1994 Summary Report: Monitoring of Archaeological Sites Along the Colorado River Corridor in Grand Canyon National Park (Cooperative Work Order 8005-8-002)

Prepared By

NPS Project Archaeologists
Christopher Coder
Lisa Leap

and

NAU Archaeological Staff
Nancy Andrews
Duane Hubbard

Prepared For

Janet R. Balsom
Chief of Cultural Resources
Resource Management Division
Grand Canyon National Park

March 1995

Table of Contents

Abstract

This report summarizes archaeological monitoring activities conducted during FY94 as required by the Programmatic Agreement for the Operations of Glen Canyon Dam. This work was conducted by a team of archaeologists from the National Park Service and Northern Arizona University. From October 1993 to September 1994, natural and human impacts to a select group of 128 sites along the Colorado River corridor within Grand Canyon National Park were monitored and evaluated. Results indicate that 81% of the FY94 monitored sites exhibit some form of natural erosion and/or human impact. Natural impacts are more prevalent than human impacts and are occurring at a higher rate. Monitoring results for each individual site are included in this report, along with current recommendations.

Recommended measures to reduce site impact include retrailing, trail obliteration, planting vegetation, installing check dams, stabilization, or closing sites to visitors. Recommendations to protect site integrity include total station mapping, surface collection, and limited testing. In addition to site monitoring, FY94 activities included some total station mapping, the placement of surface analysis units to track artifact movement, and continued stationary camera work. The FY95 work plan includes continued monitoring of selected sites according to their monitoring schedule, and remedial actions begun at priority locations. These remedial actions include total station mapping, limited testing, retrailing, trail obliteration, and stabilization.

List of Tables

Page

List of Figures

Page

I. Introduction

From August of 1990 through May of 1991, National Park Service (NPS) and Northern Arizona University (NAU) archaeologists conducted an intensive survey along the Colorado River corridor from the base of Glen Canyon Dam to Separation Canyon. The survey documented 475 archaeological sites from the river's edge to the 300,000 cfs level. Three hundred thirty-six of these prehistoric and historic sites are in places that could potentially be adversely impacted by the operations of Glen Canyon Dam.

Beginning in 1992, a program to monitor archaeological sites in the proscribed area of the river corridor was begun. Although the office of the park archeologist has been monitoring selected sites in the canyon for over a decade, nothing of this scale or intensity had yet been done anywhere else. The conceptualization, inception, and continuation of the monitoring project is a ground breaking set of events.

Fiscal year 1994 was a productive one for the project. Not only was monitoring completed on 128 sites (see Scope of Work), but actions were also taken. These include total station mapping, the placement of surface analysis units, continued stationary camera work, fine tuning of our tactics, and the paring down of our site load to a reasonable and appropriate set. These accomplishments are the result of continued cooperation between the Park Service, Northern Arizona University, the Bureau of Reclamation, the participating Tribes, and the State Historic Preservation Office.

The 1995 field season which has already begun, promises to be an even more productive one. This year the project will concentrate on more detailed mapping, stabilization projects, limited testing, sample analysis, geomorphic processes, and a higher level of photographic documentation.

With each year the information obtained and the lessons learned become more important as a base for the next. To understand the nature of the web of processes that influence and direct the pervasive erosion (and occasionally a little deposition) in the river corridor, it is crucial that monitoring not only continue, but continue to be flexible and eclectic. Any questions or comments can be directed to our Flagstaff office at (602) 523-9533, Box 5617, Northern Arizona University.

II. FY94 Scope of Work

The FY94 monitoring objectives are based on the results and recommendations of the FY91 survey and FY92-93 monitoring activities. They include: 1) continued monitoring of natural and human impacts to river corridor archaeology sites, 2) detailed site mapping using total station equipment, 3) tracking surface artifact movement, and 4) continued stationary photography. This section discusses site selection criteria, field and laboratory methods, total station mapping, and surface movement of artifacts.

A. Site Selection

During the FY91 survey (Fairley et al. 1994), site condition and impacts as they related to the operation of Glen Canyon Dam were evaluated. Impacts were categorized as direct, indirect, potential, or no impact (Fairley et al. 1994:148). Beginning with interim flow monitoring in 1992, a stratified random sample of sites was chosen from direct, indirect, potential, and no impact categories. More specifically, sites were stratified by impact category and a 20 percent random sample drawn from each category. All sites in the direct impact category were also included, resulting in 81 sites monitored in FY92.

After the first few monitoring trips, it became apparent to the archaeologists that some sites did not need to be monitored every year because they were too fragile or in well-protected locations. Other sites were actively eroding and needed more frequent visitation. A monitoring schedule was devised which included the following options: monitor semiannually (twice a year), annually, biennially (every other year), every three to five years, or discontinue monitoring. Sites monitored in FY94 were chosen from the original group of 81 sites (according to their recommended monitoring schedule) and from a new 20 percent stratified random sample (according to impact category). This resulted in 16 "direct," 54 "indirect," 50 "potential," and eight "no impact" sites monitored in FY94, for a total of 128 unique sites. Thirty-two sites were monitored twice, for a total of 160 monitoring episodes. No data were collected at one site (C:13:326), which could not be monitored due to ongoing revegetation work. Consequently, the site population is listed as N = 159 in subsequent tables.

B. Field and Laboratory Methods

Five river monitoring trips were completed in FY94, ranging from ten to eighteen days in length, from October 1993 to September 1994. See the individual Trip Reports for dates and sites visited. The trips launched from Lee's Ferry, AZ with takeout at Diamond Creek on the Hualapai Reservation near Peach Springs, AZ. Travel was by row boat or motorized raft. An average of thirty-two sites was monitored per trip. Field personnel consisted of at least one project archaeologist and one or two archaeological technicians.

Monitoring consisted of photo documentation and completion of a monitoring form. Photo documentation involved comparing previous photos to current field conditions and duplicating photographs where change occurred. Pentax 105 and Olympus Twin cameras were used, with black-and-white Kodak Plus-X pan 125 film. Color slides were occasionally taken. The site monitoring form was a compilation of quantitative and qualitative observations designed to reflect the condition of each site (Appendix A). The archaeologists recorded natural and human impacts to sites and made site specific management assessments and recommendations. The location of any impacted or deteriorated features or structures was noted on the site form and map, and comparisons made with previous visits.

Monitoring data were entered into a relational database program (Paradox) and analyzed using both Paradox and SYSTAT (statistical analysis) software. Raw data and associated graphs were compiled into a report available at the project office in Flagstaff. Final copies of monitoring forms were printed and filed at the project office.

An average of five rolls of film (36 exposures) was taken every monitoring trip, resulting in over 600 photo images produced in FY94. These photographs were mounted on cards with

site number, date, description, and directional information. Negatives were archived in polypropolene sleeves and stored in acid free archival binders.

Since March, 1992, stationary cameras have been photographing sites C:13:003, C:13:359 and C:13:371. The responsibility to change the film was delegated to the GCES beach erosion program headed by NPS employee Brian Cluer. The analysis is the responsibility of river corridor archaeologists. Currently, the only change noted was at C:13:003 after the Little Colorado River flood in January 1993 (See 1993 Annual Monitoring Report). Since then, no noticeable changes have occurred at any of the sites.

C. Total Station Mapping

From April 27 to May 9, 1994, total station mapping of selected sites was undertaken along the Colorado River corridor, between Nankoweap and Indian Canyon. It was suggested by several Programmatic Agreement (PA) members that mapping sites with a total station unit would provide the project with detailed, accurate maps that could, theoretically, be used as a baseline to track natural and/or human impacts.

During the 94-4 river trip, Signa Larralde (BOR) provided NPS with mapping equipment and crew, which included Warren Hurley (BOR) and Mike Stubing (SWCA). The sites mapped varied in the number and type of features and topographic locations. A total of 18 sites was mapped: four at Nankoweap, seven at Palisades, and seven at other locations. See Table 1 for the sites that were mapped using a total station and their river locations.

The amount of detail mapped at each location was variable dependent on the complexity of the cultural material present and the topography. All site features were plotted, however, some topographic shots were not taken due to time constraints. After meeting with Hurley and seeing the maps generated, it is recommended that additional points be shot in to provide better maps for tracking erosive activity. With the Hualapai approval, it is also recommended that the sites at Granite Park be mapped.

Table 1. Location of Sites with Total Station Maps

River Mile	Site Number
52.3 Nankoweap	C:09:051
52.3 Nankoweap	C:09:052
51.9 Nankoweap	C:09:053
52.3 Nankoweap	C:09:082
57.5	C:13:365
62.4	C:13:371
65.5 Palisades	C:13:098
65.5 Palisades	C:13:099
65.5 Palisades	C:13:100

River Mile	Site Number
65.5 Palisades	C:13:101
65.5 Palisades	C:13:272
65.5 Palisades	C:13:334
65.5 Palisades	C:13:336
73.1	C:13:070
73.2	C:13:385
73.2	C:13:386
189.7	A:16:004
206.6	G:03:004

Mapping will continue in FY95. Emphasis will be placed on fine-tuning and greater detail at sites with very active drainages (i.e., gullies, arroyos). Surveying in cross sections is highly recommended for sites labeled as critical. Furthermore, the USGS has completed several topographic maps of various locations at large scales (1:2,000). For FY95 project staff will step up communication with the USGS to avoid duplicating unnecessary points, and improve upon the maps that already exist.

D. Tracking Artifact Movement

On a ten-day river trip in September of 1993, many PA members observed our methods of monitoring archaeological sites. After viewing several locations, a suggestion was made to track artifact movement at sites that receive substantial human and/or natural disturbances. As a result, in FY94, one-by-one meter square units were placed at ten sites to observe and record artifact movement. Most of the units are at Nankoweap, Palisades, and below Unkar Delta, river left; there is also a unit at Basalt (C:13:321) and 60 Mile Canyon (C:13:006). Table 2 lists the sites with artifact movement units and their location. All sites except C:09:051 have one unit.

Table 2. Location of Sites with Artifact Movement Units

River Mile	Site Number
73.1 Below Unkar	C:13:070
65.5 Palisades	C:13:100
69.9 Basalt	C:13:321
67.7 Palisades	C:13:272
73.2 Below Unkar	C:13:385
65.6 Palisades	C:13:101
59.8 60 Mile Canyon	C:13:006
52.3 Nankoweap	C:09:051 (2 units)
52.3 Nankoweap	C:09:052
52.3 Nankoweap	C:09:082

Several suggestions were made by the PA members on the methods used to track artifact movement. What was needed was a method that had minimal site impact and low visibility. As a result, a four meter long string was cut and shaped to form a one by one meter square. A nail, approximately 20 centimeters long, was used as a stationary northwest datum corner, and a second nail was placed at the southeast corner if deemed necessary for locational purposes. Placement of the units was subjective and at areas that contained no more than 20 cultural items.

A photograph was taken to document the area, and two measuring tapes were used to triangulate the distances of the items from the north and west side walls. Artifacts, rocks, grasses, etc. were labeled and identified and drawn on grid paper. The unit's location was plotted on a site map, and some units were mapped using the total station on the 94-4 river trip. After these tasks were completed the string was removed and the datum nail was covered with sand or rocks.

The original maps (plan view and site) were put into the site form file. A xerox copy was placed into the field form file accompanied by an artifact tracking form to be completed the next time the unit is visited. The items in the units will be measured and photographed during the spring monitoring trips.

The artifact tracking units will be monitored in FY95. Observation of these units during the past year has shown that movement on the surface does occur. However, this movement illustrates a symptom of erosional processes, rather than offering an explanation. The utility of this method will be determined prior to the FY96 field season.

III. Impacts to Cultural Resources

Cultural resources along the river corridor are at risk because of the existence of Glen Canyon Dam. The dam is a sediment barrier which prevents the replenishment of beaches, dunes, and terraces with river-derived sand. Without the necessary cycle of natural deposition, these landforms can become unstable. Cultural deposits embedded in or on these unstable landforms may eventually erode. "Archeological sites once protected by sandbars and terraces have become increasingly exposed to erosion by the river and rainfall-induced terrace erosion." (DEIS p. 249) It is the very presence of the dam, then, which sets in motion a sedimentary cycle different from the one nature intended.

It is known from the way the dam was operated in the past that archaeological sites were adversely impacted as the result of Glen Canyon Dam (DEIS p. 35). Therefore, an interim flow monitoring program was begun in 1992 and continues today. The goal is to evaluate the effect of dam operations on cultural resources by monitoring erosional impacts to sites. This report evaluates impacts to archaeological resources. Other cultural resources such as traditional cultural places, sacred sites, and plant-, animal-, or mineral-gathering locales were evaluated by the individual tribes.

Archaeological site monitoring first began in Grand Canyon National Park in the 1960s. At that time, a distinction was made between human and natural impacts. The river corridor monitoring project continues to use these distinctions, but the interest is in naturally- or humanly-caused damage resulting from the existence or operation of Glen Canyon Dam. Data collected on this project document the existence of certain types of impacts and whether adverse conditions are increasing or decreasing.

A. Natural Impacts

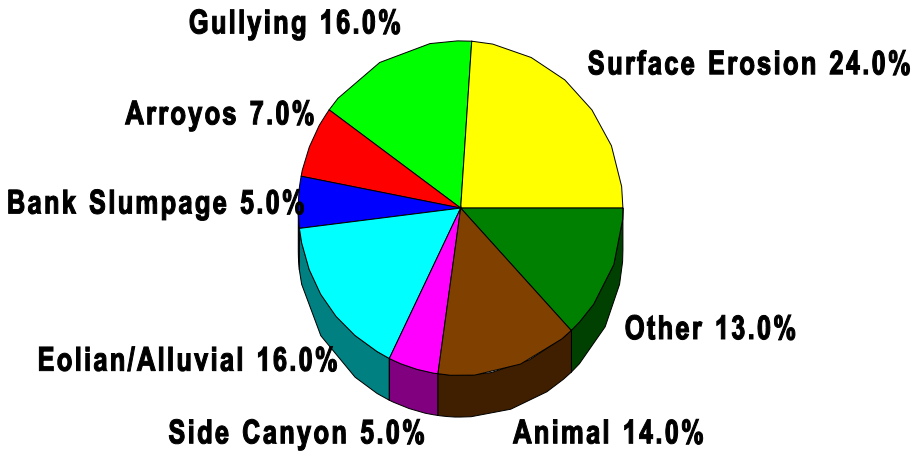
Information on eight different natural impacts was recorded. These particular impacts were chosen because they are commonly occurring erosional processes in this canyon environment and are fairly recognizable. They are: surface erosion, gullying, arroyo cutting, bank slumpage, eolian or alluvial erosion/deposition, side canyon erosion, animal-caused erosion, and other impacts (spalling, roots).

Overall, the results are that most archaeological sites (77%) are experiencing some form of natural erosion. The greatest site impact is in the form of surface erosion (57%), followed by gullies (45%), eolian/alluvial erosion or deposition (39%), and animal-caused erosion (33%). Table 3 shows the frequency of each type of natural impact at the monitored sites. Figure 1 depicts the relative frequency of natural impact occurrences at the FY94 monitored sites. For example, 53 (7%) of the 806 natural impact occurrences were due to arroyo cutting.

Table 3. Frequency of Natural Impact Types (N = 159 Sites)

Natural Impact Type	Present		Absent	
	Freq.	Percent	Freq.	Percent
Surface Erosion	91	57	68	43
Gullies	71	45	88	55
Eolian/Alluvial Eros or Dep	62	39	97	61
Animals	53	33	106	67
Arroyos	29	18	130	82
Bank Slumpage	21	13	138	87
Side Canyon	19	12	140	88
Other	49	31	110	69

Figure 1. Relative Frequency of Natural Impacts (N = 806)



These erosional processes are occurring most frequently at artifact concentrations and roasting features. Table 4 shows the distribution of natural impacts at different site features. For example, of sites with structures, 48% of them had surface erosion present. Note: the percentages do not add up to 100 because more than one type of impact may exist at more than one location on a site.

Table 4. Natural Impact Percentages at Various Site Features

Natural Impacts	Site Features					
	Structures	Artifacts	Roasters	Perishables	Rock Art	Other
Surface Erosion	48	56	52	51	26	35
Gullying	32	35	45	22	0	24
Arroyo Cutting	18	14	18	3	0	0
Bank Slumpage	12	10	15	3	0	0
Eolian/ Alluvial	34	37	37	32	0	18
Side Canyon	11	9	10	11	0	12
Animal Erosion	24	30	35	34	0	18
Other	32	24	24	34	21	24

At eighty-two sites (52%) monitors indicated that the natural impacts had occurred since the last time the site was monitored. At over half the sites, then, there was a change in site condition since the prior visit (which for some sites was the previous year).

When arroyos or gullies were present, the archaeologists recorded whether they drained all the way to the river. This involved following the erosion channel as far as it went. Some drainages die out in dune fields or on terraces before reaching the river (Type II). The assumption is that channels which drain to the river (Type I) are affected by the river's base level, and thus any lowering of the base level may geometrically increase erosion in these

channels (Hereford et al. 1991). Thirty-two percent (51 sites) of the FY94 monitored sites had arroyos or gullies draining to the river.

B. Human Impacts

Information was recorded on five different human impacts. These include the formation of trails to or through archaeological sites, moving or rearranging artifacts such as in collection piles, camping on or near sites, criminal vandalism (destruction or removal of artifacts or features), and an "other" category. These impacts were selected because they are known to be a problem along the river corridor, and are indirectly a result of the existence of Glen Canyon Dam.

Most visitors to archaeological sites along the river corridor are commercial river-runners, whose numbers have increased dramatically since Glen Canyon Dam provided regulated water flows in 1963. Since then, the river-running industry has boomed. Many of these parties like to stop at archaeological sites out of curiosity. Some sites are located next to favored camping beaches. Once a trail to a site is made, many people follow just to see where it goes.

Not surprisingly, the most frequently occurring human impact along the river corridor is the formation of trails. Of all the sites monitored in FY94, sixty-nine of them (43%) had trails made by humans. Besides river-running parties, trails on sites are also made by Glen Canyon Environmental Studies (GCES) researchers and the occasional backpacker. Human-caused trails are of importance because 1) they can turn into gullies quite easily, creating an avenue for further erosion and 2) it may be possible to stop people from trailing through sites by performing retrailing or obliteration work, or through better education. Consequently, the FY94 monitors' number one recommendation to reduce site impacts was to obliterate trails or reroute them.

Table 5 shows the frequency of human impact types. As stated above, trails are by far the most common human impact (43% of sites), followed by collection piles (12%). Camping on sites and criminal vandalism are very infrequent.

Table 5. Frequency of Human Impact Types (N = 159 Sites)

Human Impact Type	Present		Absent	
	Freq.	Percent	Freq.	Percent
Trails	69	43	90	57
Collection Piles	19	12	140	88
Camping on Site	5	3	154	97
Criminal Vandalism	1	1	158	99
Other	9	6	150	94

One way to reduce trailing impacts would be to obliterate trails or reroute them away from cultural sites. Most of this rehabilitative trail work would need to occur in Reaches 5 and 10 of the river corridor, where sixty-seven percent of trailing damage exists. Reach 5 (Furnace Flats) is from river mile 61.5 to 77.4. Reach 10 (Lower Canyon) is from river mile 160.0 to 213.9. Both of these areas are places where popular river-runner camps are located near archaeological sites. The number of trails is increasing at three sites in Reach 10 (A:15:025, A:15:042, and G:03:003) and one site in Reach 5 (C:13:371). The types of sites where trailing is most prevalent are roaster complexes, camps, and small structures.

There was one instance of criminal vandalism recorded at site C:05:035, a prehistoric rockshelter with artifacts. Apparently caused by fishermen, the damage included a large scatter of trash and a rope strung across the shelter with ten dead fish heads hanging on it.

In addition to recording the types of human impacts at sites, monitors also indicate where on the site these impacts are occurring. This gives management an idea of how to go about reducing impacts, if possible, and the level of work that might be involved in doing so. The FY94 data indicate that the greatest impacts are to artifacts and roasting pits. Rock art, thankfully, receives the least visitor impact (there are also fewer rock art sites in the Canyon than there are roasting features and camps). Table 6 depicts visitor impacts by location on the site.

Table 6. Frequency of Human Impacts at Various Site Features (N = 159 Sites)

Site Features	Present		Absent	
	Freq.	Percent	Freq.	Percent
Artifacts	34	21	125	79
Roasters/ Hearths	25	16	134	84
Structures/ Storage	14	9	145	91
Perishables/ Midden	8	5	151	95
Rock Art	3	2	156	98
Other	6	4	153	96

At thirty-nine sites (25%) monitors indicated that the human impacts had occurred since the last time the site was monitored. So, the majority of the time the human damage is not new, but occasionally it is. At only seven sites (5%) was it felt that human impacts were directly related to river fluctuations and/or dam operations. These sites were A:15:021, A:15:025,

A:15:027, A:16:159, B:10:227, G:03:003 (twice), and G:03:026. Such impacts might be the development of new trails to avoid high water or the availability of new beaches in proximity to sites.

C. Summary of Impacts

To summarize, archaeological sites along the Colorado River corridor are being affected by the natural processes of canyon erosion and by human visitors. Eighty-one percent of the FY94 monitored sites have some form of natural or human impact. Natural impacts are more prevalent at sites than human impacts (77% vs. 53% of sites), and are occurring at a higher rate (52% vs. 25% since the last monitoring visit).

Artifact scatters and roasting features are experiencing the majority of damage from both surface erosion and gullying as well as from human visitors. This is probably because these site features are relatively horizontal and lie on top of the ground surface, thereby exposing a larger surface area to the natural elements and to human foot-traffic. Also, many of these features are located in or on stabilized sand dunes and alluvial terraces which easily erode when, for example, hiking trails criss-cross over them.

D. Geomorphic Research

One of the mechanical aspects of how erosion occurs in the Colorado River corridor is the channeling of runoff from the slopes and deltas of the canyon into the main trunk stream. Hundreds of side canyons and thousands of secondary- and tertiary-level streams contribute to this process by pouring water and sediment into the Colorado River on a generally seasonal, but in some cases permanent, basis (e.g. Bright Angel and Tapeats Creek). This addition of sediment and rock debris is what gives the river its unique configuration of steep terrain and numerous rapids (Personal communication, Ivo Lucchita, 1995).

In an effort to fully understand this process, USGS geologists (Hereford, Lucchita and others) have studied the particular way in which runoff and permanent stream flow enter the river and effect the terrain over which they pass.

To this end a system has been established which designates channeled flows in the corridor as either Type I or Type II streams (after Hereford et al. 1991). A Type I stream is defined as any channel that drains directly into the main trunk stream (Colorado River). A Type II stream is simply one that does not. Typically, Type II streams drain onto higher and older depositional units laid down by the Colorado River. These secondary channels have in essence been left hanging by the Colorado River as it cuts downward.

Research to date indicates that Type II streams characteristically have larger catchment basins than Type I streams, thus Type II streams have a greater potential for channeling more runoff and hence causing more erosion. This also leaves the possibility open for Type II streams to reestablish their flow to the current level of the river, effectively changing into a Type I stream.

Type I streams are presently affected by dam operations to the extent that the presence of the dam and the subsequent regulated flows "substantially" reduced deposition which prior to the dam occurred naturally (Hereford et al. 1991). This reduction has caused a "lowering of effective base level in the river" which has "caused the longitudinal profile of the streams to

regrade, thereby rejuvenating the channel through deepening and widening" (Hereford et al. 1991:42).

This phenomenon of dam-caused headcutting of drainages and lack of sediment refurbishment is of great concern to the monitoring project as the erosion and ultimate dissolution of archeological sites will be one of the outcomes. Work by Hereford has shown that major dissection of alluvial terraces has taken place since 1965. Just after Glen Canyon Dam was firmly in place, additional work by Ivo Lucchita (also of the USGS) has prompted the idea that the dam acts as a human-constructed altithermal barrier imposing a drier, sediment poor environment on the river corridor (Coder et al. 1993).

So far the river corridor monitoring project has benefitted greatly from the geomorphological work done by the USGS. It is the intention of the project to further incorporate and add to this body of knowledge in its application to the archeology of the canyon. This greater concern with geomorphic process will not be at the expense of our monitoring effort, but as an addition to greater understanding.

E. Photographic Documentation

This section includes examples of photographs which document natural and human impacts to river corridor archaeology sites. Natural impacts are illustrated in Figures 2 through 9 and human impacts in Figures 9 through 13. The photographs show change or stability through time.

Natural erosion to sites is caused by locally heavy rainfall, the downcutting of side drainages, the lack of available sand to protect features, flooding, and the absence of a vegetative cover. Human impacts include trailing, rearrangement or removal of artifacts, and graffiti.

During FY94, over 600 photo images were produced. Project photo images include black-and-white prints, color slides, and archival artifact photographs. There are currently 4,400 black-and-white images in the project's photo archives.

April 30, 1993 September 14, 1994

Figure 2 illustrates the increasing entrenchment of a drainage resulting from heavy precipitation at C:13:349. Several features are located in the cutbanks or in close proximity to the drainage edge. Notice the headward erosion and secondary channel created since April 30, 1993 indicated by arrows.

April 30, 1993

September 14, 1994

Figure 3 illustrates the same drainage as in Figure 2 (C:13:349) but looking toward the headcut. Notice the close proximity of feature 2 near the entrenching drainage and the reconstruction of the drainage walls. Feature locations are indicated by arrows. Feature 2 is only three meters above the 28,000 cfs level. The natural course of erosion at this location is altered due to the lowered base level of the main channel.

April 29, 1993

February 27, 1994

Figure 4 illustrates the current short-term stability of feature 5 at C:13:321. This feature was exposed in 1988-1989 due to increasing entrenchment of an arroyo. Another heavy rain could significantly degrade the feature. The exposure of feature 5 is yet another example of the insufficient amount of sand available in the system.

March 19, 1991

March 2, 1994

Figure 5 illustrates an exposed structure of linear Dox slabs at C:13:359. Notice the difference in stability between the photographs. Without vegetation, the slope appears fragile and unstable. With vegetation, the feature appears stable. Notice the difference in vegetation at nearly the same time of year.

April 6, 1994

Figure 6 illustrates a circular arrangement of upright slabs and fire-cracked rock at A:15:021. The feature is located 34 meters above the 28,000 cfs level and is in danger of serious impact during a heavy rain.

May 6, 1993

September 19, 1994

Figure 7 illustrates ground cover at different times of the year. G:03:24, a circular scatter of fire-cracked rock, is relatively concealed in the May 6, 1993 photograph. The feature is exposed in the September 19, 1994 photo. Sites are most susceptible to adverse impacts when their protective cover of vegetation is absent.

November 8, 1992

March 31, 1994

Figure 8 illustrates a stabilization wall that collapsed due to heavy local rains at C:13:007. The photos represent the importance of monitoring and ongoing maintenance. Remedial actions taken in an erosive system such as the Grand Canyon require continuous upkeep. The wall was repaired in November 1994 by the NPS trail crew.

September 4, 1990

March 31, 1994

Figure 9 illustrates procedures used at C:13:007 in revegetating feature 3. Stabilization, revegetation, and obliteration of trails have reduced human and natural impacts at this site. Years of on-site camping have altered old structural alignments and further compacted the surface.

October 17, 1993

Figure 10 illustrates trailing at Granite Park leading to G:03:003. The trail leads directly to G:03:003 and is extremely visible throughout Granite Park. The vegetation is gone, which increases the potential for erosion. Trail obliteration will proceed in 1995.

March 3, 1993

September 13, 1994

Figure 11 illustrates human impacts at C:13:098. This turn-of-the-century cabin is impacted primarily by artifact movement, indicated by arrows. Previously taken photographs indicate continuous human disturbance for several years. The cabin's close proximity to a major hiking trail and large camping beach increases the risk of visitor impacts. Remedial actions in FY95 at C:13:098 will include stabilization, total station mapping, and continued photography.

May 3, 1993 March 7, 1994

Figure 12 illustrates evidence of human impacts at B:09:317. Notice the trail, footprints, and relocated artifacts since the May 3, 1993 monitoring trip. Notice the movement of the manos indicated by the arrows.

October 2, 1993

Figure 13 illustrates an example of vandalism occurring within the past year at C:05:001.

IV. Site Specific Results and Recommendations

This section briefly describes each site monitored during FY94. The site type, physiographic position, and previous work are provided, along with the current status and recommendations. Site specific characteristics and tribal considerations are included.

A:15:003

A:15:003 contains Virgin Anasazi as well as protohistoric Pai and Paiute features and artifacts. This site is situated on a dune covered bedrock terrace abutting local cliffs.

Previous Work: The site was originally recorded in September of 1978 by Bob Euler. It was re-recorded by NPS survey personnel in November 1990. A:15:003 was monitored in 1993 and 1994.

Status and Recommendations: A:15:003 is currently stable with no active erosion. However, the site is located near an established river-runner's camp and is also susceptible to damage from extreme high water and side canyon flooding. Surface drainages located on A:15:003 generally disappear into the boulder fields before reaching the river. However, some of the small gullies located on the downstream side of the site drain into the local side canyon wash which do periodically discharge into the river. The mouth of this canyon has developed a clay plug resulting from lowered base level in the main channel of the Colorado. The site was mapped in detail during the 1994 field season. It is recommended that A:15:003 be monitored in alternate years.

A:15:004

A:15:004 is a historic Pai (Hualapai) site. Two fire features, cans, milled lumber and a badly deteriorated canteen are present on the surface. Flakes and a pot bust were also observed. The site is situated on an alluvial terrace eight meters above and 75 meters from the river.

Previous Work: The site was originally recorded by Bob Euler in 1976 and re-recorded by NPS survey personnel in March of 1991. A:15:004 was monitored in 1993 and 1994.

Status and Recommendations: A flash flood in an adjacent drainage during the spring of 1993 had no impact to the site. The site is currently stable. Arroyos and gullies present on the site do not drain into the river. It is recommended that A:15:004 be monitored on a three to five year schedule.

A:15:020

A:15:020 is an extensive Virgin Anasazi and protohistoric Pai site including fire features, activity areas, stained soil and associated artifacts. Hopi sherds were found on the surface.

Previous Work: A:15:020 was recorded by NPS survey personnel in November of 1990. The site was monitored in 1993 and 1994.

Status and Recommendations: The site is located over 135 meters from the river and is currently stable. Arroyos and gullies present on the surface do not drain into the river. It is recommended that A:15:020 be relegated to a monitoring schedule of three to five years.

A:15:021

A:15:021 is a historic Paiute site consisting of a nearly intact slab and block fire feature, a desert side-notched point, Paiute indented sherds and a bone shirt button. The site is located on a stabilized mesquite covered dune ten meters above and thirty meters from the river.

Previous Work: The site was initially recorded in November of 1990 by NPS survey personnel. A:15:021 was monitored for the first time since the survey in April of 1994.

Status and Recommendations: Although the bulk of the site is currently stable, the feature is deteriorating due to exposure. It is recommended that the site be mapped, a test unit placed on-site, and samples taken and analyzed. Surface runoff from the site drains into the river. A:15:021 should be monitored on an annual basis.

A:15:025

A:15:025 is a well used hematite mine associated with prehistoric and late historic utilization. The pigment obtained and processed at this location by the Hualapai and Paiute was traded all over the southwest. Although the site was visited by Native Americans into late historic times, it has lain dormant most of the twentieth century until the current archaeological project brought it once again to the attention of tribal representatives. Presently small amounts of the pigment are being obtained for ceremonial use by members of the tribes.

Previous Work: A:15:025 was initially recorded by NPS survey personnel in November of 1990. The site has been monitored in 1993 and 1994.

Status and Recommendations: The site itself is currently stable. However, a trail has developed in response to the considerable traffic generated by the project since 1990. Tribal representatives have requested that the site be monitored on an annual basis. Surface runoff does reach the river. However, there are no river-related impacts associated with the site other than the current increased visitation. The project staff is also concerned about the safety factor involved with the climb up to and extraction of the hematite. We feel it is an accident waiting to happen. A consensus amongst the signing members is hereby solicited as to a desired course of action.

A:15:026

A:15:026 consists of two intact roasting features. No artifacts were observed on the surface. The site is located on stable dune deposits overlying high water and colluvial debris. The site is virtually invisible due to the thick cover of grass.

Previous Work: A:15:026 was initially recorded by NPS survey personnel in January of 1991. It has subsequently been monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is very stable. Bighorn sheep trail through the site while feeding, causing no discernable impact. Surface runoff does not reach the river. A:15:026 should be monitored on a three to five year basis.

A:15:027

A:15:027 consists of roasting features and an assemblage of artifacts indicating Virgin Anasazi as well as a later Pai presence. The site is located on a dissected terrace remnant adjacent to the river.

Previous Work: The site was first recorded by NPS survey personnel in November of 1990 and has been monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is currently stable and in good shape. Some recent minor impacts are due to the continued presence of bighorn sheep. Waters draining off the surface of the site flow directly into the Colorado River. It is recommended that A:15:027 be monitored on a yearly basis.

A:15:032

A:15:032 consists of a small concentration of fire-cracked rock and several (nine) Colorado buffware sherds. The site is located on a highly dissected alluvial terrace.

Previous Work: The site was initially recorded by NPS project personnel in November of 1990 and was monitored for the first time in September of 1994.

Status and Recommendations: A:15:032 is in the last phase of dissolution and is manifested only as a remnant on the surface. It is recommended that this site be removed from the monitoring program.

A:15:039

A:15:039 consists of fire features, expedient grinding slabs, and a sparse scatter of lithics. The site is located on reworked dune deposits overlying high water cobble and boulder debris at the mouth of a small canyon. Surface waters drain directly into the Colorado River.

Previous Work: A:15:039 was initially recorded by NPS survey personnel in January of 1991. The site has been monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is currently stable. A local drainage encroaching from the southeast will eventually impact features 1 and 2 as it has at some time in the past. Annual monitoring should continue. Minor testing to obtain samples for analysis should also be implemented.

A:15:042

A:15:042 consists of several activity areas with associated artifact concentrations and a historic inscription of dubious origin. The bulk of the site is stable with the exception of a prehistoric fire feature eroding from the side canyon bordering the site.

Previous Work: The site was initially recorded in March of 1991 by NPS survey personnel and has been monitored in 1992, 1993, and 1994.

Status and Recommendations: The majority of the site is stable. However, feature 2 is currently being eroded by annual side canyon flooding. Another feature was found this field season in alluvium closer to the river. Trailing has developed from visitation to the inscription. Retrailing or trail obliteration should occur to mitigate the effects from tourism, and then monitoring discontinued.

A:15:044

A:15:044 is a Virgin Anasazi site located in a shallow rock shelter consisting of ground-stone, sherds, and a biface fragment. A small fire feature is present with charcoal on the surface.

Previous Work: The site was initially recorded by NPS survey personnel in January of 1991. The site was monitored during the 1994 field season.

Status and Recommendations: The site is currently in very stable condition. The greatest probable threat to the site on a short term basis is archaeological monitoring. It is therefore recommended that A:15:044 be checked on a three to five year schedule.

A:15:048

A:15:048 is a cluster of poorly preserved roasting features of undetermined cultural affiliation. Very few were observed during the survey, a single basalt mano and a recent food can.

Previous Work: The site was initially recorded by NPS survey personnel in March of 1991 and was monitored for the first time in September of 1994.

Status and Recommendations: The general condition of the site is stable. Gullying could at some point impact Feature 2. During the most recent visit, a partial mano was observed and plotted. Surface drainage on this site does not reach the river. It is recommended that A:15:048 be monitored on a 3 to 5 year schedule.

A:15:051

A:15:051 consists of a roasting feature and a sparse scatter of artifacts including an obsidian biface. Ceramics indicate a Virgin Anasazi affiliation.

Previous Work: The site was initially recorded in March of 1991 and has been monitored twice, in 1993 and 1994.

Status and Recommendation: The site is stable. There is a mature growth of cryptogamic soil present on site. Surface runoff does not drain directly into the river. It is recommended that A:15:051 be monitored on a schedule of three to five years.

A:16:003

A:16:003 is a multicomponent rock shelter with artifacts. The site is located in a shallow overhang at the base of the Tapeats sandstone, situated near the mouth of a major side canyon.

Previous Work: A:16:003 was initially recorded by Bob Euler in 1972. It was recorded in greater detail by Jan Balsom in 1984 and yet again by NPS survey personnel in November of 1990. The site was monitored on October 1992 and April of 1994.

Status and Recommendations: The site setting is very stable, however, frequent visitation from the nearby river camp has caused a permanent trail from the drainage to the site and contributes to a lot of artifact movement. The site is also used as a shelter by modern travellers during bad weather. Because A:16:003 is considered to be outside the definition of the current project area, it is recommended that monitoring be stopped.

A:16:004

A:16:004 is an extensive area of shelters, features, structural alignments, and activity areas with a diverse assemblage of artifacts. There are three cultural affiliations present on site: Basketmaker III, Virgin Anasazi and a Pai/Paiute component. The site is located on a variety of situations: stabilized dunes, Tapeats rock ledges and a flattened basalt outcrop.

Previous Work: the site was initially recorded by Bob Euler in 1975 and was recorded and mapped by NPS survey personnel in January 1991. It was reported at this time that collection piles were observed in most of the rock shelters. The site was monitored in 1992, 1993, and 1994.

Status and Recommendations: The bulk of the site is stable. Bighorn sheep trailing is impacting feature 3. Feature 10 is being carved by gullying. Total station mapping was completed in May of 1994. It is recommended that monitoring continue on a schedule of every other year.

A:16:148

A:16:148 consists of a roasting feature and a sparse scatter of lithics. The site is located in the mesquite zone of a broad alluvial terrace.

Previous Work: The site was initially recorded in November of 1990 by NPS survey personnel. The site was monitored for the first time in 1994.

Status and Recommendations: The site is currently stable and has developed a dense cover of grass. Some minor trampling by bighorn sheep is the only impact observed. Surface runoff on this site does not reach the river. It is recommended that A:16:148 be monitored every other year.

A:16:151

A:16:151 consists of a large roasting feature, minimal artifacts, and a rock shelter. The site is divided into two distinct loci with Pai cultural affinity. A:16:151 is located on reworked dune deposits which overlay a bedrock terrace.

Previous Work: A:16:151 was initially recorded by NPS survey personnel in November of 1990 and monitored in 1992, 1993, 1994.

Status and Recommendations: The site is currently stable with minor impacts from bighorn sheep trailing. Some portions of the site drain surface water directly into the river and others do not. At the request of the Hualapai tribe, A:16:151 will be monitored on a semiannual basis. It is further recommended that trailing created since 1990 be obliterated.

A:16:155

A:16:155 is a small rockshelter with a few brownware sherds probably of Pai affinity. The shelter is situated at the base of the Bright Angel shale. Surface runoff does not drain directly into the river.

Previous Work: The site was initially recorded by NPS survey personnel in November of 1990 and monitored for the first time in September 1994.

Status and Recommendations: The site is currently stable. Some small mammal and insect burrowing is present. Monitor every five years.

A:16:158

A:16:158 is an aceramic site of unknown cultural affiliation located in a Muav rock shelter. Artifacts present on site include a large grinding slab and a few chert flakes.

Previous Work: The site was initially recorded by NPS survey personnel in November of 1990. A:16:158 was monitored in 1992, 1993, and 1994.

Status and Recommendations: This site is situated less than three meters above the 28,000 cfs level. Water was present in the site during the high water of 1983 and 1984. Site location presupposes that it has been underwater untold times since its creation. At some point a test unit could be placed to determine subsurface integrity. There was an increase in eolian sand noted inside the shelter in 1994. This was probably derived from the large sandbar located just downstream from A:16:158. This bar was refurbished during the Little Colorado River floods in January 1993. It is recommended that the site be monitored annually.

A:16:159

A:16:159 consists of a rock shelter with an artifact assemblage including sherds, lithics, groundstone, and hand tools as well as a small pictograph panel. Ceramic evidence indicates Pai affinity with a possible earlier Virgin Anasazi presence.

Previous Work: This site was initially recorded by NPS survey personnel in November of 1990. A:16:159 was monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is currently stable, but it receives more visitation than previously. A Moapa spindle whorl observed during the survey has subsequently been hidden or removed. Occasionally trash is found on-site. It is recommended that the site be monitored semiannually. A:16:159 is located opposite a popular camping beach and should be closed to visitation. However, this step may draw more unwanted attention to the site.

A:16:160

A:16:160 is a group of fire features and associated artifacts of unknown affiliation. Thick vegetation located on the site acts as a deterrent to erosion.

Previous Work: This site was recorded by NPS survey personnel in November of 1990. The site was monitored for the first time in 1994.

Status and Recommendations: Overall the site is stable. However, human trailing is causing adverse impacts at feature 1 and trail obliteration is recommended. A:16:160 should be monitored on a three to five year schedule.

A:16:163

A:16:163 is a large multicomponent site with five separate loci. Virgin Anasazi and Pai/Paiute occupation is suggested by the artifact assemblage of flakes, sherds, bifacial tools, and groundstone. The cultural materials are located across a variety of surfaces: riverside dunes, the talus slope, a debris flow and rock shelters situated high above the river in Bright Angel ledges. Pictographs and structural outlines are present on loci which are located outside the high water zone.

Previous Work: This site was initially recorded by NPS survey personnel in December of 1990 and was monitored for the first time in 1994.

Status and Recommendations: The site is currently stable. Visitation has increased since 1991. It is recommended that only the two loci (D & E) situated in the potential highwater zone be monitored on an annual basis. It is suggested that the rock shelter and pictographs be spot-checked and that an eye be kept open for increased foot traffic from the boat beach to locus A.

A:16:167

A:16:167 consists of five separate roasting features spread over about a half an acre of stabilized dune surface. Few artifacts are present on site: a few flakes , a ground slab, and a cobble hand tool. The assemblage indicates a Pai/Paiute occupation. Buried materials are probably present.

Previous Work: This site was initially recorded in December of 1990 by NPS survey personnel and was monitored in fiscal years 1993 and 1994.

Status and Recommendations: Although adverse impacts to the site are present it is presently stable. Some surface runoff reaches the river by way of a side canyon drainage. Portions of the site drain into a dune field and elevated cobble bar. A:16:167 in on the list of sites to be mapped in greater detail. It is recommended that the site be monitored every other year to avoid impacts from the project.

A:16:171

A:16:171 consists of two roasting features and a sparse array of artifacts. A single sherd of Polacca polychrome was found on the site. The sherd could be as early as 1780 and indicates further evidence of Hopi-Pai trade in the river corridor.

Previous Work: This site was initially recorded by NPS survey personnel in January of 1991 and was monitored for the first time in September of 1994.

Status and Recommendations: Surface runoff does not drain directly into the river from this location. The site is presently stable and is in no danger of direct impacts from the main channel. Monitoring every five years is recommended.

A:16:173

A:16:173 consists of three concentrations of fire-altered rock and minimal artifacts. No formal tools or ceramics were observed. The site is situated on reworked dunes overlying a slope of broken columnar basalt.

Previous Work: This site was initially recorded by NPS survey personnel in February of 1991 and was monitored for the first time in September of 1994.

Status and Recommendations: Surface runoff from this site does not drain directly into the river. If enough free sand were available in the system, the dune on site would incorporate and cover the cultural materials. Footprints and faint trailing are in evidence from the 1991 survey. Monitor every five years to minimize the human impacts on a relatively stable site.

A:16:174

A:16:174 consists of two artifact concentrations, a large roasting feature, and scattered fire-altered rock. The site has Pai affinity and is situated on an alluvial terrace abutting steep slopes and local cliffs of conglomerate. Shallow overhangs provide some shelter.

Previous Work: This site was initially recorded by NPS survey personnel in December of 1990. Monitoring took place in 1993 and 1994.

Status and Recommendations: Surface runoff at this location does not drain directly into the river. The survey crew observed recent gullying and arroyo expansion due to locally heavy rains. Moderate erosion is still present in front of the rock shelter, however, no midden is present. The roasting feature is stable due to a thick cover of vegetation at the base of the adjacent slope. Monitor every other year to minimize research impact.

A:16:175

A:16:175 is a series of shallow overhangs with associated fire features and concentrations of artifact, bone, and charcoal. Sherds and projectile points found on the surface indicate a multiple occupation of Virgin Anasazi and a later Pai/Paiute presence. The site itself is located on the upstream end of a dissected alluvial terrace. Gullies and arroyos on site drain into the river.

Previous Work: This site was initially recorded by NPS survey personnel in February of 1991. The site was monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is moderately stable with feature 1 (the midden) open to surface erosion. It was informally requested by Loretta Jackson of the Hualapai tribe that this site be monitored on a three year cycle and that A:16:185 (a human burial) located on the same small delta stop being monitored completely. It is recommended by the project staff that both sites stop being monitored until further notice.

A:16:176

A:16:176 is an aceramic site with a single roasting feature and scattered lithics. Burned bone is also present. The site is located on a small flattened area at the top of an acacia-covered slope. No gullies or arroyos drain directly into the river from the site.

Previous Work: This site was initially recorded by NPS survey personnel in January of 1991 and was monitored for the first time in May of 1994.

Status and Recommendations: The site is presently very stable. Access is difficult due to the thick cover of acacia. Monitoring of A:16:176 should be discontinued.

B:09:316

B:09:316 is a series of one-course alignments with groundstone, a few flakes, and lithics. Sherds indicate a Pueblo I-II occupation. The site is located on Muav ledges adjacent to the river. The site appears to be in the 120,000+ cfs range and has probably been inundated numerous times in the last nine centuries.

Previous Work: This site was initially recorded by NPS survey personnel in February 1991 and was monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is in very stable condition. Due to its proximity to the water, the site should be checked after flows of greater than 90,000 cfs. Monitor on a three to five year schedule as long as water levels remain below 90,000 cfs.

B:09:317

B:09:317 is located at the mouth of a major side canyon. The site consists of two separate loci, one on each side of the drainage. An intact fire feature, lithics, groundstone, and a projectile point were recorded during the survey. The site is situated on a bedrock bench where the cliffs meet the top of the talus. Runoff does not drain directly into the river.

Previous Work: This site was initially recorded by Janet Balsom in 1986 and included the upstream locus. The site was re-recorded by NPS survey personnel in November 1990, and monitored in 1993 and 1994.

Status and Recommendations: The site is currently stable concerning natural impacts. However, the surface is being adversely impacted from a steady stream of visitors. The site suffers to a greater extent because of its proximity to a highly-used camping beach. B:09:317 is located on Hualapai tribal lands (above the historic high water zone) and has historically documented Pai affiliation. This past year a perfectly preserved pair of bent twig prickly pear

tongs was unearthed by a visitor and left on the surface. It is recommended that B:09:317 be monitored on a semiannual basis and that the trail leading to the site be obliterated.

B:10:111

B:10:111 is a group three roasting features in various states of deterioration. No other materials were observed on the surface to indicate a specific cultural affiliation. Runoff does drain directly into the river at this location.

Previous Work: This site was initially recorded by NPS survey personnel in October of 1990 and monitored in 1993 and 1994.

Status and Recommendations: Natural slope creep and surface runoff are slowly, but surely, eroding the features downslope. B:10:111 is associated with a larger habitation site in the same drainage which is out of the project area. It is recommended that this site be monitored every other year.

B:10:224

B:10:224 consists of two fire features adjacent to a major drainage in reach seven. No artifacts were observed on the surface. Feature 1 is a 1.5 meter diameter mounded roaster in pristine condition rising 40+ cm above the surface. Feature 2 is the remnants of a burned sandstone slab cist eroding out of the edge of the cutbank into the main drainage.

Previous Work: This site was initially recorded by NPS survey personnel in September 1990 and monitored in 1992, 1993, and 1994.

Status and Recommendations: Presently Feature 1 is stable. Feature 2 is 80% gone with no hope or possibility of reversing that trend. Human visitation is virtually nonexistent. Bighorn sheep use this area extensively, trailing and feeding through the site on a daily basis. It is recommended that B:10:224 be monitored on a twice yearly basis.

B:10:225

B:10:225 consists of two small structures in an overhang. There is a midden associated with the habitation containing sherd, lithics, and numerous fragments of groundstone. Ceramics indicate a Pueblo II occupation.

Previous Work: This site was initially recorded by NPS survey personnel in September of 1990 and monitor in 1993 and 1994.

Status and Recommendations: The rock shelter is presently stable. Dune migration or deflation affecting the midden can be seen plainly from the river. The only human impacts result from monitoring. Monitor B:10:225 on a three to five year schedule.

B:10:227

B:10:227 is located in an obscure overhang adjacent to the river and consists of a pristine gold miners camp and operation belonging to the Powell era of exploration. As such, its importance cannot be underestimated. Accordingly, confidentiality and discretion regarding this very significant property is critical.

Previous Work: This site was initially recorded by NPS survey personnel in December of 1990. It was, however, observed and commented on by Edwin McKee, Grand Canyon Park Naturalist, during a river trip in 1937. B:10:227 was monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is presently stable and in no danger of natural impacts. However, it remains at risk due to the materials present on the surface. Constructed walls and gold washing features exist in the historic highwater zone and these should be checked. B:10:227 will be monitored at the discretion of the office of the Park Archaeologist.

B:10:261

B:10:261 consists of several roasting features in variable states of dissolution and an associated artifact scatter including lithic debris, tools, groundstone, and Lino grayware. The site is located on a dune-covered terrace in the upper mesquite zone. Surface runoff is not channeled directly into the river.

Previous Work: This site was initially recorded by NPS survey personnel in October of 1990 and monitored in 1992, 1993, and 1994.

Status and Recommendations: Presently designated areas 2, 3, and 4 are exhibiting signs of deflation including pedestalling and downslope movement of individual artifacts. This is probably caused by the lack of free sand available in the system. It is recommended that monitoring be done every other year to avoid annual trampling of the surface.

B:11:272

B:11:272 is an isolated roasting feature with no associated artifacts. The site is located on a small levelled area of a diabase bench.

Previous Work: This site was initially recorded by NPS survey personnel in February of 1991, and monitored in 1992, 1993, and 1994.

Status and Recommendations: Presently, B:11:272 is stable. Erosional scars from gullying and local rains in 1991 and 1992 have since been stabilized by naturally occurring vegetation. More vegetation is growing across the site in general. Monitor on a semiannual basis. It is further recommended that the trail passing through the site be relocated.

B:11:279

B:11:279 consists of four distinct loci of alignments and associated artifacts situated on a structural terrace overlooking a major rapid. Ceramics indicate a Pueblo II occupation. Lithic evidence indicates a Paiute presence as well. Surface runoff is channeled directly into the river.

Previous Work: This site was initially recorded by NPS survey personnel and monitored in 1993 and 1994.

Status and Recommendations: Gullying has increased in the vicinity of feature 1. Headward erosion of all the secondary channels on the site has increased since 1993. This is not directly effecting the cultural materials yet. Monitor this site yearly. Note: rattlesnakes live at features 1 and 2.

B:11:282

B:11:282 consists of a single roasting feature and an associated structural outline. A single flake was found on the surface, but no ceramics were observed. The site is of probable Pai affinity, as indicated by the wickiup ring. Surface runoff drains directly into the river.

Previous Work: This site was initially recorded by NPS survey personnel in February 1991 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is presently stable and in excellent condition. However, the structural outline rests on the first flood terrace in the side canyon where the site is located. A small, single side canyon flood could remove it completely. Monitor this site every three years and watch for indications of side canyon flooding. Spot check as required. It is further recommended to map B:11:282 in detail.

B:11:283

B:11:283 consists of two marginal outlines and some fragmented charcoal. The site is located at the base of a schist outcrop. No artifacts are present on the surface.

Previous Work: This site was initially recorded by NPS survey personnel in February 1991, and monitored in 1994.

Status and Recommendations: B:11:283 is presently stable. No signs of visitation are present. Threats from natural impacts are marginal. It is recommended that monitoring be discontinued.

B:13:002

B:13:002 consists of a Hualapai habitation including two shallow rockshelters, fire features, lithics, ceramics, hand tools, and milled lumber. The assemblage indicates long-term use of the locality. Oral history confirms Hualapai occupation of the site seasonally into the 20th century.

Previous Work: This site was initially recorded by Robert Euler in 1972. A "digging stick and mescal cutting tool" were collected off the surface at that time and are now at the Museum of Northern Arizona is Flagstaff. The site was more recently recorded in greater detail by NPS survey personnel in September 1990 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is presently stable. B:13:002 is technically located outside the parameters of what defines the ongoing monitoring project. Therefore, it is recommended that the site be dropped from the program.

B:14:093

B:14:093 consists of two fire features and a single lithic. The site is situated on highly deflated overlying Tapeats sandstone ledges adjacent to a side canyon drainage.

Previous Work: This site was initially recorded by NPS survey personnel in September of 1990 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is presently stable. Feature 2 could be impacted by major side canyon flooding. Monitoring every three to five years is recommended.

B:14:105

B:14:105 consists of three fire features and a shallow rockshelter located at the mouth of a major side canyon. The site is situated on dune-covered talus and Tapeats sandstone ledges. Ceramics present on the surface indicate a Pueblo II Cohonina affiliation.

Previous Work: This site was initially recorded by NPS survey personnel in September of 1990 and monitored in 1992, 1993, and 1994.

Status and Recommendations: Presently, the site is undergoing the slow but steady process of natural erosion due to its position on an open slope. This applies to features 2, 3, and 4. Feature 1 is experiencing minor visitor impact due to its proximity to a hiking trail. The trail connects a popular camping beach to the local side canyon. This trail exhibits more use and compaction with each passing year. Monitor this site every other year in order to decrease project impact. Consider retrailing the site in the future.

B:15:001

B:15:001 is an open habitation site with intact structural outlines and associated artifacts. A shallow rockshelter is present at this location as well. The site is situated on a large structural terrace overlooking the river. Surface drainage does not flow directly into the river from the site. The ceramic assemblage indicates a Kayenta Anasazi affinity.

Previous Work: This site was initially recorded by Robert Euler in 1962, by the Park Archaeologist, Janet Balsom, in 1985, and yet again by NPS survey personnel in December of 1990. The work in 1990 focused on mapping the features in detail. Monitoring was conducted in 1992, 1993, and 1994.

Status and Recommendations: Although this area has been the focus of Anglo-American presence since 1890 and continues to be a popular boat camp, the site is relatively stable and in good condition. A permanent trail from the river to the site and beyond has been present for a century or longer. Some compaction of the surface at Features 1, 3, and 5 is apparent. Because B:15:001 is technically located above the level of the project boundary, it will be dropped from the monitoring agenda. It will, however, remain within the schedule of the office of the Park Archaeologist to monitor on a yearly basis.

B:15:096

B:15:096 consists solely of the celebrated "Ross Wheeler" boat constructed by Bert Loper and used on the Quist-Tadie trip of 1915. The boat was abandoned by the ill-fated expedition and left to its own devices. It has become a physical reminder in the river corridor of

the hair-raising trips of the predam era. In 1984, Kim Crumbo of the National Park Service, chained the boat to the rocks to prevent its theft. The boat can be clearly seen on the rocky slope a mere seven meters above the river.

Previous Work: This historic period site was initially recorded by NPS survey personnel in October of 1990. An excellent sketch of the craft appears in the survey project report. The site was monitored in 1992, 1993, and 1994.

Status and Recommendations: B:15:096 is presently stable. Due to its proximity to the river and its historical significance, it is recommended that the "Ross Wheeler" be visited on an annual basis.

B:15:118

B:15:118 consists solely of a group of historic names placed in a travertine cave above the historic highwater zone. The names are executed in charcoal. A single red chert flake was also observed on the surface indicating an earlier occupation.

Previous Work: This location has been visited by Anglo-Americans since at least 1899 as indicated by the dates occurring with the names. B:15:118 was initially recorded by NPS survey personnel in October of 1990. The site was officially monitored for the first time in 1994.

Status and Recommendations: B:15:118 is heavily visited by groups en masse from river trips. A distinct trail leads from the boat beach to the site. New graffiti adjacent to historic panel 1 on the west-facing wall states "Power 93". Due to the site's location above the 300,00 cfs level, it is recommended to discontinue monitoring.

B:15:119

B:15:119 consists of an artifact scatter located on a narrow bedrock bench. Artifacts present include: flakes, cores, hand tools, unifaces, charcoal, and a few sherds. The ceramics indicate a Basketmaker III-Pueblo I presence.

Previous Work: This site was initially recorded in October of 1990 and was monitored for the first time in September of 1994.

Status and Recommendations: Gullies which were present when the site was recorded in 1990 are now gone. Presently a bighorn sheep trail passes through the site. The site appears very stable and is well-protected. There is no evidence of visitation. Monitor every three to five years.

B:15:124

B:15:124 consists of a single historic inscription in water-polished granite adjacent to the river. The name was carved by George Parkins in 1903.

Previous Work: This site was initially recorded by NPS survey personnel in October of 1990 and monitored in 1992, 1993, and 1994.

Status and Recommendations: B:15:124 is presently stable. Potential impacts include flows in excess of 70,000 cfs and vandalism. Because of the easy access and the simple nature of the site, it is recommended B:15:124 be monitored annually.

B:15:135

B:15:135 consist of a rockshelter with a small artifact assemblage indicating a Pai occupation. The site is located on Tapeats sandstone ledges.

Previous Work: This site was initially recorded by NPS survey personnel in October of 1990 and monitored in 1993 and 1994.

Status and Recommendations: The site is presently stable. Minor fluctuations of eolian sand occurring on the surface of the site have taken place since 1993. Monitoring every other year to lessen project impacts.

B:16:257

B:16:257 consists of a rock wall with two sherds and a scatter of historic trash. The sherds are oddly unrelated: a brownware and Tsegi orangeware. They were found over 30 meters apart and may have been carried on-site by tourists.

Previous Work: This site was initially recorded by NPS survey personnel in February 1991 and monitored in 1994.

Status and Recommendations: The site is presently stable. It is, however, near a major trail. B:16:257 is located outside the defined limits of the ongoing project, and monitoring should be discontinued.

B:16:259

B:16:259 consists of a single roasting feature, a few flakes, and sherds. The sherds are described as Pueblo I-III formative. The site is located on a sand-covered talus slope adjacent to a highly used hiking trail.

Previous Work: This site was initially recorded by NPS survey personnel in February 1991 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is unchanged since 1992. However, human impacts due to new social trailing in the area remain a problem. Monitor this site annually.

B:16:261

B:16:261 consists of the remnants of a masonry structure, a lithic scatter, and some groundstone. No sherds were observed. The site is located on a stream-cut alluvial terrace.

Previous Work: This site was initially recorded by NPS survey personnel in February 1991 and monitored in 1993 and 1994.

Status and Recommendations: The site is presently stable and not affected by flows in the main channel of the river. B:16:261 is outside the parameters defining the current project, therefore monitoring should be discontinued.

B:16:262

B:16:262 is the historic era United States Geological Survey (USGS) gauging station located 0.2 miles above the Kaibab suspension bridge. The station was constructed in the early 1920's and is clearly visible from the river. In fact, the structure is in direct contact with the water.

Previous Work: The gauging station which has been a landmark in the central river corridor for over 70 years was officially recorded in September of 1992. The structure was monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is presently stable. Unusually high water is the greatest threat to the structure. It is recommended that a small interpretive sign be placed on the footpath at B:16:262 and the site be monitored every three to five years.

C:02:089

C:02:089 consists of a rockshelter with two constructed walls, flakes, and burned bone. No diagnostic artifacts were present on-site. The site is situated on bedrock ledges over 125 meters from the river. Runoff from this spot does not drain directly into the Colorado River.

Previous Work: This site was initially recorded in April of 1991 and monitored in 1994.

Status and Recommendations: C:02:089 is presently stable. Due to its condition and location, it is recommended that this site be monitored on a three to five year cycle.

C:02:101

C:02:101 consists solely of a highly-eroded fire feature situated on a dissected alluvial terrace. The actual talus slope begins one meter above the concentration of fire-cracked rock. No artifacts were observed on the surface.

Previous Work: This site was initially recorded in September of 1990 by NPS survey personnel and monitored in 1992, 1993, and 1994.

Status and Recommendations: Presently C:02:101 continues to erode slowly but surely downslope. This is to be expected considering its exposure to the surface. The greatest threat to the increased dissolution of the site is too much visitation. It is recommended that this location be monitored on a three to five year schedule and/or after flows in the main channel exceeding 50,000 cfs. It was further suggested to install a check dam in order to curb some of the surface

erosion. If enough could be obtained, a radiocarbon sample would be of value since sites at this level in this part of the canyon are uncommon.

C:05:004

C:05:004 consists of the cache of a 19th century prospector/trapper. The site is located in a small cave only two to three meters above the 28,000 cfs.

Previous Work: This site was officially recorded by NPS survey personnel in October 1990. However, C:05:004 has been visited regularly in modern times. During 1923 the USGS trip stopped at the cache and had a picture taken with the then numerous artifacts. The photograph was published in National Geographic a year later. Since that time most of the artifacts have disappeared. Modern additions to the assemblage include a wood carving, a candle, and some incense.

Status and Recommendations: The site is presently stable. Since 1990, there is no evidence the site has been disturbed. It is recommended that C:05:004 be monitored on a three to five year schedule. Due to its proximity to the river, the site should be checked after flows in excess of 50,000 cfs.

C:05:031

C:05:031 consists of several concentrations of fire-cracked rock and minimal artifacts including a sandstone slab metate and a single sherd of Tusayan whiteware. The site is located on dune-covered bedrock ledges as well as portions of the local debris flow. The majority of the surface runoff occurring on the site does not drain directly into the river.

Previous Work: This site was initially recorded by NPS survey personnel in October of 1990 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is fairly stable although sand is being removed from C:05:031 that is not being replaced. It is recommended that the site be monitored on a yearly basis.

C:05:035

C:05:035 consists of a small rockshelter with a rock alignment and a few lithic items. Cultural affiliation is not determined.

Previous Work: This site was initially recorded by NPS survey personnel in October of 1990 and monitored for the first time in 1994.

Status and Recommendations: The site is presently stable. Vandalism occurred from fishermen visiting the site in early 1994. It is recommended that C:05:035 be removed from the monitoring schedule.

C:05:037

C:05:037 consists of two partially exposed fire features, several flakes, and a few sherds. The sherds indicate an Anasazi as well as a Southern Paiute presence. The site is situated on a lightly dune-covered talus slope and debris flow. Drainages occurring on this site do not drain directly into the river.

Previous Work: This site was initially recorded by NPS survey personnel in October 1990 and monitored in 1992, 1993, and 1994.

Status and Recommendations: C:05:037 is located near a popular river camp. Although the ephemeral nature of the site does not necessarily attract visitation, it is a nice walk from camp so a trail is present and trash is generally found in minor amounts on-site. Feature 1 exhibits increased deflation, and gullying increased in general across the site. Fire-cracked rock and artifacts are being moved downslope at feature 2. It is recommended that this site be monitored on an annual basis.

C:06:002

C:06:002 consists of an inscription documenting the time and place of the death of Frank Brown. Mr. Brown drowned during the private railroad survey expedition of 1890. The inscription was done by boatman Peter Hansbrough, who ironically was also drowned several days later. The inscription was placed on the water-worn surface of the Coconino sandstone five meters above the 28,000 cfs level.

Previous Work: This site was initially recorded as a historic property by Robert Euler in 1972 and visited again during the 1980's by the Park Archaeologist, Janet Balsom. These visits noted weathering and "fading" of the inscription. Paint from boats docking at this location during the highwater of the early 1980's can be seen on the rock face.

Status and Recommendations: The site is presently stable. Visitation is high and will remain so. Threats to the site include highwater flows in excess of 70,000 cfs and vandalism. It is recommended that the site be photographed annually. It is further suggested that C:06:002 is a good location for an interpretive sign.

C:06:003

C:06:003 consists of a sherd and lithic scatter with two probable wall alignments. The artifacts indicate a Pueblo II Anasazi occupation. The site is situated on a reworked dune-covered terrace dominated by limestone boulders from a debris flow. Surface waters draining at this location do not discharge directly into the river.

Previous Work: This site was originally recorded by Robert Euler in 1976 and has subsequently been monitored by the office of the Park Archaeologist. The site was re-recorded in greater detail by NPS survey personnel in September 1990 and monitored in 1994.

Status and Recommendations: Presently, human trailing is the major impact at C:06:003. There is also increased gullying at locus A. Obliteration of the current trail and the appropriate retrailing is recommended. Due to heavy visitation, this site should be monitored semiannually. A check dam may be helpful to control erosion at locus A. C:06:003 will be mapped in detail during 1995.

C:06:004

C:06:004 consists of a historic petroglyph placed at river level during the 1923 USGS survey expedition. The glyph is the pecked outline of a geologist's rock hammer and the letters "U.S.G.S."

Previous Work: This site was initially recorded by NPS survey personnel in September of 1990 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is presently stable. It is, however, one of the few properties placed completely in the highwater zone and becomes inundated by the river when flows exceed 50,000 cfs. Due to C:06:004 being proximal to the river and its historical importance, it is recommended that monitoring occur on a yearly schedule.

C:06:005

C:06:005 consists of three petroglyph elements placed on a Supai sandstone ledge adjacent to the river four meters above the 28,000 cfs level.

Previous Work: This site was initially recorded in September of 1990 by NPS survey personnel. The site was monitored for the first time in 1994. The Southern Paiute consortium trip stopped here in September of 1994. The site and thus the immediate area have cultural significance to these people.

Status and Recommendations: The site is presently stable. Impacts include the slow process of natural exfoliation and human visitation. The site is heavily visited due to C:06:005's proximity to the popular Brown inscription (C:06:002). Because the panel is situated on the ground surface (bedrock ledge), inadvertent foot traffic treading on the actual site is now a problem and could ultimately have an actual erosional impact.

C:09:032

C:09:032 consists of three structural outlines and granaries with associated Anasazi ceramics. The site is situated at the top of a talus slope at the contact of the Redwall and Muav limestone formations. The site is located 40 vertical meters above the river.

Previous Work: This site was initially recorded by Robert Euler in 1975. Prior to that, Harvey Butchart, renowned canyon hiker, observed five whole vessels at this spot in 1970. Three of these vessels were later stolen. C:09:032 was recorded in greater detail in August of 1990 by NPS survey personnel.

Status and Recommendations: The site is presently stable. C:09:032 is located outside the parameters determining the project area. It is therefore recommended that monitoring be discontinued.

C:09:050

C:09:050 originally consisted of a group of complete vessels eroding from a cutbank at the mouth of a large side canyon. The vessels are representative of Pueblo I-II western Kayenta Anasazi culture.

Previous Work: This site was discovered and initially recorded by NPS survey personnel in September of 1990. Due to the site's proximity to a major river camp and the precarious nature of their depositional situation, the four vessels were subsequently removed to the South Rim at the discretion of the Park Archaeologist. The site was monitored in 1992, 1993, and 1994.

Status and Recommendations: After seasonal flooding in the local drainage during September of 1990, the site location has remained stable. It is recommended that C:09:050 be monitored on a yearly basis in case more cultural materials are revealed in the cutbank.

C:09:051

C:09:051 is an extensive site consisting of a roomblock, activity areas, midden, artifact concentrations, and fire-cracked rock. The site is located on stabilized reworked dunes at the mouth of a major side canyon. The site has Pueblo II Kayenta Anasazi affiliation.

Previous Work: This site was initially recorded by Janet Balsom, Park Archaeologist, in November of 1989 and originally included three loci. In September of 1990 NPS survey personnel added a fourth locus and further documented the site. C:09:051 was monitored in 1992, 1993, and 1994.

Status and Recommendations: Retrailing at this location in 1991 has had a very positive effect on the general area. Feature 3 continues to slowly erode into the local drainage as it has been doing for most of this century. The rest of the site is stable. Game trails continue to criss-cross this portion of the delta. Semiannual monitoring is recommended, along with trail obliteration and retrailing.

C:09:052

C:09:052 consists of an extensive Pueblo II Kayenta Anasazi occupation including structural outlines and a dense artifact scatter dominated by sherds and groundstone. The site is located in the mesquite zone within reworked riverside dunes.

Previous Work: This site was initially recorded by the Park Archaeologist, Janet Balsom, in November of 1989. NPS survey personnel photographed and mapped the site in greater detail in September of 1990. The site was monitored during 1992, 1993, and 1994.

Status and Recommendations: The trail obliteration project of 1991 has had a very positive effect on C:09:052. Prior to retrailing, heavy foot traffic from backpackers and boat trips was evident, plus numerous collector's piles present on the surface. Trails are evolving

once again and need to be halted before they become fully developed. Semiannual monitoring and trail obliteration are recommended.

C:09:072

C:09:072 is a ceramic scatter and rock cluster situated on stabilized reworked dunes at the foot of a talus slope. The ceramics indicate a Pueblo I-II Kayenta Anasazi presence.

Previous Work: This site was initially recorded by NPS survey personnel in October of 1990 and monitored for the first time in 1994.

Status and Recommendations: The site is stable and unchanged since 1990. Monitor every five years.

C:09:082

C:09:082 consists of two distinct activity areas dominated by fire-cracked rock, sherds, and groundstone. Feature 1 contains groundstone, Tsegi orangeware, and lithic debris. Feature 2, a concentration of fire-cracked rock, contains Anasazi ceramics and a single Southern Paiute sherd. The site is located in reworked dunes within the lower mesquite 70 meters from the river.

Previous Work: This site was initially recorded by NPS survey personnel in October of 1990 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is presently stable. Visits in 1992 and 1993 established a secondary trail to the site. This has since disappeared. Monitor on an annual basis with no more than two archaeologists. It is also suggested that feature 2 be sampled for float, pollen, and radiocarbon samples.

C:09:083

C:09:083 consists of the abandoned engineering camp used by Bureau of Reclamation employees during the 1940-1951 period of testing in Marble Canyon.

Previous Work: This site was initially recorded by NPS survey personnel in October of 1990 and monitored for the first time in 1994.

Status and Recommendations: Presently the site is stable. Collectable artifacts are not present on the site. A trail has developed from the boat beach to the tables located on the site. Trail obliteration is recommended. Monitor every three years.

C:09:088

C:09:088 consists of the Bureau of Reclamations Marble Canyon Dam test site. Present on both sides of the river are adits (tunnels), abandoned barges, painted markers, gauges, cable, and industrial trash. The abandoned barges subsequently filled with sediment during the 120,000+ cfs floods of the 1950s and have since developed a mature cryptogamic surface.

Previous Work: The bulk of the engineering work represented at river level took place between 1950 and 1951. The archeological recording of the site was done by NPS survey personnel in December of 1990.

Status and Recommendations: The site is currently stable. Although the location is representative of an important phase of modern history in the American west, it remains to varying degrees an eyesore to many people traveling down the river corridor. It is recommended that C:09:088 be monitored on a yearly basis. It is further suggested that the trail to test adit 1 be obliterated and also that some of the manageable sizes of industrial junk be removed before the location becomes a historic property in the year 2000.

C:13:006

C:13:006 consists of a Pueblo II Kayenta Anasazi habitation with a rich assemblage of artifacts including ceramics, lithic debris, shaped stone, ashy soil, and intact groundstone. The site is eroding out of a reworked dune at the mouth of a major side canyon.

Previous Work: This site has had a lot of attention paid to it: Schwartz in the early 1960s, Euler and Taylor in 1965, Balsom and Fairley in 1984, and NPS survey personnel still again in 1990. Euler collected some complete manos in 1965 which are curated at the South Rim. The site has been described as "badly eroded".

Status and Recommendations: Although the site has been "badly eroded" a lot of intact buried material may remain. Outlines of room blocks are still clearly discernable on the lip of the slope. The entire surface fraction of the site is continuing to move downslope into the local drainage. A revegetation project and check dams may curtail erosion. It is recommended that C:13:006 undergo a program of mapping, stabilization, and limited testing for extent, float, pollen, and radiocarbon samples. The site should be monitored annually. It is further suggested that this location be officially closed to the public, due to its fragile condition. A stationary camera will be placed at the site in FY95.

C:13:007

C:13:007 consists of several questionable structural outlines with associated artifacts indicating an Anasazi occupation. The site is located on a bench bordering an active side canyon drainage just above where it enters the river. Runoff from this site is directed into the Colorado River via the adjacent side canyon.

Previous Work: This site was noticed by Schwartz in the early 1960s and recorded by Euler and Taylor in 1965. Some "Lino-like" (Basketmaker III) sherds were also observed in the local drainage. The site was recorded in greater detail by NPS survey personnel in September of 1990. By 1990 so much camping had taken place on-site that artifacts on the surface were rare and structural outlines had been moved to accommodate camping spots. In 1992, NPS trail crew placed jute matting across the site and built a wall to stabilize the erosional trend at feature 5. The wall was blown out by localized rain in 1993 and has since been repaired (November 1994).

Status and Recommendations: C:13:007 is presently stable. This is mostly due to the effective work done by the NPS trail crew. Feature 5, due to its location, will always be at some risk. Annual monitoring is recommended.

C:13:009 A and B

C:13:009 is an extensive prehistoric habitation with structures, water control features, and numerous and diverse artifacts. The site occupies both sides of a major side canyon where it hits the river. The site was recorded and mapped in two distinct loci. The remains on the surface indicate a generational Anasazi occupation on the scale of a large village. A distinct prehistoric trail can still be seen above the site disappearing up into the cliffs. Some of the runoff from this site is channeled directly into the river and some is not.

Previous Work: This site was mentioned by Schwartz but not recorded. Euler and Taylor recorded here in 1965 and did a sherd collection. Euler collected more sherds in 1976. Balsom and Fairley did some data collection in 1984 and 1989. NPS survey personnel recorded the site in detail in September of 1990.

Status and Recommendations: Erosion is ongoing across this site and at both loci. Monitor in alternate years and create a site-wide plan to deal with the property as a whole instead of on a feature by feature basis.

C:13:070

C:13:070 consists of artifact concentrations and possibly a buried structure indicating an Anasazi occupation. The site is situated on a highly dissected structural terrace. Near the edge of the terrace, two complete rectangular manos reside side by side stuck vertically into the surface. They are 90% exposed and remain tenuously upright in the position they were placed by the last person to use them. These two artifacts represent a true moment frozen in time. A single visitor or local rain could cause them to fall. Runoff at this site does not drain directly into the river.

Previous Work: This site was initially recorded by Robert Euler and Walter Taylor in 1973. It was described as a "masonry pueblo and sherd area." No photographs were taken and there is no mention of the upright manos or complete metate.

Status and Recommendations: There is increased surface erosion due to deflation and bank slumpage. Locus D has increased gullying. A lack of free sand available in the system to protect this site is noticeable here. Total station mapping was completed at C:13:070 in May 1994. It is recommended that this site be monitored in the spring and the fall and a plan for stabilization be contemplated.

C:13:092

C:13:092 is a turn-of-the-century historic camp belonging to the prospector/trapper, Felix Lantier. Structural outlines and artifacts are still present on the surface. A sparse scatter of prehistoric ceramics and lithic debris in the immediate vicinity indicate a Pueblo II Kayenta Anasazi presence as well.

Previous Work: This site was initially recorded by Robert Euler in 1976. NPS survey personnel recorded the property in greater detail in September of 1990. The site was monitored in 1992 and 1994.

Status and Recommendations: The site is currently stable. There is evidence of occasional visits by tourists from the river camp located 70 meters upstream. Annual monitoring is recommended.

C:13:098

C:13:098 is an early 19th century historic habitation and mine in the vicinity of Palisades Creek. Referred to as the M^{c}Cormick Mine, the site is well known and highly visited.

Previous Work: This site was initially recorded by Euler and Jones in 1978. NPS survey personnel recorded the site in greater detail in September 1990. It was monitored in 1992 and 1994.

Status and Recommendations: Active gullying has grown to the cabin. Two separate erosional channels have headcut to within one meter of the cabin. The site should be included in stabilization work to check further erosion. Also, minor testing and retrailing would be appropriate. Monitor twice a year and add the site to the already detailed map of the area. Some limited testing is also suggested.

C:13:099

C:13:099 consists of two loci of collapsed masonry structures and numerous artifacts including ceramics, lithics, groundstone, and charcoal. The site is a Pueblo II Kayenta Anasazi habitation located within the historic highwater zone. Channeled runoff on the site flows directly into the Colorado River.

Previous Work: This site was initially recorded by Euler and Jones in 1978 and was described at that time as "highly eroded." The site was recorded in greater detail by NPS survey personnel in September of 1990. The site was monitored for the first time in 1994. Total station mapping was also completed in April of 1994.

Status and Recommendations: C:13:099 remains "highly eroded" to this very day. Active erosion and the ongoing transport of cultural materials towards and into the river remains a problem. Included on-site are features 2, 3, 4, 6 and 7. Features 1 and 5 are presently stable. This site also gets a lot of foot-traffic from the local camp. Trail obliteration, inclusion in the stabilization program, and monitoring twice a year is recommended. Some limited testing is also suggested.

C:13:100

C:13:100 is a Pueblo II Kayenta habitation with numerous (seven) features and a rich artifact assemblage including: ceramics, lithics, hammerstone, manos, metates, and charcoal. The site is located on a highly eroded dune-covered terrace only five meters above the 28,000 cfs level.

Previous Work: This site was initially recorded by Euler and Jones in 1978. The site was recorded in greater detail by NPS survey personnel in September of 1990 and monitored in 1992, 1993, and 1994.

Status and Recommendations: Ongoing erosion at C:13:100 is presently effecting the site in the form of two localized gullies and minor trailing from the adjacent river camp. C:13:100 was included on the total station map for 1994. Trail obliteration and twice annual monitoring is recommended, plus stabilization where appropriate.

C:13:101

C:13:101 is a Pueblo II Kayenta Anasazi habitation including structural outlines, numerous features, and artifacts. The site is located in the predam highwater zone.

Previous Work: This site was initially recorded by Euler and Jones in 1978 and recorded in greater detail by NPS survey personnel in 1990. The site was monitored in 1993 and 1994. It was noted in 1978 that a hiker had used slabs from a cist for a modern fire pit.

Status and Recommendations: The NPS trail crew obliterated the hiking trail that passed through the site in 1993. This has had a very positive effect. General erosion across the surface of the site will continue as long as the dam causes there to be a lack of free sand in the system. Sand which protected sites prior to the dam is currently not replaced when it gets removed. Monitor every other year and include in the stabilization program where appropriate.

C:13:132

C:13:132 consists of a single wall alignment and boulders nearly covered in petroglyphs. A single Moenkopi corrugated sherd was found in 1978. The site is located on a rocky talus slope and ridge.

Previous Work: The site was originally recorded by Euler and Jones in 1978. The wall was recorded by Balsom in 1987 as a separate site. In 1990, NPS survey personnel consolidated the wall and boulders under a single site number and documented the rock art.

Status and Recommendations: The site is presently stable. However, C:13:132 is a highly visited location with a well-defined trail coursing directly through the site. Cigarette butts and trash have commonly been found on-site. Monitor the site every other year.

C:13:272

C:13:272 is a multicomponent site consisting of structures, features, and artifact concentrations. Ceramics indicate a Pueblo II Kayenta Anasazi occupation and two of the features appear to be protohistoric in origin. The site is located in riverside dunes partially held together by a mesquite thicket. Runoff at this location does not drain directly into the river.

Previous Work: This site was originally documented by Balsom and Fairley in 1984 and recorded in greater detail by NPS survey personnel in 1990. The site was monitored in 1992, 1993, and 1994.

Status and Recommendations: Although the site is slowly but continuously eroding due to lack of available wind-blown sand, there are presently no immediate threats to the site.

Because this property is located on a delta that gets a lot of visitation and is proximal to the river, it is recommended that C:13:272 be monitored on an annual basis.

C:13:291

C:13:291 consists of several exposed walls and features of Pueblo II Anasazi affinity with associated artifacts. The site is located on a highly dissected alluvial terrace at the base of Dox sandstone cliffs. Water eroding the surface of this site drains directly into the Colorado River.

Previous Work: This site was initially recorded in 1988 by Park Service archaeologists. It was recorded again in greater detail and mapped by NPS survey personnel in October of 1990. The site was monitored in 1992, 1993, and 1994.

Status and Recommendations: C:13:291 is presently eroding across the entire site with particular emphasis on the gullies at features 1 and 4. A standing structural post at feature 4 could yield a good date if desired. It is recommended that this site be mapped in detail, assessed for possible erosion control, and monitored with a stationary camera. C:13:291 should be monitored annually with a crew of one or two to keep impacts to a minimum.

C:13:321

C:13:321 consists of five fire features and an enigmatic pile of Dox sandstone slabs which is probably a historic component and the work of the prospector, Felix Lantier that lived in the vicinity. Recently three sherds of Tusayan corrugated were found at feature 5. These could have been transported from locus A of C:13:009. The site is situated in a stabilized dune at the mouth of a major drainage. Surface drainage does not currently flow directly into the river although judging by the geomorphology, it did at some point in the past.

Previous Work: This site was initially recorded as a distinct cultural property in September of 1990 by NPS survey personnel; it was monitored in 1993 and 1994.

Status and Recommendations: C:13:321 is presently stable. It is recommended that the site be monitored annually due to its proximity to a popular camping beach. Also features 5 and 6 are situated at five meters above the 28,000 cfs level. It is further suggested that the site be mapped using a total station and a radiocarbon sample be taken at feature 5.

C:13:322

C:13:322 consists of a rock art panel located on a vertical Dox sandstone block. The block faces southwest (toward the river). The panel contains Anasazi as well as historic/modern elements. A fire feature and some lithic debris are also present.

Previous Work: The rock art was initially recorded by NPS personnel in 1989. NPS survey archaeologists added a fire feature and lithics in September of 1990.

Status and Recommendations: C:13:322 is presently stable. It is recommended that monitoring occur every other year.

C:13:323

C:13:323 consists of a single eroding hearth and an associated lithic assemblage which includes three bifacial tools and debitage. The site is located on a west-facing dune at the mouth of a major canyon. Surface runoff at this location does not drain directly into the Colorado River.

Previous Work: This site was initially recorded by the office of the Park Archeologist in November of 1989. Radiocarbon samples were taken yielding an accelerated date of 390 to 340 BC indicating an Archaic occupation. NPS personnel did more intensive recording and analysis at this location in April and September of 1990. This site was monitored for the first time in FY94.

Status and Recommendations: A trail passes through this site causing erosion of charcoal and artifacts from the dune face. It is recommended that the trail be obliterated and that the site be monitored every three to five years.

C:13:325

C:13:325 is a multicomponent site consisting of a prehistoric roasting feature, associated lithic debris, and a historic period camp. The site is located in the mesquite zone just above the historic highwater line. Surface runoff at this location does not drain directly into the Colorado River.

Previous Work: This site was initially recorded by NPS survey personnel in September of 1990. The site was monitored for the first time in September of 1994.

Status and Recommendations: The site is located near to, although hidden from, the Hance-Tanner trail and shows evidence of some benign visitation probably from backpackers. The surface of the site is stable. Monitor every three to five years.

C:13:326

C:13:326 consists of an eroded fire feature and lithic debris located on a dune-covered alluvial terrace. Cultural affiliation is unknown.

Previous Work: This site was recorded by the office of the Park Archeologist in 1989 and tested in April of 1990. The site was added to the IMACS system by NPS survey personnel in September of 1990.

Status and Recommendations: The area where C:13:326 is located has been rehabilitated and is presently stable. Site monitoring should take place on a three to five year schedule.

C:13:336

C:13:336 is an Anasazi occupation located within the predam highwater zone adjacent to the Beamer trail. The site is situated less than four meters above the current 28,000 cfs line in an eroding dune field.

Previous Work: This site was initially recorded in 1986 and subsequently mapped and recorded in greater detail by NPS survey personnel in September of 1990. The site was monitored in 1992, 1993, and 1994. C:13:336 is included in the total station mapping program.

Status and Recommendations: Presently this property is eroding incrementally as a response to the lack of free sand in the system as well as from a general lowering of the base level in the trunk stream (Colorado River). This is indicative of all the cultural properties in this section of the river corridor. Monitoring in alternate years is recommended.

C:13:349

C:13:349 is a multicomponent site consisting of a historic habitation and an artifact assemblage indicating a Pueblo I-II Anasazi presence. The site is located in mesquite-anchored dunes 100 meters from the river. Surface runoff does not drain directly into the Colorado River.

Previous Work: This site was initially recorded by NPS survey personnel in September of 1990 and monitored in 1993 and 1994.

Status and Recommendations: Features 2, 3, 4 and 5 are currently eroding downslope due to slump and deflation. A complete metate between features 1 and 2 has recently disappeared under the collapsed bank of an arroyo. Erosion at this location is ongoing. It is suggested that minor testing to obtain samples and ascertain depth be carried out and that C:13:349 be considered for some form of stabilization, after which monitoring could take place every three to five years.

C:13:354

C:13:354 consists of a group of four granaries (storage structures) in various states of dilapidation. The features are situated on barren Dox sandstone ledges and could have been under water from floods in excess of 200,000 cfs prior to the twentieth century. No artifacts were present. The site is inferred to be Anasazi. The site is 20 meters from and almost 10 meters above the 28,000 cfs level.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored 1992, 1993, and 1994.

Status and Recommendations: C:13:354 is under no threat from the present effects of the river. Monitor on a three to five year schedule and after flows in excess of 100,000 cfs, to establish a watermark at this location.

C:13:355

C:13:355 is a protohistoric site consisting of four fire features and Cerbat brownware sherds. The site is situated on reworked debris flow materials above the mesquite zone. Channeled runoff at this location does flow directly into the Colorado River.

Previous Work: The site was initially recorded by NPS survey personnel in September of 1990. Further recording and some sampling was done in March and October of 1991 after seasonal storms uncovered more materials in a new gully. Due to its location on a debris flow, the USGS has taken some interest in this particular site. It was monitored in 1993 and 1994.

Status and Recommendations: After some revision of surface materials and new gullying caused by side canyon flooding in late 1990, the site has readjusted and is currently stable. Monitoring every three years is recommended.

C:13:356

C:13:356 consists of the remnants of a structural wall and a burned beam situated in the cutbank of an arroyo. No artifacts were observed. The site is located 75 meters from the river and 7 meters above the 28,000 cfs level. Runoff from the arroyo is channeled directly into the Colorado River. The site is inferred to be Anasazi.

Previous Work: This site was initially recorded by NPS survey personnel in September of 1990 and mapped in detail using a total station in 1994. The site was monitored in 1993 and 1994.

Status and Recommendations: Arroyo cutting and bank slumpage are ongoing at this location. It is, however, a steady state problem. The site was established during an aggradational phase in the evolution of the river that was a period of sediment accumulation. The river is now in a degradational phase (down cutting) enhanced by the dam. Hence the site, due to its location in an arroyo bottom, is doomed to erode further. The drainage in which the site exists is too large to manipulate by stabilization. Thus we recommend monitoring on an annual basis to observe how this inevitable erosion takes place.

C:13:357

C:13:357 consists of a buried cist, a burned rock feature with associated sherds, lithics, and groundstone. The assemblage indicates a Pueblo II Anasazi occupation. The site is located on a sediment-covered Dox sandstone bench just above the mesquite zone. The Tanner trail passes through the site. Surface runoff from this location does not flow directly into the river, but instead dies out in the thick mesquite and tamarisk grove adjacent to the river.

Previous Work: This site was initially recorded in September of 1990 by NPS survey personnel. The site was monitored for the first time in 1994.

Status and Recommendations: The entire surface of the site is experiencing ongoing degradation as well as continued downcutting of the local gullys. Annual monitoring for the next two years is recommended.

C:13:359

C:13:359 is a Pueblo II Anasazi habitation with structural outlines and associated artifacts. The site is located on a dune-covered terrace abutting a local cliff face. Surface runoff drains into the Colorado River. This location is currently monitored by a stationary camera.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is experiencing minor erosion across the entire surface and downslope movement is ongoing at feature 3. The gully passing through the roomblock (feature 2) is unchanged since early 1994. However, a single storm could change that dramatically. The most adverse impact to this fragile site could ultimately be too much monitoring. It is recommended that C:13:359 be mapped in detail and tested for pollen, phytolith, float, and radiocarbon samples. It is also recommended that the stationary camera be removed and placed in a more productive location. C:13:359 should be monitored in alternate years to lessen the impacts caused by the project.

C:13:364

C:13:364 consists of a single room outline constructed of local Dox sandstone and one Tusayan corrugated sherd. The site is situated on a Dox ledge six meters above the 28,000 cfs level.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991. The first monitoring was done in 1994.

Status and Recommendations: The site is presently stable. There has been no evidence of visitation or ongoing erosion since the site was recorded. It is recommended that monitoring at C:13:364 be discontinued.

C:13:365

C:13:365 consists of two highly eroded fire features situated in a dune and a problematic wall. A few lithics are present in the debris fan and represent the only artifacts on-site. Cultural affiliation is not determined. Runoff at this location does not flow directly into the Colorado.

Previous Work: This site was initially recorded by NPS survey personnel in October of 1990 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is overall stable. A small drainage rill has developed in feature 2 located on the dune surface probably as a result of trailing created during the recording of the site. Monitor in alternate years to lessen project impacts. This site was mapped using a total station during the 1994 field season. It is further suggested that feature 1 be tested to confirm if it is a cultural or natural occurrence.

C:13:371

C:13:371 is an extensive Pueblo II Anasazi habitation with at least seven features currently exposed and eroding including: walls, storage, fire-cracked rock, and structural outlines. The artifact assemblage is dominated by ceramics but lithic debris, a projectile point, and complete groundstone are also present. The site is located at the mouth of an unnamed drainage on older colluvial debris and a dissected alluvial terrace. A side canyon flood during September of 1990 did extensive damage to this site while exposing previously buried materials. Surface runoff does drain directly into the Colorado River.

Previous Work: This site was initially recorded in October of 1990 by NPS survey personnel less than a month after the flood that altered the site. A stationary camera was placed here in March of 1992.

Status and Recommendations: Ongoing erosion is present across the site with particular emphasis at features 2 and 4, and less evident impacts at features 1, 3, 5, 6 and 7. Increased animal trailing is also evident. The recommendation is to add a second stationary camera and test for samples and depth. C:13:371 was mapped in detail during 1994 using a total station. The site should be monitored spring and fall and considered for inclusion in the stabilization project.

C:13:374

C:13:374 is a small historic camp and inscription belonging to H.S. Wallace. This occupation dates to 1929. An earlier Pueblo II Anasazi component is also present. The site is located outside the project area over 200 meters up a major side canyon drainage.

Previous Work: This site was initially recorded by NPS survey personnel in October of 1990 and monitored in 1994.

Status and Recommendations: C:13:374 is outside the boundary of the current project design. Responsibility for this property will be assumed by the office of the Park Archeologist. The recommendation is to discontinue monitoring.

C:13:379

C:13:379 is an extensive Anasazi habitation site comprised of five features and an extensive assemblage of artifacts including: Pueblo II ceramics, chipped stone tools, complete groundstone, shell, and charcoal. This site is located on dune-blanketed alluvial terraces. Runoff from this location does not flow directly into the Colorado River.

Previous Work: Although this site has been known about for several years, it was not officially recorded until March of 1991. The site was monitored in 1992, 1993, and 1994.

Status and Recommendations: This site is currently stable. However, extensive gullying at this location makes the site prone to radical erosion from a single storm. This is inevitable at some point in time. Monitor every other year and watch for evidence of localized storms in this reach on a trip to trip basis.

C:13:381

C:13:381 consists of an almost completely eroded fire feature, two chipped stone tools, and burned artiodactyl bone. Cultural affiliation is not known. The site is located on an eroding sandy alluvial terrace 35 meters from the river and about 5 meters above the 28,000 CFS level. Surface runoff dies out in the vegetation line before entering the Colorado River.

Previous Work: This particular site was reported by visitors to the park in 1981. However, it was not recorded until March of 1991 by NPS project personnel. The site was monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is presently in poor condition and barely there. Enough carbon is present to secure a date otherwise there is not a lot of potential at this location for data recovery. Monitor the site in FY96 and reevaluate at that time.

C:13:384

C:13:384 is a multicomponent site revealed in profile in a cutbank. The deposition shows an alternating regime of overbank flooding from the Colorado River, seasonally dictated side canyon deposits and redeposited eolian sand. Two meters below the surface is a prehistoric slab- lined feature. This feature was stabilized in 1991. Surface runoff at this location flows directly into the Colorado River.

Previous Work: This site was initially recorded in April of 1991 and monitored in 1992, 1993, and 1994. The USGS (R. Hereford) and Helen Fairley from the office of the Park Archeologist have done additional stratigraphic work at this location.

Status and Recommendations: Within the last year, bank slumpage has covered the slab-lined feature and has further protected it. The arroyo wall will continue to erode regardless of human intervention. It is recommended that C:13:384 be monitored annually, mapped, and tested.

C:13:385

C:13:385 is a 12th century Anasazi habitation site consisting of two slab-lined features and associated artifacts dominated by Kayenta Anasazi ceramics with chipped stone and hand tools, groundstone and shaped slabs. The site is located on an alluvially cut structural terrace with an eolian component present on the surface. Surface runoff from this site dies out in a boulder field before reaching the current channel of the Colorado River.

Previous Work: This site was initially recorded by NPS survey personnel in April of 1991 and monitored in 1993 and 1994. The site was total station mapped this field season.

Status and Recommendations: Continued incremental erosion is occurring at C:13:385. Although the two features are presently stable, artifacts are presently moving downslope. The local drainage network across the entire terrace is expanding and downcutting, including other sites as well (C:13:386 and C:13:070). Monitor annually and consider stabilization.

C:13:386

C:13:386 consists of a single slab-lined cist eroding out of a dune. No artifacts have been observed at this location. More extensive materials could still be covered up by the eolian sands. Surface runoff from the site does not make it directly to the Colorado River.

Previous Work: This site was initially recorded by NPS survey personnel in October of 1991 and the feature was monitored in 1993 and 1994.

Status and Recommendations: C:13:386 is currently stable although the potential exists for a single storm to remove the entire downslope wall. Presently a four-wing salt bush is growing in an interior corner pushing out one of the slabs. There is also an ant colony in residence. Monitor every other year.

G:03:002

G:03:002 is a large roaster complex consisting of not less than 10 fire features with associated artifacts including: desert side-notched points, groundstone, Hualapai and Paiute pottery, purple glass, and metal. The site is located on low stabilized dunes covering an alluvial terrace. Surface runoff at this location does not flow directly into the Colorado River.

Previous Work: This site was initially recorded by R. Euler in 1962. His site card notes "I had only 15 minutes at Granite Park. Thorough investigation would probably reveal additional evidence of occupation." This was definitely the case and in 1972 Dr. Euler "spent two hours walking over entire 'park' area." The site was probably recorded in January of 1991 by NPS survey personnel. G:03:002 was monitored in 1993 and 1994.

Status and Recommendations: The site is presently stable regarding natural impacts. However, human impacts from social trailing is extensive and needs to be curbed across the entire Granite Park area. Monitor on an annual basis.

G:03:003

G:03:003 is a multicomponent rockshelter with an extensive midden and a group of roasting features stretching out below it. The artifact assemblage includes: chipped stone tools, broken groundstone, lithic debris, hand tools, carbon, and sherds belonging to the Kayenta and Virgin Anasazi, Hualapai, Cohonina and southern Paiute. The site is located in the Bright Angel shale and the sand dunes adjacent to the shelter. Some of the surface runoff at this location does flow into the Colorado River. Other areas of the site retain the water on the surface within the dune itself.

Previous Work: This site was initially recorded in a minimal fashion by Euler and Gumerman in 1969. Sherds were collected and an analysis was done. Field notes state that the condition of the site was "undisturbed" and the potential for a rewarding excavation was "excellent." The site was visited again in 1981 by Euler and Jones. More sherds were collected and a simple sketch map was made. G:03:003 was recorded in detail by NPS survey personnel in January of 1991. The site was monitored in 1992, 1993, and 1994.

Status and Recommendations: The bulk of the site is presently stable. However, visitation to this site has increased dramatically over the last several years. This has caused a trail to develop and become entrenched, passing through the midden directly to the rockshelter. This trail/runoff channel has several nick points which downcut during each episode of rain. The headcut of this channel is presently working its way toward the midden. It is suggested that G:03:003 be mapped in detail using a total station and that the trail leading to the rockshelter be obliterated and rerouted if warranted. It is further suggested that the site be closed to visitation at the request of the Hualapai Tribe. The site should be monitored semiannually (spring and fall) for the next two years and then reevaluated. No action should be taken on this site without the direct input of the Hualapai Tribe.

G:03:004

G:03:004 is an extensive multicomponent rockshelter with an associated group of roasting features. The artifact assemblage indicates a presence dominated by Virgin Anasazi, southern Paiute and Hualapai with Kayenta Anasazi and Hopi wares also on-site. Numerous sherds, chipped stone and hand tools, rock art and historic materials are present on the surface. The configuration of this site is very similar to G:03:003 which is in the same reach but on the opposite side of the river. Some of the runoff at this location drains into the local side canyon which flows directly into the Colorado while other areas of the site retain the surface waters within the dune.

Previous Work: This site was initially recorded by Euler in 1972. Sherds were collected and analyzed and a few cryptic notes were taken. The site was revisited several more times in the 1970s. No further descriptive work or mapping was done, but on each occasion more sherds were collected and typed. The site was recorded and hand mapped in detail by NPS survey personnel in March of 1991 and monitored in 1993 and 1994. It was mapped using a total station during the 1994 field season.

Status and Recommendations: The site is currently stable and not being adversely affected by natural impacts. However, the potential exists if a localized rainstorm hits the area. Presently a trail caused by visitation on the north side of feature 2 and 7 leading to the midden and rockshelter (feature 1) is entrenching and will at some point be too deep to control. It is suggested that this trail be obliterated and possibly rerouted up the main drainage. It is recommended that G:03:004 be monitored semiannually for the next two years and then reevaluated.

G:03:006

G:03:006 is a large multicomponent site with numerous features: structural alignment, roasting pits, rock shelters and activity areas. The ceramic evidence indicates a presence dominated by Cerbat/Hualapai people with an earlier Cohonina occupation. Artifacts observed on the surface include chipped stone and hand tools as well as groundstone and charcoal. The site is located on bedrock ledges, the top of a basalt flow and the sand dunes situated below towards the river.

Previous Work: This site was initially recorded by Euler in 1973. The site was described as "undisturbed" and consisted of a "rock shelter and 4 mescal pits" with "3 pot sherds and secondary waste flakes" present on the surface. In 1975, three more sherds were collected. The site was mapped and recorded in detail by NPS survey crews during April of 1991. The site was monitored in 1992 and 1994.

Status and Recommendations: G:03:006 is presently stable and in excellent condition. There is no evidence of visitation since the last monitoring episode in April of 1992. Due to the site's distance from and height above the river combined with its superb condition, it is recommended that G:03:006 be monitored every three years.

G:03:020

G:03:020 is a multiple (seven) feature habitation site containing structural outlines, chipped stone and hand tools as well as groundstone and carbon. No sherds were observed. The site is situated on stabilized dunes on both sides of a major side canyon drainage. The bulk of surface runoff on-site disappears into the dune sands before reaching the Colorado River.

Previous Work: This site was initially recorded by R. Euler in 1978. Three features and chert flakes were noted at that time. Euler reported seeing no ceramics. The site was mapped and recorded in greater detail by NPS survey personnel in February of 1991. The site was monitored in 1992, 1993, and 1994.

Status and Recommendations: Gullying at feature 2 has increased since 1993; features 5 and 6 are suffering from wind deflation with no replacement. Feature 7 which is eroding out of a cutbank exhibits the most change since 1993. Stabilization of selected features, total station mapping, and testing are suggested. Any work done here must be a team effort with the Hualapai Tribe. After stabilization and limited testing, monitoring should be discontinued.

G:03:024

G:03:024 is a roasting feature complex with associated ceramic, lithic, and groundstone artifacts indicating a Pueblo II Anasazi and later Hualapai occupation. The site is located above the mesquite zone on stabilized dunes.

Previous Work: This site was initially recorded by NPS survey personnel in January of 1991 and monitored in 1993 and 1994.

Status and Recommendations: The bulk of the site is presently stable. The gullys at features 3 and 5 are active and show growth and headward movement since 1993. Social trailing has developed across the site as a result of the local river camp and scientific research. Trail obliteration is suggested. Monitor semiannually for two years and then reevaluate. Any work done here must be a team effort with the Hualapai Tribe.

G:03:025

G:03:025 is a large roasting complex consisting of numerous (eight) surface features (roasters), Pai/Paiute ceramics, lithic debris, a biface, complete groundstone, and historic artifacts from the late 19th century. The site is located on a dune-covered terrace above the mesquite zone. Surface runoff at this location is not channeled directly into the Colorado River.

Previous Work: This site was initially recorded by NPS survey personnel in January 1991 and monitored in 1993 and 1994.

Status and Recommendations: The site is presently stable and the past two winters have been wet enough to allow for a lush cover of spring vegetation which acts as an anchor and a blanket for the sites. Ephemeral trailing is evident on-site due to the local bighorn sheep population. Monitor annually for two years and then reevaluate.

G:03:026

G:03:026 is a roaster complex consisting of eight surface features and artifacts including chipped stone tools, groundstone, Pai, Cohonina and Virgin Anasazi ceramics as well as historic artifacts indicating a late 19th century Hualapai use of the site. The site is located on a dune-covered alluvial terrace bordering a major side canyon drainage. The bulk of surface runoff is channeled into the local side canyon arroyo which flows directly into the Colorado River.

Previous Work: This site was initially recorded by NPS survey personnel in January of 1991 and monitored in 1992, 1993, and 1994.

Status and Recommendations: Incipient gullying is present across the site but only encroaches on cultural materials on the west side of feature 3. Social trailing from tourists and researchers is evident everywhere and the problem is compounded by bighorn sheep living in the area. The features are presently stable. It is suggested that a rerouting of trails from the river camp to the main drainage take place and monitoring occur semiannually for the next two years. All work done at this location must be done with the cooperation of the Hualapai Tribe.

G:03:028

G:03:028 is a large multicomponent roaster complex consisting of six separate loci (A-F) with numerous surface features. Artifacts include lithic debris, groundstone, charcoal, burned bone and sherds, indicating a Pueblo II formative as well as protohistoric and 19th century Pai occupation. The site is located on low stabilized dunes covering an alluvial terrace. Runoff from this location is not carried directly into the Colorado River.

Previous Work: This site was initially recorded in February of 1991 and monitored in 1993 and 1994.

Status and Recommendations: The site is currently stable with social trailing from humans present. G:03:028 should be stabilized to thwart any future growth of the gullys, and the trail rerouted. Monitor semiannually for two years and then reevaluate. All work done at this site must be approved by the Hualapai Tribe.

G:03:034

G:03:034 is a roaster complex with Virgin Anasazi affinity. Artifacts include Virgin ceramics, bifacial and hand tools, groundstone, and charcoal. The site is located on two dune-covered alluvial terraces bisected by a minor side canyon drainage. The majority of surface runoff at this location does not flow directly into the Colorado, but is absorbed by the dunes.

Previous Work: This site was initially recorded by NPS survey personnel in February of 1991. The site was monitored by Jan Balsom in May of 1994. Balsom noted a possible burial located on the river side of feature 6.

Status and Recommendations: The site is presently stable at the general level although minor surface rearrangement is occurring as well as localized deflation. This is common to almost every site in the river corridor. Monitor annually to check on the potential burial and amend the map accordingly. It is further suggested that G:03:034 be mapped in detail using a total station.

G:03:040

G:03:040 is a roasting complex divided into two separate loci and consisting of several (at least seven) features. Artifacts include bifacial and hand tools, groundstone, charcoal and lithic debris. No sherds have been observed. The site is located on a flat terrace feature bounded by two arroyos. Surface runoff is channeled into the Colorado River.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored in 1994.

Status and Recommendations: The site is presently fairly stable. However, general surface erosion and wind deflation is present. The potential for major natural impacts at this location due to localized rain or side canyon flooding is high. Monitor on an annual basis.

G:03:042

G:03:042 is a unique processing site adjacent to the Colorado River and consists of at least three deeply ground bedrock mortars situated in Tapeats sandstone. The mortars range from 1.8 to 4 meters above the 28,000 cfs level. Ethnographic evidence indicates seasonal use (August-September) of these features by Hualapai and Paiute peoples to process mesquite into flour.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is presently stable with no or little potential to experience adverse impacts in the foreseeable future. The proximity to the river makes the location easy to casually spot-check on a yearly basis in less than 10 minutes. Official monitoring should take place on a three to five year schedule.

G:03:043

G:03:043 is a roaster complex consisting of several eroded hearths and dispersed fire-altered rock. Artifacts present include lithic debris, a biface, charcoal and groundstone slabs. No ceramics were observed. The site is located on a dune-covered terrace over 160 meters from the river and 10 meters above the 28,000 cfs level. The site is bounded by a major side canyon drainage which drains surface runoff directly into the Colorado River. Affinity is probably shared prehistorically as well as historically by the Pai and Paiute peoples.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored for the first time in 1994.

Status and Recommendations: Presently features 4 and 5 are being adversely impacted by the headward erosion of a local arroyo cut on the eastern margin of the site. The rest of the site has remained stable since the survey. Due to its distance from the river, it is recommended that G:03:043 be monitored on a three year schedule. This would be a good site to obtain a radiocarbon date.

G:03:044

G:03:044 is a habitation and roaster site divided into two separate and distinct loci; locus A is a series of five cleared and modified rockshelters located in bedrock ledges over 35 meters above river level. Locus B consists of two roasting features eroding into an arroyo. Chipped stone tools and some grayware pottery were found here. During 1994, an unfired .44 caliber (19th century) cartridge was found amongst the boulders on the sandy bench at locus B. Some of the surface runoff at this site is channeled directly into the Colorado River.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored in 1992, 1993, and 1994.

Status and Recommendations: Locus A is presently stable. Locus B, however, is in a state of permanent erosion which may be due in part to fluctuating flows in the main river channel, base level lowering and a lack of free sand in the modern post dam system. Monitor Locus B only on an annual basis. It is further suggested that a radiocarbon sample be taken.

G:03:046

G:03:046 consists of several (15-20) fragments of fire-cracked rock, two flakes and a single sherd of southern Paiute grayware. The site takes up less than a 2 x 3 meter area on the surface of a riverside dune. G:03:046 is only 5.5 meters above the 28,000 cfs level.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored in 1994.

Status and Recommendations: Presently the site is being impacted by surface runoff and wind deflation. Although the site is ephemeral and lacks much research potential, it acts as an erosion barometer for events in this section of the river corridor. Due to the sites proximal location to the river, it is recommended that G:03:046 be monitored annually by a single archeologist to minimize impact.

G:03:056

G:03:056 is a group of three to four roasting features with chipped stone and groundstone tools. No ceramics were observed. The site is located on a dune 12 meters above the 28,000 cfs level.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored in 1994.

Status and Recommendations: Arroyo expansion is affecting feature 1 and the steep nature of the dune at this location is resulting in surface movement of the artifacts and features 2 and 3. Cryptogamic soil is acting as a stabilizing force to some degree. Game trailing is present. No human visitation was evident since the site was recorded in 1991. Monitor on a three to five year schedule.

G:03:058

G:03:058 consists of a single roasting feature and a fragmented mano. The site is located on a light dune-covered terrace 13.5 meters (45 feet) above the 28,000 cfs level. Runoff from this location does not flow directly into the Colorado River.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored in 1994.

Status and Recommendations: The site is presently being impacted by the growth of an arroyo into the feature. The site is bounded by arroyos and erosional channels. Monitor the site in alternate years.

G:03:059

G:03:059 is the scant remains of a small camp consisting of the dispersed fragments of an eroded fire feature, a few chert flakes, and four manuported river cobbles showing expedient use. The site is located 15 meters above the 28,000 cfs level on a dune-covered terrace.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored in 1994.

Status and Recommendations: The site is presently being impacted by surface runoff and deflation. Due to the ephemeral nature of the site and its location, no further monitoring is warranted.

G:03:060

G:03:060 is a roaster complex consisting of 13 features and a few artifacts. Artifacts include hand tools, groundstone, flakes, and five Moapa sherds indicating at the least a Virgin Anasazi presence. The site is located on a river terrace covered by partially stabilized dunes. Runoff from this surface that reached localized channels does flow directly into the Colorado River.

Previous Work: This site was initially recorded by NPS survey personnel in April of 1991 and monitored in 1994.

Status and Recommendations: Minor surface erosion and deflation is presently occurring across the site. Because of the large area (80 x 200 meters) encompassing the site and its location at the base of an active talus slope, major erosional impacts are inevitable. Annual monitoring of selected features most at risk is recommended.

G:03:061

G:03:061 is a Tapeats sandstone rockshelter with a hearth, 20-30 flakes, burned bone fragments, and four quids. These quids are evidence of agave gathering and use indicating a southern Paiute and/or Hualapai occupation. Surface runoff is not channeled directly into the Colorado from this site.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is presently stable and will probably remain so. Impacts are mainly natural due to animal use. Large cat and coyote scat as well as owl pellets are present on the surface. Monitor on a five year schedule. Obtain a radiocarbon sample in 1995.

G:03:063

G:03:063 consists solely of the remnants of a highly eroded firepit/roasting feature. No artifacts have been observed on the surface. The site is located on a highly eroded dune-covered terrace over 17 meters (55 feet) above the current 28,000 cfs level. Runoff does not flow directly into the Colorado River.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored in 1994.

Status and Recommendations: Erosion here is ongoing; gullying, arroyo encroachment, deflation, and gravity creep are all taking part. Due to the ephemeral nature of the site, little potential for data recovery exists. However, as an example of pervasive surface erosion on a site in its terminal stages, it may be useful to get annual photographs for the next two years and then reevaluate.

G:03:064

G:03:064 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 archeological features are present on-site and are dominated by the distinct mounds of fire-cracked rock 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 fire-cracked rock, erosion is occurring differentially, cutting channels around the roasters and creating peninsulas as the drainages carve out the loosed and unprotected sediments. Ultimately the archeological features will be isolated, pedestaled, and brought down to base level with the rest of the terrace. The USGS 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. Radiocarbon samples were taken from buried cutbank deposits by the NPS in 1993 revealing a suite of dates ranging from 1880 +/- 70 BP to 2870 +/- 60 BP.

Status and Recommendations: This office is currently in consultation with the Hualapai Tribe on the condition and future of this property. It is recommended that G:03:064 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. It is further suggested that G:03:064 be mapped using a total station and that the site be considered for stabilization.

G:03:065

G:03:065 consists of a rockshelter with no features, carbon or ceramics and only minimal lithic debris. A few handtools are present and a worked stick. The site is located on a series of Tapeats sandstone ledges 15 meters above the 28,000 cfs level.

Previous Work: This site was initially recorded by NPS survey personnel and monitored in 1994.

Status and Recommendations: G:03:065 is presently stable. Considering the site's condition and location, it is recommended that it be mapped then monitored every five years.

G:03:066

G:03:066 consists of an intact fire feature and a single grinding slick on a detached boulder. No artifacts were observed on the surface. The site is located on a dune-covered bedrock bench at the mouth of a major side canyon drainage.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is presently stable. It is recommended that G:03:066 be monitored in alternate years to lessen human impacts and that a radiocarbon sample be taken.

G:03:067

G:03:067 is a roaster complex consisting of five features and minimal artifacts including two bifaces and several chert flakes. A single Moapa sherd indicates a Virgin Anasazi presence at the very least. The site is located on low stabilized dunes covering a debris fan on a major side canyon delta.

Previous Work: This site was initially recorded by NPS survey personnel in March of 1991 and monitored in 1992, 1993, and 1994.

Status and Recommendations: The site is relatively stable with the main impact being from human trailing due to the proximity of two highly used camping beaches. The trail should be obliterated, rerouted, and the site monitored annually.

V. Management Summary

This management summary includes site-specific measures to reduce impacts, measures to protect site integrity, a work plan for FY95, and an assessment of the monitoring program.

A. Recommended Measures to Reduce Site Impact

Several sites monitored in FY94 show evidence of minimal to moderate human and natural impacts. It is up to the park stewards, or monitors, to protect and preserve these sites by conducting various types of stabilization and/or trail obliteration. Final on-site evaluations will be made before implementing the following recommendations.

Retrailing (10 sites) and obliterating trails (19 sites) are the most commonly recommended methods of reducing site impact. Some trails are not created with the intention of visiting a site because many sites are difficult to detect. Rather, these trails are formed by commercial and private boaters hiking up the canyons. At these areas, a designated trail should be developed to avoid the sites.

Many sites, as many programmatic signatories have seen, have multiple trails. Until these trails are obliterated, people will continue walking on them, thus impacting site features. Some trails go directly through features. The main problem with these trails is that several have become entrenched, making shallow to deep gullies that connect, in some circumstances, with Type I or Type II drainages. The process of retrailing and trail obliteration is accomplished in February and November of every year by the GRCA Resource Specialist, Kim Crumbo, accompanied by a Park Service archaeologist.

The options for reducing site impact through stabilization include planting vegetation, installing check dams and stabilizing. (The term "stabilizing" is chosen when site specific methods are suggested that do not include planting vegetation or installing check dams.) In summary, five sites are recommended for planting vegetation, ten sites are recommended for installing check dams, and seven sites are recommended for stabilization.

The final suggestion to reduce site impact is closing the site to visitors. For FY95 only three sites are recommended off limits to visitors (A:16:159, C:13:006 and G:03:003). The process of closing these areas involves following the official park network headed by the park archaeologist. Initially, in FY95, commercial guides and park rangers will be notified that these locations should not be visited. Hopefully, this initial process will decrease visitation and site degradation.

Table 7 summarizes where, and what recommendations were made in FY94 to reduce site impact. In Table 9 these recommendations are prioritized based on what sites need immediate attention.

Table 7. Recommended Measures to Reduce Site Impact

Site Number	Retrail	Obliterate Trail	Plant Vegetation	Check Dam	Stabilize	Close	Total
A:15:042	X	X					2
A:16:151		X					1
A:16:159						X	1
A:16:160		X					1
B:09:317		X					1
B:11:272	X						1
C:02:101				X			1
C:06:003	X	X		X			3
C:09:051	X	X					2
C:09:052		X					1
C:09:083		X					1
C:13:006		X	X	X	X	X	5
C:13:098	X	X		X	X		4
C:13:099	X	X		X			3
C:13:100	X	X		X	X		4
C:13:291				X			1
C:13:323		X					1
C:13:349					X		1
G:03:003	X	X				X	3
G:03:004		X					1
G:03:020			X	X			2
G:03:024		X					1
G:03:026	X	X					2
G:03:028	X	X	X	X			4
G:03:064			X	X			2
G:03:067		X					1

Site Number	Retrail	Obliterate Trail	Plant Vegetation	Check Dam	Stabilize	Close	Total
Total	10	19	4	10	4	3	

B. Recommended Measures to Protect Site Integrity

After all measures of reducing site impacts are exhausted and deterioration continues, methods to protect a site's integrity are activated. Generally, these are methods used to collect site data before it is irretrievable. The four measures suggested to protect site integrity are: mapping, subsurface testing, surface collection of the entire site, and excavation.

Fourteen sites are recommended for mapping with a total station. This process of data recovery is essential by itself, and prior to several methods of reducing site impact, or data collection. Many sites will be revisited to concentrate on the cross sections of the gullies and arroyos at the sites.

Surface collecting the entire site was only recommended at one site, C:13:006. Collecting artifacts from this site, however, will not occur until all methods of reducing site impact have been attempted.

Testing a site for subsurface cultural deposits could be the most affective and efficient option for learning about sites along the river corridor before they disappear. It was suggested for 13 sites that subsurface samples be collected. For example, at C:13:099, several artifacts, and *in situ* charcoal deposits are washing down the main Type I arroyo. It is strongly suggested that soil and charcoal samples be taken before additional information continues to wash into the river.

Excavation was not warranted at any of the sites monitored in FY94. Unless a catastrophic event occurs at a site, it is not foreseeable that excavation will be recommended.

Table 8 summarizes the recommendations made in FY94 to protect site integrity. In Table 9 these recommendations are prioritized depending on whether the sites are in immediate, moderate or minor danger of deterioration.

Table 8. Recommended Measures to Protect Site Integrity

Site Number	Mapping	Surface Collect	Test	Excavate	Total
A:15:021	X		X		2
*A:15:030	X		X		2
A:15:039			X		1
C:06:003	X				1
C:13:006	X	X	X		3
C:13:098	X				1
C:13:099	X		X		2
C:13:100	X				1
C:13:291	X				1
C:13:349	X		X		2
C:13:359	X		X		2
C:13:365			X		1
C:13:371			X		1
C:13:374			X		1
C:13:384	X		X		2
G:03:020	X		X		2
G:03:044			X		1
G:03:064	X				1
G:03:065	X				1
Total	14	1	13	0	

* A:15:030 was monitored in 95-1. Remedial action will occur on the 95-4 trip.

C. FY95 Monitoring Work Plan

Part of the long-term monitoring program is to implement management assessments and recommendations that are suggested in the field. As seen above, several recommendations to protect and preserve site information are made. Yet, due to field logistics, and various site conditions, it is crucial to prioritize the needs of each site based on the degree of impact. Three priority ranks were developed: extensive, moderate, and minor. The sites were ranked subjectively, yet are supported by accumulated information on the monitor form, and in previous photographs.

A priority rank of one means there are extensive impacts, and remedial actions should be completed in FY95. Moderate impacts are given a priority rank of two. These sites are not endangered by any immediate impact therefore remedial actions should be completed in FY96. A priority rank of three is recommended when there are very minor impacts, and remedial action should occur in FY97. Prior to any work, the sites are reassessed to insure that the previous recommendations are still necessary.

A proposal will be written describing the remedial actions and will be sent to the members of the Programmatic Agreement with the allotted 30 days for a response. The only time a proposal is substituted with a memorandum is when remedial actions involve retrailing and trail obliteration.

Table 9 summarizes the sites that were monitored, the types of impacts observed, the priority rank, and the remedial actions that were recommended. In some cases, two priority ranks were given for multiple recommendations.

Table 9. Recommendations and Priority Ranks for FY94 Sites

Site No.	Site Type	Impacts	Schedule	Priority Rank	Recommendations
A:15:021	Camp	Erosion, Visitation	Annual	1	Map, Test
A:15:039	Roaster Complex	Animal Trailing	Annual	2	Test
A:15:042	Camp	Trailing through a feature	Discontinue	1	Retrail, Obliterate trail
A:16:151	Camp	Trailing, Human Visitation	Semiannual	3	Obliterate trail
A:16:159	Camp	Spalling, Human Visitation, Artifact Movement	Semiannual	2	Close site
A:16:160	Roaster Complex	Trailing	3-5 Years	2	Obliterate trail
B:09:317	Camp	Trailing, Artifact Movement	Semiannual	2	Obliterate trail
B:11:272	Thermal	Trailing, Erosion	Semiannual	1	Retrail

Site No.	Site Type	Impacts	Schedule	Priority Rank	Recommendations
	Feature				
C:02:101	Thermal Feature	Eolian Erosion, Minor Trailing	3-5 Years	2	Check dam
C:06:003	Camp	Gullying, Erosion, Trailing	Semiannual	1 2	Retrail, Obliterate trail, Map, Check dam
C:09:051	Pueblo	Trailing, Sheet Washing	Semiannual	2	Retrail, Obliterate trail
C:09:052	Small Structure	Trailing, Artifact Movement	Semiannual	2	Obliterate trail
C:09:083	Historic Structure	Trailing	3-5 Years	2	Obliterate trail
C:13:006	Small Structure	Erosion, Trailing	Annual	2 3	Map, Test, Stabilize, Obliterate trail, Plant vegetation, Check dam, Surface collect, Close site
C:13:098	Historic Structure	Gullying, Trailing, Artifact Movement by Visitors	Semiannual	1 3	Retrail, Obliterate trail, Map, Stabilize, Check dam
C:13:099	Small Structure	Erosion, Trailing, Bank Slumpage	Semiannual	1	Map, Retrail, Obliterate trail, Check dam, Test
C:13:100	Pueblo	Trailing, Arroyo Cutting	Semiannual	1	Map, Retrail, Obliterate trail, Check dam, Stabilize
C:13:291	Small Structure	Severe Erosion, Gullies, Arroyos, Faint Trailing	Annual	1	Map, Check dam
C:13:323	Camp	Erosion, Trailing	3-5 Years	3	Obliterate trail
C:13:349	Historic Structure	Erosion, Arroyo Cutting	3-5 Years	1 2	Map Test, Stabilize
C:13:359	Small Structure	Dune Erosion	Biennial	3	Map, Test
C:13:365	Ephemeral Structure	Gullying, Animal Trailing	Biennial	3	Test

Site No.	Site Type	Impacts	Schedule	Priority Rank	Recommendations
C:13:371	Small Structure	Gullying, Erosion	Semiannual	2	Test
C:13:384	Fire Features	Bank Slumpage, Erosion	Annual	1 2	Map Test
G:03:003	Roaster Complex	Trailing, Movement of Artifacts by Visitors, Gullying	Semiannual	1 3	Retrail, Obliterate trail, Close site
G:03:004	Roaster Complex	Erosion, Trailing, Movement of Artifacts by Visitors	Semiannual	1	Obliterate trail
G:03:020	Roaster Complex	Gullying, Erosion, Trailing	Discontinue	1	Map, Test, Check dam, Plant vegetation
G:03:024	Roaster Complex	Trailing, Piping, Gullying	Semiannual	1	Obliterate trail
G:03:026	Roaster Complex	Gullying, Trailing	Semiannual	1 2	Obliterate trail, Retrail
G:03:028	Roaster Complex	Arroyo Cutting, Trailing	Semiannual	1 2	Obliterate trail, Retrail, Plant vegetation, Check dam
G:03:044	Roaster Complex	Spalling, Minor Trailing	Annual	1	Test
G:03:064	Roaster Complex	Erosion, Arroyo Cutting	Semiannual	1 2	Map, Check dam, Plant vegetation
G:03:065	Lithic Scatter	Erosion	3-5 Years	3	Map
G:03:067	Roaster Complex	Erosion, Trailing through Features	Annual	1	Obliterate trail

Stationary Cameras

For FY95, two sites (C:13:291 and C:13:006) are recommended for stationary cameras. A camera will not be placed at C:13:291 because the geographical setting makes it difficult to place a camera in a safe and effective location. Placing a camera on the opposite side of the river is too far, and placing the camera near or below the site distorts the photographs.

At C:13:006 there are several good locations to place a camera where it cannot be seen by visitors and erosion can be photographed. The camera at C:13:359 will be taken out on the February, 1995 trip and placed at C:13:006 on the March, 1995 trip.

D. Monitoring Program Assessment

The long-term monitoring and remedial action program is evolving into a process with several different management phases. The first management phase is monitoring. Some sites will receive nothing but a monitor schedule. No remedial action is necessary because the sites are in stable condition. On the other hand, some sites require attention. In these situations, monitoring serves as the first management phase followed by remedial action, and then ending in monitoring of the remedial action.

For several years, many sites have been monitored to attempt to evaluate rates of erosion and types of erosion caused by the existence of Glen Canyon Dam. Using the available monitoring data allows the staff to make well-founded management decisions.

FY95 will be the first year remedial actions will officially begin for this project. Of the 128 sites monitored in FY94, less than half (32%) need remedial action. Through the years, fewer sites will be monitored, and more detailed observances (i.e., detailed maps and surface analysis units) will be centered on the sites that are eroding. This will result in more qualitative and quantitative data being gathered. Thus, not only will the protection and preservation of sites increase, but the archaeological research base of the river corridor will also be enhanced.

VI. References Cited

Coder, Christopher, Lisa Leap, Nancy Andrews, Dana Kline, and Duane Hubbard
1992 Summary Report For 1992 GCES Monitoring of Archaeological Sites From Lees Ferry to Separation Canyon, Grand Canyon National Park. Prepared for Grand Canyon National Park, Grand Canyon, Arizona.

Coder, Christopher, Lisa Leap, Nancy Andrews, Duane Hubbard
1993 Summary Report: Monitoring of Archaeological Sties Along the Colorado River Corridor in Grand Canyon National Park. Prepared for Grand Canyon National Park, Grand Canyon, Arizona.

Fairley, Helen C., Peter W. Bungart, Christopher M. Coder, Jim Huffman, Terry L. Samples, and Janet R. Balsom
1994 The Grand Canyon River Corridor Survey Project: Archaeological Survey along the Colorado River between Glen Canyon Dam and Separation Canyon. Grand Canyon National Park, in cooperation with the Glen Canyon Environmental Studies.

Hereford, Richard, Helen C. Fairley, Kathryn S. Thompson, and Janet R. Balsom
1991 The Effect of Regulated Flows on Erosion of Archaeologic Sites at Four Areas in Eastern Grand Canyon National Park, Arizona: A Preliminary Analysis. U.S. Geological Survey Administrative Report prepared in cooperation with U.S. Bureau of Reclamation, Glen Canyon Environmental Studies, Flagstaff.

Hereford, Richard, Helen C. Fairley, Kathryn S. Thompson, and Janet R. Balsom
1993 Surficial Geology, Geomorphology, and Erosion of Archeologic Sites along the Colorado River, Eastern Grand Canyon, Grand Canyon National Park, Arizona. U.S. Geological Survey Open-File Report 93-517, prepared in cooperation with the U.S. Bureau of Reclamation, Glen Canyon Environmental Studies, Flagstaff.

U. S. Department of Interior, Bureau of Reclamation
1993 Draft Environmental Impact Statement: Operation of Glen Canyon Dam. USDI, BOR Upper Colorado Region.

Appendix A:

Sample Monitoring Form

Appendix B:
FY95 Monitoring Trips

Site Selection

The river corridor archaeological sites selected for monitoring in FY95 will derive from the original group of 475 sites inventoried during the 1990-91 survey. A total of 336 sites comprise the number of properties that are either impacted or potentially impacted by river flows (identified as the "I" group). Within the "I" group are 263 sites located on sediment deposits subject to erosion (identified as the "SI" group). By the end of FY97, all 263 "SI" group sites will be monitored and a monitoring schedule devised. Sixty-eight of these "SI" group sites will be monitored in FY95.

Additionally, the remaining sites within the "I" category will be sampled for monitoring at a 10% level on a yearly basis with replacement. The six "I" category sites scheduled for monitoring in FY95 are: B:11:277
B:15:135
C:05:007
C:09:004
C:13:335
G:03:077

An additional 139 sites (130 in GRCA, 9 in GLCA) comprise the number of properties within the "no impact" category (identified as the "N" group). A 10% sample of these sites will be monitored yearly, and the remainder will never be monitored. The thirteen "N" group sites chosen as the control group are: A:15:017
A:16:156
B:10:121
B:10:230
B:10:236
B:15:121
B:15:126
B:15:132
B:15:143
C:09:080
C:13:274
C:13:367
G:03:019

Trip Schedules

Based on Table 9, and the previous monitor site inventory, the following schedule has been created for FY95. The proposed monitoring trip schedules include month, dates, and transportation. Overall, six trips will be completed for the 1995 Fiscal Year. The list of sites scheduled to monitor was generated from an accumulation of sites monitored in FY92, FY93 and FY94. Following the list of sites to monitor are the remedial actions that will be completed.

95-1 -- October 5-21, 1994, 17 day row trip. Lees Ferry to Diamond Creek.

Site	River Mile/Bank	Site Type
C:06:003	011.1 R	Camp/Prehistoric Activity Area
C:09:050	051.8 R	Rock Alignments/Isolated Pot
C:09:053	051.9 R	Pueblo
C:09:051	052.3 R	Pueblo
C:09:052	052.3 R	Small Structure
C:09:082	052.3 R	Prehistoric Activity Area
C:13:371	062.5 R	Small Structure
C:13:098	065.5 L	Historic Structure
C:13:099	065.5 L	Small Structure
C:13:100	065.5 L	Pueblo
C:13:272	065.5 L	Small Structure
C:13:273	067.7 L	Roasters/Activity Area
C:13:069	071.1 L	Site Complex
C:13:070	073.1 L	Small Structure
C:13:131	076.6 L	Historic Structure
B:15:127	120.4 L	Camp
B:11:272	131.6 R	Isolated Thermal Feature
B:11:281	134.6 L	Camp
B:11:275	134.9 L	Ephemeral Structure
B:10:121	140.0 L	Small Structure
B:09:317	166.4 L	Camp/Rock Shelter
A:16:159	187.9 L	Activity Area/Pictographs
A:15:027	198.5 L	Roaster Complex
A:15:030	199.0 R	Isolated Thermal Feature
G:03:069	207.5 L	Shelter, Arrow Cache
G:03:064	207.8 L	Roaster Complex
G:03:032	211.2 L	Roaster Complex
G:03:061	216.6 R	Shelter, Artifacts, Hearth
G:03:048	217.3 L	Camp

95-2 -- November 4-20, 1994, 16 day row trip. Lees Ferry to Diamond Creek.

Site	River Mile/Bank	Site Type
C:02:085	001.6 R	Isolated Thermal Feature
C:06:005	011.8 L	Petroglyph Panel
C:05:031	024.5 L	Ephemeral Structures
C:09:080	052.1 R	Ephemeral Structures, Artifacts
C:13:367	057.5 R	Small Structures, Artifacts
C:13:006	059.8 R	Small Structures
C:13:007	065.4 R	Small Structures
C:13:334	065.6 L	Small Structures
C:13:339	067.9 L	Small Structures
C:13:274	067.6 L	Water Control
C:13:321	069.6 R	Roaster Complex
C:13:342	069.8 L	Historic Feature
C:13:291	072.2 R	Small Structures
B:15:121	114.2 R	Artifacts, Charcoal
B:15:118	116.5 L	Historic Inscriptions, Artifacts
B:15:143	117.7 L	Shelter, Artifacts, Charcoal
B:10:260	123.5 L	Fire Cracked Rock, Artifacts
B:10:236	124.5 R	Fire Cracked Rock, Lithics
B:10:229	136.9 R	Agricultural Features
A:16:156	186.1 L	Shelter, Artifacts
A:15:039	203.0 L	Roaster Complex
A:15:042	204.3 R	Shelter with Artifacts
G:03:004	206.6 R	Roaster Complex
G:03:063	209.8 R	Isolated Thermal Feature
G:03:044	211.2 L	Habitation Area
G:03:020	211.6 R	Roaster Complex
G:03:029	213.8 L	Roaster Complex
G:03:067	219.7 R	Roaster Complex
G:03:085	223.0 L	Artifact Scatter
G:03:072	223.3 R	Roaster Complex

95-3 -- February 21 - March 7, 1995, 15 day row trip.
Lees Ferry to Diamond Creek.

Site	River Mile/Bank	Site Type
C:06:006	011.1 R	Artifact Scatter
C:06:004	015.9 R	USGS Hammer Inscription
C:05:037	030.4 R	Fire Cracked Rock, Artifacts
C:05:009	030.4 L	Ephemeral Structures
C:09:088	039.6 B	BOR Dam Site
C:09:034	041.5 R	Bert Loper's Boat
C:09:031	044.8 L	W.B. Taylor
C:13:365	057.7 R	Ephermeral Structure
C:13:329	058.8 L	Enigmatic Feature
C:13:349	070.2 L	Historic Structure/FCR Feature
C:13:343	070.4 L	Small Structure
C:13:347	070.7 L	Small Structure
C:13:010	071.5 R	Pueblo
B:16:259	088.2 L	Roaster/Artifacts
B:15:096	107.6 L	Historic Metal Boat
B:15:124	107.8 R	George Parkins Inscription
B:15:132	108.8 L	Camp
B:15:091	109.5 R	Small Structures
B:15:143	117.7 L	Camp, Shelter, Artifacts
B:15:126	117.7 L	Small Structures
B:14:095	122.8 L	Roaster Complex
B:10:224	124.9 L	Isolated Thermal Feature
B:11:279	130.5 R	Small Structure
B:11:282	130.8 L	Rock Alignment/Roasting Feature
B:10:230	152.2 R	Camp
B:13:002	171.4 L	Roaster Complex
A:16:151	177.3 L	Roasting Feature/Artifacts
A:16:185	191.8 L	Artifacts, Possible Burial
A:15:017	195.9 R	Camp
A:15:031	196.2 R	Roaster Complex
A:15:027	198.5 L	Roasting Feature/Artifact
G:03:060	207.5 L	Roaster Complex
G:03:040	207.7 L	Roaster Complex
G:03:002	208.5 L	Roaster Complex
G:03:024	208.6 L	Roaster Complex
G:03:025	208.7 L	Roaster Complex
G:03:028	208.7 L	Roaster Complex
G:03:026	208.9 L	Roaster Complex
G:03:003	209.0 L	Roaster Complex
G:03:019	214.0 R	Small Structures
G:03:080	221.8 L	Roaster Complex

Remedial Action: Stationary Camera out at C:13:359

95-4 -- March 27 - April 6, 1995, 10 day motor trip.
Lees Ferry to Diamond Creek.

Site	River Mile/Bank	Site Type
C:02:033	000.8 R	Storage
C:02:097	001.3 R	Ephemeral Structure
C:02:098	001.3 R	Camp
C:02:096	002.0 L	Ephemeral Structure
C:06:003	011.1 R	Camp/ Prehistoric Activity Area
C:06:010	013.0 R	Small Structure
C:09:050	051.8 R	Rock Alignments/Isolated Pot
C:09:051	052.3 R	Pueblo
C:09:052	052.3 R	Small Structure
C:09:082	052.3 R	Prehistoric Activity Area
C:13:371	062.5 R	Small Structure
C:13:098	065.5 L	Historic Structure
C:13:099	065.5 L	Small Structure
C:13:100	065.5 L	Pueblo
C:13:272	065.5 L	Small Structure
C:13:070	073.1 L	Small Structure
C:13:005	076.6 L	Roaster Complex
B:14:107	122.0 R	Ephemeral Structure
B:11:280	126.8 R	Ephemeral Structure
B:11:272	131.6 R	Isolated Thermal Feature
B:11:271	135.0 L	Camp
B:10:262	137.2 L	Ephemeral Structure
B:10:227	144.9 L	Historic Mining Camp
B:09:317	166.4 L	Camp/Rock Shelter
A:16:159	187.9 L	Activity Area/Pictographs
A:15:021	199.5 R	Thermal Feature/Artifacts
A:15:005	201.8 R	Pictographs
G:03:004	206.6 R	Roaster Complex
G:03:064	207.8 L	Roaster Complex
G:03:020	211.6 R	Roaster Complex

Remedial Actions:

Map	Test	Stationary Camera
A:15:021	A:15:021	C:13:006
A:15:030	A:15:030	
C:13:098	G:03:020	
C:13:099	G:03:044	
C:13:100		
C:13:291		
C:13:349		
C:13:384		
G:03:020		
G:03:064		

95-5 -- April 30 to May 13, 1995, 15 day motor trip. Lees Ferry to Pierce Ferry.

*Remedial actions not completed on the 95-4 trip will be completed on this trip.

Site	River Mile/Bank	Site Type
C:02:092	001.4 L	Artifact Scatter
C:06:002	012.0 L	F. M. Brown Inscription
C:05:007	023.3 L	Harry McDonald Inscription
C:09:004	035.7 L	Small Structures
C:13:368	057.1 L	Rock Shelter with Lithics
C:13:333	067.5 L	Rock Shelter with Artifacts
C:13:335	067.5 L	Isolated Thermal Feature
C:13:008	069.3 L	Small Structures
C:13:092	069.6 R	Historic Structure
C:13:385	073.2 L	Small Structure
B:16:365	087.6 R	Griffith Burial
B:16:003	098.2 R	Small Structure
B:15:135	121.6 L	Small Structure
B:11:284	130.6 R	Ephemeral Structures
B:11:277	134.4 L	Roaster, Artifacts
B:13:002	171.4 L	Roaster Complex
A:16:151	177.3 L	Roasting Feature/Artifacts
A:16:158	184.1 R	Shelter with Artifacts
A:16:002	191.1 L	Shelter with Sherds
A:15:025	200.4 R	Hematite Mine
A:15:040	201.6 L	Shelter with Fire Cracked Rock
G:03:046	201.7 R	Artifact Scatter
G:03:024	208.6 L	Roaster Complex
G:03:027	208.7 L	Bedrock Mortar
G:03:028	208.7 L	Roaster Complex
G:03:026	208.9 L	Roaster Complex
G:03:003	209.0 L	Roaster Complex
G:03:034	210.6 R	Roaster Complex
G:03:077	215.6 L	Pictograph Panel
G:03:082	216.1 R	Ephemeral Structures
G:03:023	223.2 R	Historic Scatter
G:02:102	236.4 L	Historic Camp
G:02:101	237.2 R	Historic Structures
G:02:106	237.2 L	Historic Structures
G:02:100	238.5 L	Bridge Canyon Dam
G:02:105	239.2 R	Historic
G:02:103	239.6 R	Historic
G:02:108	239.9 R	Trail, Historic Platform
G:02:001	245.9 R	Camp
G:02:107	248.9 L	Ephemeral Structure
G:02:032	255.O R	Roaster Complex
G:02:009	259.4 R	Historic Cabin

95-6 -- September 10-20, 1995, 10 day motor trip. Lees Ferry to Diamond Creek.

Remedial Actions:

C:13:098	Stabilize, Photography
C:13:099	Test, Check dams, Photography
C:13:100	Check dam, Stabilize, Photography
C:13:291	Check dam, Photography
G:03:020	Check dam, Plant vegetation, Photography
G:03:064	Check dam, Photography