

**Fiscal Year 2001**

**Archaeological Site Monitoring and Management Activities Along the Colorado  
River in Grand Canyon National Park.**

Jennifer L. Dierker and Lisa M. Leap

GRAND CANYON NATIONAL PARK

Nancy B. Andrews

NORTHERN ARIZONA UNIVERSITY

RCMP Report No. 70  
Flagstaff, Arizona

Submitted to the  
Department of the Interior,  
U.S. Bureau of Reclamation  
Salt Lake City, Utah  
Acquisition No. 99-AA-40-2340

October, 2001

## Chapter 1

### INTRODUCTION

The River Corridor Monitoring Project (RCMP) is a joint program between the Grand Canyon National Park and the Bureau of Reclamation, Interagency Acquisition No. 98-AA-40-0130, and Grand Canyon National Park and Northern Arizona University (CA 120099009). This report is a requirement of the Programmatic Agreement on Cultural Resources (U.S. Department of the Interior, et al. 1994) for National Register eligible archaeological sites affected by Glen Canyon Dam operations. All work completed and recommended for this fiscal year has been done under the auspices of the Monitoring and Remedial Action Plan (MRAP), developed in 1994 and amended in 2000. All work conducted will continue to be guided by the MRAP until the Historic Preservation Plan (HPP) is completed.

In FY2001 two archaeological river monitoring trips were completed. The river trips consisted of two 16 day rowboat trips in October 12 to 27, 2000 and March 24 to April 8, 2001. A total of 91 archaeological sites were monitored, checkdam maintenance was completed at 28 sites, and medium format photographs were taken at four sites. The MRAP was updated by our office to reflect the work completed this year and the years to come until the HPP is completed. Some recommendations made by the Cultural Protocol Evaluation Panel (Doelle 2000), were also implemented in FY01.

River trip participants included: Tim Stephensen, boatman; Stuart Reeder, boatman; Tyler Williams, boatman; Jim Petterson, boatman; Brian Dierker, boatman; Brian Hansen, boatman; Dan Hall, boatman; Deb Petersen, boatman/archaeologist; Gabriel Yuselew, Zuni Conservation Project; Lisa Leap, NPS RCMP Archaeologist; and Jennifer Kunde, NPS RCMP Archaeologist. Persons who accompanied portions of our trips included: Melissa Schroeder, NPS Archaeologist; Greg Glasgow, Hualapai Tribe; Fred Nials, geoarchaeologist; Jan Balsom, NPS archaeologist; Amy Horn, NPS archaeologist; Sara Officer, NPS interpreter; Frank Wallander, NPS archaeologist; Sayre Hutchison, Denver NPS architect; Ron Hiebert, NPS Research coordinator for Colorado Plateau Parks; Sharon Fullner, GCMRC archaeologist; Renee Hiebert, VIP archaeologist; Don Cochran, NPS telecommunications; and Rachel Gray, NPS, bighorn sheep study. No Programmatic Agreement representatives participated in river trips this fiscal year.

Monitoring of the 91 archaeological sites (in total 101 monitoring episodes due to semiannual monitoring) in October and March revealed 92% of the sites with physical impacts and 32% with visitor related impacts. Both visitor-related and physical impacts occurred at 94% of the sites monitored. Overall impacts are about 10% higher than the past three to four years. Reasons for the increases are discussed in more detail in Chapter 2.

Due to budget cuts and delays in GCMRC sponsored research projects, no treatments, either preservation or data recovery, have been implemented. The only remediation work completed has been maintenance work at 28 sites with checkdams. The delays in research and budget cuts have put this program two years behind schedule.

Gabriel Yuselew of the Zuni Conservation Projects office, Zuni, NM, has co-supervised PA checkdam projects since its inception in September 1995. Once again, he accompanied our October archaeological river corridor monitoring trip to conduct checkdam maintenance. Twenty-eight sites with checkdams were visited and work was completed at 16 sites. Of the 268 checkdams that exist today, 23% (62 checkdams) had maintenance performed and 10 new checkdams were constructed. As was the case for the past two years, most of the work was completed on river-based drainages (13 sites).

Medium format photography continued this year at four locations. These photographs have allowed for visually documenting changes in sediment distribution prior to and following the experimental flow of 45,000 cfs in 1996. Since 1996, the photographs demonstrate a slow, yet steady depletion in sediment on or proximal to archaeological sites, and quite an increase in vegetation. This method of documenting change has been evaluated and compared to other photographic methods to determine if medium format photography is valuable not only for documenting change over time but for quantifying the observations. A report of the findings will be produced by the NAU geography department, and disseminated to PA members in the spring of 2002. This project was funded through the GCMRC.

A second project funded by GCMRC for FY2001 included storing 35mm black and white negatives of all the checkdam photographs and black and white medium format negatives on CDROM. The photographic lab at Bilby

Research Center was funded to make the collection of photographs (over 9,000 in the Park database) more readily accessible for research projects (such as checkdam monitoring) and educational ventures. We hope to continue this project in years to come as it will lead to a database that is functional, easily accessible, complete, archival and easy to maintain and update.

Kunde and Leap accompanied three river trips hosted by the Colorado River Funds (CRF) project: November and December (upper halves only) and February (Kunde did the entire trip). See the fall trip report (Kunde 2000) for specific work completed in November and December. The CRF trips are monetarily supported by a percentage of revenues generated by all commercial river outfitters. Commercial outfitters supply the boats, boatmen, and any personnel that the park requests to perform tasks on the river that will enhance the visitor experience. The focus of these trips is to perform rehabilitation of trails and beaches through the efforts of volunteers from the river-running community and the NPS. The program is designed to address visitor-related impacts, resource protection, and conservation priorities directly related to impacts by river trip participants. These tasks are recommended by park employees and include mainly trail improvements (retrailing, trail obliteration), trash pick up, and revegetation of areas. CRF trips have been conducted over the past eight years in conjunction with NPS wilderness coordinators.

For over the past two years CRF project managers Linda Jalbert (NPS) and Brian Hansen (CRF project manager) have requested work from the River Corridor Monitoring Project (RCMP). This project has supplied CRF staff with lists of sites with visitor-related impacts, mainly trails on sites. For the past two years project staff have been able to attend the CRF trips and either conduct the work needed, or complete an assessment for future work. Overall this has been a positive interaction with the various river companies. It is the intent of all involved to continue this type of collaboration.

Professional and public outreach events during FY2001 were at a minimum. A paper outlining how monitoring has led to the discovery of new cultural materials and expanding archaeological understanding was presented in New Orleans at the 66<sup>th</sup> Annual Society for American Archaeology meetings. Additionally, the paper presented at the SAAs, will be published in a future *Nature Notes* (a quarterly journal sent out by the Park).

NAU's main responsibility in FY2001 was the completion of the excavation reports for the following sites: A:15:048, C:13:010, C:13:099, C:13:343, C:13:347, C:13:349, G:03:004, and G:03:020. Delays in artifact analyses have slowed the writing process, along with the lack of personnel. However, PA members requested an extension and the final reports will be completed by December 2001. PA members will receive copies before the end of this calendar year.

FY01 marked the first year the RCMP staff have explicitly used the seven aspects of integrity as outlined in National Register Bulletin 15 as a means of evaluating site condition and National Register eligibility. All sites in the project area have been assessed for aspects of integrity. This report supplies a table that identifies the aspects of integrity for all sites monitored this year.

The work plan for FY2002 will include the monitoring of 34 sites, monitoring and maintenance on the 28 sites with checkdams, and additional medium format photography at selected sites. We will also continue collaborating with the proposed CRF projects to ensure that archaeological sites having visitor-related impacts, and located along the river corridor, will be dealt with by Park and river runner personnel. Much of our time will also be given to the research completed to quantify the effectiveness of checkdams. This work has already begun in FY2001 and this office will continue working with the checkdam project throughout fiscal year 2002 with possible carryover into fiscal year 2003. We will continue full involvement with initiating and implementing PEP recommendations (i.e., completion of HPP, implementation of a cultural database, researching various treatment plans). Finally, we will continue our involvement with TWG and GCMRC activities.

## CHAPTER 2

### IMPACTS TO CULTURAL RESOURCES

The existence of Glen Canyon Dam may directly and indirectly threatens cultural resources located within the historic high water line (256,000 cfs). The sediment trapped behind the dam, 66 million tons annually (Collier et al. 1996), results in a reduction of sediment downstream of Glen Canyon Dam compared to predam times. The lack of beach building floods and sediment deposition creates erosional variables much different than before the emplacement of the dam. Erosion along old alluvial terraces, where many cultural remains are concentrated, has accelerated in two distinct ways. Sediment-laden floods no longer fill in ephemeral drainage systems along the predam alluvial terraces. The lowered baselevel of the main channel of the river causes drainage systems to downcut to the new baselevel as they travel to the river (Hereford 1996, Hereford, et al. 1993, Hereford, et al. 1996a). Now, drainage systems that may have been seasonally filled in are remaining exposed and are vertically downcutting through alluvial terraces (Hereford, et al. 1993).

Monitors working on the RCMP collect data related to physical and visitor-related impacts. Degree of impact is qualitatively assessed through repeat observation (monitoring) and categorized as “active” or “inactive”. Sites exhibiting active erosion are assigned a more frequent monitoring schedule, and are candidates for remedial work. Sites where erosional processes are currently inactive, receive less frequent monitoring. In FY01, 91 unique sites were monitored, ten of which were monitored twice for a total of 101 monitoring episodes. Ninety-four percent of these monitoring episodes revealed the presence of physical and/or visitor-related impacts. This is an increase of 7% compared to previous years, but within the 83% - 95% range observed over the past eight years.

The RCMP utilizes two forms of exploratory data analysis to view and present this fiscal year’s monitoring dataset based on seven physical and five visitor-related variables identified on the monitoring form (Appendix A). Frequency tables display the presence and absence of impact types as a numerical representation of the dataset in the following sections.

#### ***Physical Impacts***

The RCMP identifies seven key physical impacts that are active, or have the potential to diminish the integrity of cultural resources located along the Colorado River corridor. Physical impacts refer to erosional processes induced by dam operations, river flows, rain, wind and gravity. Glen canyon Dam operations have been proposed as the causation of several types of impacts, including surface erosion, gullying, arroyo cutting and bank slump; other influences potentially causing the same impacts have not been discounted.

Physical impact categories include the following: surface erosion, gullying, arroyo cutting, bank slump, eolian/alluvial erosion or deposition, side canyon erosion and “other”. Surface erosion consists of any and all sheetwashing, channeling or rilling from the modern surface level to a depth of ten centimeters. Gullies are channels or trenches which extend ten centimeters to one meter below the modern ground surface. Entrenched gullies can become arroyos which channel more than one meter below the surface. Bank slump refers to the deflation or collapse of alluvial sediments along gullies, arroyos or the river itself. Eolian sediments erode or are deposited by wind action, while running water directs alluvial processes. Side canyon erosion includes rain-induced flooding and debris flows from canyons draining onto terraces or into the Colorado River. Some headward movement may also be associated with side canyon erosion. The “other” category is reserved for the identification of impacts not previously defined or regularly identified by monitors such as animal caused erosion, rock spall onto features or vegetation growth unearthing cultural remains.

Of the sites monitored in FY01, ninety-two percent showed some kind of physical erosion. Active erosional processes were identified at 72% of the sites. Since FY94, surface erosion remains the most frequently observed form of physical impact. Eighty percent of the sites monitored showed the presence of surface erosion. The remaining physical impacts in rank order are: eolian/alluvial erosion or deposition (64%), gullying (59%), “other” (32%), arroyo cutting (30%), bank slump (16%), and side canyon erosion (13%). Table 1 outlines the frequencies and percentages of physical impact types.

Table 1. Frequency of Physical Impact Types.  
N = 101

Physical Impact Types	Present		Absent	
	Frequency	Percent	Frequency	Percent
Surface Erosion	81	80	20	20
Eolian/Alluvial Erosion/Deposition	65	64	36	36
Gullying	60	59	41	41
Other	32	32	69	68
Arroyo Cutting	30	30	71	70
Bank Slumpage	16	16	85	84
Side Canyon Erosion	13	13	88	87

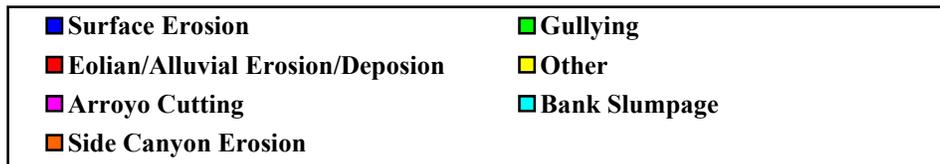
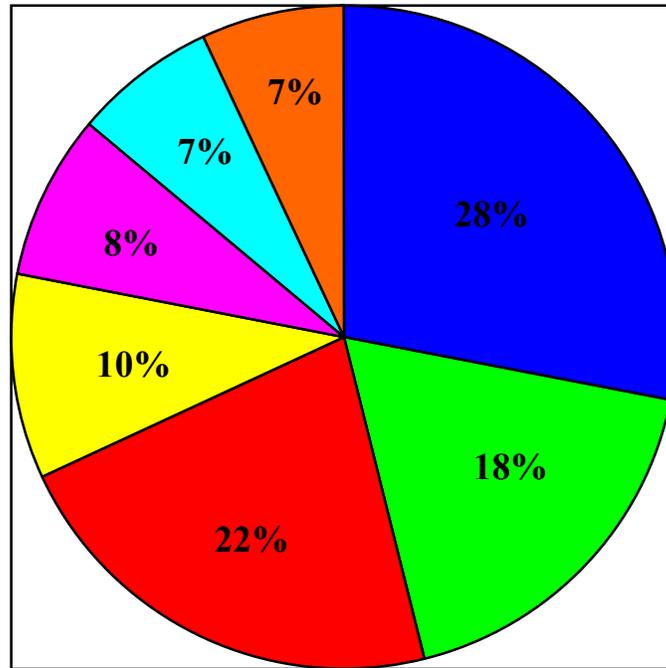


Figure 1. Relative frequency of physical impacts in FY01.  
(N = 628 Observations) (In color for final report)

Figure 1 shows the relative frequency of physical impacts (N = 628 observations). The 628 observations refer to the number of times monitors identified any form of physical impact, or each individual occurrence recorded during FY01. Surface erosion (28%), eolian/alluvial erosion or deposition (22%), and gullyng (18%) were the most frequent physical impacts observed in FY01, accounting for 68% of the 628 observations. Since FY94, surface erosion has been the most prevalent physical impact observed. It is important to understand that more than one type of physical impact may be occurring simultaneously within a site boundary or to the same cultural feature. Remedial action assessments and recommendations for treatment are grounded in the identification and understanding of how multiple physical impacts may be related.

Identification of impacts on-site aids monitors in understanding the nature and severity of the observed impacts. Locational data leads to the formulation of a ranking of impacts at sites which have been selected for remediation. Figure 2 shows the relative frequency of physical impacts to specific cultural features on-site. The highest frequency of physical impact occurs at roasters/hearths (38%), artifacts (35%), and structure/storage features (20%). These features are also the most common cultural features observed along the river corridor in Grand Canyon.

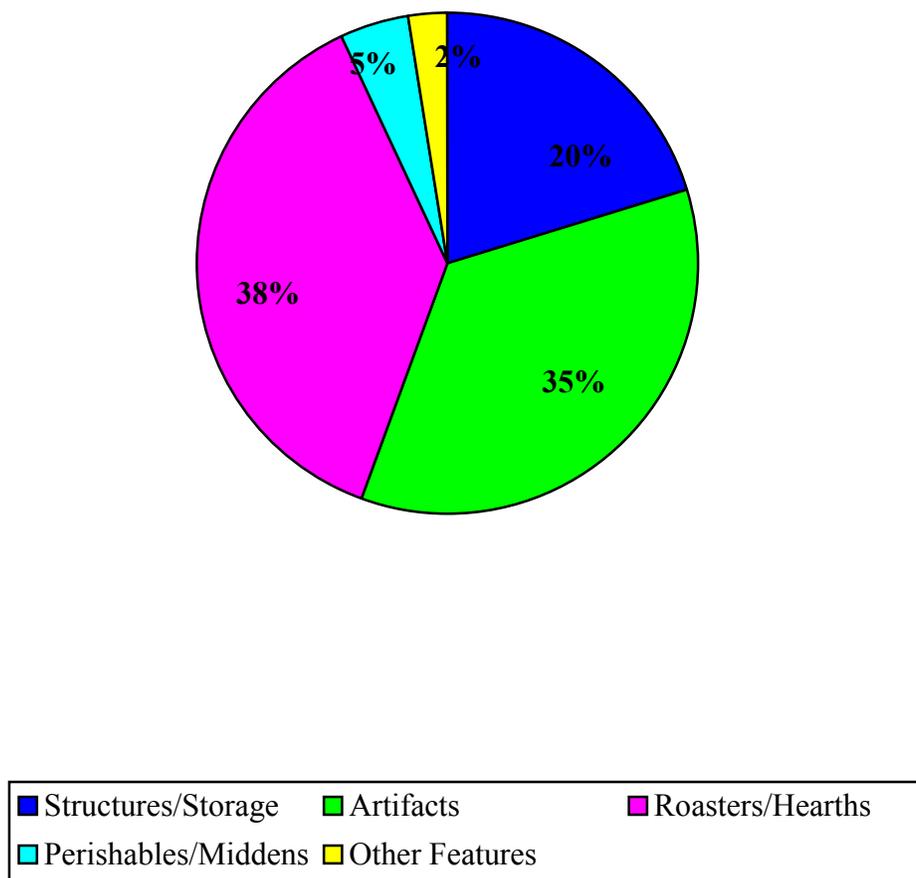


Figure 2. Physical impacts to features in FY01.  
(N = 628 observations)

Along with understanding where on-site impacts are occurring, the RCMP also identifies concentrations of impacts along the river corridor. Understanding the relationship between the location of cultural resources and the magnitude of impacts is a complex endeavor for a number of reasons. The majority of impacts observed in FY01 were identified at sites located within Reaches 5 and 10. While these locations are known to have the highest site densities along the river corridor, there are other mechanisms at work that may be exacerbating physical impacts in these locations. This may include the fact that although 70 sites have < 10 degree slope, a large percentage are located on dunes, as opposed to terrace beaches.

Reach 5 (Furnace Flats) and Reach 10 (Lower Canyon) consistently contain the highest concentrations of physical impacts along the river corridor. Reach 5 is the most open and alluviated portion of Grand Canyon. Several trails traverse from river to rim along both sides of the canyon. Eighteen percent of all the sites recorded by the project are found in this reach.

Reach 10 is characterized by several faults cross-cutting the river corridor. These faults result in a higher degree of access to the river corridor. Cultural remains can be found at nearly every side canyon drainage with an alluvial debris fan (Fairley, et al. 1994). Roasters dominate the site type in this reach.

Reaches 5 and 10 contain the highest site densities along the project area. This should be expected given the physical character of the canyon in these reaches that fostered the deposition of alluvial terraces and minimized the subsequent erosion of the same. Alluvial terraces afford the best conditions for horticultural activities and in locations where access to terraces is viable, site types should cluster in these locations. Unfortunately, due to the fragile nature of alluvial sediments, these site types are also the most vulnerable to impact. We see the greatest amount of physical impacts in Reaches 5 and 10. It is in these locations that we have been concentrating our management recommendations and remedial actions.

The lowered baselevel of the Colorado River has geometrically increased erosion in arroyos and gullies that drain to the river (Hereford, et al. 1993). When these river-based drainages impact cultural remains on their way toward the river, it is assumed that the lowered river baselevel directly affects the cultural resource. River-based drainages currently are or have the potential to directly impact the integrity of cultural resources along the river corridor. Fifty-one (50%) of the sites monitored in FY01 have river-based drainage systems.

Monitors record the presence of physical impacts and note whether impacts are currently active or inactive. This observation is achieved by looking closely at the drainage systems on-site for signs of recent run-off, water transport or active flow. The observation of active impacts may be a result of the time of year we are monitoring specific sites, or indicators of constant impact which would in turn implement remedial actions in these locations.

Active drainages may not always signal adverse effects. When sediment is transported along a drainage system, the resulting deposition may improve resources located within the drainage by increasing deposition on-site. The active designation does not infer active adverse impact. Further assessment of active impacts is necessary before remediation measures may be recommended to slow or stop further resource destruction.

Active impacts are also closely linked to the occurrence of new impacts since the last monitoring episode. If new impacts occur, this signals active erosional processes. Seventy-two (71%) of the sites monitored in FY01 experienced new physical impacts since last monitored.

### ***Visitor-Related Impacts***

Approximately five million people visit the Canyon every year, 22,000 raft the Colorado River, and 15,000 backcountry permits are issued (U.S. Department of the Interior 1998). Those who partake in a backcountry wilderness experience will most likely wander upon or intentionally visit at least one archaeological site. Some may even camp within a site due to the optimum topographic location or simply for shelter. A lack of archaeological education, curiosity, or malice, is the cause of disturbance to many sites. The project has defined these intentional or incidental disturbances as Visitor-related impacts. Specifically, these impacts are defined as trails, collection piles, on-site camping, criminal vandalism, and an "other" category.

The frequency of visitor-related impacts is presented in Table 2. Thirty-two (32%) of the 101 monitoring episodes recorded the presence of one or more visitor-related impacts. Trailing remains the most frequently identified impact with 29 occurrences in FY01. The entrenchment of trails, causing compaction, removal of vegetation and the development of rills and gullies is of concern to monitors. Monitoring comments addressing trailing often identified the presence of trails and the success of previous trail obliteration.

Table 2. Frequency of Visitor-Related Impact Types in FY01.  
N = 101

Visitor-Related Impact Types	Present	Absent
	Percent	Percent
Collection Piles	7	93
Trails	29	71
Camping on-site	4	96
Vandalism	4	96
Other	8	92

Figure 3 illustrates the relative frequency of visitor-related impacts at various features. As in past years, artifact scatters (35%), roasters/hearths (29%) and, structure/storage (21%) features receive the highest number of visitor-related disturbances. Rock art vandalism occurred on several occasions FY01 at C:02:094, where charcoal from a fire ring was used to write over the historic inscriptions. The new graffiti is most likely from fishermen due to the associated trash and proximity to Lees Ferry.

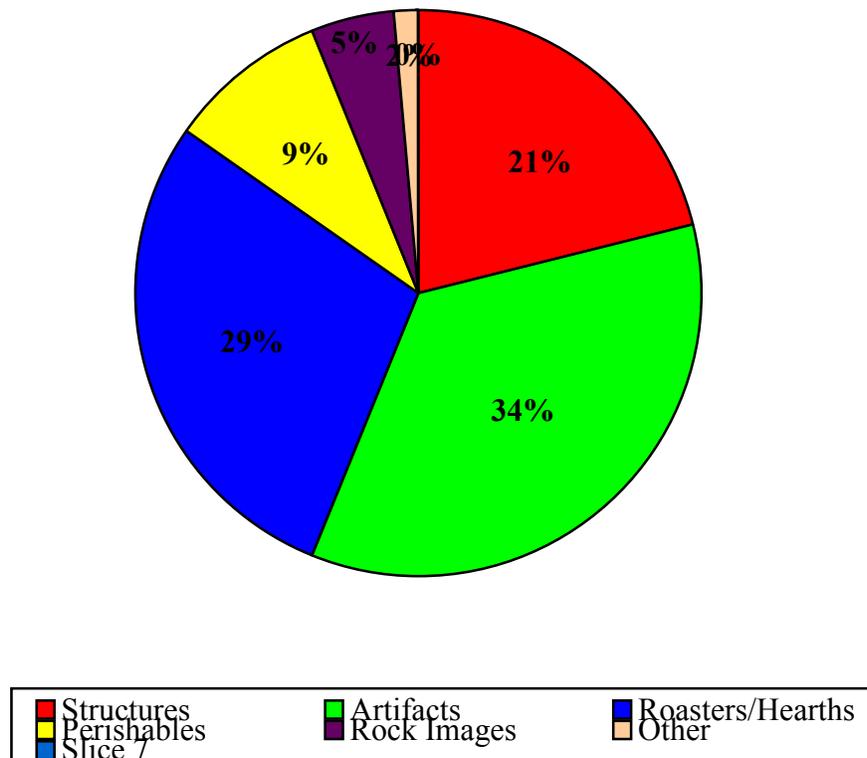


Figure 3. Visitor-related impacts to features in FY01.  
(N = 66 Observations)

Sites in Reaches 5 and 10 continue to contain the highest frequency of visitor-related impacts. In addition to these Reaches containing 45% of the sites along the river corridor, they are easily accessible from a network of backcountry trails.

The desire to collect a piece of the past or simply visit archaeological sites is evidenced by the above data. The solution to ending visitor-related disturbance is complicated at best. As cliché as it may be, education is the answer. Continued involvement with the Guides Training Trips, Colorado River Fund trips, and educational programs will pay off. When people begin to understand that archaeological sites are truly nonrenewable resources, then perhaps they will develop a sense of respect and preservation.

### ***Summary of Impacts***

Physical impacts were observed at 92% of the sites monitored in FY01. New physical impacts were observed at 71% of the sites. Active erosion was noted in 72% of the monitoring episodes this year. As in the past, surface erosion and gullyng continue to be the most frequently recorded physical impacts. Structures/Storage, Artifacts, and Roasters/Hearths received the highest frequency of Physical and Visitor-related disturbance.

Visitor-related impacts were recorded 32% of the FY01 monitoring episodes. Archaeologists observed new visitor impacts (since the last monitoring episode) in 18% of the sites. Trailing continues to be the most frequently occurring impact. One reason for this low percentage may be due to the fact that 51% of the sites monitored are on a 3-5 year schedule. Meaning low visibility, moderate to difficult access, and simply not located within popular destination spots.

Reaches 5 and 10 continue to contain the highest frequency of all types of impacts. These reaches are highly alluviated, open, and accessible. Due to these factors, they also comprise the highest site densities along the project area.

## CHAPTER 3

### INTEGRITY

#### *Aspects of Integrity and River Corridor Monitoring*

Identifying the aspects of integrity at river corridor archaeological sites eligible to the National Register of Historic Places, is seen as a means of re-evaluating and in some instances, updating site conditions. It is intended to give the reader more information on sites, their condition, and enable a connection between the description of a site, the impacts on-site and the condition the site is judged to be in. Although erosion occurs along the river corridor and sites are threatened, the presence of integrity is essentially the core of site condition and the continued monitoring of sites being impacted. Once a site loses its integrity, it may no longer be significant and thus, ineligible for monitoring under the guidelines of the Programmatic Agreement.

#### *Background and Definition of Integrity*

Integrity, as defined in National Register Bulletin 15, is the ability of a property to convey its significance (U.S. Department of the Interior 1991:44). In order for a property to be eligible for listing on the National Register of Historic Places, a property must first be significant under the National Register criteria for evaluation and the property must also have integrity. Though often subjective, evaluation of integrity must be based on understanding the physical features of a property and how they relate to the property's significance.

#### **Aspects of Integrity**

Seven unique aspects or characteristics define integrity. These aspects include location, design, setting, materials, workmanship, feeling, and association. While useful tools for defining the integrity of historic properties, many of these seven aspects of integrity are difficult to apply to properties eligible for the National Register under Criterion D; properties that have yielded, or may be likely to yield, information important in prehistory or history (U.S. Department of the Interior 1991:2). Based upon on-going discussions with project staff and other cultural resource managers, all properties eligible for nomination to the National Register under Criterion D are judged to have integrity based on all seven aspects of integrity.

Properties must contain multiple aspects of integrity to be deemed eligible for National Register status. Some of the aspects of integrity are weighted more heavily than others. For example, "feeling and perception depend on individual perceptions, their retention alone is never sufficient to support eligibility for a property to the National Register" (U.S. Department of the Interior 1991:45). For this reason, properties must contain a combination of the aspects of integrity.

Each of the seven aspects of integrity is outlined below and specific site examples are provided to explain how integrity aspects combine to actually define integrity. Examples for river corridor sites are also included to aid readers in understanding how the seven aspects of integrity are related to specific cultural resources. Some sites are illustrated more than once to aid the reader in viewing the combination of integrity aspects at particular sites.

Based on the four National Register Criteria for site significance and essential physical features, these seven aspects are judged to be present or absent. Integrity is judged present as long as a property retains the identity for which it is significant under the National Register Criteria for eligibility. Table 3 provides a listing of the aspects of integrity at all sites monitored in FY01 eligible for nomination to the National Register of Historic Places. This table outlines the criteria for significance and which aspects of integrity apply to each site. In FY99, all 264 sites were reviewed and assessed for aspects of integrity. This information can be found in Appendix B. The following sites are listed as examples of the aspects of integrity and do not necessarily represent sites monitored in FY01.

The seven aspects of integrity are as follows:

- Location
- Design
- Setting
- Materials
- Workmanship
- Feeling
- Association

**Location** refers to the place where the historic property was constructed or the place where the historic event occurred (U.S. Department of the Interior 1991:44).

The association between the site and its location enables us to understand why the site was constructed or why an event occurred. The actual location of a historic property is useful for recapturing the sense of historic events and persons. In almost all cases, the relationship between a property and its historic association(s) is lost if the property is moved. Artifacts are also assessed for their locational integrity. This is important to understanding how cultural remains relate to research questions. When viewed this way, location is directly related to association. Location also answers questions about access along and to the river corridor (U.S. Department of the Interior 1991:44).

***C:09:034 Historic Boat***

This site consists of the remains of Bert Loper's boat. On July 8, 1949, Loper died just upstream of 24 ½ mile rapid. His boat was retrieved and pulled ashore at 41 ½ mile by Don Harris. The boat has remained in-place since Harris pulled the boat to shore. The location of the boat is important because it marks the place where a well-known historic river running figure is honored. Many private and commercial boaters stop at this location to acknowledge the "Old Man of the River".

***C:09:088 Historic Structure***

This site consists of numerous artifacts and features associated with the testing of alternative locations for Marble Canyon Dam. This testing project occurred from 1942 through 1951 and represents a significant period in Bureau of Reclamation and river-running history. Artifacts and features include test shafts, platforms, cables, re-bar cemented into the limestone cliff walls, and anchor bolts. The site retains integrity of location because it stands as a place where a dam was considered for construction. The location is also important to environmentalists, river-runners and commercial passengers as a place where evidence of the proposed alteration and destruction of the river, stands as a reminder of what could have been.

***G:03:020 Roaster Complex***

This site, located on the upstream side of a major side canyon drainage, contains several fire-cracked rock features and one large, donut-shaped roaster (Feature 2). The size of Feature 2 suggests multiple use over time, making its location along the river corridor important for questions related to access and function. Charcoal, groundstone and lithics are present on and adjacent to Feature 2, suggesting that the artifacts remain in the same location as when they were abandoned.

**Design** combines the elements that create the form, plan, space, structure, and style of a property (U.S. Department of the Interior 1991:44).

Design is a reflection of the conscious decisions made about construction planning, engineering, and architecture. Design reflects functions and technologies as well as style and the spatial relationships between structures and features at a single location. Design may apply to single sites or to entire districts (U.S. Department of the Interior 1991:44).

***B:15:096 Historic Boat***

This site consists solely of the abandoned boat, the Ross Wheeler. The boat was constructed in 1914 by Bert Loper for a Grand Canyon filming project organized by Charles Silver Russell. Loper stashed the boat and abandoned the film project for BOR work. Russell hired two replacements (Reeder and Tadge) to complete the film project. Russell took the boat from its hiding place on the Green River. After losing two other boats, two crew members and much of their equipment, the boat was abandoned and the men hiked out the Bass Trail to the rim. John Waltenberg, W. W. Bass' partner winched the boat up out of the flood zone. NPS personnel moved the boat higher up from river level and chained it to the rocks where it rests today. The boat is a reflection of design and planning by Bert Loper.

***B:15:126 Small Structure***

This site consists of seven granaries, a structure and numerous artifacts along a Tapeats Sandstone overhang. The construction design of both the room and the granaries may provide information about cultural affiliation, storage and room construction. The spatial relationship between the rooms and the granaries is also reflected in the design of the features at this site.

***G:03:020 Roaster Complex***

Because the large, classic donut-shaped roasting features have not been fully investigated along the river corridor, design is important to answering research questions about construction and function. Preliminary results from testing of three roasting features along the river corridor suggest that design and construction techniques vary (Downum, in progress). The interior design of Feature 2 provides information about function, subsistence and construction. The interior design of roasting features may also provide temporal and cultural affiliation information in the future if a typology of roasters is developed.

**Setting** refers to the physical environment of a historic property (U.S. Department of the Interior 1991:45). While location refers to the specific place where a property was built or an event occurred, setting refers to the character of the place in which the property played its historical role (U.S. Department of the Interior 1991:45).

Setting may reflect the physical conditions of a property and be either natural or manmade. Setting includes all topographic features, vegetation, manmade structures and the relationships between structures and other features or open space. Setting elements include landscape features, vegetation, manmade features and the relationship between buildings, features and open space. Because the river corridor is a unique setting, integrity of setting is considered present for all sites within the area of potential effect for dam operations (U.S. Department of the Interior 1991:45).

***C:09:088 Historic Structure***

The talus cones from test drilling, spray painted numbers along the Redwall Limestone walls, cables and ferry boats all combine to provide a distinct setting of historic dam testing and construction. The site retains integrity of setting because the combination of historic artifacts and the narrow, Redwall Limestone cliff faces invoke a direct relationship between topographic features and manmade attempts to alter the natural terrain.

***C:13:009 Pueblo***

This site consists of 24 structural and nonstructural features located on an alluvial terrace overlooking a meander cusp and vegetated island, bordered by a side canyon drainage. Setting at this site is important because the physical conditions create a boundary around the site area. Setting is also reflected in the relationship between the habitation and storage structures on-site as well as water diversion structures located within the site boundary.

***C:13:385 Small Structure***

Two slab-lined features and an extensive artifact concentration of ceramics and lithics overlook a cobble island. There are several other sites, including a large, multi-room habitation site visible from this area. The setting of C:13:385 is important because of the spatial relationship between this site and the others in the area, and because of the visibility of sites both upstream and downstream and across the river from this site.

**Materials** are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property (U.S. Department of the Interior 1991:45).

Choice of materials reflects availability of resources relating to both subsistence and technology and may also be temporal indicators when assessed in the case of lithics or ceramics. Structures must contain the key exterior materials with which they were originally constructed and be historic in nature rather than constructed to reflect a historic event.

***A:15:018 Rock Art***

This aceramic rockshelter site contains groundstone, a fire feature with charcoal and flakes, and several pictograph panels. The pictographs have been executed in both hematite and charcoal. The materials used to create the pictographs may reveal temporal information and may be sourced, providing information about the location of the hematite used to create the rock images at this site.

***C:13:010 Pueblo***

This site is a large, multi-component habitation site. There are numerous structures, hearths, and cists, as well as a wide range of artifact types and temporal indicators. Materials include imported obsidian flakes and locally procured clays to produce local varieties of both Shinarump Corrugated and Deadmans Gray vessels. Whether or not materials were imported or locally gathered may reveal information regarding cultural affiliation, and temporal implications, and may provide insight into trade and exchange territories. Materials used in the construction of habitation blocks, cists and hearths also reflect availability of local resources.

***G:03:020 Roaster Complex***

In addition to location, design and setting, the materials used in the construction of Feature 2, the large donut-shaped roasting feature, are important to answering research questions about how prehistoric people utilized materials, both local and imported, in design and construction. The materials used at Feature 2 may answer questions about technology, feature function and may also reflect cultural affiliation.

**Workmanship** is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory (U.S. Department of the Interior 1991:45).

This includes evidence of an artisan's labor or ability and may apply to structures, objects, rock images or entire sites. Workmanship reflects technologies, illustrates aesthetic principles or a time period and reveals individual, local or regional techniques or traditions (U.S. Department of the Interior 1991:45). Examples include diagnostic indicators such as ceramics and projectile points. Workmanship answers research questions related to construction, style and technology.

***A:15:018 Rock Art***

The pictographs at this location are evidence of an artisan's labor. The pictographs have been executed in both hematite and charcoal. The pictograph panels also reflect the aesthetic principles and may be related to individual or regional stylistic markers.

***B:15:096 Other***

This site is the abandoned boat the Ross Wheeler. The boat was constructed on sheets of tin by Bert Loper for a Grand Canyon filming project. The construction of the boat is a direct reflection of workmanship utilized specifically for the environment of the Grand Canyon. While the original backer of the project did not approve of Loper's design, he later commandeered the Ross Wheeler from a hiding place on the Green River and used it to transport equipment and men downstream. The boat was abandoned only because the spirit of the men was broken.

***G:03:020 Roaster Complex***

The workmanship reflected in Feature 2 may reveal information related to individual or community methods of construction. Workmanship answers research questions related to technology, function, and cultural affiliation. Because the design and workmanship of the features at this site are all unique from one another, it is possible that investigating workmanship may lead to understanding differing temporal events.

**Feeling** represents a property's expression of the aesthetic or historic sense of a particular period of time (U.S. Department of the Interior 1991:45).

Feeling results from the presence of a combination of physical features which together, convey the property's character. (U.S. Department of the Interior 1991:45). Working along the river corridor in Grand Canyon, it's difficult not to experience a sense for prehistoric agricultural communities, tribal spiritual life, or historic mountain men running away to the great open west. All elements of Grand Canyon combine to evoke this perception of the past. Because of this, feeling was not considered as an aspect of integrity in Table 3. This is not to say that it doesn't exist because it does at nearly every river corridor site, but rather that it is more difficult to observe within site descriptions and monitoring data forms.

***B:15:097 Artifact Scatter***

This site represents the remnants of the trans-Canyon cableway built by W. W. Bass at the turn of the century. Congress, in 1904, sanctioned the crossing to supplement Bass' ferry and enhance tourism and scientific access to the North Rim. Though the cables were cut by the NPS in 1971, they are still visible in a Schist outcrop and the cable cage remains on the rock outcrop. Across river, there is a platform and many historic artifacts related to the operation of the cableway. The site, with its view of the trail built by Bass from North Rim to South Rim, invokes a feeling of the beginning of the tourist industry in Grand Canyon in the late 1890s and early 1900s.

***C:09:088 Historic Structure***

The talus cones from test drilling, spray painted numbers along the Redwall Limestone walls, cables, ferry boats, and wooden planking suspended along the cliff face, combine with the narrow, Redwall Limestone walls, invoke a feeling of the historic sense of the period in history when the Bureau of Reclamation was actively pursuing the construction of dams for power generation and water storage in the 1940s and 1950s.

***C:13:003 Other***

This site consists of two main areas where abundant salt within shallow alcoves has been mined by Native Americans for many generations. Along the northern portion of the site there are 25 to 30 hematite pictograph elements. There is also a long sandstone slab with four shallow ground, basins along one side. The site characterizes feeling for many reasons, primarily because of the importance of resource procurement by indigenous peoples and the cultural traditions set forth by their ancestors still carried out here today.

**Association** is the direct link between an important historic event or person and a historic property (U.S. Department of the Interior 1991:45).

Like feeling, association requires the presence of physical features that convey a property's historic character. A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey the relationship to an observer (U.S. Department of the Interior 1991:45). Examples include all properties associated with historic mining, dam construction, and transportation. Also included are materials found in association with features that may reveal information about subsistence, function or technology (AZ SHPO Personal communication, 1999).

***A:15:018 Rock Art***

The style of the pictographs at this location is evidence of an artisan's labor. The materials used include both hematite and charcoal. Charcoal found in association with the pictograph panels may provide solid dates for the site's occupation. Association is present at this site because of the combination of the pictographs and datable material (charcoal) located in the shelter with the rock images.

***B:15:097 Artifact Scatter***

The remnants of W. W. Bass' cable crossing are found in association with many other historic artifacts. There is evidence of the people who worked directly at the cable crossing and there are historic artifacts spread across the area. Artifacts found in association with the cable crossing can be used to relatively date use in the area by turn of the century tourists, scientists and miners.

***G:03:020 Roaster Complex***

Artifacts such as charcoal, lithics and groundstone, as well as faunal and ethnobotanical remains found in and on Feature 2, are important for answering research questions about subsistence, technology, and function. While artifacts themselves provide valuable information about materials, design and workmanship, artifacts found in association with features provide additional information that can be used to more clearly understand both the artifacts and the features themselves.

**Results*****How Dam Operations Affect Aspects of Integrity***

Operations of Glen Canyon Dam result in a multitude of effects, both directly and indirectly altering integrity of archaeological remains. The seven aspects of integrity are affected differently by dam operations, though both daily and cumulative effects can result in deteriorating integrity. While the aspects of integrity respond differently to the dam, in the absence of preservation and recovery options, the end result is the same—a possible loss of overall site integrity. Loss of integrity renders properties ineligible for National Register status.

***Location***

Locational integrity is threatened when artifacts, features or entire structures move across the landscape because of artificially accelerated erosional factors. The association between a location and the artifact, feature, or structure is lost when these items are removed or dislocated from their original location.

***Design***

Dam operations alter integrity of design on two levels. On the artifact level, scouring of design surfaces could lead to a loss of information related to cultural and temporal affiliation. Features or structures that are components of larger sites may suffer a loss of integrity of design when spatial relationships between features or structures are lost.

***Setting***

Integrity of setting has been affected by both the existence and operation of Glen Canyon Dam. The riverine environment, substantially altered from its predam status, has experienced the introduction of exotic plant and animal species. In some instances, these exotic plants and animals have altered the setting of predam cultural remains along the river corridor.

***Materials***

Integrity of materials is threatened by dam operations when the physical remains of historic and prehistoric peoples are dispersed or unearthed. The exterior features of structures may also be threatened due to fluctuating flows or sediment loss.

***Workmanship***

Integrity of workmanship is threatened when the physical evidence of a culture's labor is destroyed. Technologies, aesthetic principles, temporal, and cultural affiliations may be lost when workmanship is lost.

***Feeling***

Because integrity of feeling relates to individual perceptions, it is unlikely that feeling would be altered by dam operations. Traditional Cultural Places have historically not been altered by changing the immediate environment.

***Association***

A loss of the integrity of association occurs when dam operations alter or remove the physical remains which convey a property's character. Dam operations alter integrity of association for structures and features by destroying the essence of a historic event or activity, rendering it invisible to an observer. Integrity of association is also threatened by dam operations when physical materials, for example perishables, are removed from their original depositional context. This type of loss of association results in inaccurate or unavailable data for some feature types and functions.

***Methods***

Aspects of Integrity for river corridor sites were based on definitions outlined in National Register Bulletin 15 (U.S. Department of the Interior 1991), consultation with the AZ SHPO (personal communication, 1999) and river corridor site IMACs forms and monitoring data. The site descriptions, including features and materials were used as the foundation for determining the presence or absence of any of the seven aspects of integrity. Long-term monitoring data were then compared to see if any of the aspects of integrity had been removed through time due to physical or visitor-related impacts.

Although monitoring data show impacts to river corridor sites through time, none of the sites monitored in FY01 have had any loss of integrity due to the operations of Glen Canyon Dam. All 91 sites retain the aspects of integrity that make them significant sites and thus eligible for the National Register of Historic Places. Table 3 lists all sites monitored in FY01, aspects of integrity, and criterion for National Register eligibility. Although TCPs can be associated with both important events and important people in tribal histories, it is at the discretion of individual tribes to make that distinction.

Table 3. Aspects of Integrity and National Register Criterion for Eligibility for sites monitored in FY01.

Site	Property Type	Criterion	Location	Design	Setting	Materials	Workmanship	Association
A:15:003	RoastComp	A	Yes	Yes	Yes	Yes	Yes	Yes
A:15:021	RoastFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
A:15:025	Other	A, C, D	Yes	Yes	Yes	Yes	Yes	Yes
A:15:031	ThermFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
A:15:032	ThermFeat	A, D	Yes	No	Yes	Yes	No	No
A:15:033	ThermFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
A:15:035	RoastFeat	D	Yes	No	Yes	Yes	No	Yes
A:15:039	RoastComp	A, D	Yes	No	Yes	Yes	No	Yes
A:16:149	ThermFeat	D	Yes	No	Yes	Yes	No	Yes
A:16:174	RoastFeat	A, D	Yes	Yes	Yes	Yes	No	Yes
A:16:175	ThermFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
A:16:176	RoastFeat	D	Yes	Yes	Yes	Yes	Yes	Yes
A:16:185	Other	A, D	Yes	Yes	Yes	Yes	Yes	Yes
B:09:316	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
B:09:317	RoastFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
B:10:111	RoastComp	D	Yes	No	No	Yes	No	Yes
B:11:277	ThermFeat	A, D	Yes	No	Yes	Yes	Yes	Yes
B:11:281	ThermFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
B:14:108	ArtiScat	D	Yes	Yes	Yes	Yes	No	Yes
B:15:120	SmStruc	A	Yes	No	Yes	No	No	No
B:15:128	ArtiScat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
B:15:138	ThermFeat	D	Yes	Yes	Yes	Yes	Yes	Yes
C:02:092	ArtiScat	D	Yes	No	Yes	Yes	Yes	Yes
C:02:094	HistStruc	A, B, C, D	Yes	Yes	Yes	Yes	Yes	Yes
C:02:096	MultiComp	A, D	Yes	Yes	Yes	Yes	No	Yes
C:02:098	ArtiScat	D	Yes	No	Yes	No	No	Yes
C:05:031	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:09:050	Other	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:09:051	Pueblo	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:09:053	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:09:065	HistStruc	A	Yes	Yes	Yes	Yes	Yes	Yes
C:09:068	ArtiScat	A, D	Yes	No	Yes	Yes	No	Yes
C:13:006	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:009	Pueblo	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:010	Pueblo	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:069	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:070	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:098	HistStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:099	MultiComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:100	Pueblo	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:272	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:273	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:291	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:321	RoastFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:323	ThermFeat	A, D	Yes	No	Yes	Yes	No	Yes
C:13:325	RoastFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:327	RoastFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes

Site	Property Type	Criterion	Location	Design	Setting	Materials	Workmanship	Association
C:13:329	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:334	MultiComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:337	RoastFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:338	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:339	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:343	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:346	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:347	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:348	ArtiScat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:349	HistStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:355	RoastFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:359	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:365	SmStruc	D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:371	MultiComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:373	ThermFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:385	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:386	SmStruc	A, D	Yes	Yes	Yes	Yes	Yes	Yes
C:13:389	MultiComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:002	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:003	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:004	RoastComp	A, B, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:006	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:020	RoastComp	D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:024	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:025	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:026	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:028	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:029	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:032	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:034	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:037	ArtiScat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:038	ThermFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:040	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:041	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:056	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:058	RoastFeat	D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:060	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:064	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:067	RoastFeat	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:072	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:073	RoastComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:076	RoastFeat	D	Yes	Yes	Yes	Yes	Yes	Yes
G:03:080	MultiComp	A, D	Yes	Yes	Yes	Yes	Yes	Yes

## CHAPTER 4

### CHECKDAM WORK

The first river trip of the fiscal year focussed on monitoring and maintenance work at all sites with checkdams. In October, 2000 the RCMP monitoring staff and Zuni Conservation Project member Gabriel Yuselew visited the 28 archaeological sites containing checkdams or water diversion structures designed to preserve, in place, archaeological remains vulnerable to exposure in drainages downcutting predam alluvial terraces. At the close of FY2000, 291 checkdams existed along the river corridor. The main drainage at one location, G:03:038, was completely blown out, destroying 23 checkdams. It was the determination of the Zuni Conservation Project with concurrence from Fred Nials, that these checks not be rebuilt. Subtracting the 23 checkdams at G:03:038 that will no longer receive maintenance work leaves us with a total of 268 checkdams. Sixty-two (23%) of the 268 checkdams required some kind of maintenance work. Ninety-six buckets of rock and 27 buckets of gravel were transported from nearby side canyons and cobble bars to fill in or enlarge existing checkdams. Appendix C contains a listing of all sites where checkdam maintenance occurred, either alteration or repair, and a description of the work.

As a means of complementing the checkdam evaluation work being conducted by the GCMRC, and with the assistance of Fred Nials, geoarchaeologist, cross-sections were drawn at eight locations. Seven locations are in drainages containing checkdams and one at G:03:020 where checkdams do not exist. It is the intention of RCMP staff that the points used for the cross section be mapped in with a total station instrument and that annual measurements be taken to determine the volume of deposition or erosion occurring in these seven locations. Beginning in FY02, quantitative results of these cross sections will be provided in annual reports. This work will also supplement checkdam research conducted through the GCMRC.

#### Monitoring and Maintenance

##### ***A:15:005- 5 Checkdams***

The checkdams are holding steady and there is collection of sediments behind and within the two checkdams and three rock linings. No work was necessary.

##### ***A:16:149- 7 Checkdams***

No work was necessary.

##### ***A:16:174- 8 Checkdams***

A total of 10 buckets of rock was used between Checkdams 3 and 4. Baseball cobbles were lined up to a depth of 15cm. Checkdams 3 and 4 are now joined to form one checkdam. At checkdams 6, 7, & 8 the nick points were filled in with gravels and now these three checkdams are joined into one checkdam.

##### ***A:16:180- 7 Checkdams***

Twelve buckets of rock were used to reinforce existing checkdams 2, 4 and 5. A rock lining was created and a new checkdam, Checkdam 7 was constructed. Checkdam 7 consists of an alignment of large rock in the artifact scatter area.

##### ***B:14:107- 1 Water diversion structure***

Along the western end of the structure, rocks were rearranged and gravels were moved closer to the structure.

##### ***C:02:101- 17 Checkdams***

Checkdams 5, 6, 9, 10, 15, and 16 required 17 buckets of rock and gravels to fill in nick points and redefine rock linings along the drainage floor.

***C:09:050- 1 Water diversion structure***

No work is necessary. Little Nankoweap Creek is undercutting the upstream side but there is really nothing that can be done.

***C:13:006- 14 Checkdams***

Maintenance was required at Checkdam 3 and two new rock linings were constructed. Five and one-half buckets of rock were used.

***C:13:069- 6 Checkdams***

No work was necessary. A lot of sediment deposition has occurred especially at Checkdams 2, 3, and 4.

***C:13:099- 46 Checkdams and 3 Cross sections***

Minor maintenance occurred at five checkdams and one new rock lining was added. Two and one-half buckets of gravels and cobbles were used for the maintenance work and two buckets of gravel were used for the rock lining.

Cross sections were placed at Checkdams 10 and 13 and an additional cross section in the drainage below Checkdam 35N.

***C:13:100- 26 Checkdams***

A single bucket of gravel and cobbles was added to the downstream side of Checkdam 5, a log checkdam, to fill in a plunge pool.

***C:13:327- 3 Checkdams***

No maintenance work was needed. Two new checkdams were completed, numbers 4 and 5. Checkdams 1 and 2 are covered with sand due to eolian deposition. Checkdam 3 has some deposition and appears to be holding up well. Checkdam 4 is a single course structure running perpendicular to the arroyo. Checkdam 5 is another rock alignment and abuts perpendicularly to Checkdam 3. Seven buckets of cobbles and gravels were used in the construction of the two new alignments.

***C:13:336- 5 Checkdams***

These five checkdams were in great condition. An experiment was conducted at this location, building up the four existing checkdams (Checkdam 5 is a nick point treatment). Six buckets of Cardenas Basalt was used to build up the checkdams to see if they could hold more sediment.

***C:13:346- 9 Checkdams***

No work was needed. Lots of new vegetation has grown between Checkdams 2 and 4. A significant amount of sediment is building up between Checkdams 1 and 2, 5, 6, and 9.

***C:13:348- 5 Checkdams***

No work was needed. Most of the sediment is trapped behind Checkdam 3. All other checkdams are working well.

***C:13:359- 4 Checkdams***

The drainage has been active. There is debris present such as mesquite duff. The area around the drainage is hard pan, capped with cryptogamic soils. Only minor amounts of sediments have accumulated in the checkdams. No work was needed.

***C:13:371- 3 Checkdams***

No water has drained through this gully. The checkdams are unchanged and no maintenance work was necessary.

***C:13:381- 3 Checkdams***

The drainage has been active, moving debris, sediments, and rock downstream. Checkdam 3 has a lot of sediments built up behind it. Checkdams 2 and 3 have each had minor breaching of the downstream portions of each checkdam.

Burned bone and ashy soil is exposed between Checkdams 2 and 3. A new checkdam (4) was constructed to curtail active erosion near the feature. Two buckets of cobbles, 26 large rocks, and one bucket of gravel were used to construct Checkdam 4.

***G:03:002- 5 Checkdams***

Checkdam 1 has experienced minor headcut advancement and four buckets of small granite were added to the upstream side of the checkdam. Rocks were rearranged and logs placed in the area of Checkdam 2 to treat a two meter deep nick point.

***G:03:003- 11 Checkdams and 3 Cross sections***

There were nick points present between several of the checkdams and so the spaces between the checkdams were filled in to create a rock lining. Checkdams 10, 11, and 12 have been combined into one checkdam. A nick point intersecting the drainage from the north between Checkdams 11 and 12 was filled in. The area above Checkdam 9 was filled to the checkdam and several buckets were added to Checkdam 4. A new checkdam, Checkdam 14 was created with large limestone rocks between Checkdams 9 and 12.

Three cross sections were placed in the drainage between Checkdams 9 and 14. The profiles are evenly spaced and at different meanders in the drainage.

***G:03:024- 14 Checkdams***

The lower drainage was very active, the headcut did not advance but deepened substantially at Checkdam 14. Checkdam 4 collapsed and was undermined. Checkdam 11 was blown downstream. No work was done at Checkdam 11. Checkdams 4 and 14 required 9 buckets of rock and 2 buckets of gravels. In the gully adjacent to Feature 3, six checkdams were constructed, each consisting of a single bucket of granite rock and a small amount of gravels.

***G:03:025- 3 Checkdams***

The drainage was thick with clay and silt and was still damp from rain two days prior to our visit. Twelve buckets of rock and four buckets of gravel were used to fill in the breaching of the checkdams. The nick point between Checkdams 1 and 2 also required filling.

***G:03:026- 5 Checkdams***

The drainage has been very active with several large nick points and plunge pools. Eight buckets of large rock were added to the five existing checkdams.

***G:03:038- 23 Checkdams***

These checkdams have received maintenance every year since they were installed. No further checkdam maintenance work will be done at this site. Other preservation methods may be implemented at this location. Data recovery may be completed.

***G:03:040- 2 Checkdams and two Cross sections***

A lot of silt has filled in the area between Checkdams 3 and 4. The brush checkdams look very good. Grasses have grown in through the brush. No additional work was required.

Two cross sections were placed, one on either side of Checkdam 3 to determine the amount of sediment deposited by the brush checkdams.

***G:03:041- 9 Checkdams***

Several drainages on-site have been extremely active. The drainage at Feature 3 is entrenched below Checkdam 5 and work was completed here and at Checkdams 6, 7, 8, and 9. Eight buckets of rock were used. Checkdams 6 - 9 were obliterated and two checkdams (6 and 8) were reconstructed. A small plunge pool at the base of Checkdam 1 should be assessed upon the next maintenance and monitoring episode.

***G:03:058- 6 Checkdams***

No work was necessary. Sediments are filling in behind the reconstructed checkdams.

***G:03:072-16 Checkdams***

One and one-half buckets of gravel were sifted through Checkdam 16 to fill in some voids. No other maintenance work was required.

### **Checkdam Installation Recommendations for FY2001**

Regular monitoring activities included the identification of sites where new or additional checkdams would be beneficial to site preservation. The input of Fred Nials reinforced our current understanding of the types of checkdams which successfully trap sediment without causing further channel downcutting.

While maintenance work will continue in FY2002, the River Corridor Monitoring Project intends to wait for the results of the remote sensing project before conducting additional checkdam construction in new locations. The following sites have been recommended for checkdam installation or further maintenance.

***A:16:149***

Fred Nials (Personal communication, 2001) recommends lining the drainage at Features 1 and 2 with cobbles and also filling in the nick point. The checkdams should be larger structures with built up sides. Due to overall stability through time, the schedule at this site was changed from 3-5 year to inactive. The checkdam recommendation will not likely be priority because there are several sites in worse condition that require more immediate attention.

***A:16:174***

Additional checkdam construction is recommended at this location by F. Nials (Personal communications, 2001). A small checkdam should be placed in front of the shelter at the existing nick points. It is also recommended that the developing gully be lined. Further checkdam maintenance will be completed here in FY2002.

***A:16:175***

The monitoring staff recommend placing a small checkdam in the gully bisecting Feature 6. The monitoring schedule was increased from 3-5 year to biennial due to gullying and visitation.

***C:13:329***

The gully at Feature 2 is substantially down cut since last monitored. If there is a widening or later movement, more cultural material may be exposed. It is recommended that the Zuni Conservation Project members assess this location for checkdam installation.

***G:03:034***

An arroyo cuts directly through Feature 9. An assessment will be made to determine if checkdams should be constructed here to prevent further loss of the feature and exposure of more cultural remains.

***G:03:056***

Gullying at Features 1 and 3 are active and increasing. Gullying is exposing cultural material at Feature 1 and if preservation treatment is not conducted, data recovery will be necessary.

***G:03:076***

Gullying is impacting Feature 2. Checkdam in this gully may help slow down the loss of cultural materials. The gully has also downcut to one meter, becoming an arroyo that steeply drains into the Colorado River.

### **Conclusions**

The effectiveness of the checkdams as a preservation option has been questioned since implementation of this method following the BOR sponsored workshop in 1994. It is the understanding of RCMP staff that the primary objection is not whether or not checkdams are working, but a lack of quantitative data. The RCMP staff and Zuni Conservation Project members would not be investing as much time and effort into this preservation option if we did not feel it was appropriate. To date, no other preservation technique has been identified that is similarly as cost-effective, of low impact to the environment, and requires such minimal maintenance.

Participation by Fred Nials on the spring monitoring trip allowed RCMP archaeologists to show checkdam work and to receive input from a trained geoarchaeologist with no ties to the project or the agencies. In no case did Mr. Nials say that the checkdams in use were inappropriate to the drainages they were viewed in. In fact, in most instances Mr. Nials suggested additional checkdams to curtail further sediment loss (personal communication, 2001). With the assistance of Mr. Nials, cross-sections were also placed in a series of drainages both with and without checkdams. These cross-sections are intended to provide supplemental data on drainage development and growth.

RCMP staff members eagerly await the outcome of the GCMRC sponsored research project for remote sensing as a method for monitoring and an investigation into the effectiveness of the checkdams constructed along the river corridor since 1995. It is the understanding of the project staff that this research will provide geomorphic and hydrologic information on gullying and to enable us to improve mitigation measures (Pederson 2001).

## CHAPTER 5

As identified within the Programmatic Agreement, the MRAP calls for monitoring historic properties within the area of potential effect and the implementation of remedial actions for treating sites subject to impact (U.S. Department of the Interior, et al. 1994). The following chapter details all sites monitored in FY01. Each site retains aspects of integrity and is National Register eligible.

In addition to site descriptions, previous work, and monitoring recommendations, we have also included individual site maps. These maps have been revised from the original survey maps to include additional features identified and highlight the areas of impact identified during monitoring activities. Specific remedial actions recommended are further discussed in Chapter 6 with additional maps in the subsequent appendices. Appendices D-G are all site maps and provided as a separate document to aid in viewing site history and monitoring data and maps simultaneously.

### SITE SPECIFIC MONITORING RECOMMENDATIONS

#### **A:15:003 Roaster Complex Three Year Schedule**

This is a multi-component site with a PII Virgin occupation, and later Pai and/or Paiute and late historic Anglo or Pai affiliations. It consists of two loci (A and B). Locus A occupies a sandy terrace at the base of a Muav cliff face and talus slopes below. There are numerous roasting pits in this area, suggesting that this was a major activity focus. Historic and modern (post 1950s) material is present, and protohistoric (Pai and or Paiute) use of the area is suggested by the recent appearance of charcoal on the ground surface. Locus B consists of three feature areas. Feature 1 is an overhang shelter at the base of the Muav that was used by PII Virgin peoples. A midden downslope contains 1930s-era trash as well as flakes, sherds, and charcoal. Features 2 and 3 are around the bend of the Muav cliff face. Feature 2 is a cleared area with flakes and charcoal and a boot heel. Feature 3 is another cleared area with stacked rocks. According to Fred Nials (personal communication, 2001), the 1983 high flows reduced the terrace substantially. Rocks on the surface are from rock fall, not a debris flow. Deep deposits are unlikely at this location. There is no indication of significant erosion on the terrace though some deflation is occurring. Vegetation indicates sand is being transported across the surface rather than being removed completely.

#### ***Previous Work***

The site was originally recorded by R. Euler in 1978 and incorporated into the river corridor sample in 1990 (Fairley, et al. 1994). RCMP archaeologists monitored the site in FY93, FY94, FY96 and FY98 (Coder, et al. 1994b, Coder, et al. 1995a, Leap, et al. 1996b, Leap, et al. 1998d) and to date have yet to perform any remedial activities. Allen Gellis (USGS, Albuquerque, NM) termed the erosion at this site as “minor” with “no distinct drainages on slope, colluvium, or talus” (Gellis 1994). Between 1994 and 1998, very distinct drainages have been created.

#### ***Monitoring Recommendations***

The site is unchanged since last monitored in FY98. No new sign of physical or visitor-related impacts were observed. The monitoring schedule has been reduced from biennial to every three years.

#### **A:15:021 Roasting Feature Three Year Schedule**

A:15:021 is a late prehistoric-early historic Paiute site, with a later historic component, consisting of an 80% intact slab/block-lined fire feature with most of its fill still remaining. In association or nearby is a finely-worked, obsidian Desert Side-Notched point, several sherds from a single Paiute Brown Ware jar, and a recent historic can scatter. The cans are from the latter end of the 1920-1950 period and possibly have a Hualapai affinity. A single bone shirt button is also present. The prehistoric component is centered on the top of a stabilized dune; the cans and sherds are scattered over a limestone bench area adjacent the upstream terminus of the dune.

#### ***Previous Work***

The site was initially recorded in November 1990 by NPS survey personnel (Fairley, et al. 1994), and monitored by RCMP staff in FY94, FY95, and FY99 (Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 2000a). W. Hurley, BOR

Archaeologist, mapped the site with a total station in FY95 (Coder, et al. 1995b). Further detailed mapping is needed to complete the Hurley map.

***Monitoring Recommendations***

Only minor erosion has occurred since the last monitoring episode in 1998. The roasting feature first recorded in 1995 has minor rilling and sheet wash. No sign of human disturbance was noted. Continue monitoring every three years.

**A:15:025 Special Activity Locus  
Five Year Schedule**

A:15:025 is a hematite mine that was the site of prehistoric and late historic mineral procurement. The Hualapai and Paiute most likely traded the pigment, obtained and processed at this location, all over the region. GRCA archaeologists also recorded a Pueblo I-early Pueblo II Virgin component. It is possible that the fire-cracked rock on the slope below the mine is a result of the lava flow baking the limestone cobbles (F. Nials, personal communication, 2001). Although Native Americans visited the site into late historic times, it has remained dormant most of the 20th century. Presently, PA members (tribes) obtain small amounts of the pigment for ceremonial use.

***Previous Work***

Archaeologists officially recorded A:15:025 in November 1990 (Fairley, et al. 1994). RCMP staff monitored the site in FY93, FY94, and FY95 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b). No remedial actions were recommended for the site. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000).

***Monitoring Recommendations***

There is a trail leading to the site. Two large boulders in the wash have hematite on them and people have ground up portions of hematite on these boulders. Someone has also ground hematite on-site. Rodent activity and several drainages from the bench above the site are actively removing sediments in several locations creating gullies. It is recommend that a carbon sample be collected from the charred remains within the fire-cracked rock before it is totally washed out from the drip line above. This may be the only way to determine if the fire-cracked rock and ashy soils on site are culturally derived. Consult with PA Tribal members before any management actions are taken. Continue monitoring every five years.

***Hualapai Tribal Information, June 2001 River Trip***

Loretta Jackson discussed traditional use of this area and how the trading relationships between the Hualapai and other tribes in the area were only historically severed (personal communication, 2001). The importance of this location along the river corridor led to the discussion of an inter-tribal conflict resolution mechanism that may be appropriate to include in tribal consultation agreements to be written by all tribal PA members.

**A:15:031 Thermal Feature  
Inactive Schedule**

A:15:031 is a Virgin site consisting of four distinct concentrations of fire-cracked rock, a sherd and lithic scatter with Moapa Gray Ware sherds and an activity area delineated by a circular rock alignment with the presence of at least three metates and several manos. The site is located along the base of a Muav limestone cliff. A dense growth of mesquite, arrowweed and tamarisk separate the site from the river.

***Previous Work***

This site was recorded in January 1991 (Fairley, et al. 1994), and was monitored in FY92 and FY95 (Coder, et al. 1995b, Coder, et al. 1994a). A total station map was completed in FY96 (Leap, et al. 1996b).

***Monitoring Recommendations***

Although the location of these features seems precarious, no changes have been observed on-site through several monitoring episodes. Because of the stability of the site through time, it is recommended that this site be moved from a five year monitoring schedule to the inactive schedule.

**A:15:032 Thermal Feature  
Five Year Schedule**

This Pai site consists of a small concentration of fire-cracked rock with charcoal, a cleared depression, and Lower Colorado Buff Ware and Aquarius Brown ceramics. The thermal feature is 90 cm in diameter and comprised of fist-sized chunks of limestone and sandstone. One large sandstone slab is present next to this feature. Adjacent to the thermal feature is a cleared depression that may have been a habitation space for a wickiup. A clearing in the mesquite, 15 meters south of the thermal feature, contains a concentration of ceramics and a large limestone slab. The ceramics are from at least two separate vessels. No lithics are present on-site. Cultural affiliation is unknown. The site is located on a highly dissected alluvial terrace.

***Previous Work***

The site was initially recorded by NPS project personnel in November, 1990 (Fairley, et al. 1994) and monitored for the first time in September, 1994 (Coder, et al. 1995a). A total station map was completed at this location in FY96 (Leap, et al. 1996b) anticipating preservation work.

***Monitoring Recommendations***

Drainages on both sides of the site are active but do not appear to be impacting the features. No human disturbances were noted. The site appears very stable, continue monitoring every five years.

**A:15:033 Thermal Feature  
Four Year Schedule**

This site is a thermal feature situated on a stabilized dune. Artifacts reflect occupations by Puebloan and Pai (Cerbat) people. A few cans from the first half of the 20<sup>th</sup> century are also present on the surface. In FY96 archaeologists identified a pot break, and in FY97 during total station mapping, a wickiup ring was recorded.

***Previous Work***

The site was initially recorded by NPS survey personnel in February 1991 (Fairley, et al. 1994) and monitored for the first time in February 1996 (Leap, et al. 1996b). The site was mapped with a total station in FY97 (Leap, et al. 1997a) in anticipation of preservation work.

***Monitoring Recommendations***

A small rill has developed on the southwest side of Feature 5. This rill appears to be deepening and will likely become a gully. Minor impact is occurring to the feature at this time. Feature 1 is currently stable but only three meters from the edge of a side canyon. No human disturbances were noted. Continue monitoring every four years.

**A:15:035 Roasting Feature  
Inactive Schedule**

A:15:035 consists of a single roasting feature and charcoal-stained soil eroding out of a sandy slope. No artifacts were found associated with the roasting feature. Cultural affiliation is unknown.

***Previous Work***

The site was originally recorded by the NPS survey crew in 1991 (Fairley, et al. 1994) and monitored in FY93 and FY97 (Coder, et al. 1994b, Leap, et al. 1997a). This site was tested for National Register eligibility in FY94 (Leap 1994b). Intact cultural remains were uncovered and the AZSHPO concurred with National Register eligibility.

***Monitoring Recommendations***

The site is in poor yet stable condition. No human disturbances were noted. Vegetation is dying across the dune area. Recommend changing the schedule from every four years to the inactive schedule.

**A:15:039 Roaster Complex  
Three Year Schedule**

This is a late prehistoric-early historic Pai site that consists of 2-3 roasting features situated in reworked eolian sand. One roasting feature is well defined, with an interior depression surrounded by abundant fire-cracked rock and charcoal stained soil. Two other fire-cracked rock concentrations are more amorphous; one is probably an additional eroded

roasting feature, while the other may simply be a refuse area. The features and artifact assemblage, which includes sparse lithics and three unformalized grinding slabs, suggest brief use of the site as a food processing camp, although occupation may have been repetitive.

#### ***Previous Work***

A:15:039 was initially recorded by NPS survey personnel in January of 1991 (Fairley, et al. 1994) and monitored in FY92, FY93, FY94, FY95 and FY99 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 2000a).

#### ***Monitoring Recommendations***

Feature 1 continues to be actively cut by the side canyon. There are several nick points in the artifact concentration. Data recovery is recommended for Feature 1 due to its locale adjacent to the active side canyon. Continue three year monitoring schedule. Also, assess for preservation work.

### **A:16:149 Thermal Feature Inactive Schedule**

This aceramic site contains five roasting features with three manos and one grinding slab. Archaeologists recorded no chipped stone artifacts or sherds on the surface, though other artifacts may be present subsurface. Cultural affiliation is unknown. FY96 monitors found a newly exposed roasting feature two meters south/southwest of the depression near Feature 3.

#### ***Previous Work***

GRCA survey personnel initially recorded the site in November 1990 (Fairley, et al. 1994). RCMP staff monitored the site for the first time in FY96 (Leap, et al. 1996b). FY96 monitors recommended installing checkdams. Monitors and Zuni Conservation Project staff assessed the drainages in FY97, placed grass in the nick points and recommended future construction of checkdams in the arroyo impacting Features 1 and 2 (Leap, et al. 1997a). A total station map was completed in September 1997. Zuni Conservation Project staff installed seven checkdams in the river-based arroyo in April 1999 (Leap, et al. 2000a).

#### ***Monitoring Recommendations***

There is so much vegetation growing across the site it obscures features, making it difficult to detect change. Feature 2 appears unchanged. Feature 4 has increased vegetation. Features 3 and 5 have less vegetation but no evidence of surface erosion as previously observed. No sign of human visitation was observed. F. Nials (personal communication, 2001), recommends that the drainage at Features 1 and 2 be lined with cobbles, and nick points filled in. Checkdams should be larger, and built up on the sides. Overall the site appears stable compared to photos taken in 1990 and 1996. Continue annual checkdam monitoring. The monitoring schedule will be changed from every four years to inactive.

### **A:16:174 Roasting Feature Biennial Schedule**

A:16:174 consists of two artifact concentrations, a large roasting feature, and scattered heat-treated rock. Lithic evidence includes flakes, a mano/chopper, two grinding slabs, and a mano/pecking stone. Two flake tools probably functioned as cutting and/or scraping tools. Ceramics from this site include three Cerbat Brown Ware sherds. This site represents a late prehistoric-early historic Pai rockshelter situated on an alluvial terrace, abutting steep slopes and local cliffs of conglomerate. Shallow overhangs provide some shelter. FY96 monitors discovered a slate pendent in Area B and FY98 monitors discovered a new mano fragment.

#### ***Previous Work***

Archaeologists recorded the site in 1990 (Fairley, et al. 1994). RCMP staff monitored it in FY93, FY94, FY96 and FY98 (Coder, et al. 1994b, Coder, et al. 1995a, Leap, et al. 1996b, Leap, et al. 1998d). FY98 monitors recommended checkdam installation and in FY98 a total station map was completed (Leap, et al. 1998d). FY98 monitors also recommended collecting bone fragments for analysis. RCMP staff and Zuni Conservation Project staff assessed and installed eight checkdams in FY99 and plotted them on the total station map (Leap, et al. 2000a). In FY2000 checkdam maintenance resulted in alteration of four checkdams and construction of one new checkdam (Leap and Kunde 2000b). In FY2001 checkdam maintenance was completed at eight checkdams.

***Monitoring Recommendations***

There is recent reworking of eolian and alluvial sands in the shelter area. It is clear that water has run through the shelter though there appears to be little damage. Moderate to severe rodent burrowing is occurring towards the back of the shelter. Recent slope wash has occurred at the portion of the shelter in front of the drip line. There is minor gullying five meters in front of the shelter. Only minor downslope movement of artifacts is occurring. There is a minor rill cutting through the largest concentration of stones at Feature 2. Recommend installation of a small checkdam in front of the shelter at the nickpoints and lining the developing gully. Continue annual checkdam monitoring and maintenance and biennial monitoring.

**A:16:175 Thermal Feature  
Biennial Schedule**

A:16:175 is a series of shallow overhangs with associated fire features and a midden with concentrations of sherds, lithics, burned bone, and charcoal. Two Desert Side-Notched points were found at the site. Sherds and projectile points found on the surface indicate a multiple occupation of Virgin Branch and a later Pai/Paiute presence. The site itself is located on the upstream end of a dissected alluvial terrace with on-site gullies and arroyos that drain into the river. This site, with its exceptionally well-developed midden, presents evidence for a more intensive and/or longer-term use of the area.

***Previous Work***

GRCA survey personnel recorded the site in February 1991 (Fairley, et al. 1994). RCMP staff monitored the site in FY92, FY93, and FY94 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1994a). No remedial actions have been recommended for this site.

***Monitoring Recommendations***

Feature 1 appears stable with minor surface erosion and sheet wash. There is erosion of materials at the midden below the shelter. Features 1 and 2 both have small rodent burrowing. Feature 3 has minor surface erosion and rodent burrowing. Features 4 and 5 have active rodent burrowing. Feature 6 has a gully bisecting the feature. While the gully appears to be active, it is unknown if gullying is increasing due to a lack of photographs for this location. A large milled plank (7 feet long) present in photos has been removed from Feature 3 and is now located on a lower alluvial terrace. The gully at Feature 6 will be assessed for checkdam installation and monitoring will increase from every three years to biennially.

**A:16:176 Roasting Feature  
Five Year Schedule**

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, though the site is situated only three meters from the river's edge. Cultural affiliation is unknown.

***Previous Work***

This site was initially recorded by NPS survey personnel in January of 1991 (Fairley, et al. 1994) and was monitored for the first time in FY94 (Coder, et al. 1995a).

***Monitoring Recommendations***

The site is unchanged since 1994. No sign of human visitation was observed. Recommend collecting a charcoal sample from the very well preserved site as cultural affiliation and time periods are unknown. Monitoring should continue every five years due to the possibility of impacts from the operations of Glen Canyon Dam.

**A:16:185 Special Activity Locus  
Three Year Schedule**

A:16:185 is a probable human burial consisting of numerous shell beads from the Pacific coast, a finely worked rhyolite Desert Side-Notched projectile point, a few flakes, some Moapa Gray Ware sherds and a single human metatarsal. The site is located in a stabilized set of riverside dunes. Ceramics suggest a Pueblo II Virgin association, but the Desert Side-Notched point indicates a Pai or Paiute affiliation.

***Previous Work***

This site was recorded in February 1991 (Fairley, et al. 1994) and monitored in FY93, FY95, and FY99 (Coder, et al. 1994b, Coder, et al. 1995b, Leap, et al. 2000a).

***Monitoring Recommendations***

The site appears stable. The beads are still exposed but very little if any downslope movement has occurred since last monitored. No human disturbance was noted. The Hualapai Tribe should be consulted on any management recommendations for this location. Continue monitoring every three years.

***Hualapai Tribal Information, June 2001 River Trip***

During an elders trip with J. Balsom in 1994, it was determined that no treatment would occur at this location. It was determined after discussions with L. Jackson this year, that the original no-treatment option for this site will remain as the original recommendations by the elders (personal communication, 2001). No treatment will be conducted at this location.

**B:09:316 Small Structure****Four Year Schedule**

This is a possible Pueblo I-Early Pueblo II Formative habitation area that extends for 17 meters along the base of a Muav cliff. The site consists of five rooms defined by several one-course high rock alignments. In association are two metates, a few charcoal fragments, a sparse number of lithics and ceramics, and a cluster of burned rock. Room 1 contains a charcoal scatter (possibly a hearth). Room 2 has two trough metates, burned rocks, and charcoal fragments that may represent a hearth. Rooms 3 and 4 each contain a flake. Room 5 has two flakes and a sherd. No formal tools are present. Subsequent RCMP monitors have found additional sherds and lithics. The site is within the 1983 flood zone and was probably flooded during that time.

***Previous Work***

The site was originally recorded in 1991 (Fairley, et al. 1994) and has been monitored in FY92, FY93, FY94 and FY98 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1994a, Leap, et al. 1998d).

***Monitoring Recommendations***

Eolian erosion is occurring in Rooms 1 and 2. Deposition is occurring in Rooms 3 and 4. Room 5 is a questionable structure. Increased exposure of ceramics is occurring in Room 2. Project staff identified small mammal bones and a core tool in Room 4. No human disturbances were noted. There are minor alluvial deposits remaining from the 1983 and other high flow events. These deposits are sandy and locally 20-30 centimeters has been removed by deflation. The site has potential for carbon dating and would be a good candidate for examining stratigraphy because there have been few impacts from flooding. Continue monitoring every four years.

**B:09:317 Roasting Feature****Biennial Schedule**

This site consists of two loci. Locus A is located on the upstream side of a major side canyon drainage overlooking the river and includes a large roasting pit with flakes and a complete projectile point. Locus B, located downstream of the drainage, is a thermal feature at the base of a Muav Limestone cliff. Cultural affiliation is Pai/Paiute. This site is significant to the Hualapai as it is associated with individuals who have living descendants at Peach Springs today.

***Previous Work***

J. Balsom originally recorded the site in 1986, and it was re-recorded by NPS personnel in 1990 (Fairley, et al. 1994). The site has been monitored in FY93, FY94, FY95, FY96, and FY98 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1996b, Leap, et al. 1998d). Trail work was completed in FY97 and has successfully deterred visitation.

***Monitoring Recommendations***

A rodent burrow south of the main roaster is exposing more charcoal. There is a rodent burrow located inside the center of the roaster also. The site is adjacent to a major camp. Artifacts have been exposed by previous visitation. The previous trail obliteration requires maintenance and monitoring of the access trail should continue to deter future

visitation. Continue monitoring biennially as more cultural material is likely to be exposed. Trail obliteration work should be conducted after consultation with the Hualapai Tribe.

***Hualapai Tribal Information, June 2001 River Trip***

Potential trail work was described and outlined during the most recent Hualapai Tribal river trip, June 2001. Only the access to the site would be obliterated, no work would be conducted on-site. National Canyon is an important place to the Hualapai people and any work conducted here would be with their consent.

**B:10:111 Roaster Complex  
Four Year Schedule**

The site consists of three roasting features visible on the surface as clusters of fire-cracked sandstone and limestone. These features are eroding down the toe of a terrace ridge. No other artifacts were observed therefore cultural affiliation is unknown. B:10:111 is associated with a larger habitation site in the same drainage which is out of the project area. These roasters are situated below a dolomite outcrop where a room is located.

***Previous Work***

This site was initially recorded by NPS survey personnel in October 1990 (Fairley, et al. 1994) and monitored in FY93, FY94, and FY96 (Coder, et al. 1994b, Coder, et al. 1995a, Leap, et al. 1996b).

***Monitoring Recommendations***

The site is in good condition. Eolian sands have accumulated in and around the fire-cracked rock, buffering it from erosion at this time. It is recommended that a carbon sample be taken to compare with ceramics identified at the room above the site. Continue four year monitoring schedule.

**B:11:277 Thermal Feature  
Five Year Schedule**

B:11:277 is an open site situated on sand dunes adjacent to the Colorado River and consists of a large concentration of fire-cracked rock, groundstone, lithics, and plain gray ware sherds indicating a formative Puebloan occupation. There is a high potential for more materials to be buried in the extensive sand dunes.

***Previous Work***

This site was discovered and initially recorded in January 1991 (Fairley, et al. 1994) and was monitored in FY95 and FY99 (Coder, et al. 1995b, Leap, et al. 2000a).

***Monitoring Recommendations***

The site is located near a very active dune area. Although vegetation has stabilized the features, deflation of two to three meters has occurred. Dune accumulation exceeds three meters in some locations. The sediment supply held by Glen Canyon Dam could possibly help this location according to F. Nials (personal communication, 2001). No human disturbances were noted on-site. Overall, the site is in good condition. The side canyon is beneficial in this case because it helps stabilize the dune by taking its sediment supply, enabling vegetation to grow. The monitoring frequency has been reduced from every three years to every five years.

**B:11:281 Thermal Feature  
Biennial Schedule**

B:11:281 is an open artifact scatter with sherds, flakes, groundstone, chipped stone tools and fire-cracked rock. Ceramics indicate a PII Puebloan affiliation. A complete Parowan point was observed at this location indicating a trade connection to the North.

***Previous Work***

This site was initially recorded in January 1991 (Fairley, et al. 1994) and monitored in FY95 and FY99 (Coder, et al. 1995b, Leap, et al. 2000a). This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000).

***Monitoring Recommendations***

Three nick points, each 20 centimeters deep are newly located at the gully located NW of Feature 1. This would be a very good gully to conduct research on erosional rates. This gully will be measured by GRCA. Monitoring will continue biennially. Currently no artifacts or roasting materials are threatened.

**B:14:108 Artifact Scatter**  
**Inactive Schedule**

This aceramic site consists of a relatively long, but shallow, Tapeats Sandstone rockshelter with several grinding tools. It is located along a flat narrow ledge caused by spalling of the local cliff face. Of the observed groundstone, two large Tapeats Sandstone slabs show obvious grinding wear, with pecking on a single surface and shaped margins. Two other Tapeats slab fragments appear smooth on one surface, but may not be grinding tools. Two sandstone river cobble manos are also present. Locus B contains one of the manos and a grinding slab; all of the other artifacts are at Locus A. The site was probably occupied on a transient basis, possibly focused on plant food gathering and processing. Cultural affiliation is unknown.

***Previous Work***

The site was initially recorded in 1990 by NPS survey personnel (Fairley, et al. 1994) and monitored in FY92, FY93, and FY97 (Coder, et al. 1994b, Coder, et al. 1994a, Leap, et al. 1997a).

***Monitoring Recommendations***

No physical or visitor-related impacts were observed. The site is well protected from the elements and does not receive visitation. It is recommend that the monitoring schedule change from a five year schedule to inactive.

**B:15:120 Small Structure**  
**Inactive Schedule**

The site consists of a small "platform", jutting from a rocky slope. This enigmatic flat space is surrounded by broken and rocky terrain. The slopes of the feature are covered with what could be construed as fire-cracked rock, and are rimmed by some larger flattened boulders; apparently these were intentionally placed to keep the flat surface from eroding away. The site is circumvented by two game trails. Several crewmembers brainstormed the nature of this feature; possible functions include a large, eroding mesal pit, a tent platform, a helicopter pad, hunting blind, or photographers/surveyors platform. No artifacts are present and cultural affiliation is unknown. The site is located on an old debris flow with alluvial-mixed soils brought up through eolian deposition (F. Nials, personal communication, 2001).

***Previous Work***

The site was first recorded by NPS surveyors in 1990 (Fairley, et al. 1994) and monitored in FY92, FY93, and FY97 (Coder, et al. 1994b, Coder, et al. 1994a, Leap, et al. 1997a).

***Monitoring Recommendations***

Natural downslope movement of rocks is occurring here. There is a lot of vegetation and cryptogamic soil. A currently unused trail will likely be used during the summer tourist season. However, trailing should not effect the integrity because any entrenchment would be extremely shallow due to the boulder and gravel surface. It is recommended that the schedule be changed from every three years to inactive.

**B:15:128 Artifact Scatter**  
**Inactive Schedule**

This is a multi-component site with a prehistoric (possibly Archaic) lithic scatter and a turn-of-the-century historic trash scatter. The prehistoric scatter is comprised of three projectile points, 100+ flakes, a broken graver, and a couple of biface fragments. Two of the points are Elko items and the third is a Gypsum-like point, but with a wider than usual base. Debitage reflects biface thinning; no groundstone, ceramics, or tools suggestive of core reduction are present. The historic camp includes a drill jack, cartridges, two cans, a black pepper tin, and a railroad spike. The multiple use of this area suggests that it was a favorable location for various cultures and activities.

***Previous Work***

Original recording of this site was in 1990 by NPS archaeological surveyors (Fairley, et al. 1994). The site was monitored in FY97 (Leap, et al. 1997a).

***Monitoring Recommendations***

No physical disturbances were noted. The site is located on a gravel and cobble terrace that is very old. No human disturbances were noted. It is recommended that this site be moved from the five year to the inactive monitoring schedule due to its stability.

**B:15:138 Thermal Feature  
Annual Schedule**

RCMP archaeologist identified and recorded this site in April 1997 (Leap 1997a). This site consists of two concentrations of fire-cracked rock and a sparse scatter of lithics and sherds. Feature 2 appears to be the remains of a slab-lined roasting feature. Feature 1 has no intact morphology and is an array of fire-cracked rock with associated artifacts. Multiple trails are on and near the site due to its proximity to Blacktail Canyon, a popular side canyon hiked by river runners and passangers.

***Previous Work***

RCMP staff recorded the site in 1997 and monitored annually (Leap, et al. 1997a, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). The trail directly below Feature 2 was obliterated at the time the site was recorded and a new trail was outlined below the site. Visitors (river runners) destroyed the work the following summer. In September 1997 a total station map was completed (Leap 1997a). Though the trail work was destroyed, a second round of obliteration was conducted in October 1998. FY98 monitors recommended planting vegetation. Additional trail work was completed in FY99 (Hubbard 1999b). Access was blocked off to the drainage by using dead brush found in the side canyon drainage. It was determined that the features are most vulnerable to hikers (river runners) coming back down to camp from the upper Tapeats Sandstone ledges. A small rock cairn was constructed and hidden in the ledges so it is only visible from above. Theoretically, lost hikers will see the cairn from above, directing them down the ledges away from the site. RCMP staff placed deadfall in the drainage to block the upper portion of Feature 2. Approximately seven meters of the area was treated and all work was photographed. FY99 monitors recommended planting vegetation. The GRCA Revegetation crew suggested that four to five people could collect and plant seed and bunch grasses if a revegetation project is to be implemented. Also, dead brush placed on top of the newly planted grass will propagate vegetation growth.

***Monitoring Recommendations***

Active gullying is apparent at the bottom of the gully that bisects Feature 2. The gully at the feature is also getting wider, exposing and deteriorating the feature at an accelerated rate. All the gullying is a direct result of compaction by foot traffic and on-site camping. Data recovery at Feature 2 has been strongly recommended for the last two years. Excavations should be covered by Colorado River Funds or the Park Service's Fee Demo project because all this erosion is caused by visitors. Trail maintenance will continue until data recovery is completed. This will aid, somewhat, to minimizing the impact.

**C:02:092 Artifact Scatter  
Three Year Schedule**

C:02:092 is an aceramic site located in a Kaibab Limestone rock shelter overlooking the Colorado River. The site contains two Moenkopi Sandstone grinding slabs, two manos, a chopping tool, and a scatter of charcoal. The manos are unifacially ground. The only chipped stone tool was a quartzite cobble with a 10-centimeter long area of flake scars that appear to represent a "chopping" edge. Three fragments of unidentifiable bone were also observed. Cultural affiliation is unknown.

***Previous Work***

Archaeologists recorded this site in April 1991 (Fairley, et al. 1994). The RCMP staff monitored C:02:092 in FY92, FY93, FY95 and FY99 (Coder, et al. 1994b, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 2000a). FY95 monitors recommended developing a new site map. Monitors have not recommended any other remedial actions for this site.

***Monitoring Recommendations***

Gullying is increasing inside the upstream portion of the shelter. There is also a new gully here, approximately ten centimeters deep. Charcoal is being impacted by eolian erosion and animal caused impacts. Recent trash was identified. Testing for subsurface, intact cultural remains should be undertaken before further work is completed on-site. Continue monitoring every three years.

**C:02:094 Historic Structure  
Biennial Schedule**

The recorded portions of this site consist of a dugway that accessed the lower ferry on the left bank, numerous historic inscriptions associated with the dugway/ferry crossing, and large wooden posts on the right bank that were also associated with the crossing. These wooden posts are thought to be mooring posts. The ferry was established in 1873 and used until 1898; and built as a means of avoiding the Lee's Backbone road. There are many historic names and dates written in axle grease and/or tar on a rock surface plus four carved initials at the base of the dugway. Other inscriptions are located at the top of the dugway, but were not re-recorded by the 1990-91 survey crews. The names belong to mostly Mormon immigrants travelling on the Honeymoon Trail between the outposts on the Little Colorado River and the temple in St. George, Utah. Dated names cluster from 1890 to 1898 and were executed on a rock while passengers waited for a ride across the river. There is an ephemeral rock wall between the upstream and downstream portions of the panel, plus modern graffiti. RCMP monitors found two Tusayan corrugated sherds and less than five secondary flakes eroding from the surface approximately four meters below the panel in FY98. This new information changes the site class to both historic and prehistoric.

***Previous Work***

Portions of the site were originally recorded as part of the Lees Ferry Historic District by P. Geib in the 1980s under site number C:02:011. The 1990-91 survey crew, after recording both right and left bank areas, decided to isolate the lower ferry crossing as a site unto itself, which was designated C:02:094 (Fairley, et al. 1994). The site was monitored in FY92, FY93, FY96, FY97, FY98, and FY99 (Coder, et al. 1994b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap, et al. 2000a). GRCA and RCMP staff removed graffiti associated with the panel in 1996 and documented the inscriptions with a medium format camera in FY97 (Leap 1997e).

***Monitoring Recommendations***

This site does not appear to have suffered any physical impacts since last monitored in October, 1998. A fire ring is adjacent to the drainage where the sherds are located. Charcoal from this fire was used to vandalize the west facing wall. Several names have been added, the most prominent and most recent is "BCY 2000". River fluctuations this summer have likely added to visitation on-site since low steady summer flows required anglers to travel further downslope to the river. River patrol should stop here and watch for ARPA violations due to a history of vandalism on-site and the presence of prehistoric remains, or the Navajo Nation should participate in improved preservation of this site. Vandalism requires further recording and recommend that the graffiti be removed. It is recommended that subsurface testing be conducted here due to the presence of prehistoric artifacts eroding out of the gully. This would be completed on a Colorado River Fund trip.

**C:02:096 Structure-Thermal Feature Complex  
Annual Schedule**

The site consists of two sheltered areas separated by a drainage and talus cone. The upstream area (Locus A) consists of a shallow overhang with an ephemeral wall. The wall consists of small, local limestone cobbles in a single ground level course. The front of the shelter ledge might exhibit some alignment and level preparation. One large tertiary flake of white-orange Kaibab Chert was noted, as well as a long, tapered river cobble (pestle shape), pecked on two faces with a smooth surface on another margin. Locus B is located about 60 meters downstream of Locus A under a west-facing Kaibab Limestone overhang. An arroyo flows beneath the overhang dripline, exposing layers of river-deposited silt/sand inter-bedded with coarser sand and gravel colluvium. Several layers of charcoal and cultural features are exposed in the arroyo sidewalls as well. O'Connor and others (O'Connor, et al. 1994) reported finding fluvial-transported charcoal at a depth of about 2.5 m below present ground surface, near the bottom of the stratigraphic section. The radiocarbon dates from this research dated from 4567-4125 B.P. FY97 monitors recorded a partially mineralized, worked stick in Locus A. FY97 monitors discovered new lithics and a Moenkopi Corrugated sherd eroding from Locus B. FY00 monitors recorded a point base, charcoal and other lithic debitage on the arroyo floor.

***Previous Work***

Archaeologists originally recorded the site in 1991 (Fairley, et al. 1994) and the RCMP staff have monitored annually since FY95 (Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). Monitors recommended checkdam installation in FY96. In FY97 the RCMP staff assessed this area for checkdam installation and determined that the arroyo system is at an active stage that would not be conducive to checkdam construction. Surveyors completed a total station map in FY97. In FY97, FY98, and FY99 monitors consistently recommended data recovery for the features exposed at Locus B. FY99 monitors collected charcoal samples for radio carbon dating from Features 2 and 9. Carbon samples were returned and Feature 2 dates 3220 +/- 80 BP and Feature 9 dates 3560 +/- 70 BP. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). The cultural PEP panel also visited this site.

***Monitoring Recommendations***

Bank slump is increasing at Features 8 and 9. The drainage has been very active. Features 4, 5, and 7 also appear to have slumped further into the arroyo. A large platform of the site has also slumped off into the arroyo. New Moenkopi Corrugated ceramics were identified. Because new artifacts continue to be exposed at this extremely fragile and erosive site, data recovery is strongly recommended. Carbon dates of BC 2120 to 2090 at this location warrant further data recovery. Continue annual monitoring.

**C:02:098 Artifact Scatter****Annual Schedule**

The site consists of an overhang with a charcoal scatter, one sherd, one sandstone mano, and a flake scatter. The terrace at the base of the overhang has been cut by high water, and charcoal is eroding from this cut. Cultural affiliation is unknown.

***Previous Work***

Archaeologists recorded the site in 1991 (Fairley, et al. 1994) and RCMP staff monitored it in FY95, FY97, FY98, FY99, and FY00 (Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). FY95 monitors recommended trail work, planting vegetation and testing for subsurface cultural material. The GRCA trail crew completed trail obliteration work in FY96. This site was recommended for data recovery in FY97. FY98 monitors recommended installing checkdams and surveyors completed a total station map. FY99 monitors noted that no new trails were apparent, however, erosion has obliterated some of the previous trail work. FY99 monitors and Zuni Conservation Project staff assessed the gullies/trails for checkdam construction and scheduled work in FY00. This work, however, has been postponed until checkdam evaluation studies are completed. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000).

Monitors have consistently recorded angler trails, trash, tackle and recent charcoal at one end of the overhang. FY97 and FY99 monitors observed channel initiation and several nick points within the old obliterated trails and the main trail. In FY2000 the GRCA Revegetation and Rehabilitation crew, determined that arrowweed would be planted in the active drainage leading from the overhang to the beach area. This location had previously been the focus of trail obliteration work by the GRCA during FY96 monitoring. Obliterating the trail would not be successful due to the entrenched nature of the trail beginning at the parking area upstream of this location. A replicated photograph was taken for future comparison by the revegetation crew.

***Monitoring Recommendations***

The drainages below the site have become large arroyos since last monitored. Checkdams will not work here. The overhang remains unchanged. Visitation at this site is inevitable due to the extensive trail network leading from the parking lot to the river. While obliteration is not possible, revegetation work should occur annually to maintain trails and avoid multiple trailing.

**C:05:031 Small Structure****Biennial Schedule**

The site consists of two Loci (A and B) with two structural features (Features 1 and 2) and three areas of fire-cracked rock concentrations (Features 3-5). Artifacts indicate a Pueblo I - early Pueblo II affiliation. Note: Feature 2 is natural, not cultural, according to investigations by the FY97-2 monitors.

***Previous Work***

NPS survey personnel recorded this site in 1990 (Fairley, et al. 1994). Monitoring occurred annually from FY92 through FY95. In FY94, however, the site was monitored twice. In FY95 the schedule changed to every other year (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 2000a).

***Monitoring Recommendations***

There is noticeable dune deflation at Feature 3. The incipient rill/gully north of Feature 3 has increased down cutting and three nick points are present. According to F. Nials, (personal communication, 2001) the gully will not get much deeper due to the rock below the sand and the type of vegetation on-site. Features 4 and 5 are stable. The bar above the site acts as a protector because it doesn't allow side canyon floods to come to the site. The side canyon downstream of Feature 3 is reactivated but is not currently impacting the site. No human disturbances were noted. Due to our findings and consultation with F. Nials, monitoring will change from biennial to every five years. The cutting and filling of the rill will continue but will not do much damage. Vegetation is stabilizing the area but more transplanting will aid in the stabilization.

**C:09:050 Special Activity Locus  
Semiannual Schedule**

The site originally consisted of a single complete Tusayan Black-on-Red mug/pitcher eroding out of a cutbank, and nine rectangular rock cobbles in an alignment adjacent to Little Nankoweap Creek. After its discovery, the vessel was stabilized with local cobbles and boulders, then covered with sand. Park Archaeologist J. Balsom subsequently collected the vessel, and several others from the same locale, on a later episode. This is considered a Late Pueblo I-Early Pueblo II Formative site.

***Previous Work***

This site was discovered and initially recorded by NPS survey personnel in September of 1990 (Fairley, et al. 1994). 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 once in FY92 and semi-annually from FY93 through FY00 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). Medium format photographs of the pot cache were taken in FY95 and FY98 (Leap 1995a, Leap and Kunde 1998a). Hereford et al. included this site in their geomorphic map of the Nankoweap area (Hereford, et al. 1996b). In FY97 an extensive water diversion structure was constructed at the base of the cutbank to curtail further erosion from side canyon flooding and bank slump (Leap 1997a). After stabilization, a total station map was completed of the entire site. Andres Cheama from the Zuni Conservation Project noted that the NPS should plant grass seeds and possibly cacti on the slope for further stabilization. NPS revegetation crews could plant cactus on the slope on a future NPS river trip.

***Monitoring Recommendations***

No physical changes were observed at this site. Due to the history of exposure of cultural remains at this site, it is recommended that semiannual monitoring continue. It is also recommended that the GRCA Rehabilitation and Revegetation crews annually assess the trail and camp locations. Camp sites have begun to move upwards onto the high terrace adjacent to the site. Checkdam monitoring will continue annually

**C:09:051 Pueblo  
Three Year Schedule**

This is a large Pueblo II camp area on the lower side of Nankoweap Delta. The site was recorded in 1989 as three separate loci. The GRCA crew retained this scheme and added a fourth locus, located on the bank of the creek to the north and northwest. Locus A contains an L-shaped roomblock of four to six rooms consisting of discernable cobble alignments, wall fall, clay daub, ash, scattered rock, ceramics, and a midden. Locus B is an area of fire-cracked rock, a broken mano, and a few sherds; no feature designations were assigned. Locus C consists of shattered cobbles, a few ceramics and flakes, and no definable features. Locus D is situated on the bank of Nankoweap Creek northwest of Locus A. It consists of a poorly-defined roomblock, carbon, sherds, and fire-cracked rock eroding from the bank. A large San Juan Redware sherd was collected eroding out of the cutbank; the possibility of intact vessels is high and

some stabilization is warranted. The FY97 monitors found a newly exposed charcoal stain with several artifacts in a cutbank in Locus D (labeled Feature 4).

***Previous Work***

The site was originally recorded in 1989 and re-recorded by the NPS survey crews in 1990 (Fairley, et al. 1994). The site was visited once in FY92 and FY93 (Coder, et al. 1994b, Coder, et al. 1994a), monitored semi-annually in FY94 and FY95 (Coder, et al. 1995a, Coder, et al. 1995b), and then annually since FY96 (Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). The site has been the focus of trail obliteration work by the NPS Trail Crew prior to 1990. The RCMP conducted trail obliteration in FY96 and FY99 (Kunde 1998a, Leap, et al. 1996b). Hereford et al. included this site in their geomorphic map of the Nankoweap area (Hereford, et al. 1996b). Medium format photographs were taken to document Locus D in FY95, FY96 and FY98 (Leap 1995a, Leap 1996a, Leap and Kunde 1998a). The site was mapped with a total station instrument in FY97, and a portion of Feature 4 was excavated in July, 1997 (Yeatts and Leap 1997). See Hereford et al. (Hereford, et al. 1996b) for photogrammetric topography mapping of the immediate area.

***Monitoring Recommendations***

Feature 4 has recent new slump off the top of the bank though the overall drainage appears unchanged. The site appears to be in fair condition and no new impacts were observed. It is recommended that the schedule be reduced from biennial to every three years. If remedial work is to be conducted here it is due to visitation and should be completed by the NPS.

**C:09:053 Small Structure  
Inactive Schedule**

This site consists of three artifact concentrations and a rock alignment. Artifacts consist of sherds, lithics, and bone, mostly concentrated on the east and south slopes of a dune. Artifact density is fairly heavy, with 200-300 sherds and 100-150 lithics. The rock alignment is three meters long with possible corners at either end. It may be the foundation of a habitation unit or room of some kind. The structure/rock alignment could also possibly be a historic or a modern tent campsite. Cultural affiliation is considered Middle to Late Pueblo II.

***Previous Work***

This site was originally recorded by R. Euler (GRCA) in 1976 as part of site C:09:001. The site was renumbered as C:09:053 by J. Balsom (GRCA) in 1989 because it was not located near site C:09:001. A third recording of the site was completed in 1990 by NPS survey personnel (Fairley, et al. 1994). Subsequent to the survey, some retrailing and trail maintenance was carried out to curtail the impacts of hikers across the surface. The site was monitored by RCMP archaeologists in FY93, FY95, and FY97 (Coder, et al. 1994b, Coder, et al. 1995b, Leap, et al. 1997a). See Hereford et al. (Hereford, et al. 1996b) for photogrammetric mapping results of the area. Hereford et al. also included this site in their geomorphic map of the Nankoweap area (Hereford, et al. 1996b).

***Monitoring Recommendations***

The overgrowth of vegetation made the artifacts and feature difficult to observe. Overall the dune appears stable. No human disturbances were noted. It is recommended that this site be moved from a five year monitoring schedule to the inactive list. There is heavy vegetation and little erosion.

**C:09:065 Historic Structure  
Five Year Schedule**

The site consists of a number of related features and artifacts associated with the testing of a Marble Canyon Dam site in the 1950s. There are a total of 16 numbered features. Features 1-11 are on river right, and Features 12-16 are on river left. Features include: stakes with guidewires, looped rebar and anchors cemented into the Redwall, adits, cable, masonry platforms, painted inscriptions, and related artifacts. The 97-2 monitors located three additional features.

***Previous Work***

The site was initially recorded by NPS personnel in 1990 (Fairley, et al. 1994), and monitored for the first time in FY97 (Leap, et al. 1997a). In FY94 the SHPO concurred with the recommendation of National Register eligibility (Leap 1994b) even though it dated after 1950.

***Monitoring Recommendations***

Surface water is pouring over the stone platform at Feature 5. The erosion is moving rocks and some have been displaced. Surface water has removed sand and rock at Feature 6. The cable has moved from erosion and possibly visitation. The social trail to Features 5 and 6 shows recent footprints and it is recommended that this trail be obliterated to curtail further impact. The cable has been moved since the last monitoring episode also. It is recommended that improved locational information be gathered for all features at this site. Continue five year monitoring.

**C:09:068 Artifact Scatter  
Five Year Schedule**

This site consists of an artifact scatter containing sherds and lithics. No obvious architectural features were visible on the surface, but given the nature and depth of alluvial deposits, it is very likely that additional cultural materials are buried beneath the present ground surface. The site surroundings may have offered good agricultural potential. Artifacts suggest a Pueblo II occupation. The site is located on top and along the slope below an alluvial fan.

***Previous Work***

NPS personnel recorded this site in 1990, (Fairley, et al. 1994) and monitoring occurred in FY93 and FY97 (Coder, et al. 1994b, Leap, et al. 1997a).

***Monitoring Recommendations***

There is a thick cover of vegetation and cryptogamic soils blanketing the area. No sign of human visitation was observed and no impacts are occurring. The site is extremely stable. F. Nials suggest the depression is a pithouse or kiva. He also notes that deposition is only 30 to 40 centimeters deep at most due to the presence of boulders on the surface (Personal communication, 2001). Continue monitoring every five years.

**C:13:006 Small Structure  
Annual Schedule**

The site is eroding out of a reworked dune at the mouth of a major side canyon. It consists of a Pueblo II Kayenta ceramic and lithic scatter eroding from a dune face with a fire-cracked rock and cobble-strewn, ashy midden. Survey personnel identified four to five possible rooms present but in fair to poor condition. Mapping at this site leads the River Corridor personnel to believe that these are not rooms but rather terracing or some other type of alignment. Due to active erosion in the dune area, several additional features have been recorded since the river corridor survey. In FY95 monitors made several additions to the site map, including walls eroding out of gullies, an additional roasting pit, an artifact concentration, and several new drainage channels. Groundstone is present though no formal tools have been observed.

***Previous Work***

The site was recorded in the early 1960s, 1965, and 1984 and again in 1990 (Fairley, et al. 1994). River corridor archaeologists monitored this site annually in FY92 and FY93, semiannually in FY94 and FY95, and back to annual from FY95 to FY00 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). In FY95 a stationary camera was placed across from the site (Coder, et al. 1995b), but was removed after FY96 because the photographs only showed stochastic changes (Leap, et al. 1996b). In FY95 the Zuni Conservation Project personnel assessed the site for checkdam installation. In FY96 a GRCA recreational specialist and revegetation employee assessed the site for planting vegetation and placing jute mat on the deflated areas. The site was mapped with a total station in FY96 (Leap, et al. 1996b), and medium format photographs were taken prior to the BHBF in 1996. Twelve checkdams were built in the two active gully systems and jute mat was laid in the deflated dune areas (Leap, et al. 1996b). Additional vegetation work was completed at this site in FY97. In FY97 and FY99 Zuni Conservation Project personnel conducted minor maintenance on some of the original checks. Increased sediment deposition demonstrated at this site is a result of checkdam construction. It was determined that grass plugs and additional seed should be collected from the slope directly across 60 Mile drainage from this site. Grass plugs could then be transplanted on-site to further anchor and secure the dune area. A revegetation staff member should accompany the RCMP staff on a subsequent river trip to conduct this work. This area was researched by Thompson and others in 1998 and 1999 (Thompson and

Potochnik 2000). Annual checkdam monitoring resulted in maintenance at two checkdams and construction of one new checkdam in FY2000 (Leap and Kunde 2000b).

### ***Monitoring Recommendations***

The drainages on-site have been active, a lot of water has washed over the entire dune area, evidenced by washed over vegetation. In the areas where loose sands are present, eolian action has reworked the dune. There is extensive deposition in the drainages where checkdams exist. Impacts are not significantly disturbing the site. It was recommended by the Zuni Conservation Project personnel that additional vegetation be planted near Checkdam 13. Continue annual monitoring and annual checkdam maintenance.

### **C:13:009 Pueblo Biennial Schedule**

C:13:009 is an extensive prehistoric habitation area containing structures, water control features, and numerous and diverse artifacts. The site occupies both sides of a major side canyon. This site was recorded and mapped in two distinct loci. The artifact assemblage is dominated by Pueblo II-early Pueblo III ceramics. Numerous tools used as percussion items and abraders were observed, but there is a curious lack of chipped stone and metates. A distinct prehistoric trail can still be seen above the site disappearing up into the cliffs. Features include four separate locations of agricultural terracing, a 10m roomblock, an L-shaped alignment, possibly a two-room structure, four sandstone slab-lined cists, a cluster of four to six cists or mealing bins/processing stations and two rows of upright slabs with numerous artifacts including groundstone, four roasting features, three wall-fall piles, two middens, and a 4 room roomblock measuring 16 by 4 meters.

### ***Previous Work***

Portions of this site were previously recorded several times. The site was originally designated C:13:009 and 9A in 1965 by Euler and Taylor. C:13:009A corresponds to the GRCA river corridor survey Locus A (upstream of the side canyon), while C:13:009 corresponds with the GRCA Locus B (downstream of side canyon). Sherd collections were conducted in 1976, 1984 and 1989. NPS survey personnel recorded the site in detail in 1990 (Fairley, et al. 1994). The site was monitored by RCMP staff in FY93, FY94, FY97 and FY99 (Coder, et al. 1994b, Coder, et al. 1995a, Leap, et al. 1997a, Leap, et al. 2000a). Additional monitoring research was conducted at this site during the research flow of 1996 (Balsom and Larralde 1996) including medium format photography. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). FY01 monitoring staff identified a new slab-lined cist eroding out of the cutbank one meter north of Feature 10.

### ***Monitoring Recommendations***

Feature 1 is no longer present, having eroded away due to headcut advancement. Feature 2 has little change. The wall at Feature 3 is collapsing into the arroyo. Feature 4 continues to be stabilized by vegetation. Feature 5 appears to be in good condition. Feature 6 has surface erosion. Feature 7 has active sheetwash and is threatened by arroyo cutting. Feature 9 has sheetwash. Feature 10 has active cutbank erosion. More of the feature is exposed. Feature 11 is no longer stable, bank slump and active gullyng are threatening the feature. Portions of the feature are gone due to active erosion. The ant colony is still present at Feature 12 though there is increased vegetation. Feature 13 also appears more stable due to increased vegetation and cryptogamic soils. Feature 14 has active gullyng, artifacts are moving downslope. Many sherds and some bone have been exposed and are being weathered. Feature 15 has sheetwash and some rock movement compared to previous photos. Feature 16 is losing soil in the middle of the room due to eolian and alluvial erosion. Overall, significant changes and impacts have occurred compared to previous photos and monitoring comments. Although visitation has been recorded in the past, no sign of human disturbances was observed. Recommend data recovery for Features 3, 10, 11, 14, and 20 before all data is lost. It is recommended that this site be mapped with a total station. Continue biennial monitoring.

### **C:13:010 Pueblo Annual Schedule**

This is a large, multi-component habitation site divided into three "locales." Locale 1 was recorded in 1965 and Locales 2 and 3 were discovered on a 1983 GRCA monitoring trip. Five structures and 21 features are assigned to Locale 1, including a pithouse, several one to four room masonry structures, a pueblo, cists/hearths, and rubble/wall alignments. Four structures and 16 features are noted at Locale 2, including rooms and rubble piles. Locale 3 contains two structures and five features, including a shelter, cists and wall/room remains. Testing results suggest the site may

have had two to three occupations, including use by Pueblo I Cohonina and Pueblo II Puebloan; ceramics also suggest a late prehistoric-early historic Hopi connection. For details consult the 1984 excavation report (Jones 1986) and Miller et al. 2001 draft. The site contains numerous river-based drainages.

### ***Previous Work***

Archaeologists conducted data recovery at this site in 1984 (Jones 1986) as a result of high water releases that inundated cultural remains along the river. GRCA closed this site to visitors in 1985 due to the fragility of the terrain. Geomorphologists completed a topographic map of C:13:010 in 1993 using photogrammetry (Hereford, et al. 1993). The RCMP staff monitored the site annually since FY95 (Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). FY95 monitors recommended stabilization and total station mapping. FY96 monitors recommended installing checkdams and data recovery. During the 1996 research flow, the RCMP staff conducted supplemental monitoring efforts at this site (Balsom and Larralde 1996). FY97 monitors recommended data recovery, total station mapping, stabilization, and checkdams. After an assessment in FY97, monitors determined that checkdams would not be effective. FY98 monitors recommended data recovery. The RCMP staff assessed the site for data recovery in FY97 and FY98. In FY98 and FY99 the RCMP staff implemented a limited data recovery project and completed medium format photography. The RCMP staff will complete a separate report detailing this work upon completion of the analyses, see Miller et. al. Draft, 2001. FY99 monitors recommended additional data recovery. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000).

### ***Monitoring Recommendations***

Feature 48 has increased arroyo cutting and surface erosion. Eolian deflation is also present. Feature 39 has active slump and surface erosion of fire-altered rock. The arroyo in the main drainage has been active. However, many of the features on-site are unchanged since last monitored. Continued data recovery is highly recommended at this site. Though many of the features are unchanged since last monitored, they are in extremely poor condition and significant, artifacts, features and structures are being lost. Continue annual monitoring.

## **C:13:069 Small Structure Annual Schedule**

This large site consists of several cists and masonry structures. Feature 1 is a slab-lined cist remnant. Feature 2 may be a masonry room with midden. Feature 3 is a masonry wall. Feature 4 consists of eroding slabs where additional architecture may be present. Feature 5 is a well-preserved cist. Feature 6 is a masonry room. Feature 6B is another masonry room outside of the main dune area. Ceramics suggest a Pueblo II-early Pueblo III affiliation. The site is near the Tanner Trail and a well-used beach camp.

### ***Previous Work***

Prescott College personnel originally recorded this site in 1972. NPS personnel re-recorded this site in 1990 (Fairley, et al. 1994), and monitoring occurred in FY93, FY95, FY96, FY97, FY99, and FY00 (Coder, et al. 1994b, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap and Kunde 2000b, Leap, et al. 2000a). As part of the GCES Phase I program, Ted Melis took a carbon sample at this location. No information has been disseminated to the RCMP office concerning the results. In 1992, the GRCA Rehabilitation Project conducted trail obliteration, revegetation, and stabilization of minor drainages. Medium format photos were taken of this site in FY96 (Leap, et al. 1996b). Upon completion of a stabilization assessment in FY97, six checkdams were constructed along the drainage bisecting the features. One existing checkdam was reconstructed and five new checkdams were built. A total station map was also completed for this site in FY97. See Hereford (Hereford, et al. 1993)[Hereford, 1996 # 19] for photogrammetric topography mapping of the immediate area. Maintenance work on the checkdams was completed in FY99 (Hubbard 1999b). Monitoring staff observed that human impacts were high, and included distinct trails, trail caused erosion, and minimal site camping. This site was at particular risk due to the adjacent river camp that was highly used especially during the May to October season. Backpackers throughout the year also used the area and a major trail cut directly through the site. However, retrailing and revegetation work carried out in the beginning of 1992 by NPS personnel has had a positive affect on the site.

### ***Monitoring Recommendations***

The bank above Feature 2 has minor slump though not enough to impact the feature. Feature 3 has active surface erosion. Features 5 and 6 are unchanged since last monitored. It is evident that two people walked through Features 1,

2 and 3. Charcoal and ashy soil have been exposed. Continue checkdam maintenance and further revegetation work should be conducted to keep people from straying off the trail onto the site. The trail should be re-routed. Continue annual monitoring.

### **C:13:070 Small Structures Annual Schedule**

This site has four loci (A-D) and is situated on a highly dissected terrace. Locus A has three artifact scatters near the drainage mouth and along the terrace edge to the northeast. Locus B is a rubble mound that suggests a small masonry structure. Abundant sherds and lithics are located around the structure and upslope. Locus C consists of a dense scatter of charcoal (historic) and artifacts scattered over the surface. Locus D includes several artifacts and three to four charred logs exposed in an arroyo that may be the remains of a roof. The quantity and diversity of artifacts suggests that this is a habitation site; however, few architectural features are visible. Artifacts indicate a Pueblo II-early Pueblo III occupation. In FY96 monitors found small mammal bones on the northeast edge of Locus A, and in FY97 they found a basalt axe fragment in the artifact concentration of Locus D. Both the roof remains and the axe fragment are rare in Grand Canyon.

#### ***Previous Work***

The site was originally recorded in 1973 and re-recorded in 1991 by NPS personnel (Fairley, et al. 1994). The site was monitored in previous years by GRCA, and more recently monitored under the RCMP: once in FY93, twice in FY94, FY95, and FY96, and annually since then (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). In FY95 medium format photographs were taken for drainage documentation. In FY95 PA members wanted RCMP staff to select certain sites to measure artifact movement within one-meter square. These surface analysis units were removed in FY96 as per discussions with PA representatives (Leap, et al. 1996). The results of one year were inconclusive and highly subjective. In May 1996 the Zuni Cultural Resource Advisory Team (ZCRAT) monitored the site and their recommendation was to install several checkdams. A total station map of Loci B, C and D was completed in September 1997 in anticipation of some type of preservation treatment (Leap and Kunde 1997b). Upon further assessment in FY97 and FY99 with the Zuni Conservation Project personnel, it was determined that installing checks "would be a time consuming, expensive and risky effort." It was determined that the arroyo systems were (are) too advanced for any practical stabilization effort. In FY99 samples were taken from the charred logs (possible roof fall) in Locus D. Carbon samples taken from Locus D have dates of 870 +/-60 BP and 790 +/- 60 BP. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). The PEP participants stopped at this location in March, 2000.

#### ***Monitoring Recommendations***

Some bank slump has occurred at the charred roof beams. The artifact concentration at Locus D has been subjected to slow surface erosion. The arroyo to the north is active with bank retreat occurring along the west side. Gullying and arroyo cutting is active. Eolian activity is present in Locus B on the upstream side of the structure. Collection piles were dispersed in Locus C. A faint trail is visible just south of the upright mano. Footprints are also evident at Locus A. It is recommended that trail work be conducted at Locus B. Data recovery is recommended at Locus D due to the fact that preservation in place is not an option. As previously recommended, additional work should be done to understand the relationship between this large multi-component site, the adjacent sites, and Unkar Delta (across the river). More cultural remains will be exposed and displaced if recovery options are not taken soon. This location should also be investigated from the perspective of alluvial deposition and erosion contrasted with old high water shoreline deposits. One approach may be to investigate how the terrace bank retreats at different flow levels and if river flows cause the arroyo mouths to change. Annual monitoring will continue.

### **Palisades Delta**

The Palisades Delta complex, consists of several prehistoric and historic archaeological sites situated on predam alluvium and debris flows from Palisades Creek. Access to this delta is via two distinct trail networks extending north and south of the delta. Site types range from prehistoric multi-room pueblos to historic mining camps. Visitors to the Palisades Delta will likely observe various cultural remains at sites C:13:098, C:13:099, C:13:100, C:13:272, and C:13:336. It is recommended that work such as additional revegetation along the Beamer Trail at C:13:099 may cause increased visitation to C:13:100 as visitors attempt to access the most visible site on the delta, C:13:098. Viewing work

to be done in this location as curtailing visitor-related impacts to all sites in the area, enables the NPS to complete the project more efficiently and consider the impacts of the region as a whole rather than treating one site at a time.

### **C:13:098 Historic Structure (Palisades Delta)**

#### **Annual Schedule**

This historic mine and cabin site contains two loci. Locus A consists of two mine adits at the base of the Palisades cliff along the Palisades fault. The main adit is situated about 10 m above the surrounding terrain with an extensive tailing pile below it. The second adit is located about 10 m below and 20 m south of the main adit. About 225 m S/SW is Locus B, which includes a log cabin constructed of driftwood logs. The cabin measures 2.6 x 4.1 m (interior) and is five courses high. The floor is partially paved with sandstone slabs, with a log/board bed frame in the northeast corner. A canvas tent probably formed the upper walls and roof. About four meters due south of the cabin door is a driftwood log "fence". This structure is made of stacked logs up to four courses high. It may have been a windbreak. Artifacts date from 1900-1920 to the mid-1930s. In FY98 monitors found a cist feature eroding in the drainage near the cabin.

#### ***Previous Work***

This site was initially recorded by Euler and Jones in 1978 and then re-recorded by NPS personnel in 1990 (Fairley, et al. 1994). GRCA documents from 1929 and 1930 reveal an investigation made by the Park Service on the lode mining claims by George W. McCormick and others in May 1913 (Busch 1930, Daly 1929). RCMP staff monitored the site semiannually from FY93 to FY98 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d). In FY98 it was determined that annual monitoring would suffice, therefore monitoring only occurred once in FY99 and FY00 (Leap and Kunde 2000b, Leap, et al. 2000a). See Hereford (Hereford, et al. 1996b) for a photogrammetric topographic map of the immediate area. In FY95 the cabin and associated artifacts were photographed with a medium format camera. Currently, and prior to the inception of this program, NPS trail crews have maintained the trails in the area. From FY93 to the present monitors have observed visitor impacts (trailing and collection piles). It has been suggested that C:13:098 be considered for an education and interpretation stop along the river corridor. Visitation to this site has resulted in impacts to the adjacent sites and increased gullying in places where incipient trailing exists. The creation of a loop trail around this site should be considered as a means for preventing further destruction to the other sites along the delta. This site is very visible and is located near a heavily used backcountry trail. Most of the visitor impacts were observed in the fall, after the summer season.

#### ***Monitoring Recommendations***

The site is unchanged related to physical impacts. Continue annual monitoring. Consider the construction of a loop trail to curtail visitor impacts on the way to the cabin.

### **C:13:099 Structure-Thermal Feature Complex (Palisades Delta)**

#### **Semiannual Schedule**

This site contains two loci of fire-cracked rock, buried and collapsed structures and artifacts. Archaeologists identified several charcoal lenses, burned rock features and artifact concentrations. Many of the features are eroding out of the coppice dunes, bisected by a highly active drainage system. The drainage system has uncovered the majority of this site since 1978, evidenced by several newly exposed features recorded by GRCA and RCMP archaeologists. FY94 monitors recorded Features 6 and 7 eroding from the active drainage. FY95 monitors recorded Feature 8 eroding from the active arroyo. RCMP staff identified two new probable cists eroding from the active arroyo in FY98. RCMP archaeologists tested the probable features in FY99 and did not discover cultural material. Since 1990, RCMP staff discovered numerous lithics and sherds eroding from the active arroyo and scattered throughout the drainage system. An assemblage of forty sherds suggests an Early-mid Pueblo II Puebloan occupation. Lithic evidence from this site includes two mano-like objects, ground to create a knife-like edge, as well as pecked grinding stones and hammerstones. Five charcoal samples were taken from several features on-site in the early 1990s. Dates ranged from 140 years B.P. to 1410 years B.P.

#### ***Previous Work***

Archaeologists originally recorded the site in 1978. Prior to the implementation of the monitoring program (late 1980s) GRCA conducted excavation and collected samples of a deteriorating feature (Feature 3). The RCMP staff monitored C:13:099 semiannually since FY93 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a,

Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). FY94 monitors recommended trail work, installing checkdams, total station mapping and subsurface testing. FY95 monitors recommended trail work, planting vegetation, installing checkdams, subsurface testing, data recovery and total station mapping. In FY95 the GRCA trail crew performed trail obliteration work along the Beamer Trail, which relocated the hiking trail near the river to reduce visitor impacts.

In September 1995 RCMP staff and representatives from state and federal agencies, and tribal entities constructed 44 checkdams at C:13:099 (Leap and Coder 1995). C:13:099 is the first location where Zuni-style checkdams were built in the river-corridor. Archaeologists used a photogrammetric map (Hereford, et al. 1993) for recording, prior to completion of a total station map in FY97. Each checkdam was photo-documented before and after its construction with 35mm prints and slides. FY96 monitors recommended additional trail work and planting vegetation. Trail obliteration work was completed in FY97. RCMP staff conducted additional monitoring efforts during the research flow of 1996 (Balsom and Larralde 1996). FY97 monitors recommended checkdam maintenance and data recovery. FY98 monitors recommended data recovery, planting vegetation and checkdam maintenance. Checkdam maintenance projects were completed in FY97 and FY98 (Leap, et al. 1997a, Leap, et al. 1998d). Monitors recommended medium format photography and projects were completed in FY95, FY96 and FY98 and FY01 [Leap, 1995 #237; Leap, 1996b #25; (Leap, et al. 1998d). FY99 monitors recommended trail work, planting vegetation and data recovery. Archaeologists conducted feature excavation and exploratory testing at Features 1, 3, 7, 9 and 10 in FY99. RCMP will disseminate the results of this project after an analysis is completed. FY99 monitors recommended more extensive excavation. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). During FY2000 CRF river trips it was determined that planting arrowweed and grasses along the side of the trail that borders this site may aid in curtailing increased visitation. No checkdam maintenance was required in FY2000.

### ***Monitoring Recommendations***

All features are unstable. The arroyo has been very active and the sediments in the upper playa area are comprised of a lot of clay and salt resulting in erosion. Checkdam maintenance is required here and should continue annually. Data recovery should also continue. Continue annual monitoring.

### **C:13:100 Pueblo (Palisades Delta) Annual Schedule**

This site is an open Pueblo II habitation site. Feature 1 is a rectangular habitation room. Feature 2 is another probable habitation room with a possible south entrance; it has standing walls two to three courses high. Adjoining Feature 2 is Feature 3, a small, more difficult to define structure; there may be another room attached to the southwest wall of Feature 3. Features 4 and 8 are probably associated rooms. Both features are exposed in an arroyo, with walls two to three courses high. Features 5 and 6 are the remains of slab-lined cists of Dox Sandstone. A charcoal stain in a trail evidences Feature 7. South of the dwellings is an eroding drainage two meters across and 50 cm deep. Lithics and ceramics are scattered down the slope directly above the drainage. There is a heavy groundstone concentration near Features 5 and 6. Groundstone/tools include six manos, four metates/slabs, eight hammerstones, and two sandstone knives. Seven ceramic sherds were also found. During the September 1995 erosion control project, archaeologists located a new feature (Feature 9) consisting of upright Dox slabs in an arroyo. FY97 monitors discovered two new features. Feature 10 is a charcoal lens north of Feature 7 and Feature 11 is a circular cist/hearth eroding from the drainage.

### ***Previous Work***

Archaeologists originally recorded C:13:100 in 1978 and it was monitored by GRCA archaeologists until FY92. Beginning in FY93, the RCMP staff monitored the site semi-annually (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). FY94 monitors recommended revegetation work, trail work, checkdam installation, total station mapping and stabilization. FY95 monitors recommended planting vegetation and trail work due to heavy visitation. The RCMP staff conducted appropriate assessments and in FY95 trail work and checkdam installations were conducted (Leap and Coder 1995). FY95 monitors decided that no vegetation would be planted.

This site received additional monitoring during the research flow of 1996 (Balsom and Larralde 1996). FY96 monitors recommended additional trail work. The area received further trail obliteration work in FY97 and surveyors completed

a total station map in June 1997. Prior to completion of the total station map, RCMP staff used a photogrammetric topography map to plot additional features (Hereford, et al. 1996b). Monitors recommended medium format photography and projects were completed in FY95, FY96, FY98, and FY01 (Hereford, et al. 1993). FY98 monitors recommended checkdam maintenance, testing and data recovery at Features 5, 6, 7, 9, 10, and 11 before losing more cultural information. The RCMP staff and Zuni Conservation Project staff completed checkdam maintenance in February 1998. FY99 monitors again recommended data recovery at Features 5, 6, 9, and 11. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). Checkdam maintenance in FY2000 resulted in the alteration of four checkdams.

An extensive photographic record of the Palisades delta extends back to the early 1900s. RCMP staff used this record to reconstruct the predam Palisades environment. Long-term photographic replications indicate the pervasive loss of beaches and sediment in this area since the construction of Glen Canyon Dam. A 1909 Stone expedition photo confirms that the predam Palisades shoreline consisted of broad beaches and abundant sediment. Currently, the shoreline is devoid of sediment consisting of a large expanse of exposed river cobbles. It was suggested by the GRCA Revegetation crew that intensive planting in this area between the trail the site occur, filling in the dune with arrowweed and grasses to curtail future visitation.

### ***Monitoring Recommendations***

Features 5, 6 and 9 have had slight movement of sediments and rocks. Features 2, 3 and 10 are unchanged since last monitored. Feature 7 appears to be completely gone, blown out by active gullying. Checkdam maintenance is recommended and annual monitoring should continue.

### **C:13:272 Small Structure (Palisades Delta) Biennial Schedule**

This is a multi-component site with two separate loci. Locus A consists of two masonry structures (Features 1 and 2) with a sparse scatter of artifacts, and a more ephemeral feature (Feature 3) consisting of a curving cluster of mostly small sandstone rocks eroding out of a deflated area. These rocks seem too small for building elements, but do not look fire-cracked either. Artifacts are generally sparse at this locus, but include sherds, lithics, a metate, a two-handed mano, and a small mano with a beveled face that may also have been used as a knife. Locus B contains two concentrations of sandstone cobbles (Features 4 and 5) that may be hearths. No artifacts are associated. Ceramics suggest a PII date for Locus A and a protohistoric date for Locus B.

### ***Previous Work***

This site was originally documented by J. Balsom and H. Fairley in 1984 and recorded in greater detail by NPS survey personnel in 1990 (Fairley, et al. 1994). The site has been monitored annually since FY92 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). The drainages situated within the site have been studied by geomorphologists (Hereford, et al. 1993, Thompson and Potochnik 2000) and have been mapped on a topographic map using aerial photogrammetry (Hereford, et al. 1993). In 1991 H. Fairly collected carbon from Feature 5. The dates range from 330+/- 50 to 40+/- 60 B.P. C:13:272 was also one of the sites monitored prior to and after the spike flow (Balsom and Larralde 1996, Burchett, et al. 1996). Medium format photographic replication began in FY95 and continues today. In FY99 a soil description encompassing the site area was completed by NRCS (Lindsey and Fisher 1999). The Beamer Trail transected the site prior to FY93, adding to the adverse impacts. The GRCA trail and rehabilitation crews rerouted the trail below the site in 1993. Since then, the old trail has not received use. NPS trail maintenance will continue.

### ***Monitoring Recommendations***

Sediments have moved from within Feature 1. Feature 3 has minor rock movement though lots of cryptogamic soils are present. Feature 5 has deflation in the middle of the feature and a prickly pear cactus is growing in the roaster. All other features are stable. Runoff is now being transported along an entrenched trail. The old trail does have vegetation growing in it though water continues to flow in the trail. No sign of human visitation was observed. Overall, the features have not changed. Continue biennial monitoring and watch Feature 5 for exposure of cultural material due to deflation.

**C:13:273 Roaster Complex  
Annual Schedule**

This site consists of four roasting features, a slab-lined cist and two artifact concentrations. The roasting features all contain fire-cracked rock and charcoal. The artifact concentrations at AC-1 include over 50 items of lithic debitage and about 15-25 ceramic items. The artifact concentration at AC-2 consist of seven flakes, ten sherds, and one piece of groundstone. Feature 1, a large donut-shaped roasting feature, is similar in morphology to many of the roasters in the western Canyon. Ceramics indicate an early Pueblo I to Pueblo II Cohonina and Puebloan occupation. Radiocarbon dates taken from Feature 5 indicate an earlier occupation of AD 575 to AD 775.

***Previous Work***

Archaeologists recorded the site in 1990 (Fairley, et al. 1994) and the RCMP staff monitored it in FY93, FY95, FY96, FY97, FY98, FY99 and FY00 (Coder, et al. 1994b, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). FY95 monitors recommended stabilization and retrailing. In FY95 RCMP staff conducted archaeological clearance work prior to a GRCA trail crew retrailing project (Leap 1995c). FY96 and FY97 monitors recommended stabilization for Feature 3 due to its precarious location on the edge of an active drainage. FY97 monitors recommended data recovery for Features 3 and 5. In FY97 surveyors mapped the site with a total station instrument, RCMP staff conducted a data recovery assessment and archaeologists excavated Feature 5 (Yeatts 1998). FY99 monitors obliterated an access trail from the side canyon that directly impacted Feature 4. Because the Beamer Trail bisects the site, access and visitation are continued impacts. The GRCA trail crew maintains the trail in this area.

***Monitoring Recommendations***

Features 1, 2, and 3 are unchanged. Continue annual monitoring and NPS trail maintenance work. The site appears unchanged since April, 2000.

**C:13:291 Small Structure  
Annual Schedule**

The site consists of standing walls of several structures and Dox Sandstone cists. Feature 1 is a two-meter long wall with a juniper post just downslope. Feature 2 is a slab-lined cist with a room exposed in a cutbank. Feature 3 is a wall exposed in a gully. Feature 4 is a hearth or cist. Feature 5 is a cluster of Dox slabs that may be coursed. Artifacts include nineteen sherds and lithics, including a chopper, a hammerstone, and a bi-edge tool. Sediment and slope wash cover the site to a depth of more than one meter in some areas. Apparently the site was constructed on a terrace, and has since been covered periodically by slope wash and fluvial sand. During the initial recording in 1988 a metate and mano were measured, documented and relocated. FY95 monitors noted that Feature 2 was completely obliterated by the river-based arroyo. FY96 monitors discovered a Tusayan Whiteware/Sosi Black-on-White sherd below Feature 3. Artifacts indicate a Mid-late Pueblo II Puebloan occupation. Feature 6, a cist, was located by M. Yeatts during a total station mapping project.

***Previous Work***

Archaeologists originally recorded the site in 1988 and again in 1990 (Fairley, et al. 1994) The RCMP staff monitored the site annually since FY92 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). Monitors recommended checkdams and total station mapping in FY94, but after further assessment, the RCMP staff and Zuni conservators concluded that the drainages were too mature for checkdams. FY95 monitors recommended some form of stabilization for Features 1 and 4. During the research flow of 1996, visitors created a trail through the site on their way to Unkar Delta. The research flow created extensive cutbank erosion below the site, obliterating the formerly used trail. The RCMP staff obliterated the newly created trail in FY97, at which time a total station map was completed. Additional monitoring efforts including medium format photography were also conducted during the research flow (Balsom and Larralde 1996). FY98 monitors recommended testing, data recovery, radiocarbon samples, and dendro samples. FY99 monitors recommended data recovery for Features 1, 4 and 5, and continued trail maintenance. Minor trail maintenance was conducted in FY99. RCMP staff could not collect charcoal from the site in FY99 due to the charcoal disappearance through intensive erosion. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). Continued on-site trailing has been attributed to river-runners walking from a nearby camp to the Unkar Delta. In FY2000 the GRCA Revegetation crew planted seedlings in the area above Feature 5. CRF personnel rerouted the trail below the site, near the river in December, 2000.

### ***Monitoring Recommendations***

Feature 3 has had minor slump of sediments on the east side of the structure. Feature 6 looks as if minor slumping also occurred. The remaining features are unchanged. The trail bisecting Feature 5 is very visible and still in use. Ortho photos from the NPS may enable better measurements to understand bank retreat rates. Continue annual monitoring for newly eroded materials.

### **C:13:321 Roaster Complex Annual Schedule**

This site consists of four roasting features and a rubble mound of Dox Sandstone. The rubble mound may be associated with a historic cabin (C:13:092) located south of this site. Ceramics, fire-cracked rock and a shaped Dox Sandstone "lid" were found on-site. Over thirty flakes are present in the roasting features, as well as groundstone including four mano fragments and two cobbles. Ceramic evidence includes several Puebloan sherds ranging from A.D. 1050-1200, though specific cultural affiliation remains undetermined. This site may be associated with C:13:009.

### ***Previous Work***

Archaeologists originally recorded the site in 1989 and GRCA personnel monitored it until transferred to the River Corridor Monitoring Project. The RCMP staff have monitored the site annually since FY93 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). FY94 monitors recommended total station mapping and radiocarbon dating of Feature 5. FY95 monitors recommended mapping, testing and stabilization of Feature 5 in FY95. This site was one of three sites selected for data recovery prior to the research flow in 1996. RCMP staff conducted excavation at Feature 4, the only feature that would have been impacted by the flood. After excavation, the RCMP staff determined that Feature 4 had no subsurface deposits (Balsom and Larralde 1996). Monitors also took medium format photography before and after the flood (Leap 1995b). See Hereford (Hereford, et al. 1993) for photogrammetric mapping used prior to the completion of a total station map of the site in FY97. FY97 and FY98 monitors recommended continued close monitoring of Feature 5 due to ongoing erosion. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). FY00 monitors replicated medium format photographs taken prior to and following the 1996 research flow.

### ***Monitoring Recommendations***

Minor eolian movement and exposure of artifacts is occurring at Features 1 and 2. Feature 3 has also had further exposure of cobbles and fire-cracked rock due to surface erosion and eolian movement of sands. The vegetation has died off in the center of Feature 5 and more rocks have been exposed at the base of the feature. Feature 6 is unchanged. Continue annual monitoring. The dunes have been extremely active and Feature 5 will likely be further exposed.

### **C:13:323 Thermal Feature Four Year Schedule**

C:13:323 consists of a single eroding hearth and an associated lithic assemblage which includes three bifacial tools and lithic debitage. The site is located on a west-facing dune at the mouth of a major canyon.

### ***Previous Work***

This site was initially recorded by the Park Archeologist in November of 1989. Radiocarbon samples were taken from the hearth, yielding an accelerated date of 390 to 340 B.C. indicating an Archaic occupation. The hearth was also profiled at the time the carbon sample was taken. NPS personnel did more intensive recording and analysis at this location in April and September of 1990 (Fairley, et al. 1994). This site was monitored in FY94 and FY98 (Coder, et al. 1995a, Leap, et al. 1998d) and has been included in the topographic map produced by Hereford et al. of the Tanner region (Hereford, et al. 1993).

### ***Monitoring Recommendations***

Dune sands have been reworked. The fire-cracked rock is more covered with sand as are the artifacts. No sign of human visitation was observed. Although the site has been reworked by dune sands, the dunes and the site are in a very fragile environment. Continue monitoring every four years due to the potential of buried remains being exposed.

**C:13:325 Roasting Feature  
Inactive Schedule**

This site consists of a prehistoric roasting feature containing a one-handed mano and ceramics. A historic component is also present, consisting of the historic remains of a small corral. Scattered driftwood planks and poles, plus several upright posts are arranged in a circular shape. Milk and food cans, cable and barbed wire are strewn about the site area. FY94 monitoring staff recorded a .30 cal. shotgun shell near one of the upright posts.

***Previous Work***

This site was initially recorded by NPS survey personnel in September of 1990 (Fairley, et al. 1994). The site was monitored in FY94 and FY98 (Coder, et al. 1995a, Leap, et al. 1998d).

***Monitoring Recommendations***

No physical impacts were noted. The site is located on an old debris fan, dating to the early Holocene or late Quaternary period. If runoff or gulying were to occur here, it would only down cut to approximately ten centimeters. Since September, 1994 visitors have moved the logs around at Structure 2 to make it into a square. Because any erosion here would not damage the site, it is recommended that the site be moved from a four year schedule to the inactive monitoring list.

**C:13:327 Roasting Feature  
Biennial Schedule**

This is a campsite consisting of several fire features, concentrations of lithic debris, bone, and a single Moenkopi corrugated sherd. The site is situated on the edge of a high alluvial cutbank. It is also adjacent to the Hance-Tanner Trail. A roasting feature, slab-lined hearth, a 5 meter diameter lithic concentration which may be associated with the roasting feature, and charcoal lenses in adjacent arroyo cuts were discovered during geomorphologic research activities on-site.

***Previous Work***

The site was originally recorded in 1990 (Fairley, et al. 1994) and monitored in FY96, FY98, and FY00 (Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b). NPS personnel conducted test excavations in conjunction with trail work in 1992. Carbon samples taken at this time date the site from the late Archaic age through the 16<sup>th</sup> century, indicating multiple use of the area. This site is included in the Hereford et al. topographic map of the Tanner region (Hereford, et al. 1993). Retrailing took place during FY96 and obliteration of the old trail occurred in FY97 (Leap, et al. 1996b). Checkdams were recommended in FY96 and an assessment for stabilization was conducted prior to construction of three checkdams and terrace fortification in FY97 (Leap, et al. 1997a). Total station mapping occurred in FY97 upon completion of stabilization work (Leap, et al. 1997a). In FY99 the Zuni Conservation Project staff performed maintenance on one checkdam (Leap and Kunde 2000b). This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000).

***Monitoring Recommendations***

At Feature 1, bone is eroding out of the roaster. Gullies are developing and eolian erosion is deflating the feature. Feature 2 the lithic concentration, is extremely deflated (wind erosion), approximately 50 cm deep by 1.5m in diameter of soil has been lost. No human disturbances were noted. Either data recovery or more detailed recording of the features being lost are recommended at this location. Continue annual checkdam monitoring and biennial site monitoring.

**C:13:329 Small Structure  
Biennial Schedule**

This is a Pueblo II site consisting of a small rockshelter with a charcoal and bone scatter, an artifact cluster, and a small circular rock feature. Only a small portion of the site may be visible, with the remainder buried under dune deposits. A single Tusayan White Ware sherd is present on-site. This site is located in a shallow overhang and an associated system of reworked dunes.

***Previous Work***

This site was initially recorded in 1990 (Fairley, et al. 1994) and monitored in FY92, FY93, FY95, FY97, and FY99 (Coder, et al. 1994b, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 2000a).

***Monitoring Recommendations***

The overhang is unchanged. Feature 2 is being impacted by active gullying. In 1996 the gullies appeared to be filling in. Today, they have downcut creating a nick point one meter deep. Three nick points are adjacent to Feature 2. Feature 3 is unchanged. No sign of human visitation was observed. Recommend measuring gully entrenchment at this location. If the gully at Feature 2 moves westward, more cultural material may be exposed. Assess for checkdam installation. Continue biennial monitoring.

**C:13:334 Structure-Thermal Feature Complex  
Three Year Schedule**

C:13:334 is an open habitation site with a fire feature, a rock outline, a circular cist and a lithic/sherd scatter. Lithic artifacts include two probable hammerstones and a Tapeats Sandstone mano. Thirteen sherds indicate a Late Pueblo I-early Pueblo II Cohonina affiliation. The site is located on a low sandy terrace near a large playa. A backpacker in September 1996 reported a white biface associated with this site.

***Previous Work***

Archaeologists initially recorded the site in September 1990 (Fairley, et al. 1994). The RCMP staff monitored it in FY93, FY95, and FY99 (Coder, et al. 1994b, Coder, et al. 1995b, Leap, et al. 2000a). Also see Hereford's publication for photogrammetric mapping of the Palisades Delta (Hereford, et al. 1993). Monitors have not recommended any remedial actions for this site.

***Monitoring Recommendations***

Feature 1 has increased vegetation. Feature 2 shows minor evidence of alluvial erosion. Feature 3 has more vegetation. Feature 4 has rock movement and some alluvial erosion. No human disturbances were noted. Continue monitoring every three years. This site has the potential to yield very good contextual information. Monitoring may ensure that impacts will not effect the integrity of this site.

**C:13:337 Roasting Feature  
Five Year Schedule**

The site consists of a circular distribution of fire-cracked rock, some of which are spalls, and most of which are fist-sized or smaller. This assemblage is assumed to be the remains of a roasting pit, or perhaps an earth oven. No charcoal-stained soil or charcoal fragments were associated with this feature. A few lithics co-occur with the fire-cracked rock scatter. Cultural affiliation is unknown.

***Previous work***

The site was initially recorded by NPS survey personnel in September 1990 (Fairley, et al. 1994) and monitored for the first time in FY97 (Leap, et al. 1997a).

***Monitoring Recommendations***

The feature is stable and unchanged. No new impacts, physical or visitor-related were observed. Continue monitoring every five years due to the history of active eolian and alluvial erosion at this site.

**C:13:338 Roaster Complex  
Four Year Schedule**

This is an open site consisting of roasting features, a possible hearth/cist and a lithic scatter. No ceramics are present on-site. Four of the five features lie within two meters of the Hance-Tanner trail. Feature 1, a possible roasting feature, is a U-shaped arrangement of rock at the south edge of the site. One meter north of this is Feature 2, an elongated rubble pile of sandstone, limestone, and some fire-cracked rock. Twenty meters north, along the trail, is Feature 3, another roasting feature up to three meters in diameter of sandstone, limestone and cobble fire-cracked rock, and abundant charcoal. North of this is Feature 4, a slab-lined feature about a half meter in diameter. Feature 5

is a one-meter diameter concentration of charcoal-stained soil, and Dox sandstone, limestone, and cobble elements. The site is located on a dissected alluvial terrace.

#### ***Previous Work***

The site was originally recorded in 1990 (Fairley, et al. 1994) and monitored in FY96 and FY98 (Leap, et al. 1996b, Leap, et al. 1998d). H. Fairley took a carbon sample from here in FY90 with a date range from A.D. 970 - 1195. Hereford et al. included the site area in their geomorphic map of Eastern Grand Canyon (Hereford, et al. 1993). Features 3 and 4, located in the Tanner Trail, were excavated in FY97 (Yeatts 1998). A total station map of the site was completed in FY97 (Leap, et al. 1997a).

When excavated in FY97, Feature 3 (a supposed roasting feature) turned out to be a scattering of fire-cracked rock lacking any formal structure. Charcoal obtained from the base of Feature 3 supported the Pueblo II period date assigned by the original recorders. Feature 4 proved to be a cist and was likely used for storage purposes. There was no evidence that it had been used as a hearth. The author noted that the site is possibly part of the same occupation episode as two sites to the northeast (C:13:340 and C:13:008). FY99 monitors recommended reducing the monitoring schedule from biennial to every four years.

#### ***Monitoring Recommendations***

The remaining features continue to be stable. Recommend continued monitoring every four years.

#### **C:13:339 Small Structure Annual Schedule**

The site consists of a mid-late Pueblo II habitation buried on an alluvial terrace, comprised of a burned rock midden, a buried hearth, and several rock alignments. The burned rock midden, with sparse lithics and ceramics, is located on the north side of the site. It is eroding out of a cutbank. Two historic hearths are also located on-site. The site is situated against a Dox Sandstone cliff.

#### ***Previous Work***

The site was originally recorded in 1990 (Fairley, et al. 1994) and monitored in FY93, FY95, FY96, FY97, FY98, and FY99 (Coder, et al. 1994b, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap, et al. 2000a). Retrailing was conducted in FY95 (Leap 1994a). Total station mapping was also completed in September 1998. Mitigation was proposed for this site in FY95 (Leap 1995a). This site was included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). Human impacts observed during the survey included distinct trails, trail caused erosion, and rearrangement of rocks. The Beamer Trail intersects this area down to a lower terrace. Planting vegetation may help stabilize the cutbank where Features 5 and 6 are located.

#### ***Monitoring Recommendations***

Some flat rocks have disappeared off the top of the cutbank above Feature 6. Feature 5 has slightly active surface erosion off the top of the feature. Features 2 and 4 are unchanged. Footprints are present leading directly to Feature 2. This may be of concern to the Puebloan tribes. Trail maintenance is recommended as there are a lot of footprints and previous trail obliteration work appears to have decomposed. Continue annual monitoring.

#### **C:13:343 Small Structure Annual Schedule**

This is a Pueblo II Kayenta/Virgin limited activity area consisting of a small, circular, Dox Sandstone slab-lined feature. At the top of a dune are two rock alignments; one measures four meters long and the other consists of two Dox Sandstone slabs. Artifacts consist of sherds, lithics, and fire-cracked rock; one chert scraper was noted on the survey. Features 1 and 2 identified during the survey are no longer part of this site due subsurface testing and a lack of cultural material. FY98 monitors identified Dogozshi and Sosi Black-on-White sherds in the active side canyon cutbank.

#### ***Previous Work***

Archaeologists recorded the site in 1990 (Fairley, et al. 1994) and the RCMP staff monitored it in FY92, FY93, FY95, FY97, FY98, FY99 and FY00 (Coder, et al. 1994b, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et

al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). Surveyors completed a total station map in FY97 (Leap, et al. 1997a). FY95, FY97 and FY99 monitors recommended testing at this site. RCMP staff tested Features 1 and 2 in FY99 and confirmed that the "probable cists" were actually naturally formed during a debris flow. RCMP staff performed a 100% surface collection of a 5 x 18 meter area on-site. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000).

### ***Monitoring Recommendations***

Active arroyo cutting and bank slump have resulted in the movement of artifacts into the main drainage. Feature 3 has had rock movement on the surface. Impacts on-site do not appear significant at this time. Continue annual monitoring for newly exposed cultural remains until data recovery occurs at Feature 3. Artifacts and charcoal continue to move downslope and into the arroyo.

### **C:13:346 Small Structure Four Year Schedule**

This is a storage site with an associated artifact scatter consisting of four slab-lined lists, over 100 PII sherds, and many lithics. The site is located on an alluvial terrace. According to Fred Nials (personal communication, 2001), the site is located on a small alluvial fan with the distal end cut off by a flood that removed the toe of the fan and alluvial deposits acquired at that time. The dunes are changing the course of the gullies and this will likely continue. Gullies should not downcut much further. The dunes are protecting the site but these dunes also continue to diminish.

### ***Previous Work***

The site was initially recorded by NPS survey personnel in September, 1990 (Fairley, et al. 1994) and monitored in FY96 and FY99 (Leap, et al. 1996b, Leap, et al. 2000a). The site was assessed for erosion control in FY96 and FY97. In FY97, nine checkdams were constructed by the Zuni Conservation Project personnel and a total station map was completed (Leap, et al. 1997a). Minor alteration of four checkdams by the Zuni team occurred in FY99 (Leap and Kunde 2000b). No checkdam maintenance was required in FY2000.

### ***Monitoring Recommendations***

No physical or human disturbances were noted. Monitoring will continue every four years though there should not be much downcutting or further erosion. After next monitoring, consider placing the site on the inactive list if there is no change. Continue annual checkdam monitoring.

### **C:13:347 Small structure Annual Schedule**

This site consists of a masonry wall and metate eroding out of a steep arroyo. Artifacts observed on-site include a Serpentine pipe fragment and a large Black Mesa Black-on-White sherd. No other artifacts were found.

### ***Previous Work***

Archaeologists recorded the site in 1990 (Fairley, et al. 1994) and the RCMP staff monitored it in FY92, FY93, FY95, FY96, FY97, FY98, FY99 and FY00 (Coder, et al. 1994b, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). FY94 monitors discovered a serpentine pipe bowl fragment eroding from the arroyo next to the wall. Monitors collected the pipe bowl fragment and curated it at the South Rim in FY94. FY95 monitors discovered a Black Mesa Black-on-White sherd eroding from the same location. FY96 monitors conducted medium format photography before the Research Flow and recommended checkdam installation and data recovery. FY97 monitors recommended data recovery, testing and installing checkdams. Zuni Conservation Project staff and RCMP staff assessed the site for preservation action in FY97 and determined that data recovery was appropriate. Surveyors completed a total station map for this site in FY97 (Leap, et al. 1997a). FY98 monitors recommended data recovery before more artifacts and information was lost. RCMP staff conducted exploratory testing in FY99 to determine if the exposed wall continued into the arroyo cutbank. Testing indicated that the wall does extend into the sediment and that cultural materials are still intact. The large Black Mesa Black on White sherd was collected during exploratory testing in FY99 due to its vulnerable position in the arroyo. FY99 monitors recommended more extensive data recovery.

***Monitoring Recommendations***

The bank of the arroyo has slumped, filling in an area previously described as an animal burrow. The main arroyo has been active and a large nick point is present below the metate. Surface erosion, arroyo cutting, slump and side canyon erosion are all active. Data recovery is recommended because there is active erosion. Furthermore, as seen in previous data recovery actions, the intact wall continues into the bank. The potential to retrieve cultural information on this, apparently small, Puebloan site would enhance the information in the area (across from Furnace Flats). It appears that two portions of the wall are now exposed. Further slump and continued arroyo cutting will result in a loss of this site. Continue annual monitoring.

**C:13:348 Artifact Scatter  
Biennial Schedule**

The site consists of a moderate to high-density artifact scatter with jacal fragments suggesting buried, perhaps burned, structures. An estimated 75-100 sherds and 50-75 lithics are eroding out of alluvial deposits, somewhat concentrating into two main areas. The largest concentration also contains the jacal fragments. Lithics reflect an unintensified, unstaged reduction strategy, using primarily medium to coarse-grained materials. A few groundstone items were also noted. A wide variety of sherd types are present suggestive of a Late PII-early PIII occupation. The site was evidently used for habitation. According to Nials (personal communication, 2001), the site is located on a small alluvial fan of eolian-transported sands on top of gravels. The distal end has been cut off by a flood that removed the toe of the fan and alluvial deposits acquired at that time. The dunes are changing the course of the gullies and this will likely continue. Gullies should not downcut much further. The dunes are protecting the site but these dunes also continue to diminish.

***Previous Work***

The site was initially recorded in September, 1990 by NPS survey personnel (Fairley, et al. 1994) and monitored in FY96 and FY98 (Leap, et al. 1996b, Leap, et al. 1998d). In FY96 it was recommended that the gullies be stabilized with brush linings to protect the buried remains from eroding down the drainage. Installation of five checkdams was completed in FY97 (Leap, et al. 1997a) and a total station map was completed for the site in FY97 (Leap, et al. 1997a). Minor maintenance work was conducted on the checkdams in FY99 (Leap, et al. 2000a). No checkdam maintenance was required in FY2000.

***Monitoring Recommendations***

No physical or human disturbances were noted. Monitoring will continue every four years though there should not be much downcutting or further erosion. After next monitoring, consider placing the site on the inactive list if there is no change. Continue annual checkdam monitoring and maintenance.

**C:13:349 Historic Structure  
Annual Schedule**

This multi-component site consists of a historic cabin/dugout, fire-cracked rock, and artifacts. No artifacts indicating function were found in association with the structure. The prehistoric components are both pre-ceramic and PI-II Puebloan. Charcoal fragments were observed below the structure in a drainage but appear to pre-date the use of the historic structure. There are eight remaining wood pieces to the historic structure. The back of the structure, consisting now of just one foundation pine plank, is banked against a dune. The prehistoric fire-cracked rock midden/roasting pits have good assemblages of sherds and lithics, but no formal tools were noted. The site is located in mesquite-anchored dunes. New charcoal lenses and fire-cracked rock have been exposed since the initial recording of the site.

***Previous Work***

The site was originally recorded in 1990 (Fairley, et al. 1994) and monitored annually since FY93 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). A profile was examined at this site to better understand flood and debris flows along the terrace (Hereford, et al. 1993) and incorporated into the Lower Tanner section of that report. The site was photographed with a medium format camera in FY96, FY97, and FY98 (Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d). A total station map of the site was completed in 1997 and the site was remapped in September 1998. The site was assessed for stabilization by the Zuni Conservation Project in FY97. Stabilization was determined to be inappropriate at this location. Feature 2 was completely excavated in FY99 (Kunde 1998b). This report will be

disseminated upon completion of artifact analysis in 2001. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000).

### ***Monitoring Recommendations***

Feature 3 looks fairly stable with the exception of downslope rock movement. Feature 4 looks stable also. Continue annual monitoring due to the arroyo cut. The arroyo could expose new cultural remains as was the case with Features 2 and 5.

### **C:13:355 Roasting Feature Five Year Schedule**

This site consists of four fire features and a pot break. Feature 1 is a pit-lined feature with small sandstone slabs and small limestone rocks. Features 2 and 3 are eroding hearths and Feature 4 includes a historic fire feature with a remnant of a Coconino Sandstone anvil stone. This is considered a late-prehistoric (A.D. 1200–1600) Paiute site with a possible historic component. Artifacts include a secondary flake with retouch along one edge and 15 Paiute Brown Ware sherds.

### ***Previous Work***

Archaeologists recorded the site in 1991 (Fairley, et al. 1994) and RCMP staff monitored it in FY92, FY93, FY94 and FY98 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1994a, Leap, et al. 1998d). H. Fairley collected charcoal for radiocarbon dates in 1992. Five dates were retrieved spanning from 130 +/- 50 years B.P. to as early as 880 +/-60 years B.P. FY98 monitors recommended an assessment for data recovery and stabilization at Feature 3. In April 1999 PA representatives and RCMP staff decided that no data recovery would be completed at this site (Leap 1999a).

### ***Monitoring Recommendations***

The gully adjacent to Feature 4 is inactive. Some rocks in the feature have slumped down, probably due to gravity. The river-based drainage is active. Feature 1 appears unchanged since last monitored. No sign of human visitation was observed. Feature 3 is gone, though the remaining features are well preserved and significant data still exists. Continue five year monitoring schedule.

### **C:13:359 Small Structure Three Year Schedule**

This site consists of habitation/storage features and associated artifacts. Feature 1 is a small, wet-laid wall that is probably the remains of a granary. It is within a shallow Bass Limestone overhang and is constructed of Dox and Tapeats Sandstone slabs. Feature 2 is a partially exposed structure evidenced by two walls at right angles that are partially buried in the sand. Two meters west, is a single vertical slab that may indicate another structure or feature. Feature 3 is another exposed structure comprised of a linear alignment of Dox Sandstone slabs with associated sherds and lithics. North of Feature 2 is a one meter diameter stain of charcoal flecks and two manuport stones. Nine sherds suggest an early-mid Pueblo II Puebloan affiliation. Other artifacts include a biface fragment, a chert pebble tool, and a light scatter of flakes. The site is located on a bedrock fan and terrace. The alluvial terraces were made via eolian processes before occupation of Features 2 and 3. Currently, the terraces are being eroded by eolian and runoff processes. Several small gullies are present, especially by the steeper terrace riser and these are incised according to Nials (personal communication, 2001).

### ***Previous Work***

Archaeologists recorded the site in 1991 (Fairley, et al. 1994) The RCMP staff monitored the site annually from FY92 to FY98 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d). FY94 monitors recommended total station mapping and subsurface testing for cultural deposits. FY95 monitors recommended site stabilization. FY96 monitors recommended excavating the entire site due to intensive erosion. A stationary camera was placed at this site in FY92 and removed in FY96. RCMP staff conducted data recovery at Feature 2 in FY97 (Yeatts 1998). Prior to excavation work, a total station map and assessment were completed for the site. Upon completion of the excavation work, the RCMP staff and Zuni Conservation Project staff installed checkdams in the gully that bisects Feature 2. Checkdam maintenance was required at Checkdams 1 and 4 in FY99. Checkdam monitoring in FY00 led to maintenance on two checkdams and construction of one new checkdam.

### ***Monitoring Recommendations***

Feature 3 shows minor surface erosion. Feature 1 has basal erosion but this is also minor. Recommend changing the monitoring schedule from biennial to every three years for newly exposed cultural material. Recommend additional checkdam installation. According to Nials (personal communication, 2001), the topography, location, size and the type of sediment being eroded make this location amendable to treatment with closely spaced checkdams. Continue monitoring every three years.

### **C:13:365 Small Structure Inactive Schedule**

This site is located on a sand-covered debris fan and consists of two highly deflated fire features. A few lithics are present in the debris fan and represent the only artifacts on-site. Cultural affiliation is unknown. In FY96 an additional hearth feature was identified eroding from the alluvial terrace.

### ***Previous Work***

This site was initially recorded by NPS survey personnel in October of 1990 (Fairley, et al. 1994) and monitored in FY92, FY93, FY94, and FY95 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a). The site was mapped in detail in FY96 (Leap, et al. 1996b). In FY96 this site was tested to determine effects from the beach habitat building flow (BHBF) (Balsom and Larralde 1996). This site was also part of a BHBF mitigation project in FY96 using medium format photography (Balsom and Larralde 1996).

### ***Monitoring Recommendations***

No impacts were noted with comparisons of 1990 photographs. Features 2 and 3 have not changed and Feature 1 is not a cultural feature. There is no drainage at this site. Water did run here at some point but now it is a blown out area. No human disturbances were noted. Recommend moving the site from the five year schedule to the inactive monitoring list. The information potential here is minimal. This may be a useful site for work in association with geomorphic research (F. Nials, personal communication, 2001).

### **C:13:371 Structure-Thermal Feature Complex Semiannual Schedule**

This is a mid-late Pueblo II Puebloan habitation area situated on a debris fan and on both sides of an unnamed side canyon. It consists of several rockshelter overhangs, some with dry-laid masonry walls, possible room rubble, several fire-cracked rock concentrations, and a lithic/ceramic scatter. Feature 1 consists of two small rock overhangs each with two to three course dry-laid masonry walls, possibly the remains of storage features. Features 2, 3, and 4 are fire-cracked rock concentrations. Feature 5 is an architectural unit consisting of two rooms. Feature 6 consists of two fire-cracked rock concentrations, one three meters in diameter and the other three by five meters with artifacts. Feature 7 is a fire-cracked rock scatter with a few artifacts. In general, each fire-cracked rock area has at least some artifacts associated with it. FY97 monitors found a Tapeats Sandstone mano below Feature 6. FY00-1 monitors identified a small circular alignment located 2 meters south of Feature 5, exposed in the drainage which was later determined not cultural. An overhang shelter with roasting feature was also identified on the talus slope above the site. Redwall and Kaibab Chert flakes are present in the overhang and charcoal is present inter-mixed in the roaster with fire-cracked rock.

### ***Previous Work***

Archaeologists recorded the site in 1990 (Fairley, et al. 1994) and the RCMP staff monitored it semi-annually since FY92 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). Monitors recommended a combination of data recovery, testing, planting vegetation, and installing checkdams since FY94 (Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). FY94 monitors recommended total station mapping and collecting charcoal. In FY95 monitors recommended checkdams and planting vegetation. In FY96 Zuni Conservation Project staff, GRCA trail crew, and RCMP personnel constructed three checkdams adjacent to Features 3 and 5 (Leap 1996a). FY96 monitors assessed the site for planting vegetation and decided that none would be planted. FY96 monitors collected charcoal from Features 2 and 4. Radiocarbon dates with a 2 sigma, 95% probability indicate Feature 2 dates ranging between AD 1665 and 1950 and a Feature 4 age range between AD 1445 and 1655 (Leap, et al. 1998d). Prior to the research flow of 1996, Feature 8 was tested for subsurface deposits. The results showed that Feature 8 was the remains of a debris flow (Balsom and Larralde 1996).

In FY96 the site was mapped with a total station instrument and medium format photos were taken before and after the Research Flow (Leap, et al. 1996b). FY98 monitors recommended testing Feature 6 and 7, collecting a charcoal sample at Feature 3 and full data recovery of Feature 2. FY98 monitors replicated medium format photos taken during the 1996 research flow (Leap, et al. 1998d). Zuni Conservation Project staff completed checkdam maintenance at Checkdam 2 in FY99. FY99 monitors noted that Checkdams 1 and 3 were in stable condition. FY00 monitors replicated medium format photographs taken prior to and following the 1996 research flow. Shoreline photographs continue to be duplicated annually. No checkdam maintenance was required in FY00.

***Monitoring Recommendations***

Feature 2 has increased gullying and surface erosion as seen by fire-cracked rock moving downslope. All features are in poor but stable condition. Continue semi-annual monitoring for newly exposed materials until excavations recommended in FY99 are completed (Leap and Kunde 2000b). Monitoring of the 3 checkdams will continue annually by the Zuni Conservation Project personnel.

**C:13:373 Thermal Feature  
Three Year Schedule**

The site consists of a large, concentrated amount of charcoal, fire-cracked rock, Hopi sherds, and animal bone. This material is eroding out of the west side of a dune just below the top. The charcoal is fairly recent in appearance. All of the sherds were severely re-fired in the "hearth" area. The site could be evidence of late prehistoric-early historic Hopi use of the area.

***Previous Work***

This site was initially recorded in 1990 by NPS personnel (Fairley, et al. 1994) and monitored in FY97 (Leap, et al. 1997a).

***Monitoring Recommendations***

More charcoal is exposed from the fire-cracked rock scatter. Eolian erosion and surface erosion are active. No sign of human visitation was observed. Recommend taking a carbon sample and the faunal remains should be analyzed. The charcoal and ceramics are more exposed and will likely slump down the dune. Valuable archaeological information is still present. Carbon samples should be taken before cultural materials erode down the slope or are covered over by eolian processes. Continue monitoring every three years.

**C:13:385 Small Structure  
Biennial Schedule**

C:13:385 is a 12th century Puebloan habitation site consisting of two slab-lined features and associated artifacts dominated by Kayenta ceramics with chipped stone and handtools, groundstone, and shaped slabs. The site is located on an alluvial terrace with an eolian component present on the surface.

***Previous Work***

This site was initially recorded in April 1991 (Fairley, et al. 1994) and was monitored in FY93, FY94, FY95, and FY99 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 2000a). A surface analysis unit was placed at this site in FY94, however, these units were discontinued by the project in FY96 (Leap, et al. 1996b).

***Monitoring Recommendations***

Artifacts continue to erode downslope. The cist and hearth are also experiencing active surface erosion. Some artifacts are missing and likely have eroded down off the terrace. This site contains a high density of different lithics and ceramics. A minor collection pile of approximately 20 sherds is on the north side of the site though this collection pile has not changed since first recorded in 1991. The gullies on-site are not manageable and it is recommended that Feature 2, a slab-lined cist be completely excavated before it erodes away. Continue biennial monitoring due to the potential for newly exposed materials.

**C:13:386 Small Structure  
Semiannual Schedule**

The site consists of a slab-lined cist, a structure consisting of two upright sandstone slabs with a two-handed mano and trough metate. A pecked stone is also present. Two Deadmans Black-on-Red partial bowls and a Sosi Black-on-White ladle have eroded from a dune between the cist and the activity area. The site dates around A.D. 1075 based on the presence of these two ceramic types. The site is on a dune slope just above the mesquite and driftwood zone. Eolian erosion continues to uncover more cultural material.

***Previous Work***

This site was originally recorded in 1991 (Fairley, et al. 1994) and monitored in FY93, FY94, FY96, FY98 and FY00 (Coder, et al. 1994b, Coder, et al. 1995a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b).

***Monitoring Recommendations***

Eolian erosion and deposition is occurring at Structure 1. Some of the artifacts have been buried, some artifacts are now being exposed. The newly exposed Deadmans Black-on-Red bowl was reburied with the other artifacts. Continue semiannual monitoring due to the recent exposure of diagnostic artifacts. The newly exposed artifacts suggest the presence of a more comprehensive site buried beneath the dune surface.

**C:13:389 Structure-Thermal Feature Complex  
Three Year Schedule**

The site consists of an overhang shelter (Feature 1) and two roasting features (Features 2 and 3). Feature 1 is a Dox overhang ledge and may be both prehistoric and the result of river-runner rebuilding/additions; matchsticks and recent-looking charcoal are in the shelter. Surface erosion at the base of the overhang has exposed charcoal and the stained living surface of the prehistoric occupation. Burned bone, lithics, a biface, and charcoal fragments are eroding out of this surface. North of the structure is an open area with a small retaining wall downslope and lithic material eroding downslope. Feature 2 is a large roaster north of Feature 1. A soil stain is at the top, on river-deposited sands. Boulders and cobbles are mounded around the feature and stacked rocks appear to stabilize or act like a retaining wall for the roaster on the north side. Flakes are downslope and on the feature itself. Feature 3 is a smaller roasting feature or fire-cracked rock midden downslope of Feature 1. The site has two possible components: Pueblo II and late prehistoric-early historic Paiute. The site is located in bedrock ledges overlooking a major rapid in Reach 5.

***Previous Work***

The site was originally recorded in 1991 (Fairley, et al. 1994) and monitored in FY96, FY97, FY98, and FY99 (Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap, et al. 2000a).

***Monitoring Recommendations***

Feature 1 looks good with no physical impacts. Feature 2 has a lot of cryptogamic soils and annual grasses. No new impacts were observed. Feature 3 also has abundant cryptogamic soils and has not actively eroded downslope. A faint trail runs through the site and leads to Feature 1. Several slabs and wood have been deliberately moved and it is likely that people have camped in the overhang. Recommend testing for subsurface depth in the overhang by Colorado River Funds because the visitation to Feature 1 may cause loss of integrity. Continue monitoring every three years as the roasters likely contain datable cultural remains.

**G:03:004 Roaster Complex  
Annual Schedule**

The site is located at the mouth of a major side canyon and is situated less than 100 m from an established boat camp. This site contains several roasting features, two rockshelters, rock images, and historic remains. The two rockshelters have a midden containing charcoal, burned soil, fire-cracked rock, and artifacts. One shelter has several historic mason jars and other trash dating to the 1930s, plus the inscription "M BUNDY". The ceiling of this shelter, below the inscription, has some faint hematite figures. The remaining features are roasting pits. In addition to the historic component, the site may be affiliated with both Pueblo I-III occupation and late prehistoric-early historic Pai/Paiute. A fire-cracked rock concentration with no artifacts on the downstream side of Indian Canyon is probably affiliated with the main site. During FY96 monitors added historic cans to the site map, and in FY97 monitors discovered a newly exposed slab-lined feature (Feature 8) between Features 1 and 2. This feature was completely excavated in November, 2000. In FY98 archaeologists recorded a chert awl in the midden area that was not previously identified.

### ***Previous Work***

This site was initially recorded in 1972 and revisited several times throughout the 1970s. Sherds were collected and analyzed and a few notes were taken. No further descriptive work or mapping was completed, but on each occasion more sherds were collected and typed. NPS survey personnel re-recorded the site in 1991 (Fairley, et al. 1994). From FY93 to FY95 the site was monitored twice a year and, in FY96 the monitoring schedule changed to annual (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). In FY95 retrailing and trail obliteration were completed and minimal work was completed on a total station map. In FY97 more trail work was needed and medium format black-and-white and color photographs were taken of the historic inscription. After trail work was completed in FY95 a letter was published in the Boatman's Quarterly requesting that visitors use the designated trail that leads directly to the "Bundy jars", and not traverse through the prehistoric areas (Bullets 1995 Summer). Commercial users did not honor this request and more trail work was needed in April 1997. RCMP staff drafted a second letter to the Park's concessionaire representative in June 1997 regarding commercial use of the area. This letter requested that the commercial guides use the new, designated trail or the commercial outfitters would be responsible for any necessary mitigation. All mitigation work has been conducted through NPS managed and funded projects. A final assessment for trail maintenance was conducted in FY99. This assessment was to implement trail work prior to excavations and to produce a plan for a new trail after excavations are completed. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). The features were mapped with a total station instrument in FY00 in preparation for data recovery work with the GRCA Fee Demo program. Data recovery occurred in 11/2000 on a Colorado Rive Fund river trip. A separate report is currently being produced (Hubbard et. al., 2001 draft).

### ***Monitoring Recommendations***

Surface deflation and compaction are occurring at Feature 4. Rodent burrows are present in the NW quadrant of the feature. Increased deflation is occurring at Feature 3. Surface erosion and wind deflation near Feature 6 have resulted in a loss of 2-3cm of soil. Rocks are being pedestaled here. The gully next to Feature 7 has been active, resulting in sediment loss. Feature 5 is unchanged. Feature 2 was partially and Feature 8 completely excavated, the report will be completed by summer, 2001. The Bundy Jars have been disturbed by visitation. A plastic snake, ants and peanut butter have been placed inside the jars. Compaction of the midden area near the jars continues. Continue annual monitoring.

### **G:03:006 Roaster Complex Inactive Schedule**

The site consists of four roasting pits (Features 1 – 4) and an overhang shelter (Feature 5). Sherds and lithics are associated with both areas. Feature 1 is a roasting pit composed of burned limestone cobbles. Just outside are fire-cracked rock clusters that appear to be discard piles. Features 2 and 3 are side-by-side roasting features. Feature 2 has a circular depression and may have been placed in the former discard pile of Feature 3. Charcoal is associated with both features. Feature 4 is another roasting pit with a shallow, conical-shaped interior depression with charcoal fragments. Feature 5, the shelter, is 7 m long, 2 m wide, and of variable height. Four sherds as well as lithics are located outside the shelter. Ceramics suggest both PI – PII Formative and late prehistoric-protohistoric Pai occupation.

### ***Previous Work***

R. Euler originally recorded this site in 1973. In 1991, the site was mapped and recorded in detail by NPS survey crews (Fairley, et al. 1994). Monitoring occurred in FY94 and FY98 (Coder, et al. 1995a, Leap, et al. 1998d).

### ***Monitoring Recommendations***

Features 1, 2, 4, and 5 are stable and unchanged. Feature 3 is stable but there is active sheet washing. No sign of human disturbance was noted. Recommend the site be moved from the four year to the inactive monitoring schedule. No impacts are occurring.

### **G:03:020 Roaster complex Annual Schedule**

The site is comprised of seven main features divided into two loci: A and B, each on opposite sides of a large side canyon. Locus A contains Features 1, 2, 5, 6, 7, 8 (a newly exposed hearth feature recorded by RCMP staff last year), and 9, a newly exposed charcoal concentration found during the FY99 excavations at this site. Locus B contains

Features 3 and 4. Feature 1 was originally described as being two charcoal lenses eroding from a high dune with associated fragments of burned bone. Feature 2 is a large "classic" donut-shaped roasting pit with a number of manos, charcoal, and a few flakes. Feature 3 is an eroding roasting pit with a discernable rock outline on top. Feature 4 is a diffuse scatter of fire-cracked rock. Feature 5 is a disturbed area of fire-cracked rock at the edge of the side canyon. Feature 6 is another eroding fire-cracked rock area with bone, and Feature 7 is a roaster deposit exposed by a small arroyo. Cultural affiliation is unknown, but presumed to be Pai and or Paiute.

### ***Previous Work***

The site was originally recorded in 1978 by R. Euler with further recording by NPS personnel in 1991 (Fairley, et al. 1994). The site has been monitored at least annually since FY92 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). Zuni Conservation Project personnel assessed the site in the fall of FY99 and determined that checkdams were not an appropriate stabilization procedure. In FY97 a total station map of the site was completed (Leap, et al. 1997a). This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). In the spring of FY99 Features 7, 8 and 9 were excavated. Results of the excavation will be written and sent to PA members after the collected samples are sent to the appropriate analysts. After excavations, trails were obliterated. The Zuni Conservation Project staff determined that the gullies and arroyo are too advanced to install checkdams. Mapping rate, depth and width of these drainages through time could provide excellent data on the progression and rate of erosional processes effecting cultural resources at this location.

### ***Monitoring Recommendations***

The main concern is gully advancement up to and within the east side of Feature 2 (the roaster). The arroyo that is below the gully has also been very active and exhibiting headward erosion. In general, the area has experienced heavy rains and overall surface erosion. The same gully NE of Feature 2 exhibits channel deepening by five centimeters. The arroyo needs to be remapped to study the rate of erosion. We already have a base map from 1997 in this location. Data recovery of Feature 2 is recommended because the erosion that is occurring at this site is very advanced and active. This is a very large, intact roasting feature with several artifacts throughout the discard pile. The information retrieved from this feature could provide information significant to all roasters of this size and shape in the western end of the Canyon. New artifacts have eroded from the gully at Feature 2, including a Partridge Creek Obsidian biface/uniface and a possible coyote canine from the same area.

## **Granite Park Delta**

Several sites are located on the Granite Park Delta including G:03:002, G:03:003, G:03:024, G:03:025, G:03:026, G:03:027, and G:03:028. Trails on the delta have been a documented impact for over twenty years. GRCA, RCMP and the Hualapai have conducted trail obliteration projects in the 1990s with some success. Recently, much of the access trail obliteration work conducted by GRCA in FY96 and FY97 to close off the upper terraces has been removed and new access trails formed. However, several trails on the upper terrace show encouraging signs of recovery. Grasses and cryptogamic soil are abundant throughout the obliterated trails near G:03:026 and G:03:28 and G:03:025.

Despite some success to curtail visitor-related impact on the delta, a substantial work project is needed in the future. GRCA Revegetation, Trail Crew, and RCMP archaeologists agreed that the trail obliteration project could take two to three days and be conducted on a fall CRF trip. Consultation with the Hualapai is currently under way to approve such a project and a request has been made to involve Hualapai cultural resources crew during the project. Detailed information regarding the current condition and recommendations for sites G:03:003, G:03:026 and G:03:028 are presented below.

### **G:03:002 Roaster Complex Four Year Schedule**

The site consists of at least 10 roasting features, an enigmatic rock alignment, and scatters of artifacts and fire-cracked rock. The terrace measures 100 m (N/S) by 40 m (E/W). The roasting features are of various configurations and stages of deterioration, and all have gneiss, schist, granite elements, and charcoal. Other ephemeral scatters of fire-cracked rock may represent additional eroding features. Ceramics appear to be mostly representative of late prehistoric through historic Pai and Paiute affiliation. Tools include an obsidian Desert Side-Notched projectile point, various manos, grinding slabs, and metates. A few historic artifacts were noted, possibly from Hualapai use of the area around 1860-1920. These artifacts include brown and purple glass, a metal Indian tinkler, and a knife-opened can.

### ***Previous Work***

The site was first recorded in 1962, revisited in 1972, and officially recorded in 1991 by NPS survey personnel (Fairley, et al. 1994). Site monitoring occurred in FY93, FY94, and FY95 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b). In FY95 the site schedule changed to biennial, and in FY97 the schedule was changed to every four years (Leap, et al. 1997a). Thompson and others (Thompson, et al. 1996) completed a photogrammetric topographic map in 1995. The features were plotted with a total station in FY96 and overlain over the photogrammetric map. The map identifies the terrace-based and river-based drainages, thus enabling RCMP personnel to direct their attention to the drainages that could impact the site. Also in FY96, GRCA completed trail obliteration. In FY97, the Zuni Conservation Projects personnel made an assessment and five checkdams were constructed in a drainage downstream of the site (Leap, et al. 1997a). In FY98 the checkdams were stable, however in FY99 heavy rains impacted the checkdams. Maintenance included alterations on three original checkdams and construction of two new checkdams. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). Checkdam monitoring in FY00 resulted in maintenance work at two checkdams (Leap and Kunde 2000b).

### ***Monitoring Recommendations***

Feature 4 appears stable with minor erosion on the west side of the roaster. Feature 8 looks unchanged. Feature 9 is stable with minor surface erosion. Bone fragments, most likely animal bone were noted at Feature 9. Feature 7 has erosion on the east side but it does not appear to be currently active. Features 5 and 6 have minor surface erosion. The gully on the east side of Feature 5 is moderately active. Feature 3 looks good except the mano could not be re-located. Feature 1 appears stable. The metate is undercut by a rodent hole. Features 10 and 11 appear unchanged. Feature 2 has channel initiation on the northwest side of the feature. No human disturbances were noted. Continue monitoring every four years due to the alluvial system and the continued exposure of new materials. Continue annual checkdam monitoring.

## **G:03:003 Roaster Complex (Granite Park) Annual Schedule**

The rockshelter (Feature 1) was originally recorded by G. Gumerman and R. Euler on 9/4/69, and the GRCA survey crew added four roasting features (Features 2-5) in 1991. Feature 1 is a shallow overhang and midden. There is a large amount of lithic debris, including obsidian flakes, an Elko base, a biface tip, and groundstone fragments. Charcoal, ashy soil, and fire-cracked rock are also present. Ceramics suggest both late Pueblo I to early Pueblo II Formative and late prehistoric-early historic Pai affiliations. The remaining features (Features 2-5) are roasters of varying sizes, some with tools and/or flakes, ceramics, etc. In the monitoring episode of FY92 monitors noted nails, more projectile points, and sherds, and the FY96 monitors found a projectile point at Feature 2 near the dripline and trail.

### ***Previous Work***

Euler and Gumerman initially recorded this site in minimal fashion in 1969. Sherds were collected and an analysis was completed. Field notes state that the condition of the site was "undisturbed" and the potential for a rewarding excavation was "excellent." Euler and Jones visited the site again in 1981. More sherds were collected and a simple sketch map was made. G:03:003 was recorded in more detail by NPS survey personnel in January of 1991 (Fairley, et al. 1994).

River corridor monitors visited the site in FY92 and FY93, twice in FY94, once in FY95 and then semiannually beginning in FY96 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). In FY95 site overviews were taken with a medium format camera. In FY96 the features were plotted with a total station unit and overlain on a topographic map created by Thompson and others (Thompson, et al. 1996). At this time the Zuni Conservation Project personnel also assessed the site for checkdam installation (Leap 1996a). Three checkdams were built in the river-based drainage downstream of the site (Leap 1996a, Leap, et al. 1996b). They were placed in this drainage at the suggestion of K. Thompson and K. Burke in FY96. Thompson and Burke felt that according to aerial photogrammatic maps, this particular drainage could cause some substantial site destruction if untreated. From FY96 to FY98 the three checkdams were in good condition with little to no maintenance required. In FY99, however, a heavy rainstorm occurred, and as a result, the Zuni Conservation Project staff and RCMP staff constructed ten new checkdams in the river-based drainage, and extensive work was completed on two of the original checkdams. A few large rocks were removed from the third original checkdam to define a central channel (Leap, et al. 2000a). The new checkdams need to be mapped in on the

1993 Hereford map with a total station. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). Checkdam monitoring in FY00 resulted in maintenance at three checkdams (Leap and Kunde 2000b).

The site receives a great number of visitors, and as a result, multiple trails bisect features and several collection piles exist. Aerial photographs taken over the last 25 years show a geometric increase in the social trailing at Granite Park in general. This trend is enhanced by the local big horn sheep that spend considerable time in this area due to the lush grass growth accompanied by the wet winters. NPS and Hualapai representatives have performed retrailing and trail obliteration in FY96 and FY97, yet people continue to visit the site. A letter was published in the *Boatman's Quarterly* by L. Jackson and L. Leap requesting river runners and researchers to minimize their impact to the area (Jackson and Leap 1996 Summer)

### ***Monitoring Recommendations***

The drainage leading off the talus to Feature 1 has several nickpoints and is deepening in some areas. Feature 3 has some minor deflation. Sheetwash is evident across Feature 5. Features 2 and 4 look to be in fair condition. Collection piles at the shelter were dispersed. Trails are all over the dune and the trail leading to Feature 1 is now a drainage. Continue annual checkdam maintenance. Assess in conjunction with the NPS Revegetation crew for planting vegetation at trail access points to the sites. Consult with the Hualapai for solutions to visitation problems. The trail leading to Feature 1 should be treated. Continue annual monitoring. Continue annual checkdam monitoring.

### ***Hualapai Tribal Information, June 2001 River Trip***

Trail obliteration work is necessary in the Granite Park Wash drainage to curtail further visitation on-site. As in the past, any trail obliteration work would then be monitored by the River Corridor Monitoring Project and changes reported to the Hualapai Tribe. This work could be conducted on a CRF river trip with approval from the Hualapai Tribe.

## **G:03:024 Roaster Complex Biennial Schedule**

The site consists of five roasting features with associated ceramics and lithics. The artifacts are concentrated around the fire-cracked rock middens as well as dispersed downslope. Tools include tabular grinding slabs, cobble manos, a drill/perforator, and a cobble chopper. Raw material types include Kaibab and Redwall Chert, chalcedony, and Partridge Creek Obsidian. Unidentifiable burned bone was also observed. The ceramic assemblage suggests use during Pueblo II occupation, late prehistoric-protohistoric Pai, and historic Pai and Paiute, the latter suggested by a few broken brown glass fragments and a metal artifact. In FY94 monitors found a chert biface west of Feature 2 newly exposed in an active gully.

### ***Previous Work***

The site was first recorded in 1991 (Fairley, et al. 1994) by NPS survey personnel and monitored in FY93, FY94, FY95, FY97, and FY98 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1998d). In FY96, GRCA, Hualapai representatives and RCMP personnel completed trail obliteration. A letter was published in the *Boatman's Quarterly* requesting minimal use of this area by researchers and river runners (Jackson and Leap 1996 Summer). A total station map of the features was completed and overlain on a topographic map produced by Thompson et al. (Thompson, et al. 1996). In FY97 the Zuni Conservation Projects personnel completed an assessment, and as a result, five checkdams were constructed near Features 2, 3 and 4 (Leap 1996c, Leap, et al. 1997a). In FY99 all checkdms had minor restructuring and an additional nine were installed (Leap, et al. 2000a). This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). FY00 checkdam maintenance required alteration at four checkdams and construction of one new checkdam (Leap and Kunde 2000b).

### ***Monitoring Recommendations***

Feature 3 appears stable however, it is adjacent to an active gully. This gully has checkdams. Feature 2 looks unchanged, the same gully adjacent to Feature 3 runs next to Feature 2 but it has not been active in this location. Rodent burrowing is active at Feature 2, bringing up extensive amounts of ashy soil. Features 1, 5 and 6 are unchanged. Feature 4 looks good but it is also adjacent to an active gully/arroyo. Feature 5 has a trail bisecting the

site. Continue annual checkdam monitoring and maintenance. Continue biennial monitoring due to the presence of active gullying.

### **G:03:025 Roaster Complex Three Year Schedule**

The site consists mainly of roasting features with some historic trash. Feature 1 is a fire-cracked rock scatter with a cluster of five partially buried limestone and sandstone slabs at the center. Feature 2 is a fire-cracked rock "ring" with a cleared center. Feature 3 is a "classic" donut-shaped roaster. Feature 4 is a bowl-shaped depression encircled by fire-cracked rock. Feature 5 is a ring of fire-cracked rock cobbles around a depressed, cleared center. Feature 6 is a cluster of five grinding slabs, three manos, purple glass, wire, and 45 Southern Paiute sherds from a pot break. Feature 7 is a jumble of slabs and cobbles with two lithics and a sherd in the vicinity. Feature 8 is a probable surface hearth--a concentration of fire-cracked rock with charcoal. Artifacts, except for the Southern Paiute utility ware sherds, are few, and include a crude biface and 10 or more tertiary flakes of a variety of material types. The historic trash is scattered throughout the site and includes a kerosene lamp base, tin cans, machined wood, and glass. The site assemblage possibly reflects both Paiute and Hualapai use of the area around the turn-of-the-century. In FY95 archaeologists documented two cairns eight meters north of Feature 1.

#### ***Previous Work***

This site was initially recorded by NPS personnel in 1991 (Fairley, et al. 1994) and monitored in FY93, FY94, FY95, and FY97 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a). After monitoring in FY95 the site was placed on a biennial monitoring schedule. In FY97 the monitoring schedule was once again changed to every four years (Leap, et al. 1997a). In FY96 the area was assessed for erosion control. As a result, GRCA and RCMP personnel and Hualapai representatives completed trail obliteration, and Zuni Conservation Project staff built three checkdams just outside the site boundary. At this time, the features were plotted with a total station and overlain on a topographic map produced by Thompson and others (Thompson, et al. 1996), and a letter was published in the *Boatman's Quarterly* requesting river runners and researchers not to disturb this area (Jackson and Leap 1996 Summer). In FY97 and FY98 minor checkdam maintenance was completed. No maintenance was conducted in FY99. Maintenance work was completed at one checkdam in FY00 (Leap and Kunde 2000b).

#### ***Monitoring Recommendations***

Features 1, 2, 3, 4 and 5 are stable. Feature 7 is located approximately two meters from a very active arroyo though the feature appears stable. Feature 6 is completely void of vegetation. A new headcut has formed approximately four meters south of Feature 6. Feature 8 looks good. All features have minor surface erosion. Ants and small rodents are having minor impacts at all features. Human disturbances were not noted. Continue checkdam maintenance and monitoring. Continue monitoring every three years.

### **G:03:026 Roaster Complex Three Year Schedule**

The site consists of seven roasting pits and two activity areas exhibiting several different phases of use and existing in various stages of deflation, from pristine to nearly eroded to their original baselevel. The sherds (and other artifacts) indicate late prehistoric-early historic and mid-historic (1850-1900) Pai use. Some flakes and tools were observed, including two biface items and an obsidian point. Groundstone was also located. Two fragments of pressed purple glass were observed near activity area A; perhaps pieces of a dish.

#### ***Previous Work***

The site was originally recorded in 1991 (Fairley, et al. 1994) and monitored at least annually since FY92 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). Carbon samples for Hereford's geomorphological research were collected from Features 2, 3 and 8 prior to the RCMP. Dates range from 190 +/- 50 to 520 +/- 50 B.P. Trail obliteration, retrailing, and vegetation work was conducted in FY96 and FY97 by NPS and RCMP staff. Upon completion of the trail work, the Hualapai and RCMP staff submitted a letter to the *Boatman's Quarterly* requesting no more visitation by commercial passengers and a decrease in the research conducted at Granite Park (Jackson and Leap 1996 Summer). In FY96 the features were plotted using a total station instrument and overlain onto a topographic map created by Thompson and others (Thompson, et al. 1996). The site was assessed in FY96 and as a result, five checkdams were constructed in the side canyon-based drainage (Leap, et al. 1996b). In FY99 four of these checks were

slightly altered and one new check was built. In FY99 personnel from the Natural Resources Conservation Services (NRCS) conducted some soil sieving and wrote a small report on the findings (Lindsey 1999). This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). No checkdam maintenance was required in FY00.

### ***Monitoring Recommendations***

Features 1, 2, 5, 6, and 7 are stable and unchanged. Feature 3 has an active gully on the west side of the feature. Several active rodent burrows are disturbing the feature and bringing ashy soil to the surface. Piping is occurring west of the feature and the gully. Feature 4 is covered by cryptogamic soil and herbaceous vegetation. No human disturbances were observed. Continue watching Feature 3 to see if the gully cuts deeper and starts to have a significant impact to the feature. It is recommended that the trail work be completed here on a CRF trip. The project will take an estimated three days to complete the work at all the sites on the Granite Park Delta. The Hualapai will be consulted about the proposal for work on the delta in November, 2001. There are three access trails that lead to this site. Two of the trails are on the west slope near the camp and one is near the side canyon. Both trails need extensive trail obliteration and revegetation. Some of the trails on-site have recovered since the FY96 trail obliteration effort, however, new trails are located along-side some of the previously obliterated trails. Prickly pear planted in FY96 has established throughout some of the trails. Deadfall could be collected on the delta and across the river for use in the trail obliteration effort. Continue annual checkdam monitoring and maintenance. Continue monitoring every three years.

### ***Hualapai Tribal Information, June 2001 River Trip***

It is the recommendation of the River Corridor Monitoring Project that the access trails leading from the camp site to the upper terraces be obliterated. Obliteration work would take one full day during a regularly scheduled CRF river trip. Obliteration would consist of deadfall and other vegetation to camouflage the access points long enough so that existing vegetation would have an opportunity to take hold and grow over the trail areas. This would should only be completed with the approval of the Hualapai Tribe.

### **G:03:028 Roaster Complex (Granite Park) Biennial Schedule**

The site is divided into six loci of activity (A-F). Locus A consists of two roasting features with fire-cracked rock, ash, charcoal, a lithic concentration and some ceramics. Locus B is a light scatter of lithic debitage, including a point base, and a sherd. Locus C is a tight concentration of about 20 flakes and a sherd. Locus D contains three "blow-out" or "dug-out" areas that may be wickiup depressions with associated flakes and fire-cracked rock, plus additional fire-cracked rock and lithic concentrations and a grouping of buried slabs. Locus E is an area of possible domestic activity, represented by four possible wickiup depressions--some with encircling stone "foundations", and associated lithics, sherds, groundstone, and fire-cracked rock. Locus F has one well-defined roaster, and other fire-cracked rock concentrations that may represent more roasting features. Lithic debitage consists of a wide variety of cherts and obsidian, and reflects expedient reduction. Pueblo II Formative sherds dominate at Loci A, B, and E, while late prehistoric-early historic Pai sherds are seen at Loci C, D, and also E. The site is located on low stabilized dunes covering an alluvial terrace.

### ***Previous Work***

The site was officially recorded in 1991 by NPS personnel (Fairley, et al. 1994) and monitored in FY93, twice in FY94, once in FY95, FY97, FY99, and FY00 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a, Leap and Kunde 2000b, Leap, et al. 2000a). The GRCA trail crew obliterated extensive trailing in FY95. In FY96 the features were located with a total station instrument and overlain on the 1995 topographic map produced by Hereford (Hereford, et al. 1996b). In FY96 GRCA trail crew also completed trail obliteration, retrailing, and vegetation to deter visitation (Leap 1996b). This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). FY2000 monitors recommended that trail obliteration and planting cactus and grasses should be completed. All of the work on the delta will take an estimated three days. Deadfall could be collected on the delta and across the river for use in the trail obliteration effort. The Hualapai will be consulted about the proposal for work on the delta.

### ***Monitoring Recommendations***

Loci A, B, and C are stable with no change. Cryptogamic soils have increased in these locations. Locus D is stable with some sheet washing. Feature 4 of Locus D has no change. Locus E has sheet wash and more gravel sized rocks are exposed in the cryptogamic soil. Minor to minimal impacts are occurring but the locus is still stabilized by the cryptogamic soil. Surface erosion is evident in three of the loci. The most significant erosion is occurring along the south side of Feature 1. Piping is occurring below Feature 3, and this is moving towards the feature. Faint trails are still present and still in use. Trailing is primarily located in and around Features 1 and 2. Trail maintenance should continue by the GRCA Rehabilitation crew annually in conjunction with Hualapai Tribal consultation. The area will be assessed for work on an upcoming CRF trip. Continue biennial monitoring.

### ***Hualapai Tribal Information, June 2001 River Trip***

It is the recommendation of the River Corridor Monitoring Project that the access trails leading from the camp site to the upper terraces be obliterated. Obliteration work would take one full day during a regularly scheduled CRF river trip. Obliteration would consist of deadfall and other vegetation to camouflage the access points long enough so that existing vegetation would have an opportunity to take hold and grow over the trail areas. This should only be completed with the approval of the Hualapai Tribe.

### **G:03:029 Roaster Complex Five Year Schedule**

G:03:029 consists of two overlapping roasting features, several flakes, and a single Cerbat Brown Ware sherd. The site is located on dune-covered Tapeats Sandstone ledges and is protected by vegetation.

### ***Previous Work***

The site was identified and recorded in February 1991 (Fairley, et al. 1994) and was monitored in FY95 and FY01 (Coder, et al. 1995b).

### ***Monitoring Recommendations***

Surface erosion is active and several rills bisect the roaster, evidenced by the movement of sediments and the presence of newly developed rills. Alluvial erosion and deposition are also active due to the presence of water channeling and movement of dune sediments. Vegetation including creosote, brittlebush, bunch grasses, mesquite, rabbitbrush and ephedra are stabilizing some of the site area. An active gully on the east side of the roaster Feature 2 is beginning to impact the feature. Recommend complete excavation of Feature 2 before it is lost. Continue monitoring every five years.

### **G:03:032 Roaster Complex Three Year Schedule**

G:03:032 is a roaster complex with artifacts. Feature 1 is a large roasting area with fire-cracked rock. Feature 2 consists of fire-cracked rock along the toe of an alluvial terrace. Feature 3 is a three-meter diameter circular depression, 40-50 cm deep dug into the terrace. Feature 4 is a large flat area with an associated area of fire-cracked rock. Feature 5 is a circular, hearth-like accumulation of heat-altered rock. Several flakes, two groundstone tools, an old metal button, and a small wire cotter pin were noted. A circular shell bead was also observed. The site is probably a late historic period Hualapai occupation.

### ***Previous Work***

This site was initially recorded in February of 1991 (Fairley, et al. 1994) and was monitored in FY95 and FY99 (Coder, et al. 1995b, Leap, et al. 2000a).

### ***Monitoring Recommendations***

Features 1 and 2 both have minor surface erosion and pedestaling of fire-cracked rock. Both features have grasses and cryptogamic soils. Fire-cracked rock is migrating downslope and into the gully on the north side of Feature 2 and into the arroyo on the south side. Cryptogamic soils are sloughing in small areas towards the arroyo at Feature 2 on the north side. Feature 3 has a lot of tall grasses growing and looks very stable. Feature 5 has surface erosion and sheetwash, with the beginning of gullying on the north side. Feature 4 is stable. No human disturbances were noted.

Features 4 and 5 are questionable features so it is recommended that they be tested for subsurface cultural materials. This work will occur on a Colorado River Fund trip. Continue monitoring every three years.

**G:03:034 Roaster Complex  
Annual Schedule**

The site is located on both sides of a drainage that cuts through a dune-covered alluvial fan. Locus A is on the downstream side of the drainage and Locus B is on the upstream side. Features 1 through 6 and Feature 10 are located in Locus A. All features but Feature 2 are roasting/fire features (one of which, Feature 5, has an associated pot break). Feature 2 is a rock cairn and rebar that attests to some form of historic activity. Archaeologists discovered a few chert and rhyolite flakes, a biface knife base, and a hammerstone. Features 7 through 9, at Locus B, are all roasting features. This site may be related to G:03:031, a rockshelter located slightly upstream and above this site. Prehistoric artifacts, including ten Shinarump Grayware sherds, suggest a Pueblo I-early Pueblo II Virgin affiliation. FY94 monitors found what they believed could be a burial just downslope of Feature 6.

***Previous Work***

Archaeologists recorded the site in 1991 (Fairley, et al. 1994) and the RCMP staff monitored it in FY94, FY95, FY97, and FY99 (Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 2000a). FY94 monitors recommended total station mapping and FY95 monitors recommended testing for subsurface cultural materials. This area was assessed in April 1997, and RCMP staff determined that no data recovery was warranted. RCMP staff conducted an assessment for charcoal samples in FY99 and determined that sampling would disturb the features' stability.

***Monitoring Recommendations***

Features 4, 5, and 7 are stable. Feature 1 has had rock fall and surface erosion and the arroyo adjacent to Feature 1 has been recently active. Feature 3 appears to be in good condition though minor gullying is occurring between Feature 3 and Feature 5. Feature 2 has minor eolian deposition. Feature 6 has had a lot of sediment loss to the fire-cracked rock. Vegetation is also less apparent. Feature 7 has an active arroyo five meters north of the feature. Feature 8 has more grass growing on-site but there is surface erosion occurring. Feature 9 has major active arroyo cutting through the feature along the north side. Gullying is also occurring on the south side of Feature 9 but with less direct impact to the feature. Human impacts were not observed. Recommend installing checkdams in the arroyos at Feature 9 due to serious downcutting through the feature. Recommend moving the schedule from biennial to annual monitoring.

**G:03:037 Artifact Scatter  
Five Year Schedule**

The site is located in an outcropping basalt overhang on a Tapeats Sandstone slope. It consists of two loci (A and B), about 10 m apart, each containing an artifact scatter. Between 100-150 flaked lithics were noted, mostly at Locus B. Tools include bifaces, a core/chopper, and projectile point tip. The 50-65 sherds indicate that this is a multi-component site, with late Pueblo I-early Pueblo II Cohonina and late prehistoric-early historic Pai occupations. Locus B also contains several groundstone items, such as a ground/pecked shale slab metate, a basalt slab metate, a Tapeats mano, and a partially polished basalt cobble shaped like a maul. There is also a sparse charcoal scatter and a piece of shaped wood at Locus B.

***Previous Work***

The site was initially recorded by NPS personnel in 1991 (Fairley, et al. 1994) and monitored in FY97 (Leap, et al. 1997a).

***Monitoring Recommendations***

Minor sheetwash is present in Locus A and Locus B. Small rodent and/or ant burrowing is present in both loci. A fragment of burned bone was noted at Locus B adjacent to the metate. No human disturbances were noted. Recommend continued five year monitoring due to the potential for newly exposed materials.

**G:03:038 Roaster Complex  
Biennial Schedule**

This site consists of four roasting features, a possible wickiup ring and associated ceramics. Feature 1 is a scatter of fire-cracked rock. FY97 monitors discovered a new roasting feature at the contact of the alluvial terrace and the talus slope. A RCMP archaeologist recorded a newly exposed roasting feature on the September 1998 mapping trip in proximity to the river. Sherds indicate a multi-component site with Pueblo I-early Pueblo II Virgin and late prehistoric-early historic Paiute occupation.

***Previous Work***

Archaeologists recorded the site in 1991 (Fairley, et al. 1994) and the RCMP staff monitored it in FY96 and FY98 (Leap, et al. 1996b, Leap, et al. 1998d). FY96 monitors recommended checkdam installation. In FY97 an assessment was made and Zuni Conservation Project staff installed brush linings. Surveyors completed a total station map in FY97. FY98 monitors recommended installing jute mat to curtail deflation and establish vegetation. Zuni Conservation Project staff performed maintenance on all the previous brush checks and added 11 rock checkdams in FY99 (Leap, et al. 2000a). FY99 monitors noted on the April river trip that additional checkdam maintenance is needed. FY99 monitors assessed Feature 4 for data recovery and decided to continue monitoring the preservation treatment instead of excavating. During a September 1998 mapping trip a RCMP archaeologist discovered a new roasting feature below the main site area near the river. The archaeologist recommended data recovery at this feature due to its physical condition and potential for lost cultural material. Checkdam monitoring resulted in maintenance work at five checkdams in FY00 (Leap and Kunde 2000b). In FY01 it was determined that no further checkdam construction or maintenance would occur here as the drainage catchment is too large to effectively trap sediments in the drainages using conventional checkdam methods.

***Monitoring Recommendations***

The gullies have been very active, downcutting and filling in at some locations. No other physical impacts were observed. All checkdams have been completely blown out. No sign of human visitation was observed. Recommend collecting a carbon sample from the Feature 4 roasting feature before significant information is lost. This feature is the largest and most complete roaster on-site, the location of the feature in the drainage is like a checkdam or barrier, there is a large nick point below the feature and headward erosion will destroy this feature. Nials (personal communication, 2001) recommends measuring the drainage size to figure out how large of a catchment is too large. Checkdams have been unsuccessful because the drainage is too big and originates high up on the talus slope. The surface is hard pan and is ideal for runoff creating more water flow through the drainage. No further treatment is necessary except data recovery at Feature 4. Feature 3 is also recommended for data recovery because it is located adjacent to the same active gully as Feature 4. Other features look stable. Continue biennial monitoring until data recovery is completed.

**G:03:040 Roaster Complex  
Biennial Schedule**

The site consists of two loci (A and B) of activity that represent at least two and six to seven roasting features, with associated debitage and many formal tools. Locus A may be one large roasting feature that has been eroded by a wash, or more than one feature with elements eroding together. Fire-cracked rock elements at both loci are of predominately limestone cobbles, with a variety of Kaibab and/or Redwall Chert flakes in association. At least part of Locus A (the fire-cracked rock on the southern edge of the locus) forms a semi-circle that is half blown out by the wash. Locus B contains a much more obvious circular fire-cracked rock feature with additional, smaller fire-cracked rock concentrations around it. The main feature is slightly mounded and has a clear center. Many tertiary flakes, including bifacial thinning flakes, were observed. Tools include a sandstone slab metate fragment, flakes with retouch and use wear -- some possibly used as scrapers, biface/preforms, and cores. Cultural affiliation and site chronology are unknown though assumed to be Pai/Paiute due to the sites location at Arroyo Grande.

***Previous Work***

Archaeologists recorded the site in 1991 (Fairley, et al. 1994) and have monitored it at least annually from FY94 to FY98 (Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d). In FY98, RCMP monitors changed the monitoring schedule to biennial. FY95 monitors recommended total station mapping at this site. In FY96 monitors recommended installing checkdams and data recovery at Locus B. Surveyors mapped the site with a total station instrument in FY96 (Leap, et al. 1996b), but no data recovery was performed. Zuni Conservation Project staff constructed four checkdams near Locus B in FY97 (Leap, et al. 1997a). A large side-canyon

flood completely took out two checkdams in FY99. The other three checkdams (one adjacent to the side canyon and two in a terrace-based drainage) were unaffected. No maintenance work was required in FY00 (Leap and Kunde 2000b).

#### ***Monitoring Recommendations***

No new physical impacts were observed. The features appear stable and unchanged. No sign of human visitation was observed. Locus A may be impacted by the cutbank in the large drainage. The drainage with the brush checkdams will probably only downcut another ten centimeters at the most according to Nials (personal communication, 2001). Continue biennial monitoring and annual checkdam monitoring.

#### **G:03:041 Roaster Complex Annual Schedule**

This site consists of three large roasting features. Archaeologists recorded a sparse lithic scatter, two cores, a chopper, and one Tizon wiped sherd on-site. The late prehistoric-early historic Pai site appears to have been a temporary hunting camp, based on the absence of grinding implements and the abundance of bone.

#### ***Previous Work***

Archaeologists recorded the site in 1991 (Fairley, et al. 1994) and the RCMP staff monitored it in FY96, FY98, FY99, and FY00 (Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). The RCMP staff recommended stabilization in FY96. In FY97 the site was assessed for checkdams and Zuni Conservation Project personnel constructed three rock and brush linings in the drainages below the site. A total station map was completed in FY97. FY98 monitors recommended planting vegetation and obliterating trails caused by remedial work projects. RCMP staff assessed this area for trail obliteration and planting vegetation in FY99 and found that the trails were recovering naturally. Checkdam maintenance occurred at one checkdam and six additional checkdams were built in FY99. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000). Checkdam monitoring resulted in the maintenance of two checkdams in FY00 (Leap and Kunde 2000b).

#### ***Monitoring Recommendations***

Deadfall from NPS trail obliteration, remains in the same spot since photographed in 1996. Feature 1 is unchanged. Feature 2 is losing surrounding soils but the rocks of the feature appear unchanged. The drainage abutting Feature 3 has been very active and entrenched. Continue annual checkdam monitoring and maintenance. Continue annual monitoring.

#### **G:03:056 Roaster Complex Five Year Schedule**

G:03:056 is a group of three to four roasting features with chipped stone and groundstone tools. Feature 1 consists of a dispersed scatter of fire-cracked rock with lithics, a polishing stone, and a side-notched projectile point in association with the feature. Feature 2 is another dispersed scatter of fire-cracked rock with a laterally ground mano in association. Feature 3 is a very dispersed fire-cracked rock scatter. It is possible the projectile point is a reworked Archaic dart point base. No ceramics were observed.

#### ***Previous Work***

This site was initially recorded by NPS survey personnel in March of 1991 (Fairley, et al. 1994) and monitored in FY94 (Corder, et al. 1995a).

#### ***Monitoring Recommendations***

Feature 1 is being impacted by gullying, surface erosion and rodent activity. The gully is impacting the west side of the feature. The feature is beginning to slump into the gully. Five active rodent holes were observed. Feature 2 has surface erosion and pooling in the small pockets between the rocks. Alluvial erosion is removing the soil. Some down slope movement of the fire-cracked rock has occurred. An old animal trail cuts through the feature on the down slope side. The mano is still present. Feature 3 has two rills which are still active on the southeast side of the feature. Minor impact is occurring. The feature is being stabilized by cryptogamic soil and small herbaceous vegetation. No

human impacts were observed. Continue monitoring the gully near Feature 1. Recommend checkdam installation. If checkdams are unsuccessful, data recovery will be necessary. Continue monitoring every five years.

**G:03:058 Roasting Feature  
Three Year Schedule**

G:03:058 consists of a single roasting feature seven by ten meters in diameter and an associated fragmented mano. The site is located on a light dune-covered terrace.

***Previous Work***

The site was originally recorded in 1991 (Fairley, et al. 1994) and monitored in FY94, FY96 and FY98 (Coder, et al. 1995a, Leap, et al. 1996b, Leap, et al. 1998d). Checkdams were recommended and an assessment was conducted in FY96. Two rock/brush checkdams were built in FY97 in conjunction with minor trail obliteration and vegetation planting (Leap 1997b). A total station map was completed in FY98 (Leap, et al. 1998d). Four new checkdams were constructed in FY99 by the Zuni Conservation Project staff and RCMP personnel (Leap, et al. 2000a). Monitoring resulted in the maintenance of six checkdams and construction of two new checkdams in FY00 (Leap and Kunde 2000b).

***Monitoring Recommendations***

There is generally eolian movement of sediments due to a lack of vegetation surrounding the feature. The creosote within the feature could impact the feature however at this time it appears stable. No human disturbances were noted. The potential is there due to a camp directly below the site. Monitor the roaster every three years because there is good information potential. The vegetation on-site is likely disturbing the feature. Assess for data recovery prior to more disturbances. Continue monitoring every three years. Continue annual checkdam monitoring and maintenance.

**G:03:060 Roaster Complex  
Five Year Schedule**

G:03:060 consists of a roaster complex with 13 features and artifacts. Artifacts include hand tools, groundstone, flakes, and five Moapa sherds that indicate a Virgin Branch component. Tools include one flake chopper, two biface tips, two bifaces, and two grinding stones. The site is located on a river terrace covered by partially stabilized dunes. Runoff from the surface reaches localized channels that flow directly into the Colorado River. FY95 monitors found two bifaces at Features 1 and 6. FY97 monitors discovered a large biface (knife) and FY99 monitors recorded a thermal feature (Feature 14) next to a gully on the site's north side.

***Previous Work***

Archaeologists recorded the site in April 1991 (Fairley, et al. 1994) and the RCMP staff monitored it in FY94, FY95 and FY99 (Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 2000a). FY99 monitors recommended obtaining charcoal samples from Feature 13 and total station mapping.

FY99 monitors identified active surface erosion, arroyo cutting, bank slump and animal burrowing. The presence of gullying was recorded but no increases were observed. Because of the large site area (80x200 meters) and its location at the base of an active talus slope, major erosional impacts are inevitable. FY99 and FY01 monitors recommended taking a charcoal sample and data recovery from Feature 13 before it is obliterated.

***Monitoring Recommendations***

Feature 3 has rodent burrowing that has been recently active. Feature 4 is unchanged since 1991 photographs. Feature 5 is unchanged. Feature 6 has active surface erosion. Features 1, 2, and 8-14 appear unchanged. No sign of human visitation was observed. Some deflation has occurred, evidenced by coppicing around the creosote though the presence of cryptogamic soil indicates that the deflation is not very recent. Recommend complete excavation of Features 5, 6, and 13. Although they are stable, they are located in precarious areas that, with one moderate rainfall, the active arroyo could take out all the features. Continue monitoring every five years.

**G:03:063 Thermal Feature  
Inactive Schedule**

G:03:063 consists solely of a highly eroded roasting feature. The feature is dispersed across a ten by three meter area. No artifacts have been observed on the surface since the survey. The site is located on a highly eroded dune-covered terrace.

***Previous Work***

This site was initially recorded by NPS survey personnel in March of 1991 (Fairley, et al. 1994) and monitored in FY94 and FY95 (Coder, et al. 1995a, Coder, et al. 1995b).

***Monitoring Recommendations***

A gully 20 to 25 centimeters deep and 10 to 20 centimeters wide is moving up towards the main site area. The site probably does not have extensive cultural information so it is recommended that the gully be left untreated. No human disturbances were observed. It is recommended that the site be placed on the inactive monitoring schedule.

**G:03:064 Roaster complex  
Annual Schedule**

This site consists of 15 features including mostly roasting features. Charcoal lenses are present in several of the arroyo cuts. Artifacts associated with the roasting features include lithics, ceramics, a shell bead, and groundstone. Lithics include a flake drill and a reworked Elko Corner-Notched projectile point. The ceramic assemblage suggests a multi-component site: Pueblo I-III Formative and late prehistoric-early historic Pai/Paiute. This could be one of the most informative sites in western Grand Canyon with potential for dating and chronology-building. FY96 monitors discovered a large Redwall Chert point tip exposed in the river-based drainage across from Feature 1. FY97 monitors discovered a chert awl at Feature 6. RCMP staff on the September 1997 mapping trip discovered newly exposed Jeddito Yellow ware sherds, obsidian flakes, an olivella shell bead, and two new probable roasting features/fire-cracked rock scatters exposed by the river-based arroyo. FY98 monitors discovered new fire-cracked rock features exposed by the arroyo. FY99 monitors discovered seven new charcoal lenses exposed in the river-based arroyo.

***Previous Work***

Archaeologists recorded the site in 1991 (Fairley, et al. 1994) and RCMP staff monitored it at least annually since FY94 (Coder, et al. 1995a, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). In FY93 archaeologists collected radiocarbon samples resulting in a range of dates from 170 +/- 50 BP to 2670 +/- 140 BP. FY94 monitors recommended planting vegetation, installing checkdams, and total station mapping. FY95 monitors conducted medium format photography of the active drainage (Leap 1995a). FY95 and FY96 monitors recommended testing and total station mapping. In FY95 total station mapping began and in FY97 a complete map was produced. FY96 monitors also recommended either an attempt at stabilization or full site excavation. FY98 monitors recommended obliterating trails caused from five days of intensive site mapping and data recovery. After further assessment it was determined that the trails were recovering naturally. FY99 monitors recommended data recovery and remapping of the arroyo headcuts to identify their rate of advancement. The RCMP collected charcoal samples from Charcoal Lens D and Feature 1 in FY99. These samples are curated at the South Rim collections facility. The samples will be sent for dating in the near future. This site was also included in the studies conducted by K. Thompson and A. Potochnik (Thompson and Potochnik 2000).

***Monitoring Recommendations***

Feature 14 has nick point advancement with a substantial plunge pool, 30 centimeters deep. Not much significance remains at this feature due to the erosion. Feature 13 has a new nick point below the feature and advancement east of the feature 30 centimeters in depth. The gully NW of Feature 12 has advanced, exposing more fire-cracked rock. Feature 11 has abalone shell and 2 biface fragments exposed. No change was observed at Feature 10. Feature 9 does have a newly exposed chert biface that is almost perforated. The metate that was partially exposed in an arroyo wall since the survey, has been lost to the expanding arroyo and bank slump. Feature 1 has been compacted by rain but no real change has occurred. Feature 15 has nick point advancement toward the feature. Features 2 - 7 are unchanged since last monitored. Overall, several new artifacts have been exposed in the widening arroyos. Data recovery should occur at Features 1, 13 and 14. Although these features are currently stable, they are all adjacent to active arroyo systems and with one heavy rainfall the features could be lost. Annual monitoring will continue due to the exposure of artifacts, headward erosion and drainage widening.

The Hualapai and Paiute should be consulted on preservation and recovery options for this site. This area, referred to as Arroyo Grande, continues to exhibit extensive erosional activity on an area that is very significant to these tribes.

**G:03:067 Roasting Feature  
Biennial Schedule**

The site consists of five fire-cracked rock middens with associated lithics and a dispersed flake scatter. Archaeologists discovered two thin bifaces and one Moapa Brown Ware sherd upslope of Feature 1, suggestive of a late Pueblo I-early Pueblo II Virgin affiliation.

***Previous Work***

Archaeologists recorded the site in 1991 (Fairley, et al. 1994) and the RCMP staff monitored it annually from FY92 to FY95 (Coder, et al. 1994b, Coder, et al. 1995a, Coder, et al. 1995b, Coder, et al. 1994a). In FY95 the monitoring schedule changed to biennial and the RCMP staff monitored the site in FY97, FY99, and FY00 (Leap, et al. 1997a, Leap and Kunde 2000b, Leap, et al. 2000a). FY94 and FY95 monitors recommended obliterating on-site trails. The GRCA trail crew conducted trail obliteration in FY96. FY99 monitors recommended trail maintenance and assessment for brush and rock linings in the drainages near Features 1 and 4. RCMP staff assessed the site and determined that no checkdams would be built. GRCA trail maintenance is warranted due to three large and heavily used camps below this site. In FY2000, a trail near Feature 1 was obliterated.

***Monitoring Recommendations***

Features 2, 3, and 4 are unchanged since last monitored. A healthy layer of cryptogamic soils covers the surface in the vicinity of these features. Feature 5 has lost large driftwood pieces from the feature and fire-cracked rock is eroding downslope into the drainage. Feature 2 should be tested for subsurface extent and integrity as is located directly in the path of the previously defined trail work. Trail work completed by the GRCA Rehabilitation crew continues to successfully deter visitation on-site. GRCA trail maintenance will continue, as will biennial monitoring.

***Monitoring Recommendations***

Feature 1 has active surface erosion and alluvial erosion. The gully is active though no significant impacts are present. Feature 2 has a minor rill along the north side. Alluvial erosion is occurring and rocks have formed around the feature creating natural checkdams. Cholla and creosote are growing in the feature. Feature 3 has sheetwash but the feature appears very stable. There is a well developed cryptogamic crust. Minor sheetwash is active on the south side of the feature. Feature 4 is stable with well developed cryptogamic crust. At Feature 1 two large rocks have been recently removed, as evidenced by the open depressions. One of the rocks was located several meters from the feature in a small open sandy area. Continue biennial monitoring. No management recommendations are currently necessary.

**G:03:072 Roaster Complex  
Annual Schedule**

This is an extensive roasting feature complex that includes an overhang shelter previously recorded as historic site G:03:023. The prehistoric component of that site is described here as G:03:072. Fourteen features (Features 1-14) are present. All but Feature 1 are roasting features or hearth/fire-cracked rock scatters of various shapes and sizes, some with associated groundstone, lithics, and sherds. Feature 1 is the overhang shelter, which, in addition to the historic component described as site G:03:023, has a prehistoric component consisting of a lithic scatter downslope of the shelter and in the shelter fill. Ceramics observed indicate that this may be a multi-component site, with both late Pueblo I-early Pueblo II Virgin occupation and late prehistoric-early historic Pai and Paiute occupations. On a total station mapping trip in FY98 RCMP monitors identified newly exposed diagnostic artifacts in a gully. They include one biface, sherds and groundstone.

***Previous Work***

The site was originally recorded in 1991 (Fairley, et al. 1994), monitored once in FY93, and monitored annually since FY95 (Coder, et al. 1994b, Coder, et al. 1995b, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). In FY96 an assessment was made for checkdam installation. In FY97 a total station map was completed and 14 checkdams were placed in three river-based and side canyon-based drainages (Leap, et al.

1997a). In FY99 checkdam maintenance resulted in building two new checkdams and altering one original checkdam (Leap, et al. 2000a). Minor to moderate alluvial deposition as a result of building checkdams is evident in two of the four drainages with checkdams. Data recovery has been recommended at Features 11, 12, and 14. Checkdam monitoring resulted in maintenance work at Checkdam 16 and construction of one new checkdam in FY00 (Leap and Kunde 2000b).

#### ***Monitoring Recommendations***

Feature 12 has had a lot of sediment deposition to where only three rocks are exposed and there is no vegetation. Gully erosion is deeper at Features 11 and 12. Feature 9 is stable but has some signs of surface erosion. No change was observed at Feature 10. Feature 7 appears stable. Features 5 and 6 have exhibited minor surface erosion. Surface erosion is also noticeable at Features 2, 3 and 4. Annual monitoring will continue as will the recommendation for data recovery at Features 11, 12, and 14. Continue annual checkdam monitoring and maintenance.

#### **G:03:073 Roaster Complex Inactive Schedule**

This is a roaster complex with an artifact scatter and an overlay of early 20th century trash. Ceramics indicate a Puebloan and protohistoric Pai presence. The site is located on a very old river terrace underlain by Tapeats Sandstone.

#### ***Previous Work***

The site was initially recorded by NPS survey personnel in April 1991 (Fairley, et al. 1994) and monitored for the first time in FY96 (Leap, et al. 1996b).

#### ***Monitoring Recommendations***

There appears to be no physical impacts to the site. No human disturbances were noted although there may be some foot traffic after the summer due to the camp below the site. It is recommended that the site be moved from four year monitoring to the inactive monitoring list. It may possibly be outside the area of potential effect. Also, the site is extremely stable.

#### **G:03:076 Roasting Feature Three Year Schedule**

This site consists of the deflated remains of a single roaster partitioned into three segments by local runoff and vegetation. A single cobble mano is located on the surface. Archaeologists observed no diagnostic materials and cultural affiliation is unknown. The site is situated on the remnant face of a dune, abutting a rock-strewn talus slope.

#### ***Previous Work***

Archaeologists recorded the site in March 1991 (Fairley, et al. 1994) and the RCMP staff monitored it in FY96 and FY99 (Leap, et al. 1996b, Leap, et al. 2000a). FY96 monitors recommended stabilization for this site and it was assessed in FY97. RCMP staff decided that no work would be done.

#### ***Monitoring Recommendations***

Feature 1 surface erosion is active though the feature is not affected. Feature 2 rodent disturbances are less but the gully is downcutting and the depth below the feature has reached one meter. This gully is now an arroyo that steeply drains into the river. Piping and gullying are active on the southwest side of the feature. Feature 3 is stable with increased cryptogamic soil growth. No human disturbances were noted. Checkdams may help at the Feature 2 arroyo and at the gully developing between Features 1 and 2. Continue monitoring every three years.

#### **G:03:080 Structure-Thermal Feature Complex Annual Schedule**

The site is divided into two loci. Locus A contains numerous lithics, sherds, hand tools, and extensive rock images. The pictographs and lone petroglyph are in poor condition. Spalling and salt seep have covered several of the images. This locus is on a sheltered bench at the base of a basalt cliff, just upstream from the dune that Locus B is located on. Locus B consists of nine separate structural and fire features. Numerous artifacts are present, including fire-cracked rock, lithics, ceramics, groundstone, tools, shell fragments, and charcoal. This site has excellent potential for buried materials and datable features. Ceramics suggest a late prehistoric-early historic Pai affiliation. In March of FY95 monitors recorded a newly exposed thermal feature (Feature 9).

### ***Previous Work***

The site was originally recorded in 1991 (Fairley, et al. 1994), monitored once in FY92 and FY93, and annually since FY95 (Coder, et al. 1994b, Coder, et al. 1995b, Coder, et al. 1994a, Leap, et al. 1997a, Leap, et al. 1996b, Leap, et al. 1998d, Leap and Kunde 2000b, Leap, et al. 2000a). In FY97, medium format black-and-white and color prints were taken of Locus A, and an attempt was made to sketch several of the distinct rock art figures. In FY99 visitor-related impacts (trailing) were observed at an all time high. Trails led from the camp, across Locus B, to Locus A. The pictographs (Locus A) are a popular attraction stop for commercial river runners and Hualapai river-runners who make the uprun.

In FY99 RCMP staff suggested annual monitoring. It was also recommended that several trails be obliterated by planting vegetation throughout the site. They noted that visitor-related impacts, in particular trailing, should be addressed and managed by the Hualapai Nation.

### ***Monitoring Recommendations***

Feature 8 has two large animal burrows. A lot of vegetation has died off at Feature 5 and the drainage headcut is 50 centimeters below the feature. Feature 4 is unchanged though there is no vegetation at all on the feature. The grasses are gone and cryptogamic soils are dying. Features 3, 6, and 7 are unchanged. Feature 2 has sheet wash which may develop into a gully. Surface erosion is evident throughout the site. Four collection piles were dispersed at Locus A. The Hualapai Tribe should contact the Hualapai river-runners regarding upruns to this site. If the Hualapai decide to bring tours here, they should consider data recovery or the development of the area as an interpretive site.

### ***Hualapai Tribal Information, June 2001 River Trip***

Drainage headcuts are moving towards the features at Locus B. Trails lead to the rock writings directly through Locus B. There are multiple trails and several large rock cairns, some made with artifacts. The cairns all lead through Locus B to Locus A. There is also a trail leading to Locus A from the river, upstream of the side canyon. Wood has been cached here as well. It is believed that commercial river-runners do not stop here as it is the last day for most trips. Commercial trips also travel a substantial number of miles on their last day, not stopping at attraction sites. Private river-runners and the Hualapai River Runners are the only groups likely visiting this location. One of the access points should be obliterated to ensure that impacts to the site are kept to a minimum. L. Jackson (Personal communication, 2001) suggested obliterating the trail downstream of the rock writings since multiple trails on this side of the site are impacting other features. Work at this location should be discussed further as it makes no sense to complete trail obliteration if the trails will continue to be used. An education dialogue should be developed between the Hualapai Cultural Office and the office of the river runners. Any trail obliteration work could be completed by the NPS on a CRF river trip.

## CHAPTER 6

### NPS SCOPE OF WORK FOR FY2002

#### *Management Recommendations*

The long-term monitoring program was established to implement management assessments and recommendations derived from field inspection. This chapter summarizes the management recommendations made at all the sites monitored in FY01. It also discusses a work plan for FY02 based on accumulated years of recommendations.

Recommendations are based on the degrees of various impacts to a site as illustrated during field observation and photo comparisons. Management actions include preservation and data recovery options, and each site can receive one or more recommendation. All these recommendations and work completed has been guided by the MRAP (U.S. Department of the Interior and Service 1997) until final ratification of the HPP.

Remedial actions will be undertaken when the monitoring identifies adverse impacts to significant cultural resources. This will include prioritizing historic properties for treatment and evaluating the effectiveness of treatment (U.S. Department of the Interior and Service 1997:7). The type of action will be based on the recommendations provided in the monitoring report in an interactive process with the Tribes. The overall research domains established in the draft Historic Preservation Plan (U.S. Department of the Interior, et al. 1997) will guide analysis of the data recovered from all remedial actions (U.S. Department of the Interior and Service 1997:7).

Potential actions to mitigate impacts or potential impacts identified during monitoring may include one or more of the following: redirect or remove existing trails; develop public interpretation; close site to public; take no action based on traditional cultural values; construct checkdams; vegetate or revegetate areas; stabilize banks with rock armor or similar technique; stabilize structures; collect artifacts; conduct subsurface testing and/or partial data recovery; and conduct complete data recovery (U.S. Department of the Interior and Service 1997).

At those sites that have had or may have adverse impacts, remedial actions will be required to mitigate the effects of these impacts. As this will rarely include complete excavation (data recovery) of cultural deposits, monitoring of the remaining *in situ* cultural materials will be necessary in order to evaluate the effectiveness of the remedial strategy (U.S. Department of the Interior and Service 1997).

When a remedial action is identified a written plan of appropriate scope will be prepared for review prior to implementation (U.S. Department of the Interior and Service 1997:7). Site specific mitigation plans will be prepared and provided to all PA signatories prior to implementation of any projects to satisfy the goal as stated.

Consultation will occur in the form of review and comment on the trip reports and annual reports. Where circumstances may cause a resource to be lost in the length of time it would take to follow the normal process of trip report preparation and review, or if vulnerable resources are identified outside of the normal monitoring processes, the land managing agency/Tribe should remediate the resource as they deem appropriate (U.S. Department of the Interior and Service 1997:7). The other signatories should be notified prior to the action, if possible, or as soon after the action as feasible.

The implementation of the remedial actions will occur following the consultation process discussed above. For situations where the resources are not in immediate danger of being lost, the remedial actions will occur as can be scheduled (U.S. Department of the Interior and Service 1997:7). Other situations may require more immediate action, or require expertise that is not available within the time frame of a normal monitoring trip. In these situations, discussions between the signatories, in the context of the report reviews, will be used to formulate acceptable strategies and time frames.

As primary land manager, "NPS, when appropriate, will develop with each of the consulting Tribes procedures for implementation of the Native American Graves Protection and Repatriation Act (NAGPRA). In addition, Reclamation, as the lead agency in Section 106 of the NHPA, will develop NAGPRA agreements with the Hualapai Tribe and Navajo Nation for project impacts that may affect their respective lands (U.S. Department of the Interior

and Service 1997:1). Furthermore, “any action called for in this plan that takes place on either Hualapai or Navajo tribal lands will be coordinated with the cultural preservation staff of each Tribe. This coordination will be documented and included in trip reports” (U.S. Department of the Interior and Service 1997:1).

### *Preservation Options*

Options for preserving sites that have been commonly implemented since the RCMP began in 1992 consist of monitoring, retrailing, trail obliteration, planting vegetation, and installing checkdams. The monitoring form has an “other” category for preservation methods not specified above. When these measures are recommended, it usually means that the impacts observed have the potential to be reversed and loss of site integrity is not an immediate threat. Sites that have undergone remedial action will be evaluated for the effectiveness of the stabilization efforts. Monitoring of these sites is vital to evaluating the effectiveness of remediation strategies employed. This will include quantitative methods completed by GCMRC and the NPS monitoring program (U.S. Department of the Interior and Service 1997:3). The various preservation actions are discussed below.

### *Monitoring*

Thirty-three sites on the annual and semi-annual schedules will be monitored in FY2002 (see Table 4). The fundamental goal of the monitoring program is to collect data that will be used to identify potential, ongoing, or even no erosional impacts to significant cultural resource sites. This work occurs along the Colorado River between the river and the pre-dam flood zone at approximately the 300,000 cfs line (the area of potential effect (APE)) (U.S. Department of the Interior and Service 1997:2). (Presently, PA members have agreed that the Holocene deposits are used as the APE.)

Archaeological site monitoring forms have been developed by the NPS in consultation with the other signatories. These forms will be completed for each site during monitoring to establish a diachronic record of qualitative and quantitative change at the site (U.S. Department of the Interior and Service 1997:2).

Table 4. List of sites selected for monitoring in FY2002 by the RCMP staff (n = 33).

<b>Site Number (n=33)</b>					
A:15:005	C:09:050	C:13:099	C:13:347	G:03:030	G:03:064
A:15:020	C:13:006	C:13:100	C:13:349	G:03:034	G:03:072
A:16:004	C:13:010	C:13:273	C:13:360	G:03:041	G:03:080
B:14:105	C:13:069	C:13:291	G:03:003	G:03:043	
B:15:138	C:13:070	C:13:321	G:03:004	G:03:044	
C:02:096	C:13:098	C:13:343	G:03:020	G:03:057	

### *Checkdam Construction*

Five sites (A:16:175, C:13:329, G:03:034, G:03:056, and G:03:076) were recommended for placement of checkdams (see Table 5). However, due to the delays in the research conducted to evaluate checkdam effectiveness (Pederson 2001), additional work was put on hold. Starting again in FY02 new assessments will be made and new checkdam construction may occur. See Map Appendix E for the individual site maps highlighting the proposed work areas of the five sites. The drainage systems at the five new sites recommended for checkdam installation include 2 sites with terrace-based drainages and 3 with river-based drainages. Through RCMP monitoring activities we have noticed that checkdams have been more effective on terrace-based drainages than river-based (Leap, et al. 2000a).

Table 5. Five sites recommended for checkdam installation. Included in the table is the approximated length of the drainage to be assessed.

<i>Site Number</i>	<b>Drainage Type</b>	<b>Approximate Drainage Length</b>	<b>Description</b>
A:16:175	River-based	40 m	Active gully (10 – 100 cm deep) bisecting Feature 6.
C:13:329	Terrace-based	5 m	New gully (10 – 100 cm deep) bisecting Feature 2.
G:03:034	River-based	60 m	Active arroyo (1 m deep) cutting through on the north side of Feature 9, and an active gully (10 – 100 cm deep) cutting to the South of Feature 9.
G:03:056	Terrace-based	60 m	Active gully (10 – 100 cm deep) west of Feature 1.
G:03:076	River-based	50 m	Arroyo ( 1 m deep) cutting South of Feature 2 and new gully (10 – 100 cm deep) South of Feature 1 and East of Feature 2.

Based upon recommendations from the Cultural PEP Geomorphological Subpanel, “We recommend that decisions and actions to preserve sites or recover cultural data should no longer await results of geomorphic research [Doelle, 2000:39 #461]”, preservation work will continue. The 28 sites with checkdams (see Table 6) may receive annual maintenance, involving building new checkdams and altering existing checkdams. A geomorphologist will accompany the trip as recommended by the PEP (Doelle 2000).

Table 6. List of sites with checkdams that will be monitored for maintenance by Zuni Conservation Project and NPS personnel.

<b>Sites with checkdams (n = 28)</b>					
A:15:005	C:02:101	C:13:100	C:13:359	G:03:024	G:03:041
A:16:149	C:09:050	C:13:327	C:13:371	G:03:025	G:03:058
A:16:174	C:13:006	C:13:336	C:13:381	G:03:026	G:03:072
A:16:180	C:13:069	C:13:346	G:03:002	G:03:038	
B:14:107	C:13:099	C:13:348	G:03:003	G:03:040	

### *Planting Vegetation*

Revegetation is beneficial in areas where minor soil deflation or compaction occurs. In some cases, minimal planting encourages new local vegetation growth, thus, curtailing surface erosion. Planting vegetation at sites has been, and will continue to be work completed by Park revegetation personnel, accompanied by an RCMP archaeologist. While on site, the RCMP archaeologist consults with the NPS specialists, whether they are the trail supervisor, recreational supervisor or vegetation crew supervisor. An on-site assessment takes place and is documented on the RCMP remedial action form. If the work does not involve direct impact to the site the work is completed, if time permits. If work involves some degree of impact to the site RCMP archaeologists write up the scope of work and send it out to PA members for their approval. The work is not completed until comments are received by PA members. Additionally, all proposed work goes through the NPS compliance process. The work will be completed on Colorado River Fund (CRF) trips or Park resource trips. The revegetation crew is responsible for several large delta areas that include some of the selected sites. See Map Appendix F for the individual site maps highlighting the areas for vegetation work. This year five sites (see Table 7) are recommended for some type of vegetation work, either transplanting or planting new, native seedlings.

Table 7. Site list representing where archaeologists recommended vegetation work.

<i>Site Number</i>	<b>Approximated Area of Work</b>	<b>Date of Initial Recommendation</b>	<b>Comments</b>
B:14:105		5-2-96	
C:02:098	500 sq m	3-27-95	Work will be completed to avoid multiple trailing on the western site boundary.
C:05:031	250 sq m	10-13-01	Additional transplanting will aid in the stabilization of the rill near Features 3 and 4.
C:13:006	35 sq m	10-5-93	More transplanting near Checkdam 13 will decrease slope erosion.
G:03:052		3-3-96	

*Trail Obliteration and Retrailing*

Trail work was advised at a total of 21 sites (see Table 8). Two sites (C:13:291 and G:03:004) have already been completed during a CRF trip (Kunde 2000). The remaining sites will be assessed and completed on future CRF trips beginning this November following similar NPS processes described under the Planting Vegetation section. All CRF trips are funded by commercial outfitters but appropriate NPS personnel will supervise the work. See Map Appendix G for the individual site maps highlighting the locations for trail work.

Table 8. List of sites where trail work is recommended.

<i>Site Number</i>	<b>Approximated Area of Work</b>	<b>Date of Initial Recommendation</b>	<b>Comments</b>
A:15:005	20 m	4-3-95	Maintain trailwork.
A:16:160		5-6-94	Maintain trailwork.
B:09:317	10 m	3-7-94	Maintain the previous trail work.
B:15:138	40 m	4-20-97	Maintain trail obliteration until data recovery is implemented.
C:09:065	10 m	3-26-01	Obliterate trail between Features 5 and 6.
C:13:005		5-3-95	Maintain trailwork.
C:13:007		5-18-00	Maintain trailwork.
C:13:069	40 m	4-19-00	Obliterate trail that bisects Features 1 and 2.
C:13:070	50 m	10-10-94	A faint trail exists just South of Locus B.
C:13:098	150 m	2-25-99	This site is included for trail work for the entire Palisades area.
C:13:099	50 m	2-25-99	This site is included for trail work for the entire Palisades area.
C:13:100	75 m	2-25-99	This site is included for trail work for the entire Palisades area.
C:13:272	60 m	2-25-99	This site is included for trail work for the entire Palisades area.
C:13:336		2-25-99	This site is included for trail work for the entire Palisades area.
C:13:339	70 m	11-9-94	Maintain current Beamer trail to avoid further impact to Feature 1.
C:13:362	50 m	2-20-96	Obliterate trail leading from Feature 4 that travels to and bisects Feature 2.
G:03:003	140 m	10-16-93	Maintain trail obliteration at this heavily visited site.
G:03:026	180 m	3-10-94	Maintain access trails made from camp to the side

<i>Site Number</i>	<b>Approximated Area of Work</b>	<b>Date of Initial Recommendation</b>	<b>Comments</b>
			canyon, and obliterate trails running through and or bisecting Features 2, 3, 5, 6, 7, and area B.
G:03:028	170 m	3-10-94	Maintain trail obliteration at Features 1 and 2, and Loci B, C, D, and F.
G:03:056		4-5-01	Assess for treatment.
G:03:080	180 m	11-22-98	Several trails lead from the river and side canyon to visit Locus A (rock art panel). These trails cut through Features 3 and 4 and Locus A.

### ***Recovery Options***

Recovery options such as collecting samples (carbon, micro- and macro- botanical), surface collection of artifacts, feature-based excavations, and testing for feature significance are recommended commonly when physical or visitor-related disturbances threaten the integrity of an archaeological site. Further, all methods to preserve site integrity have failed or are impractical. This fiscal year 21 recovery options are recommended.

### ***Collecting Carbon and Testing for Integrity***

Three sites are recommended for carbon collection and one site is recommended for testing for feature integrity (see Table 9). Carbon samples are recommended at a couple sites based solely on research. The information gathered through carbon collection and analyses would improve the interpretation of the individual site and enhance relationships with other sites in the area. The third carbon sample is located at a site where erosion is occurring.

Testing for integrity involves testing a feature to correctly identify it as a cultural manifestation. The finding of no subsurface material would not remove any of these sites from the National Register because there are other “real” features on these sites. It would however, remove the features from the monitoring and remedial action program. Additionally, testing for two of the sites (C:02:094 and C:13:389) will occur on CRF trips so BOR will not incur costs of any analyses. See Map Appendix H for the individual site maps highlighting where testing and carbon collection will occur.

Table 9. Individual sites listed for carbon sampling and testing for feature significance.

<b>Site Number</b>	<b>Impact Agent</b>	<b>Description</b>
A:15:025	Water erosion caused by the dripline	Carbon collected from the FCR pile.
A:16:176	Research based – no impacts to the site	Carbon collected from only feature on the site to identify chronology.
B:10:111	Research based – no impacts to the site	Carbon sample collected from Feature 1 to compare it with the ceramics located in a room above the site.
G:03:032	Research based – subsurface testing for in situ cultural material	It is unclear if Features 4 and 5 have any integrity. They may be modern or natural manifestations.

### ***Data Recovery***

Data recovery for the project has commonly involved complete excavation of eroding features and collecting carbon and micro- and macro-botanical samples from these features. Seventeen sites (see Table 10) are recommended for such work. All impacts to the features are caused by physical erosion to such a degree that preservation is not a cost effective or practical treatment. As mentioned before, the overall research domains established in the draft HPP (U.S. Department of the Interior, et al. 1997) will guide analysis of the data recovered from all mitigative measures. Map Appendix I provides the individual site maps highlighting the locations for data recovery. Realistically, several of these actions will not be completed due to commitments on other trips and limited funding. It is important, however,

that PA members realize that several of the sites listed in Table 10 have been recommended for data recovery as early as 1994. These sites have demonstrated severe erosion to the extent that if something does not happen soon, cultural information will be lost forever.

Table 10. List of sites recommended for data recovery.

Site Number	Impact Agent	Initial Date of Recommendation	Description
A:15:039	Side canyon erosion	4-6-94	Complete excavation of Feature 1 (FCR concentration).
B:09:316	Minor eolian erosion	4-3-01	Complete excavation of Room 1 (hearth) with assistance by a geomorphologist to profile the flood stratigraphy.
C:02:096	River-based arroyo cutting	10-1-96	Profile and sample the arroyo cut dissecting Locus B (Features 2 – 9) -- artifact concentrations, hearths and FCR concentrations. Previous carbon sample results indicate archaic occupation
C:13:009	Cutbank erosion adjacent to Colorado River	10-11-98	Complete excavation of Features 3, 10, 11, 14, and 20 -- 4 structures and 1 FCR concentration.
C:13:010	River-based arroyo and gully cutting	4-29-96	Continue the feature excavations at Features 7, 31 and 34 – all structures.
C:13:070	River-based arroyo cutting	4-30-96	Complete excavation of Locus D --artifact concentration. Carbon dates indicate PII occupation.
C:13:099	River-based arroyo cutting	4-15-97	Complete excavation of Feature 3 (structure) and Feature 1 (possible pit house). Carbon dates indicate Basketmaker occupation.
C:13:327	Bank slump from river-based arroyo	2-18-96	Complete excavation of Feature 1 (roaster). Carbon dates indicate Archaic to early Basketmaker occupation.
C:13:347	River-based arroyo cutting	10-16-95	Previous testing shows the structure (the only feature at the site) continues into the dune. This structure is very unstable.
C:13:373	Eolian and surface erosion	11-9-96	Complete excavation of the site (a single FCR feature with some sherds and burned bone).
C:13:385	River-based gully cutting	10-18-00	Complete excavation of Feature 2(cist feature)
G:03:020	Side canyon arroyo cutting	10-17-96	Complete excavation of Feature 2 (roasting pit). Carbon dates indicate PII – PIII occupation
G:03:029	Terrace-based gully cutting	4-6-01	Complete excavation of Feature 2 (FCR concentration).
G:03:038	River-based gully cutting	4-5-01	Complete excavation of Features 3 and 4 (roasting features). Checkdams were unsuccessful.
G:03:060	River-based gully cutting	11-21-98	Complete excavation of Features 5, 6, and 13 – FCR features).
G:03:064	River-based arroyo cutting	2-29-96	Complete excavation of Features 1, 13, and 14 – roasting features.
G:03:072	River-based arroyo cutting	11-20-97	Complete excavation of Features 11, 12, and 14.

### *Miscellaneous Field Work*

- Medium format photography
  - a. Continue shoreline, oblique photography at selected sites and research new locations (possibly using a larger lens). This information will aid in the study completed through USGS (repeat photography research), as called for in the PEP.
- Provide field and lab assistance for the research completed to quantify the effectiveness of checkdams. Sixteen sites were selected for this GCMRC funded project. RCMP archaeologists will accompany at least one, possibly two river trips, in FY2002.
- Continue in-field drainage measurements to supplement studies completed by LIDAR research, total station mapping and checkdam research.
- Support LIDAR research.
  - a. Identify specific flow regimes near archaeological sites in conjunction with GCMRC surveyors.
  - b. Identify and work with surveyors on the total station mapping efforts.
  - c. GPS sites and plot them on orthophotographs. This will aid in the LIDAR studies that are currently being proposed by USGS.

### *Office work*

- Provide assistance to the HPP and Supplemental Plans as called for by the PEP.
- Cultural Database Plan -- Update database and help develop a database plan (database design), as called for in the PEP report. The design is intended to link cultural data more efficiently and effectively with the other research being conducted in the Canyon (i.e., the biological and physical sciences). A database design specialist will be hired this year to improve upon the status of the data. This will include redesigning of the following databases: survey, photograph, monitoring, and remedial action.
- Complete data entry for the ASMIS condition assessment. This will supplement recommendations made by the cultural PEP concerning baseline site condition assessment. This task will also supplement the foundation of the cultural database plan, as called for by the PEP.
- Process FY02 monitoring and remedial action data, including data sheets, photographs and slides. Update the RCMP databases accordingly.

### *Proposed NPS River Trips*

A minimum of 2 trips per year are required to adequately complete the site monitoring agenda and remedial actions (U.S. Department of the Interior and Service 1997:5), however, this year only one 16 day river trip is scheduled beginning April 25, 2002. This trip will be geared toward checkdam work. Additional trips may be arranged to review concerns of the various agencies and Tribes. The seasonality of events in the river corridor (visitation and vegetation) determines the optimum time to undertake the monitoring trips. This would include the period from mid September through April. Considering the inadequate hours of daylight and the cold temperatures of December and the late winter, trips would be most suited to the fall and early spring (U.S. Department of the Interior and Service 1997:5).

One RCMP archaeology trip (PA-funded) will occur in the spring. The trip will run 16 days following the NPS minimum tool requirement. A qualified NPS Archaeologist will direct this trip. Qualification as (NPS) trip leader will require a minimum of 60 days river corridor monitoring experience between Glen Canyon Dam and Separation Canyon. GCMRC may provide professional staff (such as a geomorphologist) to assist with both monitoring and remedial actions when appropriate or requested by the signatories (U.S. Department of the Interior and Service 1997:5).

Signatories to the Programmatic Agreement may accompany any monitoring trip if they so request and logistical arrangements can be made. Requests should be received by NPS no later than 1 month prior to trip launch (U.S. Department of the Interior and Service 1997:5).

Several CRF river trips are scheduled for the fall and spring that will support work recommended in this report. Visitor impact assessments and implementation at the sites listed in Table 8 will be completed to deter further impact that may threaten site integrity. Total station mapping of the following sites: C:09:001, C:09:028, C:09:065, C:09:088, C:13:009 will occur in the spring. CRF managers will hire qualified survey technicians as requested by RCMP staff. When time allows other work suggested in Tables 4-9 will also be completed.

GCMRC is supporting one, possibly two, spring river trip(s) involving the evaluation of remote sensing technologies for monitoring purposes (Pederson 2001). Included in this research Pederson, with the aid of RCMP personnel, will evaluate the effectiveness of checkdams at 16 selected sites.

### ***Reports***

Trip reports will be prepared by the NPS following each river trip. The reports will summarize the actions taken on the trips including sites visited, changes that have occurred at the sites, effectiveness of previous remedial actions, as well as any unanticipated remedial actions that were undertaken. In addition, a section recommending remedial actions that are needed at each site will be provided. Sensitive information related to Traditional Cultural Properties will be retained by the culturally appropriate Tribe, with only the information necessary to guide remedial actions being detailed in the report (U.S. Department of the Interior and Service 1997:6).

These reports will be provided to all of the signatories for review. It is then incumbent on the reviewers to comment on the reports and proposed remedial actions within 30 days of receipt. If requested, meetings will be scheduled to discuss any of the proposed remedial actions and other options. If no concerns are voiced, or after resolution of differences, the remedial actions will occur as can be scheduled on upcoming trips, unless otherwise determined by the signatories.

An Annual report, based upon the fiscal year calendar, will be prepared by both GLCA and GRCA synthesizing the previous years' monitoring results and the effectiveness of remedial actions that have been implemented to date (U.S. Department of the Interior and Service 1997:6). It will also identify the next years scope of work, changes in methodology if necessary, and remedial actions that are projected to be required in the upcoming year.

Once the annual report is approved by all of the signatories it will be incorporated into the annual report required by the Grand Canyon Protection Act. Recommendations for operational changes based on the data collected will be developed in consultation with the Tribes, NPS, and Reclamation, and forwarded to the Technical Work Group and the Adaptive Management Group identified in the Act for incorporation into management recommendations on dam operations for the Secretary of the Interior. This yearly review will satisfy the consultation requirements under Section 106 of the NHPA for the Monitoring and Remedial Action Program.

## References Cited

- Balsom, J. R. and S. Larralde (editors)  
 1996 *Mitigation and Monitoring of Cultural Resources in Response to the Experimental Habitat Building Flow in Glen and Grand Canyons, Spring 1996*. Final report submitted to the Grand Canyon Monitoring and Research Center, Bureau of Reclamation, December 31, 1996, Flagstaff, AZ.
- Bulletts, A.  
 1995 Summer Respecting the Bundy Jars. *Boatman's Quarterly* 8(No. 3).
- Burchett, T. W., C. M. Coder and D. Hubbard  
 1996 Monitoring of Archaeological Sites Below Glen Canyon Dam Along the Colorado River in Response to the Experimental Habitat Building Flow of 1996. In *Mitigation and Monitoring of Cultural Resources in Response to the Experimental Habitat Building Flow in Glen and Grand Canyons, Spring 1996*, edited by J. R. Balsom and S. Larralde. Final report submitted to the Grand Canyon Monitoring and Research Center, Bureau of Reclamation, December 31, 1996, Flagstaff, AZ.
- Busch, J. E.  
 1930 McCormick mining claims. U.S. Department of the Interior, General Land Office, Phoenix.
- Coder, C. M., L. M. Leap, N. B. Andrews and D. C. Hubbard  
 1994b *1993 Summary Report: Monitoring of Archaeological Sites Along the Colorado River Corridor in Grand Canyon National Park*. Report prepared by Grand Canyon National Park and Northern Arizona University. Submitted to the Bureau of Reclamation, Upper Colorado Region, Salt Lake City, UT. Copies available from RCMP #12.
- Coder, C. M., L. M. Leap, N. B. Andrews and D. C. Hubbard  
 1995a *1994 Summary Report: Monitoring of Archaeological Sites Along the Colorado River Corridor in Grand Canyon National Park*. Report prepared by Grand Canyon National Park and Northern Arizona University. Submitted to the Bureau of Reclamation, Upper Colorado Region, Salt Lake City, UT. Copies available from RCMP #18.
- Coder, C. M., L. M. Leap, N. B. Andrews, D. C. Hubbard and J. L. Kunde  
 1995b *1995 Summary Report: Monitoring of Archaeological Sites Along the Colorado River Corridor in Grand Canyon National Park*. Report prepared by Grand Canyon National Park and Northern Arizona University. Submitted to the Bureau of Reclamation, Upper Colorado Region, Salt Lake City, UT. Copies available from RCMP #27.
- Coder, C. M., L. M. Leap, N. B. Andrews, D. Kline and D. C. Hubbard  
 1994a *Summary Report for 1992: GCES Monitoring of Archaeological Sites from Lees Ferry to Separation Canyon, Grand Canyon National Park*. Report prepared by Grand Canyon National Park and Northern Arizona University. Submitted to the Bureau of Reclamation, Upper Colorado Region, Salt Lake City, UT. Copies available from RCMP #6.
- Daly, R. M.  
 1929 McCormick mining claims. U.S. Department of the Interior, General Land Office, Phoenix, Arizona.
- Doelle, W. H.  
 2000 *Final Report: Cultural Resource Program Assessment*. Grand Canyon Monitoring and Research Center.
- Fairley, H. C., P. W. Bungart, C. M. Coder, J. Huffman, T. L. Samples and J. R. Balsom  
 1994 *The Grand Canyon River Corridor Survey Project: Archaeological Survey along the Colorado River between Glen Canyon Dam and Separation Canyon*. Glen Canyon Environmental Studies. Copies available from RCMP #1.

- Gellis, A.  
1994 *Trip Report on Erosion at Selected Archaeological Sites, Grand Canyon National Park, Arizona*. U.S. Geological Survey.
- Hereford, R.  
1996 Geoarchaeology of the Colorado River in the Eastern Grand Canyon, Grand Canyon National Park, AZ. Paper presented at the 61st Annual Meeting of the Society for American Archaeology, New Orleans, LA.
- Hereford, R., K. J. Burke and K. S. Thompson  
1996b *Description of Map Units and Discussion to Accompany Map Showing Quaternary Geology and Geomorphology of the Nankoweap Rapids area, Marble Canyon, Arizona*. U.S. Geological Survey. Copies available from U.S. Geological Survey Open-File Report 96-502.
- Hereford, R., H. C. Fairley, K. S. Thompson and J. R. Balsom  
1993 *Surficial Geology, Geomorphology and Erosion of Archaeologic Sites along the Colorado River, Eastern Grand Canyon, Grand Canyon National Park, Arizona*. Grand Canyon National Park in cooperation with the U.S. Bureau of Reclamation, Glen Canyon Environmental Studies. Copies available from U.S. Geological Survey Open-File Report 93-517.
- Hereford, R., K. S. Thompson, K. J. Burke and H. C. Fairley  
1996a Tributary debris fans and the late Holocene alluvial chronology of the Colorado River, Eastern Grand Canyon, Arizona. *Geological Society of America Bulletin* 108(1):3 - 19.
- Hubbard, D. C.  
1999b *Fiscal Year 99-4 Archaeological River Trip, April 14th - April 29th, 1999*. River Corridor Monitoring Project. Report prepared for Grand Canyon National Park. Copies available from RCMP #64.
- Jackson and Leap  
1996 Summer The Sand, the Wind, and the Willow. *Boatman's Quarterly* 9(No. 3).
- Jones, A. T.  
1986 *A Cross Section of Grand Canyon Archaeology: Excavations at Five Sites Along the Colorado River*. Western Archaeological and Conservation Center. Copies available from Publications in Anthropology No. 28.
- Kunde, J.  
2000 *Fall 2001 Trip Reports Summary: Archaeological Site Monitoring and Management, and Colorado River Fund Activities Along the Colorado River in Grand Canyon National Park*. Grand Canyon National Park. Submitted to Trip Report. Copies available from RCMP #74.
- Kunde, J. L.  
1998a *FY99-1 Archaeological Monitoring River Trip, October 6 - 21, 1998*. River Corridor Monitoring Project. Report prepared for Grand Canyon National Park. Copies available from RCMP #58.
- Kunde, J. L.  
1998b Preserving and Protecting River Corridor Archaeological Sites. In *Nature Notes*, pp. 6-7. vol. 14, no. 2, Winter 1998. Published by the Division of Visitor Services and Interpretation, Grand Canyon National Park, Grand Canyon, AZ.
- Leap, L. M.  
1994a *Proposed Mitigation for Sites C:13:273 and C:13:339 to Provide Clearance for Trail Maintenance in the Colorado River Corridor, Grand Canyon National Park*. River Corridor Monitoring Project. Copies available from RCMP #20.
- Leap, L. M.  
1994b *Ten Properties Along the Colorado River Corridor Recommended for National Register Eligibility, Grand Canyon National Park*. River Corridor Monitoring Project. Copies available from RCMP #19.

- Leap, L. M.  
1995a *Fiscal Year 95-3 River Monitoring Trip Report*. River Corridor Monitoring Project. Report prepared for Grand Canyon National Park. Copies available from RCMP #24.
- Leap, L. M.  
1995b *Monitoring of Archaeological Sites in Response to the Proposed Research Flow of 1996*. River Corridor Monitoring Project. Copies available from RCMP #30.
- Leap, L. M.  
1995c *Testing Results from C:13:273 and C:13:339 to Recommend Clearance for Beamer Trail Maintenance in the Colorado River Corridor, Grand Canyon National Park*. River Corridor Monitoring Project. Copies available from RCMP #23.
- Leap, L. M.  
1996a *Archaeological River Monitoring Trip Report for Fiscal Year 96-3*. River Corridor Monitoring Project. Report prepared for Grand Canyon National Park. Copies available from RCMP #34.
- Leap, L. M.  
1996b *Fiscal Year 96-2 Archaeological River Monitoring Trip Report*. River Corridor Monitoring Project. Report prepared for Grand Canyon National Park. Copies available from RCMP #33.
- Leap, L. M.  
1996c *Remedial Actions Conducted at Sites C:13:006, C:13:371 and Granite Park, Grand Canyon National Park*. River Corridor Monitoring Project. Copies available from RCMP #36.
- Leap, L. M.  
1997a *Archaeological River Monitoring Trip Report for Fiscal Year 97-2 (November 5 - 21, 1996)*. River Corridor Monitoring Project. Report prepared for Grand Canyon National Park. Copies available from RCMP #39.
- Leap, L. M.  
1997b *Archaeological River Trip Report for Fiscal Year 97-3 (February 19 - March 6, 1997)*. River Corridor Monitoring Project. Report prepared for Grand Canyon National Park. Copies available from RCMP #47.
- Leap, L. M.  
1997e *Archaeological River Monitoring Trip Report for Fiscal Year 98-1 (October 6 - 25, 1997)*. River Corridor Monitoring Project. Report prepared for Grand Canyon National Park. Copies available from RCMP #52.
- Leap, L. M.  
1999a Notes from the Programmatic Agreement Meeting held March 18, 1999, Embassy Suites, Phoenix, Arizona.
- Leap, L. M., N. B. Andrews, D. C. Hubbard and J. L. Kunde  
1997a *1997 Summary Report: Archaeological Site Monitoring and Management Along the Colorado River Corridor in Grand Canyon National Park*. Grand Canyon National Park. Copies available from RCMP #50.
- Leap, L. M., N. B. Andrews and J. L. Kunde  
1996b *1996 Summary Report: Monitoring of Archaeological Sites along the Colorado River Corridor in Grand Canyon National Park*. Grand Canyon National Park. Copies available from RCMP #37.
- Leap, L. M., T. Burchett, J. L. Kunde, N. B. Andrews and D. C. Hubbard  
1998d *1998 Summary Report: Archaeological Site Monitoring and Management Along the Colorado River Corridor Below Glen Canyon Dam*. Grand Canyon National Park. Copies available from RCMP #57.

- Leap, L. M. and C. M. Coder  
1995 *Erosion Control Project at Palisades Delta along the Colorado River Corridor, Grand Canyon National Park*. River Corridor Monitoring Project. Report prepared for Grand Canyon National Park. Copies available from RCMP #29.
- Leap, L. M. and J. L. Kunde  
1997b *A Proposal to Conduct Site Preservation Work at 23 Archaeological Sites along the Colorado River Corridor*. River Corridor Monitoring Project. Copies available from RCMP #46.
- Leap, L. M. and J. L. Kunde  
1998a *Archaeological River Monitoring Trip (98-2), November 6 - 21, 1997*. River Corridor Monitoring Project. Report prepared for Grand Canyon National Park. Copies available from RCMP #53.
- Leap, L. M. and J. L. Kunde  
2000b *2000 Summary Report: Archaeological Site Monitoring and Management Along the Colorado River Corridor in Grand Canyon National Park*. Grand Canyon National Park. Copies available from RCMP #73.
- Leap, L. M., J. L. Kunde, D. C. Hubbard, N. B. Andrews, C. E. Downum, A. R. Miller and J. R. Balsom  
2000a *Grand Canyon Monitoring Project 1992-1999: Synthesis and Annual Report FY99*. Grand Canyon National Park. Copies available from RCMP #66.
- Lindsey, B.  
1999 *1999 Sand Sieve Analysis for G:03:026*. National Resources Conservation Service.
- Lindsey, B. and F. Fisher  
1999 *Soil Description--Palisades Creek Area*. National Resources Conservation Service.
- O'Connor, J., L. Ely, Wohl, Ellen, L. Stevens, T. Melis, V. Kate and V. Baker  
1994 A 4500-Year Record of Large Floods on the Colorado in the Grand Canyon, Arizona. *The Journal of Geology* 102:1-9.
- Pederson, J. L.  
2001 *Testing the utility of Monitoring and Mitigation Strategies for Gully Erosion of Cultural Sites in Grand Canyon: Towards Refining our Understanding of the Geomorphic Conditions Responsible*. Utah State University. Submitted to GCMRC Report.
- Thompson, K. and A. Potochnik  
2000 *Development of a Geomorphic Model to Predict Erosion of Pre-dam Colorado River Terraces Containing Archaeological Resources*. SWCA Environmental Consultants, Flagstaff, Arizona. Copies available from SWCA Cultural Resources Report No. 99-257  
SWCA Project No. 2362-1383.
- Thompson, K. S., K. J. Burke and R. Hereford  
1996 *Topographic map showing drainage basins associated with pre-dam terraces in the Granite Park area, Grand Canyon, Arizona*. U.S. Geological Survey. Copies available from Open-file report 95-592.
- U.S. Department of the Interior, B. o. R., A. C. o. H. Preservation, N. P. Service, A. S. H. P. Officer, H. Tribe, H. Tribe, H. Tribe, K. P. Tribe, N. Nation, S. J. S. P. Tribe, S. P. Tribe and Z. Pueblo  
1994 Programmatic Agreement on Cultural Resources.
- U.S. Department of the Interior, B. o. R. and N. P. Service  
1997 Monitoring and Remedial Action Plan. In *Final Draft Historic Preservation Plan for Cultural Resources Affected by Glen Canyon Dam Operations*, pp. 71-80.
- U.S. Department of the Interior, B. o. R., N. P. Service, H. Tribe, H. Tribe, N. Nation, S. J. P. Tribe, S. P. Consortium and Z. Pueblo

1997 *Final Draft Historic Preservation Plan for Cultural Resources Affected by Glen Canyon Dam Operations*. Bureau of Reclamation and National Park Service.

U.S. Department of the Interior, N. P. S.

1991 *National Register Bulletin 15*. National Register of Historic Places. Submitted to Bulletin.

U.S. Department of the Interior, N. P. S.

1998 *Grand Canyon National Park Draft Wilderness Management Plan*. U.S. Department of the Interior, National Park Service.

Yeatts, M.

1998 *1997 Data Recovery at Five Sites in the Grand Canyon, Final Report*. River Corridor Monitoring Project and The Hopi Tribe. Copies available from RCMP #60.

Yeatts, M. and L. M. Leap

1997 *Proposed Testing at AZ:C:09:051 (GRCA)*. The Hopi Tribe and River Corridor Monitoring Project. Copies available from RCMP #49.

Appendix A  
River Corridor Monitoring Project Form

Appendix B  
Integrity Table at 264 sites.

Appendix C  
Checkdam Maintenance work Completed in FY01.