, although it is recognized that the visibility of the site from the trail will likely draw some visitors.

#### **42Cb2671**

The rockshelter where this site is located is quite prominent and very visible from the river camp about 200 meters to the south. The shelter is 30 meters above the floodplain and about 50 meters horizontal distance from a pedestrian/equestrian trail on the floodplain. Access up the slope to the site is steep but easy. There is evidence this site has been repeatedly visited in the past and it has been adversely impacted by looting and artifact collecting. A looters pit was observed in the upper sheltered area, but this has deflated and dimensions could not be determined. Large numbers of artifacts have been placed on a boulder surface, presumably by visitors to the site or during the course of past looting (Figure 45). Some walls may have been toppled during the course of looting, and some walls appear to have stones that have been restacked.

The close proximity of this site to [REDACTED] suggests that looting activities could be associated with historic ranching activities. The direct view of the site from the river camp also suggests that river visitors have contributed to the adverse effects. Despite the looting, the site remains in good condition with intact deposits. No vehicle or industrial impacts were observed, no graffiti or inscriptions were noted, and no litter was evident on or around the site. Camping impacts appear to be limited to the river camp about 200 meters to the south. The presence of livestock dung suggests cattle may have impacted the integrity of the site.

**Recommendations.** Given the current prohibition on camping on private lands adjacent to this site, it is unlikely that this site will receive significant visitation. Periodic monitoring of the site is recommended. However, if camping is allowed on the private property in the future, more aggressive monitoring of the site for adverse effects, including vandalism, is warranted. Given that this site is located on private property,

disclosure of site location to the public is strongly discouraged, although it is recognized that this site, because of its visibility from the river, will continue to receive some visitors. It is also recommended that artifact piles now evident at the site be dispersed or cached to ameliorate the possibility of illegal collecting. Pending approval of the land owner, data recovery at this site would be appropriate.



Figure 45: Artifacts stacked on a boulder next to looters pits at 42Cb2671.

#### 42Cb2672

This site is located on an alluvial fan about 15 meters from and 1 meter above an existing pack trail that leads [REDACTED]. The site location is visible from the river camp about 140 meters to the east. The overall site condition remains in excellent condition with no evidence of looting or subsurface disturbance of cultural deposits. Litter is present throughout the site, including a glass liquor bottle under a tree on the northern edge of the site, a plastic water bottle to the west, and a plastic cup and blue foam to the southeast toward the river. The site has also been impacted by livestock grazing as evidenced by hoof prints and dung. There is no obvious evidence of pedestrian impacts, and camping impacts are limited to the established river camp to the southeast along the river bank. The site has likely escaped detection by most visitors due to its unusual location on an alluvial fan and the sparse nature of the artifacts on site.

**Recommendations.** Given the potential of this site to contain intact cultural deposits, as well as its excellent site condition with no evidence of looting, disclosure of this site location to the public is strongly discouraged. This site remains especially vulnerable to future adverse effects, including looting, due to its easy access from nearby river camps and proximity to the pack trail. Periodic monitoring of the site is warranted, but site monitors should take precautions to avoid creating a pedestrian trail to the site that could accelerate public impacts. Camping should be limited to existing camps.

## 42Em723

This site is easily accessible from the Green River and remains a popular destination for river visitors who have established a well worn pedestrian trail from the river landing point to the site. The site is located only 2 meters horizontal distance from the trail and begins only 2 meters above the trail. The 5-degree slope is not onerous. Visitation to the site on the pedestrian trail appears to be significant, as evidenced by footprints and lack of vegetation along the trail due to foot traffic. The site exhibits considerable evidence of adverse impacts over the years. Panel 1 has graffiti indicating the name "Rod" and other images (Figure 46), and Panel 5 appears to be entirely modern/historic names and images.



**Figure 46: Inscribed name at Panel 1 at 42Em723.**

There is possible evidence that campers have remained at the site, as indicated by concentrations of charcoal around one boulder. It is possible that this charcoal is prehistoric given the prevalence of lithic artifacts nearby. The site has also been impacted by livestock, as evidenced by desiccated dung near the southwest edge of the site, and agricultural development in the area is evidenced by a water pipe that was situated under a boulder near the northeast side of the site, apparently to tap into a spring that is no longer evident. No litter was observed. Some graffiti at this site may have occurred as recently as 2000 although the '00 inscription could also be 1900. There is no evidence of ATV traffic or industrial development in this area, and access to this side of the river is currently limited to boats. A historic road/trail is located on the opposite side of the [REDACTED].

**Recommendations.** This site remains extremely vulnerable to adverse effects from unrestricted public visitation. It is also evident that this site is much more complex than initially indicated, with evidence of lithic artifacts, stone tools and hearth features that are vulnerable to surface collection and illegal excavations. Given that this site is already well known to visitors (including day-use visitors launching from the Nefertiti boat ramp just up stream), restricting public access is likely not realistic. This is problematic in that artifacts subject to collection are located in close proximity to the trail and there is no feasible way to route the trail away from potential cultural deposits. In light of these considerations, this site may be appropriate for public outreach efforts at the Nefertiti camp site to educate river users as to the fragile and irreplaceable nature of cultural resources, to the unacceptability of artifact collection and graffiti, and other admonishments to tread lightly and to report suspicious behavior to the BLM. In addition to such outreach measures, significant artifacts should be cached and consistent monitoring of this site for future adverse effects should be considered a high priority.

#### 42Em3877

This site is located along a ridge line with easy access from [REDACTED]. [REDACTED] It is located about 75 meters vertical distance above the floodplain and about 400 meters horizontal distance. Access is easy, but there is no evidence of pedestrian trails to the site. Given the site is situated directly above [REDACTED] [REDACTED] it is possible that curious individuals seeking a birds-eye view of the rapids would inadvertently discover the site. Hence, it remains vulnerable to surface collection of stone artifacts. Overall, site condition is excellent with no evidence of adverse impacts from river visitors, livestock, agricultural or industrial developments, road access, ATVs or vandalism of any kind. No litter was observed on or around the site, and camping impacts are located 400 meters to the east.

**Recommendations.** This site is significant because intact deposits here could shed important insights into prehistoric strategies to test the suitability of raw materials common along the Green River for stone tools. The presence of stone tools at this site, as well as a constructed feature, suggests this site was occupied for extended periods rather than single episodes. As such, the location of this site should not be disclosed to the public. The ephemeral nature of the site is such that the site will likely go unrecognized by most members of the public. Periodic monitoring of the site for evidence of surface collection of artifacts and illegal excavations is warranted.

#### Summary

As discussed above, individually all of the 21 sites documented in October 2007 are in good to excellent condition, although many (ca. 40 percent) have evidence of some adverse impacts. These impacts included graffiti at five sites, looting at five sites, camping at two sites and site modifications at five sites. Although the damage to the integrity of the sites ranges from minor to significant, these impacts have not completely destroyed the scientific potential of these sites to contribute important insights into prehistoric lifeways in the Desolation Canyon and Gray Canyon area. There is minimal



evidence that the impacts have occurred recently, and much of the damage may be attributed to episodic vandalism and graffiti over the past century. These impacts are summarized in Table 5.

**Table 5: Summary of Adverse Impacts**

Site No.	Site Type	Site Condition	Looting	Graffiti	Site Modification	Litter or Debris	Livestock	Other
42Cb76	Open camp	Good	No	No	No	Yes	Yes	-
42Cb81	Rock Art	Fair	No	Yes	Yes	No	No	-
42Cb217	Rock Art	Excellent	No	No	No	No	No	-
42Cb218	Rock Art	Good	No	No	No	No	No	-
42Cb219	Rock Art	Good	Yes	Yes	No	No	No	-
42Cb233	Open Residential Granaries	Good	Unknown	No	Restacked Walls	No	No	-
42Cb234	Rock Art	Good	No	Yes	No	No	Yes	-
42Cb416	Granary/Cist	Good	Yes	No	Restacked Walls	No	No	Topped Walls
42Cb417	Granary	Good	Yes	Yes	No	No	No	-
42Cb2663	Cist	Good	No	No	No	No	No	-
42Cb2664	Granaries	Good	No	No	Possible	No	No	-
42Cb2665	Open Architecture	Good	Yes	No	Restacked Walls	No	No	1931 Testing
42Cb2666	Historic Cache	Good	No	No	No	No	No	Camping
42Cb2667	Historic Road	Good	No	No	No	No	No	-
42Cb2668	Rockshelter	Good	No	No	No	No	Yes	-
42Cb2669	Rockshelter	Good	No	No	Artifact Piles	No	No	-
42Cb2670	Rockshelter	Good	No	No	No	No	No	-
42Cb2671	Rockshelter	Good	Yes	No	Artifact Piles	No	Yes	-
42Cb2672	Open Residential	Good	No	No	No	Yes	Yes	-
42Em723	Rock Art	Good	No	Yes	No	No	Yes	Camping
42Em3877	Lithic Scatter	Good	No	No	No	No	No	-

Generally, the sites most vulnerable to impacts from recreation visitors are those in close proximity to river camps where individuals remain for a significant length of time, or they are located next to an established pedestrian trail where access is easy. This conclusion may be biased by the nature of the intuitive surveys that focused on areas in relative close proximity to river camps and trails, and more remote and inaccessible locations were not investigated. One area examined without camps or trails was [REDACTED]. Of the seven sites recorded in this area, one had evidence of digging sometime in the distant past, one had possible evidence that stones had been restacked and one had abundant graffiti. Factors related to the accessibility of sites are summarized in Table 6.

These findings are generally consistent with those of the May 2007 investigations that found a similar pattern of site degradation in proximity to river camps and access trails. In contrast, the September 2006 investigations, focused mostly on Flat Canyon, found almost no evidence of significant adverse impacts caused by human activities. Generally, it appears that site visibility is a factor in the prevalence of adverse impacts with architectural and rockshelter sites visible from a camp or trail being the most vulnerable. There is no consistent pattern to the prevalence of graffiti at rock art sites, although it appears that those sites with graffiti have had multiple episodes of graffiti over an extended period of time and would appear to be the most vulnerable in the future.

At least four instances of malicious vandalism or looting was observed in October 2007. One involved excavations into shallow cultural deposits inside a structure at 42Cb2665 [REDACTED] (this may actually be remnants of a 1931 test pit by the Claflin Emerson Expedition), an attempt to remove a petroglyph with a rock saw at 42Cb219 at the [REDACTED], and excavations and wall dismantling at 42Cb416 and 42Cb417, both storage sites located in close proximity [REDACTED]

**Table 6: Site accessibility factors**

Site No.	Site Visible From Camp or Canyon Trail	Location Visible	Trail to Site	Foot prints On Site	Meters To River Camp	Meters To Trail Or River	Meters Above Trail	Slope	Access
42Cb76	No	Yes	Major	No	150	10	15	40	Easy
42Cb81	No	No	No	No	No Camp	240	10	15	Easy
42Cb217	No	Yes	No	No	No Camp	120	1	1	Easy
42Cb218	No	No	No	No	No Camp	240	15	10	Easy
42Cb219	Yes	Yes	Major	Yes	240	5	6	45	Easy
42Cb233	Yes	Yes	No	No	No Camp	100	10	45	Easy/ Difficult
42Cb234	No	Yes	No	No	No Camp	200	10	12	Easy
42Cb416	No	Yes	No	No	400	150	100	40	Moderate
42Cb417	Yes	Yes	Major	Yes	500	1	10	90	Difficult
42Cb2663	No	Yes	No	No	150	120	120	40	Moderate
42Cb2664	No	Yes	Minor	No	No Camp	180	15	60	Easy
42Cb2665	Yes	Yes	No	No	No Camp	150	15	20	Easy
42Cb2666	No	Yes	Major	No	300	20	5	25	Easy
42Cb2667	No	No	No	No	350	200	100	45	Easy
42Cb2668	No	Yes	Major	No	200	30	5	27	Easy
42Cb2669	No	Yes	No	No	300	150	50	18	Easy
42Cb2670	No	Yes	No	No	200	50	10	20	Easy
42Cb2671	No	Yes	Major	Yes	200	50	30	20	Easy
42Cb2672	No	Yes	Major	No	150	15	6	6	Easy
42Em723	Yes	Yes	Major	Yes	No Camp	2	2	5	Easy
42Em3877	No	No	No	No	400	400	75	15	Easy

## General Summary

This discussion constitutes a preliminary report on efforts by the Desolation Canyon Cultural Resource Partnership, a coalition that includes the Bureau of Land Management, the University of Utah, the Utah Division of State History and the private non-profit Colorado Plateau Archaeological Alliance (CPAA), to facilitate more proactive long-term protection and preservation of historic and archaeological resources in Desolation Canyon. The intent of the partnership has been to formally and thoroughly document cultural sites in selected portions of the canyon to determine which sites are being impacted by river visitors and to what extent, to develop strategies to better assist federal land managers in monitoring ongoing damage to sites, to foster archaeological site etiquette among river visitors through proper public outreach, and to assist in the training of river rangers in proper site documentation techniques that will augment baseline data needed for future management decisions. Efforts in 2007 have focused on those areas of the canyon identified by the BLM as being at greatest risk to adverse impacts.

As of the end of 2007, more than 65 sites have been formally documented between the Sand Wash launch and Price River. It is anticipated that at least three

additional field research trips by boat will be conducted in 2008, as well as overland trips into lower Gray Canyon, upper Flat Canyon, upper Jack Canyon and Price River Canyon. It is also anticipated that about 150 sites will be documented by the end of 2008, allowing a sufficient database whereby the nature, diversity and distribution of cultural resources can be considered more thoroughly. This database will assist land managers in determining the nature and extent of adverse impacts to cultural resources, identifying those sites that are most vulnerable to visitation, and developing strategies to ameliorate the cumulative impacts of river recreation.

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