

**1993 Summary Report:
Monitoring of Archaeological
Sites Along the Colorado River
Corridor in Grand Canyon National Park
(Cooperative Work Order 8005-8-002)**

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ABSTRACT

From August of 1990 through May of 1991 the Cultural Branch of the Resource Management Division, Grand Canyon National Park, in conjunction with the Anthropology Department of Northern Arizona University carried out an archaeological survey from the base of the Glen Canyon Dam to Separation Canyon along the Colorado River corridor. Four hundred and seventy-five cultural properties were recorded. Subsequent to the survey this office has developed and maintained a program of monitoring natural and human impacts on a select group of sites at risk throughout the river corridor within the Grand Canyon National Park. In fulfillment of the programmatic agreement this document is a description of the work accomplished on the project for fiscal year 1993.

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Introduction

During the 1993 fiscal year (October 1, 1992 to September 30, 1993) a total of one hundred thirty-seven archaeological sites were monitored by the River Corridor Monitoring Project (RCMP). Twenty-six of these properties were monitored twice, creating one hundred sixty-three monitoring episodes for the year. This is almost double the number of episodes (eighty-three) done in FY 1992.

The large number of sites monitored was accomplished by the increased availability of personnel during the spring of 1993, and making efficient use of the annual Resource Division trip in October 1992. Twenty-six sites were monitored twice in order to ascertain if our perceptions of change would be compromised if a site was monitored at one time of the year as opposed to another. Significantly the surface of many sites are obscured by vegetation throughout the spring, making monitoring difficult if not totally ineffectual. Sites monitored in late summer/early fall exhibit more impacts from visitation (trailing, trampling, trash) due to the large number of tourists moving through the corridor between May and October. Conversely, sites monitored in February/March exhibit less human impact as they have had the late fall and winter to recuperate.

In the future the target population of sites monitored annually will decrease as sites are eliminated completely from the system while others are relegated to less frequent observation. Determining which sites will get annual monitoring as opposed to a less frequent regimen has been one of the major concerns of our staff for this year.

Factors determining monitoring priority include: present levels of natural impacts, accessibility to the public, degree of risk based on setting and proximity to the river, and the current condition and stability of each particular site. Regarding our own impacts it is a concern of the project that we do not monitor a fragile site into oblivion by visiting it too often. We must always realize the effect of our own presence and act appropriately.

The 1992 and 1993 fiscal years were a learning experience for the project. Although the office of the Park Archaeologist has been doing a quality job of monitoring several sites along the river corridor annually since 1982 and sporadically since the 1960s, nothing of this scope and magnitude has been attempted. Be that as it may, the project determined that 1993 would be the time to fine tune our methods while moving ahead with the essential tasks of photo documentation and collecting data on impacts to sites. Paring down the field forms to a practical working size as well as obtaining good critical input from the cooperating members of the programmatic agreement were the project goals of 1993.

A trip was arranged for September 1993 for the specific purpose of obtaining that input and developing a consensus for the future between all those concerned. The trip included representatives from the various Tribes, SHPO, the Bureau of Reclamation and the NPS project staff. Group meetings were held at camp almost daily with opinions and suggestions coming from every quarter (the lowliest boatman to the highest officials were heard).

While the trip was still on the water, several suggestions were made and adopted. The project was given unanimous consent to scrap the old field form and to begin using the new form designed in July 1993 by NPS project personnel. It was further decided that: 1) detailed mapping using a total station was warranted on several selected sites, 2) units tracking artifact movement on the surface should be established as well as, 3) the quantification of geomorphic change where appropriate, 4) stabilization and/or 'natural' attempts at erosion control on sites exhibiting high rates of erosion (in partnership with the Zuni Conservation Office). Jim Garrison and Bob Gasser from SHPO also advised in favor of carrying out a program of testing for significance on nine archaeological sites within the river corridor.

Scope of Work

The physical parameters of the project were established in practice by the archaeological survey of 1990-1991 (Fairley *et al.* 1991). This includes cultural properties found within the confines of the river

corridor below the theoretical 300,000 CFS level. There are of course no lines drawn along the walls of the Canyon to denote this level, however, by utilizing the biological, geomorphic and hydrological information available a consensus can generally be reached on where project work is appropriate. As people familiar with doing work in the Canyon know, a gray area does exist when it comes to where one arena ends and another begins. At this point in time the project is comfortable with where the work is to be carried out. However, there will be minor additions and deletions to the site list as the project becomes more fine tuned.

A total of five trips were completed by project personnel for FY 1993. This figure includes RCMP presence on the annual Resource Division work trip in October, 1992. A detailed record of scheduling, personnel and work accomplished on each trip is documented and kept on file in the project office at Northern Arizona University in Flagstaff. This information will not be duplicated in this report. Concerned members desiring this information for FY 1993 can contact the project office at (602) 523-9533 to obtain copies of individual trip reports. Beginning in FY 1994 trip reports have been sent to the appropriate Tribes and agencies upon completion of each trip. This is not only a courtesy, but policy.

Field, Office and Photographic Methods

In an effort to increase our efficiency in the field some changes have been made regarding methods of organizing our monitoring procedures. For FY 1993 site forms, maps and previous work have been placed in flexible three-ring binders according to river mile. All previous photographs are placed in archival plastic photo pages according to river mile and also kept in flexible three-ring binders. The binders provide easy access and keep the work to be done in a simple and practical order. The binders are kept in water-proof containers while on the river. This system facilitates work in the field and in the office once a trip is completed.

In the office all previous work and work in progress is kept by quad and site number in its respective file. The files are kept current and are available for use by the appropriate Tribes and agencies.

Regarding photographic work, the staff has realized that duplicating all previous photo points from the survey is not only impractical but a waste of time, film and money. As a result, only photographs of selected features, examples of erosion, and specific areas on sites at risk are duplicated. Even with this selective method the project generates several complete rolls of black and white prints per work trip. The project also maintains a small but excellent color slide collection documenting various aspects of our work in the river corridor for use in presentations.

After each work trip the film is developed and processed into the established system at our Flagstaff office. There are currently over 3,800 black and white images in the photo library. The photographs are mounted on cards with site number, date, description and directional information. As the project generates more photographic documentation the record will develop into one of the most important sources of visual information illustrating change for cultural properties as well as geomorphic processes.

Five stationary cameras were still in use throughout the 1993 FY. These units record a single color image once a day everyday. Although the idea is good in theory, in practice it is actually generating thousands of pictures which are nearly identical. It is the judgement of the project staff that at least two of these cameras will be moved in fiscal year 1994 to new locations. It is also advised here that the units photographing AZ C:13:003 and AZ C:13:371 remain at those sites indefinitely. Photographs generated by the stationary cameras are processed by and maintained at the beach erosion study office in the Forestry building on the N.A.U. campus. The collection is available for project use at any time.

Figure 1. Illustrates the frequency of a given impact as observed on the sites monitored in the project area. The categories are not mutually exclusive. Any particular site can manifest multiple impacts and generally do. It is readily seen that gullying is almost a standard impact. Where there is enough sediment arroyos generally form. For our purposes arroyos consist of drainages deeper than a meter, gullies being less than a meter. Trailing has a gray area component to a degree in that there is overlap with human trails. In some cases, such as Granite Park, they reinforce one another. A discernable difference does exist, however; game trails tend to skirt and pass through site areas, human trails are destination-oriented and begin and terminate at specific points namely beaches and the more visually interesting cultural properties. Sheet washing refers to the unchanneled surface runoff apparent at almost every site except shelters and overhangs. Other erosion is the catch-all category including insects, small mammal burrowing, root disturbance, spall, mass wasting, and slump. All of this specific information is on record in project files.

Figure 2. Illustrates the frequency of human impacts observed on the sites monitored in the project area.

Trailing remains the most frequent impact from 1992 and has the greatest potential for long-term damage to cultural properties (See figures 13 and 14). Collection piles are difficult to stop from happening but can be dispersed. Collection piles seem to have a will of their own to the extent that the bigger they get the more popular they become. Our policy has become to disperse them or they grow geometrically. Camping can be controlled to an extent and is not a major threat so far. Vandalism at sites in the project area is in it's infancy. We are concerned that inevitably the problem will become worse.

Photographic Documentation

The following section consists of several examples of photographs which illustrate various components of the monitoring project. During FY 1993 over 2,500 photo images were produced. This includes 1,600 color slides¹ from the stationary units at five locations as well as over 950 black and white prints documenting the archaeological sites. The prints were taken by project personnel using hand-held 35 mm cameras.

The camera is our most powerful tool in documenting impacts to cultural properties in the river corridor. There are currently over 3,800 black and white images in the project's photo library, containing not only the last two years of monitoring efforts but also the extensive documentation carried out during the 1990 to 1991 survey. There is also a large collection of photographs located at the Resource Management Division of Grand Canyon National Park. This archive documents several select sites in the river corridor, in some cases dating to the early 1960s.

The 1993 field season was very useful in pinpointing where certain types of erosion is developing and where stability is present. This contributes to the more efficient planning of work trips and allows the staff to focus on where remedial actions are warranted and where valuable field time is best spent.

¹All film from the stationary units is processed and kept at the Beach Erosion Study office on the N.A.U. campus. We have open access to this work.

Figure 3

Figure 4 March 31, 1993

Figures 3 and 4 illustrate examples of vandalism occurring within the past year. The culprits have conveniently dated their work which took place four days prior to the photographs. The vandalism compromises a historical ferry crossing dating to the late 19th century. Alice Rowe (upper photograph) was at the location (C:02:094) with her husband Jack on November 13, 1896 as they waited to cross the river on their way to have their marriage sealed at the Temple in St. George, Utah.

October 13, 1992

February 5, 1993

Figure 5. Daily stationary camera shots of C:13:003 (Hopi Salt Mine). The upper photograph shows a flow of approximately 6,500 CFS while the lower photograph is around 10,000 CFS. Note large sandbar created by the Little Colorado flood of January 12 through 21, 1993. This scale of sediment refurbishment was common prior to construction of Glen Canyon dam. Use boulder indicated by arrow for scale.

April 3, 1992

April 2, 1993

Figure 6. Cutbank erosion at C:13:384. Much of the debris placed here by the USGS in November 1991 has been removed by annual flooding. Note slumped sediment in lower photograph (black arrow). Archaeologist is pointing to location of buried hearth under fill.

December 8, 1990

April 30, 1993

Figure 7. Surface erosion of feature 3, C:13:299 by removal of the eolian component revealing a hard-packed surface and gravel/cobble pediment. The lack of available sediment in the entire system due to Glen Canyon dam results in this depleted situation for many archaeological properties. Removal of the protective cover causes quicker and often irreversible impact to the site.

April 3, 1992

March 14, 1993

Figure 8. The arroyo pictured above was created by a side canyon flood in 1989 at C:13:291. On going erosion has been documented by project photographs since 1990. Note recent rock movement indicated by arrows. Several features at this site are exposed and deteriorating. Feature 2, a charcoal lens, is located in this cutbank in the right of the photograph.

Fig. 9 October 15, 1993

Fig. 10 June 2, 1993

Figures 9 and 10 show the naturally occurring erosion of rock art panels along the river corridor in the west end. Both of these sites, A:16:001 above and A:15:005 below, are located within easy walking distance of major river camps. A:15:005 is one of the most extensive examples of pictographs using locally derived hematite in the river corridor and is heavily visited.

April 4, 1992

March 26, 1993

Figure 11. Comparison illustrating the pervasive nature of erosion at G:03:064. Arrow in upper photo indicates slump that has since been removed by runoff. The arrow in the lower photo indicates new slump. Note vertical cracks developing on the right side of the isolated column.

April 4, 1992

March 25, 1993

Figure 12. Ongoing erosion of truncated roaster at G:03:064. Arrows indicate degree of entrenchment in seasonal channels on surface of slumped sediment below the feature. This particular comparison documents almost two meters of linear growth in less than a single year. The growth of the arroyo complex at this location may be attributable to base level lowering in the main channel of the Colorado.

March 19, 1993

Figure 13 shows recent entrenchment of the trail to G:03:003 from Granite Park Wash. All of the downcutting at this location has occurred since the fall of 1991. The erosion is due to increased human traffic from the river camp situated less than 400 meters away. Obliteration and retrailing would be appropriate to the problem.

March 19, 1993

Figure 14 is a continuation of the trail upslope from figure 13. The arrow marks the current advance of the headcut. Headward erosion has moved from the cutbank to its current position (over 30 meters) in less than 18 months. The rock shelter at G:03:003 can be seen in the extreme upper left hand corner.

Monitored Sites

A:15:001

June 1993

A:15:001 is a roaster complex consisting of six exposed features with an associated artifact scatter. Artifacts suggest a Virgin Anasazi as well as late prehistoric Pai/Paiute occupation. Modern cans dating from 1935 to 1950 present on the surface indicate later Anglo use. The site is located on dune covered limestone and the associated cliffs which are common locally. Access is difficult seasonally due to the thick cover of vegetation dominated by mesquite, acacia and various species of cacti. It is recommended that this site be monitored on a two to three year cycle.

A:15:003

March 1993

A:15:003 is similar to A:15:001 in that Virgin Anasazi/ protohistoric Pai/Paiute features and artifacts are present on a dune covered bedrock terrace abutting local cliffs. Modern trash and cans are also present. Vegetation is locally thick and dominated by mesquite, acacia and various species of cacti. Due to easy access and high visibility this site should be monitored on an annual basis.

A:15:004

May 1993

A:15:004 is a historic Pai (Hualapai) site. Two fire features are present on the surface, as well as cans, milled lumber and a badly deteriorated canteen. Flakes and a pot bust are also present. The site is situated on an alluvial terrace 8 meters above and 75 meters from the river. Current impacts are the local arroyo and channeled surface runoff. A:15:004 should be monitored on a two to three year basis.

* A recent flash flood in the adjacent drainage occurred during the spring of 1993 with no impact to the site.

A:15:005

June 1993

A:15:005 consists of a Pai/Paiute habitation, special activity areas, and an extensive pictograph panel. The site is situated on a variety of land forms: alluvial terrace, talus slope, cliff base and cliff face. Features and artifacts are subject to adverse impact from side canyon flooding, talus movement, cliff spall and mass wasting. Large blocks of cliff face have detached and fallen into the drainage adversely impacting the pictographs located on the surface of the rock. It is recommended that the site be monitored two to three times per fiscal year. It is also recommended that A:15:005 be mapped in detail utilizing a total station.

A:15:020

May 1993

A:15:020 is an extensive Anasazi and protohistoric Pai site with fire features, activity areas, stained soil and associated artifacts. Hopi sherds (2) were found on the surface. The site is located on a terrace 135 meters from the river and over 16 meters above the 28,000 CFS level. The site is in good condition and exhibits little evidence of surface erosion or adverse impacts from visitation. This site has a Form determined priority of 2. It is recommended, however, due to the site distance of over 135 meters from the river and its stable condition that monitoring be done in alternate years to lessen impacts from the archaeological team.

A:15:025

March 1993

A:15:025 is a well used hematite mine associated with prehistoric and historic aboriginal utilization. Hematite was mined and processed at this location and traded all over the Southwest by the Hualapai as well as the Paiute. Although the site was visited by Native Americans into the late historic times it has lain dormant most of the twentieth century until recently, when the current archaeological project brought it once again to the attention of Native Americans involved with the monitoring program. Presently, small amounts of the red pigment are being obtained from the site for ceremonial use by members of the tribes. It is recommended that monitoring of this site consist of spot checks for vandalism. Stops here occur three to four times a year, dependent on the presence of Tribal representatives. No river related impacts pose a threat to this site.

AZ A:15:026

April 1993

This site is located on reworked sand deposits overlying colluvial debris. The site is virtually invisible due to thick grass cover. No change has occurred since recorded on 1-29-91, and there was no sign of visitation. Recommend monitoring every three to five years.

A:15:027

Oct. 1992, March 1993

This site is located on an alluvial terrace overlying talus slope. No changes were observed since recorded on 11-10-90, and there was no evidence of visitation. Arroyos are adjacent to both the up and downstream sides of the site. They are presently encroaching on the site and determine the North and South boundaries. Monitor every other year to check arroyo expansion, or as otherwise indicated.

A:15:031

Oct. 1992

A:15:031 is a Virgin Anasazi site consisting of fire features, a rock alignment, numerous groundstone artifacts, and a few Moapa Gray Ware sherds. The site is located along the base of a Muav limestone cliff 100 meters from the river. A dense growth of Mesquite arrowweed and tamarisk separate A:15:031 from the river. Channeled surface runoff and localized arroyo cutting are impacting the southern boundary. It is recommended that A:15:031 be monitored every three years.

A:15:035

Oct. 1992

A:15:035 consists of a single roasting feature (FCR) eroding out of a sandy slope just upstream and opposite A:15:031. Surface creep and channeled surface erosion are impacting the isolated feature. The site is located 75 meters from the river and 7 meters above the 28,000 CFS level. A:15:035 should be monitored on a 3 to 5 year schedule.

A:15:039

April 1992

This site is located above the mesquite zone on a reworked dune. Active erosion is occurring. A local drainage is encroaching on the southeast margin of site impacting Features 1 and 2. Bank slumpage is evident on the site. Monitor annually, test eroding features and stabilize.

A:15:042

April 1993

This site is situated in a drainage at the base of a basalt outcrop. The shade and permanent

water in the vicinity make this an attractive stop for the boating public. In the 1980s Emory Kolb's name was found at this site and since that time a well developed trail has emerged connecting the boat beach to the scratched name. Although the site in and of itself would not warrant yearly monitoring, the recent heavy visitation suggests that the trail, the inscription and the prehistoric site be checked yearly. The possibility of side canyon flooding always remains a threat to the prehistoric component.

A:15:051

May 1993

A:15:051 consists of a single roasting feature eroding out of the base of a local talus slope. Two obsidian tools and Virgin Anasazi ceramics were found on the surface. A localized drainage passes through the site and pedestaling of soil and small gravel is occurring due to the channeled surface runoff. It is recommended that A:15:051 be monitored in 1994 and then in alternate years thereafter.

A:16:002

Oct. 1992

This site consists of a rockshelter with only one artifact: a sherd that suggested late prehistoric-early historic Pai. The site is located on the upstream side of a side drainage at the top of columnar basalt rubble, and at the base of a basalt cliff approximately 33 m southeast of the river. Natural impacts are minor however human disturbance is evident--recent trash, fire scars, clearing of rocks and slight subsurface disturbance. The site should be tested and eventually excavated, and the site should be monitored every two to three years.

A:16:003

Oct. 1992

The site consists of a long, shallow rockshelter under a 4 m high overhang with an extensive midden in front. The artifacts suggest three components: Late Archaic-BMIII, PI-III Virgin Anasazi, and late prehistoric-early historic Pai or Paiute. The site is located under a Bright Angel shale overhang. Due to moderate human and natural impacts observed and the site's high profile and easy access. Trails should be obliterated and the site should be tested. Annual monitoring is recommended.

A:16:004

April 1993

This site is located on dune covered talus as well as a rising talus slope and bedrock ledges. Trampling and trailing occurs across the site due to increased visitation. Trailing increases channeling of surface water insuring erosion. It is recommended that this site be monitored yearly.

A:16:151

Oct. 1992, May 1993

The site consists of two separate loci of artifacts, midden and fire features reflect a late prehistoric-early historic Pai occupation with later historic use. The site is located at the mouth of an unnamed canyon below Honga Springs. The site is unprotected with a moderately low profile, and the natural and human impacts are moderate. It is recommended that the site be monitored every two years.

A:16:158

May 1993

This site is located in a riverside Muav overhang 2.5 m above the 28,000 cfs mark. A:16:158 was inundated by the 93,000 cfs flows of 1983-84. The location presupposes it has been under water an incredible number of times since its creation and as such there is not much remaining. The site should be tested to determine integrity. If there are subsurface remains the site should be monitored every three to five years. If there are no cultural remains the site would be deleted from the schedule.

A:16:159

March 1993

The site contains numerous tools plus pictographs. This previously unknown site was recorded in November, 1990. Some boatmen from the survey project have subsequently taken people to the location. Trailing, however, is not a problem as the approach from the river to this site is jumbled rock. This year a plastic coffee mug and an article of clothing were found on site. A Moapa spindle whorl found during the survey is missing at this time and some of the hand tools have been moved onto an anvil stone. The pictographs remain unchanged. It is recommended that this site be monitored on a yearly basis as well as occasionally spot checked. It is probably not wise to monitor the site if a group is camped nearby.

A:16:162

April 1993

This site is located in an overhang of Bright Angel shale 9.7 m above 28,000 cfs. Sand is present on the floor, and the origin is probably eolian. However, some wood is present and if it is driftwood, not manuported, the sand could be from a high water flood prior to 1960. Spalling of the cliff face is the primary adverse impact followed by monitoring. It is recommended that the site be monitored on the slow end of the three to five year cycle or following a water flow in excess of 100,000 cfs.

A:16:167

May 1993

This site consists of five roasting features and a small, collapsed, scoured rockshelter with few artifacts. Artifacts suggest a multi-component site with both PI-II Virgin Anasazi and late prehistoric-early historic Pai/Paiute occupations. The site is situated on the upstream side of a delta that empties into a no-name canyon off the Hualapai reservation. Although the natural impacts such as arroyo cutting, gullyng and animal-caused erosion are high, no human impacts were observed, it was suggested to eventually discontinue monitoring. The priority rank of three recommends monitoring every two to three years.

A:16:174

May 1993

The site consists of two artifact concentrations, a large roasting pit, an FCR concentration and an FCR "alignment". It is a late prehistoric-early historic Pai site located on an alluvial terrace where it meets the base of a conglomerate formation; a shallow overhang provides shelter. Gullyng and arroyo cutting are moderately impacting the site, yet human impacts are absent. Suggested monitoring is every two to three years.

A:16:175

May 1993

This site is situated on vegetation covered dunes abutting the base of low cliffs. The bulk of the site is stable, however, bank slumpage is actively occurring in the cutbank closest to the river where artifacts are present. High flows in excess of 50,000 cfs would affect this trend to some unknown degree. There is no evidence of visitation other than archaeology stops. Loretta Jackson, Hualapai Tribe, has requested that we stop monitoring the two sites on this delta as A:16:185, a human burial, is located in the vicinity. A highly used camp is located here, but the thick vegetation generally confines people to the beach. Recommend stop monitoring A:16:185 and relegate A:16:175 to a two to three year cycle after conferring with Jackson.

B:09:316

April 1993

This site is situated along a narrow bench where the local Muav cliff makes contact with a talus slope. No change was noted since first recorded in February, 1991. The site has been inundated by high water prior to the construction of Glen Canyon Dam and is subject to flooding if flows exceed 120,000 cfs.

B:09:316 has received the lowest priority rank and needs to be monitored on a three to five year schedule.

B:09:317

May 1993

This site consists of a large, intact roasting pit with associated discard, several flakes and a Desert Side-Notched point indicating Pai or Paiute affiliation. The site is located in a partially protected flat area against the base of a cliff. Minor surficial sheeting washing, gullyng, and animal burrowing has occurred. Human impacts observed include trailing and a collection pile. Although the site is moderately stable, it is recommended that the trails should be obliterated, and that the site be tested and mapped. Annual monitoring is recommended.

B:10:111

May 1993

The site consists of three roasting pits visible on the surface as clusters of FCR sandstone and limestone eroding down the toe of a stream terrace/talus ridge. No cultural materials were observed therefore cultural affiliation is unknown. Extensive arroyo cutting and some animal trailing was noted, yet no human impacts were observed. This site did not receive a priority rank, and it is recommended to discontinue monitoring.

B:10:224

March 1993

This site is situated on the downstream cutbank of a primary side canyon drainage 80 m from the river. The location is a reworked dune field overlying a debris fan resulting from side canyon flooding. The site consists of a small pristine roasting feature and an associated cist. The cist is 50% gone as a result of cutbank erosion from the drainage. Annual monitoring is recommended.

B:10:225

May 1993

This site is located under a shallow overhang and on the slip face of a steep dune. It consists of a rock alignment and an artifact scatter/midden with sherds, lithics, groundstone, FCR and bone. The sherds suggest a PII occupation. Surficial sheet wash, gullyng, wind deflation, animal trailing and burrowing are significantly impacting the site. Human visitation is minimal. It is recommended that the site be stabilized, tested, surface collected, and monitored every two years or sooner.

B:10:227

April 1992, Oct. 1992

This site is located in an obscure overhang and is an historical site belonging to the Powell era of exploration in the Grand Canyon. The materials are in pristine condition and as such have taken on a significant aspect. Walls made by the minors for their gold washing operation are located in the modern high water zone. The site is considered off limits except for limited monitoring activity. An agenda concerning the site will be determined by the Park Archaeologist.

B:10:261

March 1993

The site is located on a series of reworked sand dunes in the upper contours of the mesquite zone. Shallow seasonal drainages effect all the features to a degree as does continual wind deflation and sediment accumulation. The roasting features are reworked in mirror image to the dunes on which they are found. No visitation observed. Annual monitoring is unnecessary and would impact the site to a greater degree than the normal regimen of erosion and deposition. Recommend monitoring every two to three years.

B:11:272

April 1993

This site is situated on a diabase bench with a veneer of eolian sand overlooking the river. Surface runoff, gulying and active arroyo development exist on 50% of the site. Two distinct trails pass through the site due to the proximity, and the popularity of the camp, and the traditional hiking by boaters. Monitor on a yearly basis to check trailing.

B:11:279

May 1993

This site is located on a flat bench above a large rapid on the downstream side of a side canyon drainage. It consists of four loci of structures and artifact scatters that are associated with a PII Formative occupation. The site is moderately stable, yet it is easily accessible and some human trails are present. Natural impacts include moderate gulying and spalling. It is recommended that the site have check dams installed and that it be developed for public interpretation. Monitoring is recommended annually.

B:11:282

March 1993

This site is located on an alluvially cut terrace in a side canyon drainage and a rocky slope above the drainage. The site consists of an intact roaster on the slope and a loose elliptical stone outline on the small terrace. Although no change has occurred since the initial recording (2-23-91), the stone outline (Feature 1) is at the mercy of any side canyon flooding. It could also be adversely effected by base level lowering. No visitation was evident. It is recommended that this unique site be monitored yearly.

B:11:284

May 1993

This site is situated in a shallow alcove at the top of talus and at the base of a limestone cliff. It consists of two rock walls that are perpendicular to the cliff base. No artifacts are present therefore cultural affiliation is unknown. The site is moderately stable and protected from the elements. The pour off above the site is the site's main threat, yet extensive surficial sheet washing, moderate gulying and arroyo cutting are also present. Human impact is non-threatening at this time. It is recommended that the site eventually be tested, and it is also recommended that we discontinue monitoring. Although, at the present time the priority rank suggests monitoring every two to three years.

B:13:002

March 1993

This site is located up a large side canyon drainage at the contact of the cliff face and talus slope. It is recommended that the site be monitored on a two to three year schedule.

B:14:093

March 1993

The site is located on a set of reworked dunes bisected by a major side canyon drainage. Feature 2 is highly eroded and Feature 1 shows evidence of ongoing erosion. Wind deflation and encroachment of arroyos are the immediate threats to the site. This low profile site acts as a barometer for rates of surface change in this reach, and it is recommended that the site be monitored annually. Profiling features, arroyo monitoring and stabilization are also recommended.

B:14:095

April 1993

The site contains roasting features, sherds and lithics representing PI-early PII Anasazi culture. The site is located in the dunes near some large debris boulders which have washed down from a large side canyon. The site is in stable condition, yet, it is moderately unprotected. Surficial sheet washing, gullying, wind deflation, dune migration, and minor animal trampling were the natural impacts that were observed. No human impacts were present. It is recommended that the site be tested, and monitored every two to three years.

B:14:105

June 1992, March 1993

This site is situated on the upstream side of a major side canyon delta. The cultural materials are found from the bedrock ledges at the cliff/slope contact, down the dune covered talus and on the bedrock ledges above the main drainage. The site is impacted by normal exposure to the elements and increased visitation from the boating community and the archaeologists. No trails eroded below ground surface have developed but distinct compaction and incipient trails are noticeable. A major camping beach is located on the downstream side of this delta. It is recommended that the site be monitored yearly.

B:14:108

March 1993

This site is located along a flat narrow ledge caused by spalling of the local cliff face. The overhang is 120 m from the river but would be inundated in extreme high water (200,000+ cfs). The large eddy caused by big flows at this location has deposited sand as well as driftwood. B:14:108 has a priority rank of four and it is recommended that this site be monitored every five years.

B:15:001

April 1993

The site is situated on a large granite bench overlooking the river. The actual prehistoric site (B:15:001) was recorded by Dr. R. Euler in 1962. The site has been monitored by Jan Balsom (Park Archaeologist) since 1982. Light trailing is present on the surface and much of the artifact scatter has disappeared from continuous visitation. The site is within 70 m of the popular camping beach. The structures have remained intact and are in good condition. It is recommended that B:15:001 continue to be monitored on at least a yearly basis. This site has excellent potential for a public awareness display/walk/mini tour.

B:15:091

Oct. 1992

The site consists of two masonry rooms and five granaries that are believed to be of PI-II affiliation, although no diagnostic artifacts were present to validate this assumption. The site is located approximately 0.6 mi below a large creek on the northwest end of a sandy delta. The site is fairly stable, yet, it is moderately unprotected and easily seen. Natural impacts are minimal and include surficial sheet

washing. Human visitation is also minimal and is seen in the form of trails. It is recommended that the structures be stabilized and monitored every two to three years.

B:15:096

Oct. 1992, April 1993

This site consists solely of the celebrated "Ross Wheeler," a boat constructed by Bert Loper and used in the Quist, Tadge trip of 1915. The boat was abandoned to its own devices and has become a physical reminder in the river corridor of the hair raising trips of the pre-dam era. In 1984 Kim Crumbo of the National Park Service chained the boat to the rocks to prevent theft, 6.5 vertical meters above the 28,000 cfs level. The boat can be seen clearly from the river and a monitoring stop for this site is a 10 to 15 minute affair. It is recommended that the "Ross Wheeler" be monitored yearly. Stops can always be made quite easily if anything looks dramatically different.

B:15:120

April 1993

This "site" is located on a bench 55 vertical feet above the 28,000 cfs level just above Bass Rapid. The "site" is an enigmatic cleared area 4 m in diameter. The area does not appear to represent a cultural manifestation and will be removed from the database.

B:15:123

April 1993

This site is located on a talus slope overlooking a secondary drainage. The entire site consists of a single fragmented vessel above ground obscured by rock. The site should be monitored for any evidence of trailing, rock movement, etc. This can be done every year by one person.

B:15:124

April 1993

This site consists solely of the historic inscription: George W. Parkins Washington, D.C. 1903. The name is carved into water polished granite 2 m above the 28,000 cfs level at an old ferry crossing. This inscription is one of the most beautifully executed works along the entire river corridor and should be checked as often as is convenient. Like B:15:096, this inscription need not be more than a 15 to 20 minute stop. It is suggested that it be officially monitored yearly. Threats include vandalism from visitors and high water in excess of 70,000 to 80,000 cfs.

B:15:135

May 1993

This site is located on the west side of a side drainage at the base of the Tapeats Formation. It consists of a rockshelter with upright sandstone slab walls outlining a habitation area. The associated artifacts suggest a late prehistoric-early historic Pai association. The site is moderately unprotected and unstable. Natural impacts such as: surficial sheet washing, gullying, deflation, dune migration, and animal trampling and burrowing. Human trailing is present, but minimal. It is suggested that a detailed site map be developed and that testing is performed. It is also recommended that the site be monitored at least annually.

B:16:001

Oct. 1992, May 1993

This is an excavated mid-late PII-early/PIII Kayenta Anasazi site. The site consists of a plaza, a roomblock of four contiguous rooms, a single room, and a detached kiva with an attached room feature. The site is located on a high terrace above the river. Burrowing and gullying make the site moderately unstable, while human impacts are moderate. Eventual stabilization of structures and annual monitoring

is recommended.

B:16:003

Oct. 1993

The site consists of five well-defined masonry structures. Ceramics are lightly dispersed and indicate a PII Anasazi affiliation. The site is situated on a flat debris flow terrace where a schist slope meets the terrace. Natural impacts are minimal but human impacts are high due to trails and a collection pile. Obliteration of trails and monitoring every two to three years is

B:16:259

April 1993

This site is located on a sand covered talus slope adjacent to the river trail near Pipe Creek. A roasting feature is eroding and represents the only site of this type in this section of the corridor. A network of social trails are developing at this location due to increased day hiking to and from Pipe Creek. Obliteration of these secondary trails is recommended. Monitor annually.

B:16:261

May 1993

The site consists of a dry-laid, masonry room and an association of lithics and groundstone. The site is situated on a terrace adjacent to and cut by a creek. No sherds were found, but the site may be affiliated with puebloan structures across the creek. The site is heavily impacted by surficial sheet washing, active arroyo cutting, animal caused erosion, and deflation. Human impacts are moderate with distinct trails, camping on the site, and trail caused erosion. Discontinue monitoring is the recommended action.

B:16:262

May 1993

B:16:262 is the USGS gauging station located .2 mi above the Kaibab suspension bridge. The station was constructed in the early 1920s and is clearly visible from the river. The priority rank has been determined as two. However, this stable structure should be officially monitored every three to five years. It may be appropriate to erect a small interpretive sign explaining the function and historic nature of the station since it is such a visible landmark.

B:16:365

March 1993

The site consists of the historic grave of Rees B. Griffiths, which is marked by a rectangular mound of rock cobbles and fragments. There is a memorial plaque stating dates and cause of death. The grave is located in between two outcrops of granite/schist. Natural impacts include minimal surficial sheet washing. Human impacts include distinct trails and erosion caused by them. Monitoring should be discontinued.

C:02:050

Oct. 1992

This site is located near an outcrop of Kaibab limestone along the Paria. It is a multi-component site consisting of sherds and lithics, and fire features that have been highly effected by historic impacts. The ceramic assemblage is a mix of Virgin and Kayenta types, and suggests a PII Anasazi occupation. Historic trash suggests use from the late 19th Century through the early 20th Century. The site is moderately stable, but it is highly unprotected. The natural impacts are extensive and include: surficial sheet washing, gullying, arroyo cutting, dune migration and animal trailing. Human impacts include moderate trailing and on-site camping. Annual monitoring is recommended.

C:02:085

April 1993

This site consists of a charcoal stain with bits of charcoal and a few associated pieces of animal bone. The stain is located in an alluvial terrace cutbank facing south. The site is unstable and unprotected. It has experienced extensive surficial sheet washing, bank slumpage and arroyo cutting and minor gulying. Human trailing is moderate. The priority rank suggests yearly monitoring.

C:02:092

March 1993

AZ C:02:092 is situated in a shallow overhang of Kaibab limestone below the Paria Riffle. It consists of two groundstone slabs, a cobble tool and a few flakes. Day-use trash associated with hikers and fishermen is usually found on the surface, e.g. cans, cigarette butts. No criminal vandalism is evident. An erosional scar is developing from a pour-over on the upstream side of the site which is removing alluvium from the terrace with each episode of rain. This erosion is not currently effecting the site but left unchecked will eventually. Monitor yearly.

C:02:094

March 1993

This site is the old lower ferry crossing below the Paria Riffle. For the purposes of monitoring, official work is done on the left bank at the riverside bedrock ledges. This area contains Mormon pioneer names and dates from the late 19th century placed on the rock face with axle grease and/or tar. Presently high day use by fishermen and hikers is the biggest threat to the site. A large amount of trash can be removed from this location on each trip; cans and bottles, charcoal, food items, fishing tackle, plastics and paper products. It is also still fashionable to put your name and date on the wall. Someone scratched Danny Ray Horning's name on a rock last summer. It is recommended that this site be monitored each spring and each fall possibly by the Lees Ferry Ranger. (See photograph).

C:02:101

March 1993

This site is a small, highly eroded fire feature located on the upper most alluvial terrace within view of 10-Mile Rock. A talus slope begins less than 1 m above the fire cracked rock. 1983 high water worked the base of the slope adjacent to the site. Surface erosion in the vicinity is currently high. The local bench is so dissected that there is more drainage than terrace. This is also a clue to why sites are rare in this stretch at lower levels. Archaeological monitoring on a yearly basis could pose a long term threat to the feature as cryptogamic soil is common. It is recommended that erosion in the vicinity be casually observed when passing by and that monitoring be conducted in alternate years. Also to test excavate what remains for a C-14 date.

C:05:004

June 1992, April 1993

This site is situated in a small cave overlooking one of the numerous rapids in the Roaring 20's. It consists of the meager remnants of a 19th century prospector/trappers cache. When the USGS trip of 1923 worked their way down the canyon the crew stopped at this spot and took their pictures with the gear. A year later one of those pictures appeared in National Geographic. Since then most of the artifacts have disappeared. Modern offerings are also present in the form of a wood carving, a candle and some incense. The cave is only 2-3 m above the 28,000 cfs level and it has been inundated numerous times between 1923 and 1983. The priority rank of C:05:004 has been rated as two, however, it is only necessary to monitor C:05:004 every three to five years or after the release of flows in excess of 50,000 cfs.

C:05:031

April 1993

The site is located on a reworked, dune covered side canyon debris fan and associated bedrock ledges. The largest erosional element on the site is an arroyo cutting the slope at the southern margin of Locus A. The site is essentially open and constantly exposed to the positive and negative effects of wind. A camping beach is located on the upstream side of this same delta. Visitation to the site was documented by a pair of underwear in the arroyo adjacent to Locus A. C:05:031 has a priority rank of two and it is recommended that it be monitored yearly. If it appears that archaeological monitoring begins causing an adverse impact the schedule should change to alternate years.

C:05:037

March 1993

This site is located on a reworked dune system overlying a talus slope and debris fan. This particular site is in poor condition. Paiute pottery was found as well as datable charcoal, yet, much of the cultural material has been weathered into eternity. A popular camp is situated less than 100 m downstream from the site. C:05:037 has been given a priority rank of two suggesting annual monitoring. However, less would be acceptable--two to three year cycle.

C:06:002

Oct. 1992, March 1993

This site consists of the inscription commemorating the death of Frank Brown. He died in the river corridor during the survey expedition of 1890. The inscription was done by boatman Peter Hansbrough who also drowned several days later down river. The inscription is placed on the water worn surface of the Coconino sandstone 5 m above the 28,000 cfs level. The high profile location could be adversely impacted by vandalism or high flows (90,000+ CFS). Paint from boats that parked directly on the inscription during the high water of 1984 is still present. C:06:002 was given a priority rank of two. Monitoring that frequently is probably not necessary. but a Photograph *once a year* should be taken.

C:06:004

Oct. 1992, April 1993

This site is situated on the back wall of a small alcove in the Supai formation. The site consists of a rock hammer outline and the letters USGS pecked into the rock surface. This was done by the USGS team on their 1923 work trip. The inscription is only 1 m above the 28,000 cfs level. The position of the hammer looks like it goes under the water somewhere around 50,000 cfs placing it below the surface several times between 1923 and 1960 and again in the 1983 flood. C:06:004 has been given a priority rank of three, suggesting a monitoring cycle of two to three years. However, annual inspections are suggested.

C:06:006

April 1993

This site is located on a sandy alluvial terrace mantled with pea sized gravels derived from the Hermit Shale. A few large boulders are also present. The site is bracketed by two arroyos that drain the talus slope behind the site. Runoff from a recent storm has moved a small boulder in a seasonal channel running through the feature. Evidence of new surficial erosion is apparent as incipient channeling and dispersed gravels. No evidence of visitation was observed. C:06:006 has a priority rank of three and it is recommended that it be monitored in alternate years.

C:09:001E

April 1993

This site is located on a reworked dune-covered alluvially cut terrace among the mesquite. Trailing from the camps to the main trail on a major delta is prevalent. High water from the 1983 flood encroached the site area closest to the river. Monitor every other year and in years when cfs exceeds 90,000.

C:09:030

Oct. 1992

The site consists of two historic but unrelated graves, the grave of Peter Hansbrough from the Stanton-Brown expedition, 1889 and the grave of a Boy Scout named David Quigby, 1951. Hansbrough's grave is located under a Muav overhang and Quigby's on a alluvial terrace. No natural impacts have been recorded, but human impacts include distinct trails, on site camping, and erosion caused by the trails. This property is monitored by the office of the Park Archaeologist.

C:09:032

Oct. 1992, April 1993

The site consists of masonry structures and granaries with no associated artifacts. The site is considered to be Mid-late Kayenta Anasazi from previously recorded data. The site is situated near the Redwall/Muav contact at the top of a talus slope. Natural impacts include surficial sheet washing and gullying. Human impact is minimal with distinct trails. Discontinue monitoring.

C:09:050

Oct. 1992, March 1993

The site is located in a cutbank on a major delta. It is unusual in that complete prehistoric puebloan vessels were found eroding from the sediment during the initial GCRCS survey in September, 1990. These vessels were removed and are curated on the South Rim. No other artifacts are currently eroding from the cutbank. This location has a priority rank of two and should be monitored at least annually. Further stops could be made to spot check the arroyo as dictated by weather, runoff and schedule.

C:09:051

March 1993

This site is located on reworked dunes overlying a debris fan up a side canyon 90 m from the confluence with the Colorado. The surface exhibits a high degree of impacts ranging from: accelerated cutbank erosion due to lowering of the base level, obvious trailing, wind deflation and localized gullying. Cutbank erosion is particularly invasive all along Locus D which parallels the creek bed and has caused Feature 3 to be bisected. Three large collection piles exist on this site (i.e., one has developed where a branch hiking trail drops into the creek at Locus D). Retrailing will prove to be helpful at the site by redirecting the foot traffic. An extensive prickly pear field already protects much of the surface at this site but retrailing is suggested because there are visible features at Loci A and D. C:9:051 has a priority rank of one and should be monitored twice a year by two crew members. It is also suggested that the site be professionally mapped--total station/OPS.

C:09:052

Oct. 1992, March 1993

This site is located in an open area of reworked dunes between mesquite thickets. The site is impacted in a minor way by wind; however, the primary impact is trailing by hikers and river runners. Collection piles of over 50 sherds are common on this site and the artifact rich site adjacent to it. Recent retrailing should reduce human impact. Recommend monitoring on a yearly basis. Also map in detail.

C:09:053

Oct. 1992

This site consists of three artifact concentrations and a rock alignment. Artifacts consist of sherds, lithics, and bone, concentrated on the east and south slopes of a dune. Cultural affiliation is considered Mid-late PII Anasazi. The site is situated at the mouth of a canyon and is buried by a dune deposit. Natural impacts are minimal with the presence of burrowing and wind deflation. Human impacts are very high including site camping, trails, and erosion caused by the trails. Annual monitoring and detailed mapping are the recommended actions.

C:09:068

April 1993

The site consists of a sparse sherd and lithic scatter, with about 10 sherds and several lithics. Artifacts suggest this was a PII Anasazi occupation. The site is located on top and along the slope below an alluvial fan. Natural impacts include gullying and animal caused erosion by trampling. There are no human impacts that have been recorded. Test for subsurface cultural deposits is the recommended action. Monitor in alternate years.

C:09:069

March 1993

This site is located on an old river terrace equivalent to the upper mesquite level. No changes have been noted since the initial recording (9-2-90). The grass and low vegetation are currently prolific on site covering and protecting features that are visible in the fall and winter. Recent retrailing by the Park Service has been noted. Monitor annually.

C:09:082

March 1993

The site is located in eolian dunes above the mesquite terrace proximal 70 m from the river. Wind deflation and trailing have the largest adverse impacts. Two distinct activity areas emerge from the dunes containing both PII Anasazi and later Paiute ceramics. Due to the fragile nature of the site any visitation has an adverse effect. This year at least three "show me" trips and a monitoring trip have visited the site plus untold backpackers. C:09:082 has a priority rank of two and it is recommended that the site be velvet glove monitored annually by two archaeologists.

C:09:088

May 1993

This site is the Bureau of Reclamation's Marble Canyon Dam location situated on both sides of the river in the steep narrow recesses of that canyon. The site stretches for a half mile down river. Remnants include test adits and associated debris fans, broken loading docks, cable, bolts, gauges, abandoned barges, retaining structures, walls, trails, cans, glass and domestic garbage. This was also the location of a cable system erected to bring in men and supplies from the rim. The project lasted over a year and was abandoned in 1951. The cable system was also destroyed at that time. It is recommended that C:09:088 be monitored yearly with particular emphasis placed on the erosion of the debris fans and the sediment filled barges.

C:13:006

March 1993

This site is eroding out of redeposited sand on the upstream side of a major canyon. The site is rich in materials including ceramics, lithic tools and debris, ground stone and structural outlines. Adverse impacts are present in a threesome: (1) continual erosion of the local secondary drainage due to seasonal

flooding, causing further cutting of the slope on which the site is perched; (2) wind deflation and; (3) archaeological intervention. Monitor annually by a single person.

C:13:007

Nov. 1992, April 1993

This site is a mid-late PII Anasazi occupation consisting of three, possibly four structural outlines. FCR, sherds, a few flakes, ashy soil, and rodent bones of questionable affinity were found. The site is located on the north side of a canyon drainage and on a dune-covered bench above the river. Natural impacts are moderate including sheet washing, gulying, and active arroyo cutting. Human impacts are moderate including distinct trails, on site camping, and erosion caused by the trails. Retrail or define existing trails, obliterate trails, and annual monitoring are the recommended actions.

C:13:008

April 1993

C:13:008 is one of the best photo documented archaeological sites in the Grand Canyon. It was originally recorded and photographed in 1965, and Park Archaeologist Jan Balsom has monitored it since 1982. Because it is located over 150 m from the river the site will be deleted from the schedule unless a really big flood occurs.

C:13:009

Oct. 1992, May 1993

The site consists of numerous (24) non-architectural and structural features. The artifact assemblage is dominated by PII/early PIII Anasazi ceramic debris. Numerous percussion tools and abraders exist. The site is located on an alluvial bench and an adjacent slope. Natural impacts are high and include sheet washing, gulying, and active arroyo cutting. Human impacts include collection piles and distinctive trails. Rerouting trails, stabilization, and continued annual monitoring are recommended.

C:13:069

Oct. 1992, April 1993

This large site consists of several cists and masonry structures. The features are eroding out of dunes and the cultural/temporal relationship is unknown. Features include slab-lined cists, architectural walls, habitation rooms, charcoal-stained soil, and a light scatter of sherds and lithics. Natural impacts are moderate including surficial sheet washing, gulying, active arroyo cutting, burrowing, wind deflation, bank slumpage, and dune migration. Human impacts are high including distinct trails, trail caused erosion, and minimal site camping. Retrail or define existing trails, obliterate trails, and monitor biannually or quarterly are the recommended actions.

C:13:070

Oct. 1992, March 1993

The site consists of artifact concentrations situated along the edge of terrace overlooking the river at the mouth of a tributary. Artifacts indicate a PII-early PIII Anasazi occupation. Natural impacts include surficial sheet washing, gulying, active arroyo cutting, animal trailing, wind deflation, bank slumpage, and dune migration. Human impacts are high including collection piles, distinct trails, and on site camping. Monitor biannually or quarterly.

C:13:092

Oct. 1992

This historic camp presumably belonged to the prospector Felix Lantier and dates to the turn of the century. the camp consists of the structural outline of a tent platform, a fragmented woodstove, wire nails, bottle glass and saw-cut wood. Prehistoric sherds are also present on the adjacent slope. These

sherds are associated with the PI-PII Anasazi occupation of this particular delta. This site is proximal (10 m.) to the river and only 6 m. above the CFS level. It is recommended that C:13:092 be monitored twice a year.

C:13:098

Oct. 1992

This historic mine and habitation has been heavily hit over the past decades by natural erosion as well as by human impacts. What remains are the actual tunnels to the mine, the wooden foundation of a tent structure, and various artifacts including: iron cookware, cans, stove fragments, wire nails, glass, saw-cut wood, buckets, cartridges, barrel hoops. The bulk of these items belong to the turn of the century, but there are examples present dating from 1920 to 1940. Due to the tendency of this location to suffer from surface erosion as well as visitation, it is recommended that C:13:098 be monitored twice a year.

C:13:100

Oct. 1992, March 1993

This site is located on a reworked sand dune on the lower mesquite terrace, and was originally recorded by Park personnel in July, 1978. Gullying is impacting the majority of the site and particularly Feature 4. There is also a major hiking trail that runs through the site. A cobble tool in the drainage associated with Features 5 and 6 has moved 1.5 m since the archaeological survey in September, 1990. C:13:100 is a site that dovetails with the USGS (Hereford) geomorphological work and should be watched closely. Monitor yearly.

C:13:101

Oct. 1992

This prehistoric site consists of several features (hearth, a room and cists) and associated artifacts belonging to the Anasazi culture with PI-PII affiliation. The site is situated on a transport slope which is prone to intensive surface runoff. It is also proximal to a major hiking trail and located within 100 meters of a river camp. The trail has been recently removed from the immediate area of the site, thus deleting one of the causes of adverse impact. It is recommended that this site be monitored on an annual basis.

C:13:272

Oct. 1992, March 1993

The site is a late PI-early PII Formative special use area consisting of five features and two artifact concentrations. Features include roasting pits with charcoal staining and FCR. The site is located on an alluvial terrace at the base of the Dox formation. Natural impacts include surficial sheet washing, gullying, and active arroyo cutting. Human impacts are moderate and include distinct trails and erosion caused by them. Retrail or define existing trails, obliterate trails, install check dams, Test for subsurface cultural deposits, full data recovery and monitor biannually or quarterly are the recommended actions.

C:13:291

Oct. 1992, March 1993

This site is located on an eroded and highly dissected alluvial terrace. C:13:291 was originally recorded in October of 1988. At some point before the GCRCS survey (1990-91) the site was adversely impacted by a side canyon flood causing damage to all visible structures as well as moving the surface assemblage. The telltale red clay signature of the side canyon flood can be seen from the river as a cap on the tan alluvial sands of the Colorado in the cutbank at the boat beach. A large Juniper beam can be seen as a vertical post in the arroyo at Feature 4. Monitor yearly and map professionally. It is also suggested that a stationary camera be placed on this site as soon as a suitable location is agreed upon.

C:13:321

Oct. 1992, April, May 1993

This aceramic site consists of an enigmatic rubble mound of angular Dox sandstone slabs (probably historic), discard piles, and four roasting pits/hearths. The cultural affiliation is unknown. The site is located in a drainage between large sand dunes. Natural impacts include surficial sheet washing, wind deflation, bank slumpage, and dune migration. Human impacts are moderate and include distinct trails, erosion caused by them, on site camping, and rearrangement of rocks. Monitor annually.

C:13:329

March 1993

The site is located in a shallow overhang and reworked dunes. Features 2 and 3 are subject to adverse effects by local gulying and Feature 3 could be undercut in the event of high water in excess of 80,000 cfs. No observable change noted since recorded in September, 1990. C:13:329 has been given a priority rank of three. We recommend however, that Feature 3 be monitored annually for at least the next two fiscal years. May also consider stabilization and profiles.

C:13:334

March 1993

This is an open, multiple-feature site with three features and an artifact scatter. The artifacts suggest a late PI-early PII Cohonina affiliation. The site is situated on an alluvial terrace. Natural impacts include surficial sheet washing and gulying. There are no human impacts. Monitor every two to three years.

C:13:336

March 1993

The site is located on an alluvial terrace proximal 48 m to the river. The terrace surface is covered by a veneer of reworked sand, and the site can be seen in the deflated areas between the low dune crests. This is typical of the sites in this area. The Beamer trail also transects this site adding in some unspecified degree to the adverse impact. C:13:336 is within the boundaries of the USGS (Hereford) geomorphological study and, as such, it is recommended that the site be monitored yearly.

C:13:339

April 1993

The site consist of a mid-late Pueblo II habitation buried on an alluvial terrace, plus two later historic hearth features which post-date the main occupation of the site. The site is situated against a Dox sandstone cliff. Natural impacts include surficial sheet washing, gulying, active arroyo cutting, and bank slumpage. Human impacts include distinct trails, trail caused erosion, and rearrangement of rocks. Retrail or define existing trail obliterate trails, and annual monitoring are recommended actions.

C:13:342

April 1993

This historic site is located over 200 m from the river yet it is only 7.5 m above the 28,000 cfs level. The structure and artifacts are situated on a reworked sand dune associated with old mesquite growth. It is visited by backpackers and river personnel. Some minor movement of 19th century artifacts that reside as a modern display on an old horizontal wooden beam has been noted since the site was recorded in September, 1990. An incipient runoff channel is developing on the west-side of the site. It is recommended that C:13:342 be monitored yearly.

C:13:343

April 1993

This site is eroding down a reworked sand dune and an associated cutbank all of which overlies a scoured Dox sandstone outcrop. No change is apparent on the surface since the recording of the site in September, 1990. The site's greatest threat is an arroyo carved into the bedrock which channels seasonal runoff against the cutbank containing cultural material. It is recommended that C:13:343 be monitored the next fiscal year and at that time a decision can be made concerning rechanneling and further scheduling.

C:13:347

April 1993

This site consists of a wall remnant in an arroyo less than 20 m from the river and only 1.75 m above the 28,000 cfs level. The high cfs flows of 1983-84 caused steepening of the arroyo floor below the wall which accelerated erosion of the feature. Erosion is taking place at the present time as evidenced by photographs taken when the site was recorded in September of 1990. Although this site received a priority rank of three, it is recommended that due to the proximity of the site to the river and its placement in an active arroyo, it be monitored yearly and possibly tested and stabilized.

C:13:349

April 1993

The site consists of a historic cabin/dugout, FCR, and artifacts. No artifacts indicating function were found in association with the structure. The prehistoric components are pre-ceramic and PI-II Anasazi. The site is in dunes that run parallel to the river. Natural impacts include surficial sheet washing, gullyng, and active arroyo cutting. There are no human impacts. Annual monitoring is the recommended action.

C:13:350

April 1993

This site is located in a reworked dune field 126 m from the river. What remains on the surface is highly deflated. There is no apparent on site change since its recording in September, 1990. The site is 5 m above 28,000 cfs. It is recommended that C:13:350 be monitored every two to three years.

C:13:354

April 1993

This site is a group of sandstone slab and mortar granaries situated on a Dox ledge and overhang adjacent to the river. The features are 9 m above the 28,000 cfs level and at some time in the past have been inundated by extremely high water flows. No artifacts are present at the site. No change has occurred since the original recording in March, 1991. It is recommended that C:13:354 be monitored annually even though the site was only rated a priority rank of three.

C:13:355

March, May 1993

The site consists of four roasting/fire features and Paiute sherds. All features appear prehistoric/protohistoric (A.D. 1200-1600). The feature is located in a tamarisk/mesquite zone. Natural impacts include gullyng, active arroyo cutting, bank slumpage, and animal trailing. Human impacts are minimal including trails and erosion caused by them. Retrail or define existing trails, map in detail, and monitor annually are the recommended actions.

C:13:356

April 1993

The site, located at the mouth of a drainage, consists of a quickly eroding prehistoric wall. There is a burned beam that could yield a date. There is potential for an intact room/rooms existing behind the wall buried in the dune. Natural impacts are present including surficial sheet washing, bank slumpage, and arroyo cutting. The site has minimal human impact. Monitor annually.

C:13:359

April 1993

The site is located on a sand dune abutting a local cliff base. The site is approximately 18 m to the river and only 5 m above the 28,000 cfs level. Gullying is impacting the site particularly at Feature 2-- a structural wall has been cut by seasonal runoff. After fluviially dictated surface erosion, archaeological monitoring has the greatest adverse impact on this site. C:13:359 is monitored on a daily basis by a camera located on the opposite bank. Due to the fragile nature of the surface it is suggested that actual physical monitoring be done every year by a single archaeologist.

C:13:365

April 1993

This site is located on a partially sand covered debris fan and consists of two highly deflated fire features. It is recommended that this site be monitored during the next year and then on a three to five year cycle.

C:13:368

April 1993

This site is located under a rock shelter in a travertine deposit. Alluvial deposits are present in the shelter as fine-grained laminated sediment. A new gully has formed on the surface due to a structural alteration in the dripline of the overhang. No visitation is evident. C:13:368 has a priority rank of three, and it is recommended that the site be monitored every two to three years.

C:13:371

March, April 1993

This site is located at the mouth of an unnamed drainage below the Little Colorado River. Features and artifacts are situated on a debris fan near the river, reworked sand-covered terraces and the upper bedrock ledges. A side canyon flood in the early fall of 1990 had a high adverse impact on the site; particularly Features 2, 3, 4, and 5, located in the sand nearest the canyon mouth. The lowest portion of the site (Feature 7) is susceptible to flooding with cfs levels over 40,000. Presently the site is monitored on a daily basis by a camera located on the ledges. C:13:371 has a rank of two on the monitoring form. It is recommended that the site be monitored twice a year by a crew of no more than two archaeologists. It is also suggested that the site be professionally mapped to scale, and tested to determine integrity of the lowest feature.

C:13:379

April 1993

The site comprise five features that are exposed in arroyos that cut an alluvial terrace. The features include a slab lined cist, two wall remnants, a disturbed area that may have wall remnants, and a coursed wall with trough metate fragments. Ceramics suggest an Early-mid PII Anasazi affiliation. The site is in a chain of high dunes pinch out at a distinct bend in the upper terraces. Natural impacts are extensive including surficial sheet washing, gullying, active arroyo cutting, wind deflation, and bank slump. There are no human impacts. Monitor annually.

C:13:381

April, May 1993

This highly eroded site is located on the first sandy terrace above a local side canyon debris fan. The site is bounded by a major hiking trail and is also adjacent to a backpackers' camp. No erosional changes were observed. C:13:381 has a priority rank of two suggesting a yearly monitoring schedule. It is recommended that this site be monitored next year and at that time it will be decided if this rank is appropriate.

C:13:384

April 1992, April 1993

This is a buried site in a cutbank up a major side canyon. The deposition shows an alternating regime of overbank flooding from the Colorado River and the seasonal side canyon flooding of Lava-Chuar. Late 19th century material has been recovered from the top .10 m of soil development. Two meters down at the base of the cutbank there is a vertical slab lined hearth. In 1991 the USGS and Helen Fairley (NPS archaeologist) did some work and on completion did some expedient shoring up of the base of the cutbank with dirt and dead vegetation. This effort will protect the feature from a single side canyon flood which at the latest will occur next spring. Further episodes of runoff down Lava-Chuar will continue to erode or destroy the site. It is recommended that this site be physically monitored at least once a year and spot checked two to three times.

C:13:385

April 1993

This 12th Century Kayenta Anasazi site is situated on the lip of high sand covered terrace. The site consists of two slab lined features eroding out of a sandy slope, and an artifact scatter dominated by late PII. Several chipped stone and grinding tools are associated with the site. Surficial sheet washing, active arroyo cutting, wind deflation, bank slumpage, and dune migration are the natural impacts. There are no human impacts at this time. Test for subsurface cultural deposits, and monitor annually are the recommended actions.

C:13:386

March 1993

The site consists of a single, isolated, slab-lined cist on a dune. No artifacts were observed and cultural affiliation is unknown. The site is on a dune slope just above the mesquite and driftwood zone. Natural impacts include sheet washing and minor erosion. There are no human impacts at this time. Monitor annually.

G:03:002

April 1993

G:03:002 is another large roaster complex containing a minimum of ten surface features and associated artifacts. Desert side notched points, groundstone, purple glass, metal artifacts, and ceramics are present on the surface, indicating Hualapai use through the turn of the century. Impacts include surface runoff, deflation, localized gullyng, animal trailing and minor human visitation. It is recommended that this site be monitored on an annual basis and mapped in detail.

G:03:003

April 1992, March 1993

This multi-component rock shelter and associated roasting features rests on large sand dunes that have evolved over an alluvial terrace on the downstream side of Granite Park. A minor trail which was established in the 1960s has been enhanced by archaeological work and increased visitation from

the river running community. Aerial photographs taken over the last 25 years show a geometric increase in the social trailing at Granite Park. This trend is enhanced by the local bighorn sheep herd which in the last two years has spent considerable time in this area due to the lush grass growth that accompanied the wet winters. Wind deflation and channeled runoff due to trailing are secondary impacts at this time. G:03:003 has a monitor rank of two and should be monitored at least annually. Spot checks should be made two to three times a year to note any further encroachment of the trail from Granite Park drainage to the rock shelter. This trail should be obliterated.

G:03:004

Oct. 1992, March 1993

G:03:004 is an extensive multicomponent site, consisting of a rock shelter, midden, numerous roasting/fire features, rock art, and historic and modern trash. The site is located at the mouth of a major side canyon and is situated less than 100 m. from an established boat camp. Trailing has become extensive due to increased awareness of the site and the popularity of the location as an overnight camp as well as a common lunch spot. The priority rank of 2 indicates the site should be monitored a minimum of once a year. It is recommended that G:03:004 be monitored before and after the tourist season (May-September) and that the site be mapped in detail using a total station.

G:03:020

April 1992

This site is located on reworked sand dunes occupying both sides of a side canyon drainage as it enters the Colorado. Headward erosion of the local arroyo and gully system are the main adverse impacts to the site. Feature 7 is nearly gone due to this process. Extreme high water (80,000+ cfs) could back up this canyon and further undercut the sandy bank upon which Feature 5 rests. G:03:020 has a priority rank of two and it is recommended that it be monitored on a yearly basis for the present. Profiles and testing is also suggested.

G:03:023

Oct. 1992, May 1993

This site consists of a small rock shelter containing numerous historic artifacts and an unaffiliated prehistoric component. Erosional impacts are minimal. The greatest risk is from visitation, not fluctuation of the river. It is recommended that G:03:023 be monitored on a two to three year schedule.

G:03:024

May 1993

G:03:024 is a roaster complex with associated sherd and lithic scatters. Cultural affiliations include Pueblo II Anasazi and Pai/Paiute occupation. This site is located on a sand-covered terrace prone to gullying as well as deflation. Features 2, 3 and 4 are particularly at risk. It is recommended that this site be monitored on an annual basis. It is further recommended that G:03:024 be mapped in detail with the other sites in vicinity.

G:03:025

March 1993

G:03:025 is a large roaster complex containing a minimum of eight features and numerous artifacts. The site is affiliated with the Pine Springs Band of the Hualapai. Paiute pottery is present, indicating trade or seasonal use by those people, as well. Historic artifacts are also present and indicate aboriginal use of the area during the turn of the century. The potential for adverse impacts at this site is high due to a combination of factors; surface runoff, arroyo formation, deflation, animal trampling/trailing, and visitation. It is recommended that G:03:025 be monitored on an annual basis and be mapped in detail using a total station.

G:03:026

March 1993

This site is located on reworked sand derived from older alluvial terrace overlying debris flow deposits. Social trailing, bighorn sheep grazing and minor wind deflation are the adverse impacts. The monitoring form suggests a rank of two which indicates a yearly monitoring schedule. Retrailing or obliterating many of the trails at Granite Park may be warranted.

G:03:027

April 1993

This site consists of a group of bedrock mortars located in the boulder debris adjacent to the river at Upper Granite Park Wash. The best example of the mortars is visited by many modern river running trips and a prominent trail has developed. These lovely and unique artifacts are as nearly indestructible as they are uncollectible, putting them at low impact risk. G:03:027 has a priority rank of three and it is recommended that it be monitored on a two to three year cycle.

G:03:028

March 1993

G:03:028 is another large site consisting of six loci, including roasters, domestic activity areas and artifact concentrations. PII sherds are present but the site is dominated by Hualapai use. The site is located on a sand-covered terrace and is prone to the effects of erosion in the form of gulying and deflation. Human impacts are also an ongoing problem due to social trailing, particularly at features 1, 2 and 3. It is recommended that G:03:028 be monitored on a yearly basis and be mapped in detail with the other sites in the vicinity.

G:03:042

April 1993

This unique site consists of a group of beautiful bedrock mortars sunk into riverside ledges of Tapeats sandstone. These labor intensive features are intrinsic to Yuman and Numic culture in the western reaches of the river corridor downstream all the way to Yuma. Human impact is not a problem nor is erosion of the actual mortars. G:03:042 was given a priority rank of three. It is recommended however that due to the unique nature and pristine condition of the site that it should be checked annually.

G:03:044

April 1993

This site is situated in rock shelters at the base of a Bright Angel cliff as well as on the talus slope beneath it. The site extends on to a sandy reworked alluvial terrace closer to the river. Locus A is the upper level and Locus B is on the terrace. Headward migration of a local arroyo at Locus B is compromising the roaster. The bulk of the site is removed from any river impact and the biggest threat to the site is too much visitation from archaeologists. G:03:044 attained a priority ranking of two indicating annual monitoring. It is recommended however that only Locus B be monitored for expansion of the arroyo and the erosion of the roaster. A detailed map, testing and profiling is also recommended at Locus B. Locus A can be left alone unless otherwise indicated by radical change on the terrace.

G:03:061

April 1993

This site is located in a Tapeats sandstone rock shelter overlooking a small side drainage and its associated debris fan. This site harbors datable materials, good depth and other than monitoring is free of human impact. Access is across an unfriendly boulder field and it is unlikely that anyone would stop here

barring incredibly foul weather or a random boat disaster. Large cat dung, coyote scat and owl pellets are all present. G:03:061 has been given a priority rank of three suggesting monitoring on a two to three year cycle. It is recommended that this site be monitored once every three years to minimize compacting the loose, carbon-rich surface.

G:03:064

April 1993

This site is a roaster complex situated on an alluvial terrace directly above the mesquite line adjacent to the river. The sediment comprising the terrace is poorly consolidated and easily eroded. Over thirteen archaeological features are present on site and are dominated by the distinct mounds of FCR indicating roasters. The entire terrace system has been eroding since at least 1965 and is currently expanding at an undetermined rate. Due to the protective caps of FCR erosion is occurring differentially, cutting channels around the roasters creating peninsulas as the drainages carve out the loosed and unprotected sediments. Ultimately the archaeological features will be isolated, pedestaled and brought down to base level with the rest of the terrace. The U.S.G.S. is particularly interested in this location as a recent phenomenon of unique quality to the river corridor and has been studying the arroyo system in detail since 1992. Carbon-14 samples were taken from buried cutbank deposits by the NPS this year revealing a suite of dates ranging from 1880 +/- 70 BP to 2870 +/-60 BP. This office is currently in consultation with the Hualapai Tribe on the condition and future of this property. It is recommended that G:03:64 be monitored twice a year (spring and fall). It is further recommended that monitoring be done by two archaeologists and that visitation to this site be strictly limited due to its fragile nature.

G:03:066

March 1993

This site is located at the base of a talus slope on an eolian sand covered bench overlooking the local side canyon drainage.

The site consists of a small intact roasting feature and a bedrock grinding slick, yet no artifacts are present on the surface. The site is in excellent condition. Oddly enough in a small gully meters from the roaster a large amount of modern trash was found. This was apparently an abandoned food cache deteriorating in place and consisted of powdered soup, hot chocolate packets, food cans, ketchup, coffee and opened Budweiser beer cans. Rodents and insects made the most of it and a large garbage bag full of the debris was removed, leaving no trace. It is recommended that this site be monitored every year.

G:03:067

May 1993

G:03:067 is located on a major delta on a low dune-covered debris fan. It is situated between two major river camps and is adversely impacted from extensive social trailing. The roasting features are highly eroded and surface artifacts are scarce. Feature 1 is only 50 m from the river and could be impacted by extreme high water (90,000+ cfs). G:03:67 has received a priority rank of one. However, annual monitoring will be sufficient.

G:03:072

May 1993

G:03:072 is a roaster complex with a minimum of fourteen features. Numerous artifacts are present on the surface, including Pai and Paiute ceramics. Natural impacts are the greatest threat to the site, with all features being subject to damage from varying degrees of gullying. It is recommended that G:03:072 be monitored in alternate years and be mapped in detail using a total station.

G:03:077

March 1993

This site consists of a small group of hematite pictographs and associated grinding slicks. The site is located on Tapeats ledges near river level. Potential adverse impacts include cliff spall, side canyon flooding, and visitation. G:03:077 is a Traditional Cultural Property of the Hualapai tribe and they should be consulted regarding any action taken or change noted at this site.

G:03:079

April 1993

This site is located in a Tapeats sandstone rockshelter. The shelter is well protected by a large mesquite thicket and boulder field. It is also 12 m above the 28,000 cfs level. There has been no observable changes since recorded (4-28-91). Recommend monitoring on a three to five year cycle.

G:03:080

March 1993

The entire site is located on the upstream side of a major side canyon. This extensive site is situated on a dune-covered debris fan as well as on the base of the locally occurring basalt cliff. On the downstream side of the delta there is a popular camping beach. The rock art (pictographs) act as a draw for visitors. Side canyon flooding is always a potential danger to the features adjacent to the drainage (e.g., Features 4, 5, 6, and 7). Spalling is a continuous impact to the rock art. There is no permanent trailing, but visitation is obvious from footprints, a gum wrapper and a cigarette butt. Recommend monitoring at least annually with spot checks as appropriate, and checking lower features for any arroyo development.

G:03:082

June 1992, March 1993

This site is located in a series of Tapeats ledges and overhangs adjacent to a steep narrow side drainage. The site is in poor condition due to runoff from local pour overs. No depth remains to test. This site has a priority rank of three. It is recommended that G:03:82 be monitored on a two to three year cycle.

G:03:085

April 1993

This site is located on a dissected, reworked dune and associated bench. Cultural materials are represented by a brownware pot drop and several flakes. Fluvially-caused erosion on the surface is high, but visitation is non-existent. It is recommended that this site be monitored every two to three years.

Conclusions

With a second year of monitoring behind us we are beginning to discern general trends dictating the problem of ongoing erosion to cultural properties in the river corridor. The primary problem is the restricted flow of water determined by Glen Canyon Dam. Since construction of the dam, sediments which once flowed through the system are now effectively trapped in Lake Powell and unavailable for dispersal downstream. Currently if the protective cover of unconsolidated sediment is removed by the forces of erosion there is little or no chance it will be replaced from an archaeological site (see figure 7).

From a geomorphic perspective, the dam acts to create an artificial altithermal environment for the river corridor. This altithermal environment is created by increased rates of erosion combined with the perpetual downcutting of side drainages and dissection of established alluvial terraces. These mechanisms are compounded by the unnatural lack of sediment within the system (Ivo Luchita personal communication, USGS). This scenario contributes to the lowering base level of the mainchannel which in turn increases the gradient of secondary drainages flowing into the Colorado (Hereford *et al* 1991). This results in accelerated erosion throughout the corridor and subsequently the incremental loss of archaeological sites.

The flooding of the Little Colorado River (LCR) in 1993 is an excellent example of how much sediment can be added to the system by the natural course of events (see figure 5). Two episodes of unusually high discharge were recorded on January 12 (13,700 CFS) and January 21 (10,600 CFS). Added to the flows in the main channel, 17,150 CFS peak flow on both days, a total of 30,850 CFS and 27,750 CFS respectively would have rolled down the river below the LCR. The amount of sand deposited by the river as the waters receded was phenomenal. Over the spring and summer the bulk of the sand could be seen being reclaimed by the river in a relationship as old as the canyon itself. However, some unmeasured fraction of silt and sand was redeposited on the banks and slopes adjacent to the river. In fact on separate occasions during work trips in the spring of 1992 so much sand was blowing around in Reach 5 that it was at times difficult to see. These are the steady state conditions most conducive to long term preservation. Since 1960 the dam has intervened in the naturally occurring system. There is presently no mechanism operating which generates enough free sediment to refurbish the surface once the eolian blanket is removed.

1. A new efficient monitoring form will be utilized in 1994 consisting of a single sheet on both sides.
2. It has been determined that more detailed maps need to be produced for most if not all of the sites at risk. This will begin in 1994.
3. A pilot program to track the movement of surface artifacts at select locations will begin in 1994. Quantitative information will be available for 1994.
4. Photographic work has been scaled down to duplicate only the essential images which illustrate ongoing and potential impacts instead of every feature on every site every time monitoring takes place. This still generated 962 black and white photographs for FY 93.
5. We must remain consistent with our field work, but flexible. If we are on the water and notice recent erosion in a locality that does not appear on the current schedule we should be able to investigate. To document any change immediately after it occurs should be a priority when the opportunity arises.
6. The stationary cameras remained in their original locations during FY 93 (see Figure 5). Some of

the sites may be changed in FY 94.

7. At this time the staff has developed a very good idea of how often sites need to be looked at and when. October through April remain the optimum months. with December through the end of February being too cold and too dark to make work trips worth the time and money. Mid-May through mid-September is generally too hot and the corridor is crowded with too many tourists to make the work efficient and unnoticed. A trip can be scheduled in September to do show-me stops and pick-up work.
8. Mixed work trips, although sometimes unavoidable, remain inefficient and should be avoided as much as is practical.

In conclusion, we would like to thank the Bureau of Reclamation and the cooperating agencies for their suggestions and critical thinking, and the River Subdistrict for their continued support. Any questions or comments can be directed to NPS Project Archaeologists Christopher Coder and/or Lisa Leap located at Box 5617, Northern Arizona University, Flagstaff, AZ, 86001.

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