

SUMMARY REPORT FOR 1992 GCES MONITORING OF ARCHAEOLOGICAL SITES
FROM LEE'S FERRY TO SEPARATION CANYON, GRAND CANYON NATIONAL
PARK

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I. Introduction

From August of 1990 through May of 1991 an archaeological survey was carried out along the Colorado River Corridor between Glen Canyon dam and Separation canyon. This cultural inventory covered a total of 255 linear miles along both banks of the river. The area surveyed consisted of a swath of terrain beginning at the waters edge up to the theoretical 300,00 CFS level.¹

A total of 475 archaeological sites were recorded² including prehistoric and historic properties. From this large pool of sites a total of 160 were found to be impacted to a greater or lesser extent by the Colorado River itself.³ These sites were then entered into a group to be monitored on a scheduled basis. This monitoring phase of archaeological work is intended to document as well as better understand the changes occurring to the cultural properties along the river corridor with particular reference to the machinations of Glen Canyon Dam.

II. Scope of Work

Selected sites in the Grand Canyon National park have been casually monitored since the 1960's, but the process was informal and discontinuous. Since 1985 however, a formal annual monitoring trip has been conducted by the Park Archaeologist between Lees Ferry and Diamond Creek. There is some overlap between the sites monitored on the annual Park trip and the Corridor Project sites, however, these two projects will remain separate in scope.

For the fiscal year 1992, monitoring of the selected sites consisted of, 1. Photo documentation, 2. Completion of an experimental monitoring form, and 3. The entering of the

¹The 300,000 CFS level remains a floating and judgemental contour dependent on width of the river and the observer's ability to discern vegetation lines combined with knowledge of historic high water flows.

² This includes ---- which were previously recorded but were for various reasons re-recorded to include them in the GRCA database.

³ The parameters of this process are spelled out in the EIS statement of January 1992. The process is ongoing and the monitoring phase is subject to change dependent on new and better information obtained from current studies.

acquired data on a computer system. The monitoring form (see pages) is a compilation of quantitative and observational judgments designed to rank each site individually as to its stability, state of erosion and priority for further work. In addition, the form is designed to facilitate the transference of data onto a computer file.

From April 1 through September 1992, three separate monitoring trips were launched and completed on schedule. The first trip (April 1-11) utilized 2 motorized snout rigs. Each boat carried two archaeologists and a Park Service boatman. Two Paiute tribal members, Gevine Savala and Verdell Jakes accompanied this trip as guests of the Park Service and representatives of their tribe.

A total of 34 archaeological sites were monitored during this trip. Importantly, weather was good, making actual monitoring easier to accomplish. Due to the wet winter, grasses and low vegetation were growing in profusion throughout the river corridor obscuring many of the sites and protecting them as well.

Three of the four archaeologists on this initial trip had been crew chiefs during the survey phase of 1990-91 and this element was crucial in the expedient location of sites as the trip moved down river. The point is that geographic experience is a critical element on the river concerning time, and time is money. Without some geographic expertise in the corridor either by the archaeologist or the boatman a lot of valuable work time can be lost searching for sites.

Trip # 2 (June 11 to June 20, 1992) consisted of a single motorized snout rig with a crew of 2 archaeologists and a Park Service boatman. In addition, a guest of the Park Service, William Morris of the Arizona Department of Public Safety, accompanied the trip.

A total of 25 sites were monitored during this trip. Surface vegetation was beginning to dry up by this time, presenting a slightly better view of the surface than in April. However, tourist traffic was much greater and the temptation for many of them to stop and see what the archaeologists were doing was high. These are generally positive encounters with some information imparted and some public relations work thrown in. Unfortunately, we know that even for the well-intentioned, after a certain point, the more people that know about each site the more likely that site is to be visited, revisited and adversely impacted.

The third trip of 1992 (September 4 to September 13) was also a single motorized boat trip, consisting of three archaeologists and a Park Service boatman. Twenty-four sites were monitored on this trip making a total of 81 completed for 1992.⁴ During September the surface was visible as the bulk of the vegetation had succumbed to the summer heat. A lot of people were still present in the corridor and often curious

⁴ Two sites (B:16:262 and C:13:371) were monitored twice in 1992.

about our work. Once again, these encounters were positive. What we would like to stress is this: some of the sites we work with are more sensitive than others regarding content and affiliation. It remains up to the good judgement of the field crew when to be discreet and when to do interpretive work for the taxpaying public.

In addition to the scheduled monitoring of sites by boat and crew there are currently five archaeological sites located between Lee's Ferry and Diamond Creek being monitored by stationary cameras. The cameras now in use are located at the following sites: AZ:C:13:371, AZ:C:13:003, AZ:C:13:359, AZ:B:10:229, and AZ:A:16:180. These cameras were tactically placed in March of 1991. Each camera⁵ is anchored in a specially designed ammo box and silicone glued to the appropriate rock. The camera automatically takes a single photograph each day at the same time. The film cannot be stacked, thus it must be changed every 36 days in order to avoid unsightly gaps in the record. This monthly procedure is now being taken care of by the GCES beach erosion study team. The study team is allowed use of our data and we are saved the trouble of a monthly trip to change the film in 5 cameras. The slides are digitized, catalogued and stored at the Geography Department on the Northern Arizona University campus in Flagstaff. We have open access to this collection.

Laboratory Methods: Before going into the field, the lab staff prepared "site packets" containing a blank monitoring form to be completed in the field, copies of the Imacs site form, site map, and the prior year's monitoring form. Photographs of the site were put into a pocket taped to the inside of the site packet folder. There was one folder for each site, arranged into groups by river mile. The grouped folders were put into large plastic ziplock baggies for waterproofing, and stored in 50 mm size ammo cans on the boat.

At the end of the 1992 monitoring year, it was decided that the site packets took up too much room, used too much paper, and that the photographs were difficult to remove to and from the pockets, plus were loose once they were removed from the pocket. A different system was devised for the 1993 monitoring year, and will be described in that annual report.

Upon returning from the field, river gear, field equipment, rolls of film, and site packets were returned to the lab. River gear and field equipment were cleaned and checked over for any needed repairs. (It is important that the field director notify the lab staff of any broken or missing equipment, plus supplies that need to be ordered for future river trips).

Film was sent in for processing, photographic information was entered into a computer database, and photographs mounted onto archival cards and filed in the lab. (See the Laboratory Manual for specific lab procedures). Site packets were dismantled and the duplicate photos refiled. Completed monitoring forms were entered into a computer database.

⁵ The cameras are Pentax Zoom 105 R Data models.

III. Sites Monitored In 1992 and Final Recommendations

This section briefly describes each site monitored and gives a recommended action. In many cases, additional informal suggestions were made on the monitoring forms and these are contained in brackets following the description.

AZ:A:15:026

April 1992

This site is located on reworked sand deposits overlying colluvial debris. The site is virtually invisible due to a thick cover of grass. No change since recording on 1-29-91. No sign of visitation. Recommended monitoring every 3 to 5 years.

AZ:A:15:027

April 1992

This site is located on an alluvial terrace overlying talus slope. No change since recording on 11-10-90. 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 it's North and South boundary. Monitor every other year to check arroyo expansion, or as otherwise indicated. [Obliterate trails, install stationary camera, excavate]

AZ:A:15:039

April 1992

This site is located above the mesquite zone on a reworked dune. Active erosion is occurring. Local drainage encroaching on southeast margin of site impacting features 1 and 2. Bank slumpage evident on site. Monitor every 2 to 3 years. [Excavate]

AZ:A:15:040

Sept. 1992

This site is situated on an alluvial terrace where it makes contact with the local cliff face about 50 meters from the river. The cliff overhangs the site creating a shelter. Intense vegetation and steep alluvial banks make access to the site difficult. The difficult access is this locality's best defense against visitation. The fine sediment on which the site rests is highly dissected in both directions up and down the terrace. The runoff is directed by the cliff rising above it. A lower base level in the main channel could be responsible for the aggravated erosion. There is, however, no quantitative data to prove that assumption for this site yet. Owing to the fragile nature of this site, monitoring on a yearly basis would have an adverse affect on the surface as well as the approaches to it. It is recommended that the site be monitored on a 3 year cycle and after flows exceeding 50,000 CFS. It is further recommended that an arroyo/gully on the same terrace in the

vicinity of the site be monitored in a quantitative fashion on a biannual basis. This information should include any dimensional change of that particular drainage (LxWxH) and any pertinent information including recent local weather events, odd flows and side canyon flooding.

AZ:A:15:042

June 1992

This site is situated in the Spring Canyon 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 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 on a yearly basis. The possibility of side canyon flooding always remains a threat to the prehistoric component. [Develop for interpretation, professionally map]

AZ:A:16:004

April 1992

This site is located on dune covered talus as well as the rising talus slope and bedrock ledges. Trampling and trailing occurring across the site due to increased visitation. Trailing increases channeling of surface water insuring erosion. It is recommended that this site be monitored on a yearly basis. [Install stationary camera, retrail, close to the public]

AZ:A:16:158

Sept. 1992

This site is located in a riverside Muav overhang a mere 2.5 meters above the 28,000 CFS mark. AZ:16:158 was inundated by the CFS flows of 1983-84. It's location presupposes it has been under water an incredible number of times since it's creation and as such there is not much remaining. This site has a priority rank of 4 which suggests a monitoring cycle of 3 to 5 years. It is recommended that this site be monitored after a flow in excess of 50,000 CFS. Otherwise stopping here is a waste of time and money.

AZ:A:16:159

June 1992

This site is located in a rock shelter on a riverside ledge opposite the Whitmore wash camping beach. This habitation site contains numerous tools plus a set of pictographs. This year a plastic coffee mug and a pair of human underwear were found on site. This previously unknown site was recorded in November of 1990. It is known that boatmen from the survey project have subsequently taken people to the location. Trailing is not a problem as the approach from the river to this site is jumbled rock. 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 stop here if a group is camped at Whitmore.
[Install remote sensing device, excavate]

AZ:A:16:162

Sept. 1992

This site is located in an overhang of Bright Angel shale 9.7 m above 28,000 CFS. Spalling of the cliff face is the primary adverse impact here followed secondly by monitoring. Sand is present on the floor. It's origin is probably eolian. However, some wood is present on site and if it is driftwood not manuported the sand could be from an extreme high water flood prior to 1960. It is recommended that this site be monitored on the slow end of the 3 to 5 year cycle or following a water flow in excess of 100,000 CFS.

AZ:A:16:175

April 1992

This site is situated on vegetation covered dunes abutting against the base of low cliffs. The bulk of the site is stable. However, bank slumpage is actively occurring in the cut bank closest to the river. Artifacts are present in the slumped material. High flows in excess of 50,00 CFS would affect this trend to some unknown degree. There is no evidence of visitation other than archaeology stops. Loretta Jackson has requested that we stop monitoring the 2 sites on this delta (192 mile canyon) as AZ: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 2 to 3 year cycle after conferring with Loretta Jackson, Hualapai Tribal Archaeologist.
[Stabilize cutbank]

AZ:B:09:316

June 1992

This site is situated along a narrow bench where the local Muav cliff makes contact with it's talus slope. No change noted since first recording in February 1991. The site has been inundated by high water prior to construction of Glen Canyon dam and is subject to flooding if flows overreach 120,000 CFS. B:09:316 has received the lowest priority rank and needs to be monitored on a 3 to 5 year schedule.
[Install stationary camera, excavate]

AZ:B:10:224

June 1992

This site is situated on the downstream cutbank of Fossil Canyon drainage 80 meters from the river. The location is a

reworked dune field overlying a debris fan resulting from side canyon flooding. The site itself consists of a small pristine roasting feature and an associated cist. The cist is 50% gone as a result of erosion in the cutbank of Fossil Canyon drainage. Recommend annual monitoring.

[Install stationary camera, plant vegetation to stabilize]

AZ:B:10:227

April 1992

This site is located in an obscure overhang in reach 9. B:10:227 is a historical site belonging to the Powell era of exploration in Grand Canyon. The materials found here are in pristine condition and as such have taken on a significant aspect. The site is now considered off limits except for limited monitoring activity. An agenda concerning the site will be determined by the Park Archaeologist. B:10:227 is a "non-corridor" site.

[Close to public, monitor with remote camera, surface collect]

AZ:B:10:261

April 1992

The site is located on a series of reworked sand dunes in the upper contours of the mesquite zone. Shallow seasonal drainages affect all of the features to a degree as does continual wind deflation and accumulation. The roasting features found at this locality are reworked themselves 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 2-3 years.

[Plant vegetation to stabilize]

AZ:B:11:272

April 1992

This site is situated on a diabase bench with a veneer of eolian sand overlooking the river. Surface runoff, gullying and active arroyo development exist on 50% of the site. Two distinct trails pass through the site due to the proximity of and the popularity of the camp at Dubendorf Rapid and the traditional hiking by boaters at Stone and Galloway Canyon. Recommend monitoring on a yearly basis to check trailing. The increased tourist load in the river corridor mandates watching those sites in the project area subject to the adverse impact of recreation.

[Retrail or obliterate trails, better map]

AZ:B:11:282

April 1992

This site is located on an alluvially cut overbank flood terrace in a side canyon drainage as well as the rocky slope above the drainage itself. The site consists of an intact roaster on the slope and a loose elliptical stone outline on the

small terrace in the drainage. It is probably of late prehistoric Hualapai affinity. Although no change has occurred since the initial recording (2-23-91) the stone outline (Fea.# 1) is at the mercy of any side canyon flooding that were to occur. It could also at some future time be adversely affected by base level lowering. That is however not presently a concern. No visitation was evident. It is recommended that this unique site be monitored on a yearly basis.

[Install stationary camera, eventually excavate]

AZ:B:13:002

June 1992

This site is located up Mohawk canyon drainage at the contact of the cliff face and talus slope. The site is within the jurisdiction of the Hualapai Tribe and as such is subject to Tribal wishes. It is recommended that the site be monitored on a 2 to 3 year schedule. This particular site was recorded by Euler and extensively collected.

AZ:B:14:093

April 1992

This site is located on a set of reworked dunes bisected by the drainage at 122.2 mile. Feature 2 is highly eroded and feature 1 shows evidence of ongoing erosion. Wind deflation and encroachment of arroyos locally 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 for the present.

[Excavate]

AZ:B:14:105

June 1992

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 being impacted by normal exposure to the elements and increased visitation from the boating community as well as archaeological work. No trails eroded below ground surface have developed but distinct compaction and incipient trails are noticeable across the site. A major camping beach is located on the downstream side of this delta approximately 100 m distant. It is recommended that this site be monitored on a yearly basis.

B:14:105 is a "non-corridor" site.

[Retrail, plant vegetation, develop for interpretation, install check dams, excavate]

AZ:B:14:108

June 1992

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 4 and it is recommended this site be monitored every 5 years.

AZ:B:15:001

June 1992

This site is situated on a large granite bench, it's associated cliffs and rimrock overlooking the river. This location is known along the corridor as Stanton's switchyard, in reference to the railroad survey trip of 1890. 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 1985. 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 known as Lower Bass. The structures on this site 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/official walk/mini tour type thing (Jan?)] B:15:001 is a "non-corridor" site. [Develop for interpretation, stabilize structures, excavate]

AZ:B:15:096

June 1992

This site consists solely of the celebrated "Ross Wheeler", a boat constructed by Bert Loper and used in the Quist, Tadge disaster trip of 1915. The boat was abandoned to it's own devices and has established itself as 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 drug the boat above the high water threat where it now rests amongst the boulders. (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 physically monitored on a cycle of every 2 to 3 years. Stops can always be made quite easily if anything looks dramatically different with the boat from the water.

[Develop for interpretation]

AZ:B:15:120

April 1992

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 meters in diameter. The only cultural manifestation at this locality was the imprint of a helicopter skid on the surface. This site or whatever it is serves no purpose or utility in the cultural sense that can be

rationalized or ascertained at this time. Recommend discontinue monitoring.

AZ:B:15:123

April 1992

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. This site typifies the Catch-22 of monitoring: Should we not monitor it at all, should we monitor it yearly in order to better watch it's progress, or should we take some middle of the road approach? Recommend ? Let Jan decide.
[Surface collect]

AZ:B:15:124

June 1992

This site consists solely of the historic inscription: George W. Parkins Washington, D.C. 1903. The name is carved into water polished granite a mere 2 meters above the 28,000 CFS level at William Bass 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 on a yearly basis. Threats include vandalism from visitation and high water in excess of 70 to 80,000 CFS.
[Develop for interpretation, plant vegetation to stabilize beach]

AZ:B:15:131

Sept. 1992

This modern site is located on a Tapeats sandstone ledge 10 meters directly above the river. It consists of some vertical sandstone slabs in a configuration suggesting a fire ring. No charcoal remains. Sand and driftwood are present indicating inundation in 1983. The feature probably dates from 1970 to 1982. This non-site was given a 4 - lowest priority. It is recommended however that the site not be monitored at all. It could be used as a CFS reference guide in the advent of any future flows in excess of 1983-84.

AZ:B:16:259

April 1992

This site is located on a sand covered talus slope adjacent to the river trail near Pipe Creek. A roasting feature is eroding presently and represents the only site of this type in this section of the corridor. Recommend monitoring on an annual basis.
[Obliterate trails, excavate]

AZ:B:16:262

June and Sept. 1992

B:16:262 is the USGS gauging station located .2 miles above the Kaibab suspension bridge. The station was constructed in the early 1920s and is clearly visible from the river. The priority rank of B:16:262 has been subjectively gauged as 2. It is recommended however that this stable structure does not need to be officially monitored more than every 3 to 5 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.

AZ:B:16:365

June 1992

This site consists solely of the maintained grave of Rees Griffiths. The burial is located at the base of the granite cliffs between Bright Angel pueblo and Phantom Ranch. A bronze plaque commemorates his life and his untimely death in the line of work along the Kaibab trail "not far from" his final resting place. It is suggested here that Mr. Griffiths be given the same respect as Native American burials and that he be allowed to rest in peace. It is recommended that monitoring of the site be stopped. A casual visit to the grave to see if any vandalism has occurred may be appropriate on our stops at Phantom.

AZ:C:02:092

Sept. 1992

AZ:C:02:092 is situated in a shallow overhang of Kaibab limestone below the Paria Riffle and 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; i.e. cans, cigarette butts. No criminal vandalism is evident. An erosional scar is developing from a pour-over on the upstream side of the site and is removing alluvium from the terrace with each episode of rain. This erosion is not directly effecting the site yet but will eventually. Recommend monitoring on a yearly basis.

AZ:C:02:094

Sept. 1992

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. Here are found Mormon pioneer names and dates placed on the rock face with axle grease and/or tar. The names and dates are late 19th century. 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 with a sense of humor scratched Danny Ray Horning's name

on a rock here last summer. It is recommended that this site be monitored each spring and each fall.

[Develop for interpretation, put up a 'Do Not Litter' and 'No Fires' sign]

AZ:C:02:101

Sept. 1992

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 a meter 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 remaining. 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 in the site area. It is recommended that erosion in the vicinity be casually observed when passing by the location to see if any radical changes have taken place and that monitoring be conducted in alternate years.

[Stabilize with a check dam or vegetation]

AZ:C:05:004

June 1992

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 to 3 m above the 28,000 CFS level and it has been inundated numerous times between 1923 and 1960. The priority rank of C:05:004 has been rated as 2. It is recommended however that it is only necessary to monitor C:05:004 on a 3 to 5 year cycle or after the release of flows in excess of 50,000 CFS.

AZ:C:05:031

Sept. 1992

This site is located on a reworked dune covered side canyon debris fan and it's 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 the wind. A camping beach is located on the upstream side of this same delta. Visitation to the site has been documented on this trip by a pair of women's underwear found in the arroyo adjacent to locus A. [No evidence regarding adverse or beneficent impact concerning the purple panties remains.] C:05:031 has a priority rank of 2 and it is recommended that it

be monitored on a yearly basis. If it appears archaeological monitoring causes an adverse impact here the schedule should change to alternate years.

[Install check dams]

AZ:C:05:037

June 1992

This site is located on a reworked dune system overlying a talus slope and debris fan. This particular site is in poor condition. The cultural material, scant to begin with, has been weathered into eternity. Paiute pottery was found here as well as datable charcoal. A popular camp is situated less than 100 m downstream from the site. C:05:037 has been given a priority rank of 2 suggesting annual monitoring. However, less would be acceptable (2 to 3 year cycle).

[Retrail, plant vegetation, excavate]

AZ:C:06:002

June 1992

This site consists of the inscription commemorating the death of Frank Brown at this location in the river corridor during the survey expedition of 1890. The work was done by boatman Peter Hansbrough who drowned as well 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 is in no present danger. It could be adversely impacted by vandalism or high flows (90,000+ CFS). C:06:002 has been given a priority rank of 2. Monitoring at this site is probably not necessary that frequently, but stopping here and taking a picture once a year would take no more than 5 minutes.

[Develop for interpretation, install stationary camera]

AZ:C:06:004

June 1992

This site is situated on the back wall of a small alcove in the Supai formation, consisting 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 a meter 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 once since (1983). C:06:004 has been given a priority rank of 3, suggesting a monitoring cycle of 2 to 3 years. Let it be mentioned that it is only a 5 minute stop in some often needed shade and visually inspecting it once a year would be no problem.

[Develop for interpretation]

AZ:C:06:006

Sept. 1992

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 on the site as incipient channeling and dispersed gravels. No evidence of visitation was observed. C:06:006 has a priority rank of 3. It is recommended that it be monitored in alternate years.

AZ:C:06:008

Sept. 1990

This modern camp is located on bare ledges of Esplanade sandstone a mere 4.5 meters above the 28,000 CFS level. The site has been determined to be a river runners high water camp with rock alignments and areas cleared of surface debris. It is no longer valid and it is recommended that monitoring be discontinued.

AZ:C:09:001E

April 1992

This site is located on a reworked dune-covered alluvially cut terrace amongst the mesquite. Trailing from the camps to the main trail on Nankoweap delta is prevalent. High water from the 1983 flood encroached on the portion of the site closest to the river. Recommend monitoring every other year and in years when CFS exceeds 90,000.

AZ:C:09:050

June 1992

This site is located in a cutbank on Nankoweap delta. It is unusual in that complete Anasazi vessels were found eroding from the sediment during the initial GCRCS survey in September of 1990. These vessels were removed and curated on the south rim. No other artifacts are currently eroding from the cutbank. This location has a priority rank of 2 and should be monitored at least annually. Further stops could be made to spot check the arroyo as dictated by weather, runoff and schedule. [Install check dams and plant vegetation soon; excavate eventually]

AZ:C:09:051

June 1992

This site is located on a system of reworked dunes overlying a debris fan up Nankoweap Creek 90 m from the confluence with the Colorado. The surface exhibits a high degree of impacts ranging from: accelerated cut bank erosion due to lowering of the base level, obvious trailing, wind deflation and localized gullyng. Cut bank 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 presently exist on this site (i.e. one example has developed

where a branch hiking trail drops into the creek at locus D). Retrailing will prove to be helpful at this site by redirecting the foot traffic. An extensive prickly pear field already protects much of the surface at this site but it is not enough to save the visible features at loci A and D. C:9:051 has a priority rank of 1 and should be monitored twice a year by a maximum crew of 2. It is also suggested that this site be professionally mapped.

[Retrail or obliterate trails, excavate]

AZ:C:09:052

April 1992

This site is located in an open area of reworked dunes between mesquite thickets on Nankoweap delta. The site is impacted in a minor way by the action of 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 have results we will see next year. Recommend monitoring on a yearly basis.

AZ:C:09:069

April 1992

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 is 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 at this location. Recommend monitoring annually for the next fiscal year.

AZ:C:09:082

June 1992

This site is located in a set of eolian dunes above the mesquite terrace on Nankoweap delta proximal (70 m) to the river. Wind deflation and trailing have the largest adverse impacts at this location. Two distinct activity areas emerge from the dunes here 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 3 show me trips and a monitoring trip have visited this site plus untold backpackers. C:09:082 has a priority rank of 2 and it is recommended that the site be velvet glove monitored annually by not more than 2 archaeologists and that show me trips be kept to a minimum. [Retrail or obliterate trail, excavate]

AZ:C:09:088

Sept. 1992

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 their 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 on a yearly basis with particular emphasis placed on checking erosion of the debris fans and the sediment filled barges.

[Develop for interpretation, professionally map]

AZ:C:13:006

April 1992

This site is eroding out of redeposited sand on the upstream side of a major canyon. The site itself is rich in materials including ceramics, lithic tools and debris, ground stone and structural outlines. Adverse impacts are present here 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. Recommend monitoring annually with the stipulation that a single person monitor the site. [Install stationary camera, install check dams, develop for interpretation, plant vegetation to stabilize, excavate]

AZ:C:13:008

Sept. 1992

This site is on the current park monitoring schedule by Park Archaeologist Jan Balsom and has been watched since 1983. It was originally recorded and photographed in 1965. C:13:008 is one of the best photo documented archaeological sites in the Grand Canyon. As it is located over 150 meters from the river and is already being monitored it is recommended that this site be included for one more fiscal year and then dropped from our scheduled stops. If the situation arises that it would be appropriate for our unit to stop here due to weather, flooding, etc. it would be no problem. [Jan, I wasn't sure how you felt about this site so change it as you see fit.

AZ:C:13:100

April 1992

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

[Retrail, install check dams, develop for interpretation, plant vegetation to stabilize, excavate]

AZ:C:13:131

June 1992

This historic site (1890's) is located on the upper mesquite terrace. Back packers camp in Red canyon 110 meters from the river at Hance Rapid. Most of what was John Hance's camp is now mostly gone. A few cans, posts and wire, broken glass and the remnants of a cooking area are all that remain. Any complete or visually stimulating artifacts have been removed in the decades since the camp was abandoned after the century turned over. Human impact here is high. It will probably remain so. Due to the rating system this site has received an inflated priority rank of 1 suggesting monitoring at least twice a year. It is recommended here that this site be removed from the GRCA program after another fiscal year and be turned over to the Park archaeologist (Jan Balsom) for monitoring at her discretion.

[Develop for interpretation]

AZ:C:13:272

April 1992

This site is in the vicinity of Palisades Creek and is situated on the sandy reworked surface of a sloped terrace. The entire site is located toward the river from the outwash plain of a late Pleistocene debris flow. Subsequently, the site is subject to an ever-changing system of gullies and seasonal channels flowing across the surface. This has occurred since the original recording in September of 1990, uncovering more cultural materials. The Beamer trail transects the site adding to the adverse impacts. This site is proximal (34 m) to the river and located within the area of the USGS (Hereford) geomorphological work. Recommend monitoring on a yearly basis. [Same as AZ:C:13:100]

AZ:C:13:291

April 1992

This site located above Unkar Delta is situated 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 on the site as well as moving the bulk of 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. Recommend monitoring on a yearly basis and professionally map. C:13:291 is also known as Ivo's site and is monitored by the USGS as well. It is also suggested that a stationary camera be

placed on this site as soon as a suitable location is agreed upon.

[Same as AZ:C:13:100]

AZ:C:13:329

June 1992

This site is located in a shallow overhang and an associated system of reworked dunes. Features 2 and 3 are subject to adverse effects by local gullying and feature 3 could be undercut in the event of high water in excess of 80,000 CFS. No observable change noted since recording of the site in September of 1990. C:13:329 has been given a priority rank of 3. We recommend however that feature 3 be monitored on an annual basis for at least the next two fiscal years.

AZ:C:13:333

Sept. 1992

This site is located between elongate active sand dunes. A gravelly surface indicates seasonal or flood channeling across the site with the dunes defining the runoff. This could be a 300,000 CFS overflow channel. Site appears unchanged since recording in September of 1990. The most imminent threat to the surface is too much intervention by archaeological monitoring. It is recommended that this site be monitored on a 2 to 3 year schedule.

AZ:C:13:336

April 1992

This site is located in the vicinity of the Palisades on an alluvial terrace proximal (48 m) to the river. The surface of the terrace 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 on a yearly basis. [Install check dams, plant vegetation to stabilize]

AZ:C:13:342

Sept. 1992

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 in the 300,000 CFS range and is visited by backpackers and river personnel moving between Tanner delta and Cardenas. 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 on a yearly basis. This may be a good location for an

interpretive sign. [or maybe not.]

AZ:C:13:343

Sept. 1992

This site is eroding down on 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 of 1990. The greatest threat to the site is an arroyo carved into the bedrock which channels seasonal runoff against the cut bank 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 scheduling.

[Obliterate trail]

AZ:C:13:347

Sept. 1992

This site consists of a wall remnant in an arroyo less than 20 meters 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 in turn 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 only a priority rank of 3 it is recommended that due to the proximity of the site to the river and it's placement in an active arroyo that it be monitored on a yearly basis.

AZ:C:13:350

Sept. 1992

This site is located in a reworked dune field 126 meters from the river. What remains on the surface at this location is highly deflated. There is no apparent change on site since its recording in September of 1990. The site is 5 meters above the 28,000 CFS level. It is recommended that C:13:350 be monitored every 2 to 3 years.

AZ:C:13:354

Sept. 1992

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 meters above the 28,000 CFS level and at some time in the past have been inundated by extremely high flows of water. No artifacts are present at this site. No change has occurred since the original recording in March of 1991. It is recommended the C:13:354 be monitored on an annual basis even though the site was only rated a priority of 3.

[Stabilize structure]

AZ:C:13:359

April 1992

The site is located on a sand dune abutting against a cliff

base in the vicinity of Escalante Canyon. The site is proximal (18 m) to the river and only 5 m above the 28,000 CFS line. Gullying is impacting the site particularly at feature 2 where a structural wall has been cut by seasonal runoff. After fluvially 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 on the site it is suggested that actual physical monitoring be done every other year. [Obliterate archaeologist trail, install check dam at Fea. 2, excavate]

AZ:C:13:365

Sept. 1992

This site is located on a partially sand covered debris fan and consists of 2 highly deflated fire features. It is recommended that this site be monitored during the next year and then after on a 3 to 5 year cycle.

[Retrailing]

AZ:C:13:368

Sept. 1992

This site is located under a rock shelter within 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 3 and it is recommended that this site be monitored every 2 to 3 years.

AZ:C:13:371

April and Sept. 1992

This site, known as Crash Canyon, is located at the mouth of an unnamed drainage below the Lower Colorado River. Features and artifacts are situated on a debris fan near the river, reworked sand-covered terraces as well as the upper bedrock ledges. A side canyon flood in the early Fall of 1990 had a high adverse impact on the site: particularly the features (2,3,4,5) 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 above. C:13:371 has a subjective rank of #2 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 this site be professionally mapped.

[Remote sensing program, check dam, excavate]

AZ:C:13:374

April 1992

This site is located within a Tapeats sandstone overhang a considerable distance up the Little Colorado River and 60 ft.

above the 28,000 CFS line. Although this site has a monitoring priority rank of 2 indicating an annual stop it is recommended that this site be dropped from the schedule.

[Retrail, install check dams, stabilize bank]

AZ:C:13:379

April 1992

This site is situated on a chain of high sand dunes and their reworked terrace segments at the downstream end of the Unkar delta. The site is on old river alluvium and even though it is 190 m from the main river channel it remains only 6.5 meters above the 28,000 CFS level. Over-bank channels from the high annual flows occurring prior to the construction of Glen Canyon dam exist adjacent to and below the site. These old flows would have brought huge amounts of sediment in to settle out in front of the Anasazi village. Today there is no balance between sediment accumulation and removal on the site. Hence the perpendicular gullying that now dominates the terrace goes unchecked. It is recommended that this site be monitored on an annual basis with a professionally derived map to be done.

[Install stationary camera, plant vegetation, stabilize banks, stabilize structures]

AZ:C:13:381

Sept. 1992

This highly eroded site is located on the first sandy terrace above the 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 2 suggesting a yearly monitoring schedule. It is recommended that this site be monitored next year and at that time decide if this rank is appropriate.

[Retrail, develop for interpretation]

AZ:C:13:384

April 1992

This is a buried site revealed in a cutbank up Lava-Chuar Creek. 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 cm 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 at this location 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 2 to 3 times for gross changes.

[Stabilize banks, install stationary camera, excavate]

AZ:G:03:003

April 1992

This multi-component rock shelter and associated roasting features rests on a large system of 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 Big Horn 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 2 and should be monitored at least annually. Spot checks should be made 2 to 3 times a year to note any further encroachment of the trail from Granite Park drainage to the rock shelter. This trail should be obliterated.

AZ:G:03:020

April 1992

This site is located on a reworked system of 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 in fact 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 2 and it is recommended that it be monitored on a yearly basis for the present.

[Install check dams, plant vegetation, stabilize banks]

AZ:G:03:026

April 1992

This site is located on reworked sand derived from an older alluvial terrace overlying debris flow deposits. Social trailing, Big Horn sheep grazing and minor wind deflation are the adverse impacts at this location. The monitoring form suggests a rank of 2 which indicates a yearly monitoring schedule. It may be better for the site to monitor every 2 to 3 years and check the progress of the trails by aerial photographs. Retrailing or obliterating many of the trails at Granite Park may be warranted.

[Develop for interpretation]

AZ:G:03:027

Sept. 1992

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 to it from the boat beach. These lovely and unique artifacts are as nearly indestructable as they are uncollectable, putting them at low impact risk. G:03:027 has a priority rank of 3 and it is recommended that it be monitored on a 2 to 3 year cycle. [Develop for interpretation]

AZ:G:03:042

June 1992

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 here nor is erosion of the actual mortars. G:03:042 was given a priority rank of 3. It is recommended however that due to the unique nature and pristine condition of this site that G:03:042 be checked on an annual basis. As no artifacts or structures exist here a stop of 10 minutes is enough to deal with the site. [Develop for interpretation]

AZ:G:03:044

April 1992

This site is situated in rock shelters at the base of a Bright Angel cliff as well as 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 found on the terrace. Headward migration of a local arroyo at Locus B is compromising the roaster located there. 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 2 indicating annual monitoring. We are recommending however that only Locus B be watched for expansion of the arroyo and the erosion of the roaster. Locus A can be left alone unless otherwise indicated by radical change on the terrace. [Obliterate trail]

AZ:G:03:061

June 1992

This site is located in a Tapeats sandstone rock shelter overlooking a small side drainage and it's 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 at this location. G:03:061 has been given a priority rank of 3 suggesting monitoring on a 2 to 3 year cycle. It is recommended that this site be monitored on a once every three year schedule to minimize compacting the loose, carbon-rich surface.

[Excavate]

AZ:G:03:066

April 1992

This site is located at the base of a talus slope on an eolian sand covered bench overlooking the local side canyon drainage. Boulders dominate. The site consists of a small intact roasting feature and a bedrock grinding slick. The site is in excellent condition. No artifacts are present on the surface. 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 and hot chocolate packets, food cans, ketchup, coffee and opened Budweiser beer cans. Rodents and insects had made the most of it and we removed a large garbage bag full of the debris, leaving no trace. It is recommended that this site be monitored every year.

[Obliterate trail, date feature]

AZ:G:03:067

June 1992

This site is located on a major delta above Diamond Creek on a low dune-covered debris fan. G:03:67 is situated between two major last night river camps and is adversely impacted from extensive social trailing. The site is in poor condition. The roasting features are highly eroded and artifacts are scarce on the surface. 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 1. It is recommended however that annual monitoring of the site will be sufficient.

[Retrail, excavate]

AZ:G:03:079

April 1992

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 meters above the 28,000 CFS level. There has been no observable changes since recording (4-28-91). Recommend monitoring on a 3 to 5 year cycle.

AZ:G:03:080

April 1992

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

monitoring at least annually with spot checks as appropriate.
[Install stationary camera, develop for interpretation,
excavate]

AZ:G:03:082

June 1992

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 here to test. This site has a priority rank of 3. It is recommended that G:03:82 be monitored on a 2 to 3 year cycle.

AZ:G:03:085

April 1992

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. Impacts from visitation are non-existent. It is recommended that this site be monitored every 2 to 3 years.

[Excavate]

Recommended Actions

The 1992 monitor form lists 15 "recommended actions". A summary of the recommended actions for the 1992 monitor year are listed below, with the corresponding frequency of mention in each category. These recommendations were made by monitoring crew members, and may be different from the formal recommendation presented in the section preceding.

<u>Recommended Action</u>	<u>Frequency</u>
1. Discontinue monitoring.....	34
2. Monitor visitation with remote sensing devices.....	4
3. Monitor erosion with stationary cameras.....	16
4. Retrail or define existing trails.....	17
5. Obliterate trails.....	22
6. Install check dams.....	12
7. Plant vegetation to stabilize site surface.....	12
8. Stabilize banks with rock armor or similar technique.....	6
9. Stabilize structures.....	11
10. Surface collect entire site.....	2
11. Test for presence/depth of subsurface cultural deposits.....	0
12. Map as a form of data recovery (excavation not warranted).....	6
13. Full data recovery (excavation).....	33
14. Close site to all public visitation.....	2
15. Develop for public interpretation.....	22

The most frequently mentioned action is to discontinue monitoring (34), with full data recovery (33) close behind. Obliterating trails and developing for public interpretation each had 22 mentions; retrailing (17) and stationary camera installation (16) came next. The least frequently mentioned actions were testing (0), surface collection (2), closing to the public (2), and remote sensing (4). Installing check dams (12), planting vegetation (12), stabilizing structures (11) and banks (6), and mapping (6) fall somewhere in the middle. See the bar chart on page 24.

Monitor Priority Rankings

Question #45 of the 1992 Monitor form refers to the monitoring priority of each site. Sites are ranked according to four values. The values for this variable are:

1 = highest priority (quarterly or biannual monitoring)

2 = annual monitoring

3 = monitor every 2-3 years

4 = monitor every 3-5 years

The following table lists the monitor priority rankings given for each site by field crews. The results are summarized in the pie chart below. These recommendations may be slightly different from the final recommendations presented in the preceding section.

Table 1. Monitor Priority Rankings*
1992 Monitor Sites

Site Number	River Reach	Monitor Session	Site Type	Monitor Priority Ranking
A:15:026	10	92-1	RoastComp	3
A:15:027	10	92-1	Camp	2
A:15:039	10	92-1	RoastComp	2
A:15:040	10	92-3	Camp	3
A:15:042	10	92-2	Camp	3
A:16:004	10	92-1	RoastComp	2
A:16:158	10	92-3	ArtiScat	4
A:16:159	10	92-2	Camp	2
A:16:162	10	92-3	Camp	4
A:16:175	10	92-1	RoastComp	3
B:09:316	10	92-2	SmStruc	4
B:10:224	7	92-2	ThermFeat	2
B:10:227	9	92-1	Camp	2
B:10:261	7	92-1	RoastComp	2
B:11:272	8	92-1	ThermFeat	2
B:11:282	8	92-1	Camp	2
B:13:002	10	92-2	RoastComp	2
B:14:093	7	92-1	RoastComp	2
B:14:105	7	92-2	EphStruc	2
B:14:108	7	92-2	Metate	4
B:15:001	6	92-2	SmStruc	2

Site Number	River Reach	Monitor Session	Site Type	Monitor Priority Ranking
B:15:096	6	92-2	Other	3
B:15:120	6	92-1	Other	4
B:15:123	6	92-1	IsoPot	4
B:15:124	6	92-2	Inscript	2
B:15:131	7	92-3	ThermFeat	4
B:16:259	6	92-1	Camp	2
B:16:262*	6	92-2, 92-3	HistStruc	2, 3
B:16:365	6	92-2	Burial	2
C:02:092	1	92-3	Camp	3
C:02:094	1	92-3	Other	2
C:02:101	1	92-3	ThermFeat	3
C:05:004	3	92-2	OtherCache	2
C:05:031	3	92-3	EphStruc	2
C:05:037	3	92-2	Camp	2
C:06:002	2	92-2	Inscript	2
C:06:004	2	92-2	Inscript	3
C:06:006	1	92-3	ArtiScat	3
C:06:008	2	92-3	SmStruc	4
C:09:001E	4	92-1	DeltaComp	2
C:09:050	4	92-2	IsoPot	2
C:09:051	4	92-2	Pueblo	1
C:09:052	4	92-1	SmStruc	2
C:09:069	4	92-1	roastComp	4
C:09:082	4	92-2	Camp	2
C:09:088	4	92-3	Other	2
C:13:006	4	92-1	SmStruc	2
C:13:008	5	92-3	SmStruc	2

Site Number	River Reach	Monitor Session	Site Type	Monitor Priority Ranking
C:13:100	5	92-1	Pueblo	2
C:13:131	5	92-2	HistStruc	1
C:13:272	5	92-1	SmStruc	2
C:13:291	5	92-1	SmStruc	2
C:13:329	4	92-2	EnigFeat	3
C:13:333	5	92-3	Camp	3
C:13:336	5	92-1	Camp	2
C:13:342	5	92-3	HistStruc	2
C:13:343	5	92-3	SmStruc	3
C:13:347	5	92-3	SmStruc	3
C:13:350	5	92-3	ThermFeat	4
C:13:354	5	92-3	Storage	3
C:13:359	5	92-1	SmStruc	2
C:13:365	4	92-3	EphStruc	3
C:13:368	4	92-3	LithicScat	3
C:13:371 *	5	92-1, 92-3	SmStruc	2, 2
C:13:374	4	92-1	Camp	2
C:13:379	5	92-1	SmStruc	2
C:13:381	5	92-3	Camp	2
C:13:384	5	92-1	Other	2
G:03:003	10	92-1	RoastComp	2
G:03:020	10	92-1	RoastComp	2
G:03:026	10	92-1	RoastComp	2
G:03:027	10	92-3	BedMortar	3
G:03:042	10	92-2	BedMortar	4
G:03:044	10	92-1	RoastComp	2
G:03:061	11	92-2	Camp	3

Site Number	River Reach	Monitor Session	Site Type	Monitor Priority Ranking
G:03:066	11	92-1	Camp	3
G:03:067	11	92-2	RoastComp	1
G:03:079	11	92-1	EphStruc	4
G:03:080	11	92-1	RoastComp	1
G:03:082	11	92-2	EphStruc	3
G:03:085	11	92-1	ArtiScat	3

* sites monitored twice

IV. Erosional Change

The following photographs show examples of erosional change through time, the differences in surface vegetation in varying seasons, and site stability through time.

AZ:A:16:175A: These photographs are taken of the same locality but from a different angle. The photos illustrate the difference that can occur in ground cover during late winter.

AZ:A:16:162A: These photographs show the types of erosion and spalling common to bench and rock shelter sites throughout the entire river corridor. Virtually no change took place to the configuration of the surface during the period of twenty one months that elapsed between the time the photos were taken.

AZ:C:13:291A: The cutbank in these photographs was caused by a side canyon flood in 1989. The slope has adjusted and come to an angle of repose in the later photograph (bottom). Feature 2 on this particular site is a charcoal lense exposed in the face of the cut bank. Note the difference in surface vegetation between April and October.

AZ:C:13:342: This is a historic site belonging to the turn of the century phase of prospecting along the river corridor. These photographs taken almost exactly two years apart show no significant changes. Minor rearrangement of artifacts on the wood beam indicate some visitation is taking place. Note Cardenas Canyon in the upper right hand corner (bottom photo).

AZ: C:13:354 is a site consisting of several granaries in various states of decrepitude. Feature 3 makes use of a partial overhang and retains most of its original base outline. No change of any note has taken place between March of 1991 and September of 1992 at this location. The top photo was taken in late winter at about 9:00 am. The bottom photo was taken during the glare of noontime in late summer.

AZ: C:13:384 This cutbank contains cultural materials from bottom to top and is subject to annual and sporadic side canyon flooding. Eventually the cultural materials will be undercut by these floods. The sticks and brush seen in the bottom photograph were placed by the U.S.G.S. research trip in the late winter of 1991-92.

AZ: G:03:020 This recent arroyo is encroaching on a roasting feature (#7) at the left side of the photograph. During the 14 months between photographs much of the rock and sand has adjusted. Note the acacia root is still present across the channel.

AZ: G:03:064 These photographs illustrate the demise of a large roaster. The arroyo has cut the feature in half and the concave surface reflects the configuration of the original pit. Charcoal and fire-cracked rock are continuously moved from the depression down the slope. Note that seasonal channels begun in

April of 1991 have entrenched by April of 1992.

Conclusions

The 1992 monitoring season was a learning experience for all those involved. The bulk of the work helped us better understand what works and what does not, and what is of practical value and what wastes our time.

Since the Grand Canyon and Colorado River are one of the world's greatest erosive systems we must be prepared to see radical change happen at specific localities that have during the project's short tenure appeared to be stable. Intense local impacts occurring in the Canyon due to rain, runoff, the wind and mass wasting are common. The recommendations concerning site monitoring schedules should remain flexible to the extent that we do not entrench our work in a self-fulfilling prophecy based on the observations of a single field season. For example, if a monitoring crew moving down river observes intense side canyon flooding has taken place recently in reach 8 and the surface has taken hits it may be prudent to stop and spot check a particular site even though it was relegated to a 3 to 5 year work cycle.

The 1993 field season should give some continuity to this concern and also fine tune the project's agenda that much more. As already mentioned, our work this previous year has been a learning experience and the following list is comprised of what we learned for fiscal year 1992.

- * There is a problem with the priority ranking system to the extent that some sites receive a high rank that do not need to be monitored more than every 3 to 5 years and vice-versa.
- * Too much of the photographic work is redundant. The project does not need a dozen photos of the same feature covered in grass. All photo points do not need to be repeated every year.
- * Some of the larger and more complex sites would be easier to deal with and provide better quantitative information if we had more sophisticated site maps.
- * The monitor forms are too convoluted. There are too many subjective options which get translated into a number for the convenience of the computer. The form needs fine tuning.
- * Some thought needs to be put into a small scale program to

quantify actual change on specific sites regarding downcutting, arroyo and gully widening, slope creep and removal of sand from the surface.

- * Certain sites (eg. G:03:044, G:03:66), while needing monitoring, are too fragile to visit on a yearly basis. Thus, sites of this type should be looked at in alternate years to allow recovery and minimize impact. The concern in these cases is to not allow the monitoring project to become a bigger adverse impact than the natural course of events.
- * So far, the cameras have documented little change. In this regard we must remain flexible and patient. Something will happen eventually and the cameras will catch it when it does. The ability to change location of the cameras should remain an option after another year of use in the current positions.
- * Mixed business trips are inefficient. If we go down the river to monitor we should monitor. Guests (to a limit) are fine, provided they are interested in the project and participate in the team sport nature of river trips.
- * Concerning row versus motor trips: Both have their positive and negative aspects. Instead of unilaterally determining to use one or the other I would like to recommend making use of both to utilize the best features of each method. Possibly a single row trip of 18-19 days as well as 2 motor trips (one 10 day and one 7-8 day).

In conclusion, it is suggested that no major methodological changes be adopted until the end of the 1993 season, to acquire some continuity to the observations and information gathered this past year. It is important to go down the river on each monitoring trip with an agenda and a pace; it is also equally important to be flexible and act on opportunity as it arises. Often times changes occur spontaneously in the canyon and if the crew is paying attention then that change can be documented on the spot. The work to be done in 1993 will better establish a more efficient methodology for the future. At this time, recommendations made on our experience in 1992 should be considered part of a changing scenario in an ongoing process.