Draft Historic Preservation Plan for Cultural Resources Affected by Glen Canyon Dam Operations

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U.S. Department of the Interior
Bureau of Reclamation
Upper Colorado Region

and

National Park Service
Glen Canyon National Recreation Area
Grand Canyon National Park

With Contributions by the
Havasupai Tribe, Hopi Tribe,
Hualapai Tribe, Navajo Nation,
Southern Paiute Consortium,
and Zuni Pueblo

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Acronyms and Abbreviations

AIRFA	American Indian Religious Freedom Act
AMP	Adaptive Management Program
AMWG	Adaptive Management Work Group
APE	Area of potential effects
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CRSP	Colorado River Storage Project
EIS	Environmental Impact Statement
GCDEIS	Glen Canyon Dam Environmental Impact Statement
GCES	Glen Canyon Environmental Studies
GCPA	Grand Canyon Protection Act
GIS	Geographic Information System
GLCA	Glen Canyon National Recreation Area
GRCA	Grand Canyon National Park
HPP	Historic Preservation Plan
MRAP	Monitoring and Remedial Action Plan
NAGPRA	Native American Graves Protection and Repatriation Act
NAU	Northern Arizona University
NHPA	National Historic Preservation Act
NPS	National Park Service
PA	Programmatic Agreement on Cultural Resources
P.L.	Public Law
Reclamation	Bureau of Reclamation
Research Center	Grand Canyon Monitoring and Research Center
SHPO	State Historic Preservation Officer
TCPs	Traditional cultural properties

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Executive Summary and Management Plan

This document provides the direction for management of cultural resources along the river corridor from Glen Canyon Dam to Pierce Ferry in Glen Canyon National Recreation Area (GLCA) and Grand Canyon National Park (GRCA). The river corridor, as defined here, includes downstream areas along the Colorado River that are affected by the operations of Glen Canyon Dam. According to Section 106 of the National Historic Preservation Act (NHPA), the Upper Colorado Region of the Bureau of Reclamation (Reclamation) is responsible for project-oriented impacts to cultural resources. The National Park Service (NPS) is responsible for long-term management of those resources under Section 110 of the same Act. As signatories to the Programmatic Agreement on Cultural Resources (PA), tribal groups are responsible for overseeing the management of traditional cultural properties (TCPs) and places of religious significance. The Historic Preservation Plan (HPP) describes the extent of these responsibilities and the specific ways that cultural resources will be managed in order to fulfill NHPA requirements as specified in the PA on Glen Canyon Dam Operations.

CHAPTER I

Introduction

OVERVIEW AND RATIONALE FOR PROGRAM

Glen Canyon Dam was completed by Reclamation in 1963 as a feature of the Colorado River Storage Project (CRSP). The underlying project purposes are defined by Section 1 of the Colorado River Storage Project Act of 1956, which authorized the Secretary of the Interior to construct, operate, and maintain Glen Canyon Dam

> *. . . for the purpose, among others, of regulating the flow of the Colorado River, storing water for beneficial consumptive use, making it possible for the states of the Upper Basin to utilize, consistently with the provisions of the Colorado River Compact, the apportionments made to and among them in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, providing for the reclamation of arid and semiarid land, for the control of floods, and for the generation of hydroelectric power, as an incident of the foregoing purposes . . .*

Given that Glen Canyon Dam was completed prior to enactment of the National Environmental Policy Act, no Environmental Impact Statement (EIS) was filed regarding construction or operation of the dam.

Although National Environmental Policy Act compliance was not required for the initial construction of Glen Canyon Dam, cultural resource compliance laws were in place during its construction. Of importance in this discussion is the Reservoir Salvage Act of 1960 (P.L. 86-523), later amended into the Archeological and Historic Preservation Act of 1974 (P.L. 93-291). The Reservoir Salvage Act and the Archeological and Historic Preservation Act provide for the preservation of historical and archeological data which might otherwise be lost as a result of the construction of a dam. This includes loss or destruction as a result of flooding, the building of access roads, the erection of workmen's communities, the relocation of railroads and highways, and other alteration of the terrain caused by the construction of a dam or any federal construction project or federally licensed activity or program.

In addition to the direction provided by the Reservoir Salvage Act and the Archeological and Historic Preservation Act, federal agencies are mandated to consider their activities upon historic properties as

dictated in the NHPA (as amended in 1992). Direction for implementation of this Act is found in 36 CFR Part 800 which defines a federal undertaking as any

> *. . . project, activity, or program that can result in changes in the character or use of historic properties, if any such properties are located in the area of potential effects. Undertakings include new and continuing projects, activities, or programs and any of their elements not previously considered under Section 106.*

While cultural resource preservation laws mandate protection of cultural resources on federal lands potentially impacted by federal undertakings, additional laws have authority when issues pertain to the Colorado River. Referred to as the "Law of the River," these authorities represent a collection of federal and state statutes, compacts, court decisions and decrees, federal contracts, a treaty with Mexico, and formally determined long-range operating criteria which define the operation and management of the Colorado River.

The CRSP authorized the construction of Glen Canyon Dam and related facilities for the purposes of flow regulation, water storage for beneficial consumptive use, irrigation, and, as incident to the other purposes, hydroelectric power generation. Even though power production was incidental to other purposes, the powerplant at Glen Canyon Dam has been used primarily for generating power during high demand periods, a method of generation referred to as "peaking power." The daily fluctuating releases associated with peaking power operations have caused concern among federal, state, and tribal resource management agencies; fishing and rafting interests; and environmental groups concerned about detrimental effects on downstream cultural resources, vegetation, wildlife, and other river resources, including endangered species.

In response to these concerns and a proposed uprating and rewinding of the generators at Glen Canyon Dam, Reclamation initiated the Glen Canyon Environmental Studies (GCES) in 1982 to evaluate the effects of low and fluctuating flows caused by the operations at Glen Canyon Dam on downstream resources. Shortly after the initiation of research associated with the GCES, Glen Canyon Dam began spilling water, with a maximum flow of 93,000 cubic feet per second (cfs) achieved in July of 1983. Water releases above powerplant capacity were continuous for nearly four years, with detrimental impacts documented to many of the downstream resources.

Public concerns about possible increases in peaking power generation at Glen Canyon Dam continued to be expressed. The uprate and rewind of powerplant generators was completed in 1987. Reclamation agreed not to use the increased generating capacity until completing additional studies of impacts on downstream resources from dam operations. Maximum peak releases were limited to 31,500 cfs, even though the generators have the capacity of releasing 33,200 cfs because of the uprate and rewind.

On July 27, 1989, public concern and scientific documentation of the detrimental affects of Glen Canyon Dam operations resulted in former Secretary of the Interior Manuel Lujan directing Reclamation to prepare a full EIS on the operations of Glen Canyon Dam. The purpose of the EIS

was to determine specific options that could be implemented to minimize—consistent with law—adverse impacts on the downstream environmental and cultural resources and Native American interests in Glen and Grand Canyons.

In addition to the evaluation called for by the EIS, Congress passed the Grand Canyon Protection Act (GCPA) (P.L. 102-575) on October 30, 1992. Section 1802(a) of the Act requires the Secretary to

> *. . . operate Glen Canyon Dam in accordance with the additional criteria and operating plans specified in Section 1804 and exercise other authorities under existing law in such a manner as to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established, including, but not limited to natural and cultural resources and visitor use.*

In accordance with Section 1804(a) of the Act, Reclamation completed the final Glen Canyon Dam Environmental Impact Statement (GCDEIS) and filed it with the Environmental Protection Agency on March 21, 1995.

Another component of the GCPA, Section 1805, "Long-Term Monitoring," identifies the need for both long-term monitoring and any necessary research and studies to determine the effects of dam operations upon the natural, recreational, and cultural resources downstream from the dam.

The Colorado River is a highly complex and dynamic system affected by variables and conditions outside the parameters of dam operations. These variables and conditions were significantly altered by the completion of the dam. Without the influx of sediment, seasonally variable water temperatures, and yearly cleansing floods, the river system can never function as it had before the dam was built. In recognition of the changed river system and the ability Reclamation has to manage flow regimes from Glen Canyon Dam, the Secretary of the Interior is authorized to implement a program of research and monitoring related to Glen Canyon Dam operations to ensure that the dam is operated as stated in Section 1802(a), ". . . to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established."

A Monitoring Philosophy for Glen Canyon Dam Operations and for Resources of the Grand Canyon

In order to fulfill the requirements of Section 1805 of the GCPA, the final GCDEIS includes a commitment for long-term research and monitoring through a program called Adaptive Management. Many of the resources considered by the GCES program for long-term monitoring are ecosystem related, and cultural resources are identified as a long-term program need. As discussed in the GCDEIS, the long-term monitoring and research program will focus on defining a balance between the extremes of (1) very restricted monitoring which recognizes the impacts of scientific study on the essence of what Grand Canyon means to most humans, and (2) full measurement of all ecosystem attributes predicated on a belief that an unmeasured parameter might be critical at a later time (Reclamation 1995).

Details of the long-term monitoring and research program and adaptive management can be found in the GCDEIS and accompanying supporting documents. Of relevance to this discussion are the additional monitoring requirements for cultural resources based upon NHPA mandates for federal undertakings which will adversely affect historic properties. Implementing regulations for the NHPA, articulated in 36 CFR 800, provide guidance to federal agencies for preservation of cultural resources through appropriate application of research and monitoring methodologies which ensure that information is not lost due to the agencies' actions.

For the purposes of this project, the federal agencies, Arizona State Historic Preservation Officer (SHPO), Advisory Council on Historic Preservation, and the participating tribes have agreed to a finding of no adverse effect based upon a long-term monitoring and remedial action program which is described in this HPP.

The Geographical Scope of Monitoring

The area to be monitored is the Colorado River corridor between Glen Canyon Dam and Lake Mead reservoir. This area is approximately 290 miles long, with approximately 255 miles representing the free-flowing river from Glen Canyon Dam to the slack water created by Lake Mead at Separation Canyon. Although the river elevation below Separation Canyon (rivermile 240) is primarily controlled by the operations of Hoover Dam, some limited examination of the resources between Separation Canyon and Pierce Ferry at Lake Mead is considered within this program given the effects of flooding, changes in the predam sedimentation regime, and equalization flows.

The lateral extent of the monitoring effort is defined by the extent of processes and conditions influenced by dam discharges and predam river flows. The relevant flow related to lateral extent is the maximum predam flood, estimated to be approximately 220,000 to 300,000 cfs. Because this proposed monitoring program is long-term in scope, the minimum discharge considered must consider all potential operational scenarios. The maximum release from Glen Canyon Dam is expected never to exceed 180,000 cfs (Reclamation 1995:8). However, for the purposes of impact evaluation for Section 106 of the NHPA, all resources located below the lateral extent of maximum possible flow from Glen Canyon Dam, estimated to be 256,000 cfs, were included in this HPP.

Cultural resources are affected by agents other than direct impact from Glen Canyon Dam water releases. Predam river terraces form the substrate for most cultural resources. These terraces are directly affected by both river flow and sediment depletion caused by the emplacement of Glen Canyon Dam. Therefore, all sites within river-deposited sediments are considered to be within the affected environment for this HPP.

A Summary of Impacts

With the closure of Glen Canyon Dam in 1963, the pattern of deposition, erosion, and flooding on the Colorado River through Glen and Grand Canyons was changed forever. As a result, general loss of river-deposited terraces has occurred. Archeological sites once protected by sandbars and terraces have become increasingly exposed to erosion by the river and by rainfall-induced terrace erosion.

The postdam river cannot rebuild high terraces, resulting in more archeological site erosion than occurred in the predam environment. The 1983-1986 flood flows caused direct erosion of terraces. Extreme rainfall conditions during 1978-1985 led to accelerated erosion of archeological sites. Because the dam traps sediment and reduces floods, little or no sediment is deposited at the mouths of small ephemeral tributary streams, which compounds the situation. Only low elevation sediment deposits can be replenished in the postdam environment. Large sediment-laden floods may rebuild the bases of high terraces at most locations, but may erode terraces at other locations.

The initial impacts to archeological sites began with the construction of Glen Canyon Dam and the resulting change in the amount and distribution of sediment. The preservation of cultural sites depends on the terraces that have formed along the river corridor. Without a mechanism for sediment augmentation and redeposition to predam terrace levels, dam operations will continue to negatively impact cultural resources. Given that none of the GCDEIS alternatives alter the basic change in postdam sediment input to the system, it is expected that dam-related impacts to cultural sites will continue. These impacts are permanent, and the damage is irreversible. However, the rate at which impacts occur could be affected by alternative operations, principally through flood frequency reduction measures and special flows intended to redistribute and deposit sediment throughout the system.

The analysis of impacts is based on our present understanding of changes in cultural resources known to have occurred as a result of Glen Canyon Dam. Some impacts are direct while others are indirect. The influence of dam operations on TCPs is based on information provided by ethnographic research and knowledge shared by Indian tribes known to have a history of ancestral use of the Grand Canyon. Traditional cultural resources include riparian vegetation and wildlife as well as archeological sites, and impacts on these resources are also of concern here.

Not all impacts of the dam are negative. Postdam changes in the riparian ecosystem within Grand Canyon have favored growth of certain vegetation types, while other vegetation is thought to be declining. The net effects of these changes in riparian vegetation are dynamic; however, some of the traditional resources (willows, giant reeds, yellow warblers, yellow-throats, and other plants and riparian birds) have clearly increased since construction of the dam.

One of the most visible TCPs located within the river corridor, the Salt Mines and their associated sediment deposit below the Little Colorado River confluence, will be protected by GCDEIS alternatives that allow sediment accumulation on the sandbar at the base of the mines.

Under all the alternatives described in the GCDEIS, impacts to cultural resources will continue. Impacts due to dam operations may cause irretrievable loss of cultural resources that are regionally or nationally significant. This HPP provides guidance for fulfilling NHPA requirements as specified in the PA on Glen Canyon Dam Operations.

ARTICULATION WITH THE PROGRAMMATIC AGREEMENT ON CULTURAL RESOURCES AND THE MONITORING AND REMEDIAL ACTION PLAN

In order to meet Reclamation NHPA Section 106 responsibilities and NPS NHPA Section 110 responsibilities as outlined in 36 CFR 800, both agencies have entered into a PA. The PA stipulates inventory of cultural resources, monitoring of these resources for impacts from dam operations, and remedial actions to mitigate damage identified during monitoring.

On February 9, 1994, the PA became a legally binding document when it was signed by the Advisory Council on Historic Preservation. Other signatories include the Arizona SHPO; Reclamation's Upper Colorado Regional Director; the NPS's Western Regional and Rocky Mountain Regional Directors; and the Chairmen or Governors of the Hopi Tribe, the Hualapai Tribe, the Navajo Nation, the Shivwitz Paiute Tribe, the Kaibab Paiute Tribe, the San Juan Southern Paiute Tribe, and Zuni Pueblo. The Havasupai Tribe has been invited to participate in the PA process from the beginning, but to date has not signed the PA.

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The PA lays out a plan for managing cultural resources in the river corridor, starting with inventory and evaluation of those resources, moving on to implementation of a plan for monitoring and remedial action, and ending with a plan (the HPP) for long-term management that includes and builds on information in the previous documents. The preparation of the HPP by Reclamation and the NPS, its subsequent review by the signatories of the PA, and finally its implementation satisfies the requirements outlined in the PA for management of cultural resources in the river corridor. The main points of the PA are elaborated in Chapter II and the PA is included as Appendix A.

CONTENTS OF THE HISTORIC PRESERVATION PLAN

Subsequent chapters of the HPP incorporate the following information:

Chapter II outlines federal and tribal legal authorities and includes a point by point description of the requirements of the PA.

Chapter III summarizes the history of inventories, ethnographic reports from the tribes, and SHPO consultation within the river corridor. Broad classes of cultural resources are defined, including archeological resources (including prehistoric and historic sites), TCPs, and archeological resources viewed by the tribes as TCPs. The two data bases which have been accumulated to date (archeological sites and TCPs) are described and evaluated in terms of methodology, strengths and gaps in information, the way in which determinations of eligibility and significance were made, and efforts needed to close information gaps. Finally, areas of cultural resource sensitivity are defined, first in terms of impact zones related to the operations of Glen Canyon Dam, and secondly in terms of the importance of archeological and traditional cultural resources to archeological researchers and the tribes. The level of specificity of information regarding archeological resources and TCPs that can be included in public documents, especially their locations, will be discussed in this chapter along with restrictions to access and distribution.

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Chapter IV outlines the purpose, contents, and implementation of the Monitoring and Remedial Action Plan (MRAP). Procedures for consultation and coordination are discussed, including points of involvement for tribes and requirements for producing and reviewing reports.

Chapter V discusses long-term management goals. This chapter does not rely on previously prepared documents; consequently, it represents the most detailed and lengthy part of the HPP. First, it outlines standard operating procedures for cultural resource management along the river corridor in conjunction with both normal and unusual operations of Glen Canyon Dam. Secondly, it outlines long-term research domains that both direct and benefit from the monitoring program for cultural resources. Thirdly, it details mechanisms for data storage and research reporting. Finally, it projects funding and staff requirements into the future. Tasks remaining to be accomplished before "normal" monitoring is in full effect are listed along with a time-table for their completion. Funding and staff elements of the "normal" monitoring program, including monitoring of archeological sites, remedial actions, tribal participation, and tribal monitoring of TCPs are summarized.

Finally, Chapter VI consists of a mechanism for revisiting the HPP in the future to allow for changes or modifications, if necessary.

Supporting documentation in appendixes includes the PA; the MRAP; the standard report formats for annual monitoring reports from GLCA and GRCA, developed by Reclamation and the NPS during the four years that the monitoring program has been in effect; and a standard format for requests for proposals for tribal participation in the cultural resources program.

CHAPTER II

Authorities and Responsibilities

FEDERAL LEGAL AUTHORITIES

Well over 100 pieces of legislation exist which define federal historic preservation law. The first of these, the Antiquities Act of 1906, authorized the President "to declare by public proclamation [as national monuments] historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest." Much like the National Park Service Organic Act of 1916, federal historic preservation law is based upon the concept of conserving cultural resources for the benefit of future generations. While too numerous to detail in this document, a brief summary of the laws most pertinent to this program are described below:

Antiquities Act of 1906 (P.L. 59-209, 34 Stat. 335) provided for protection of historic, prehistoric, and scientific features on federal lands, with penalties for unauthorized destruction or appropriation of antiquities. It authorized the President to proclaim national monuments and require permits for scientific investigation of antiquities on federal lands. This Act is the first federal law dealing with archeological resources.

Historic Sites Act of 1935 (P.L. 74-292, 49 Stat. 666) declared "a national policy to preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States." It authorized the creation of the Historic American Buildings Survey, the Historic American Engineering Record, and the National Landmark Survey. It authorized the NPS to ". . . restore, reconstruct, rehabilitate, preserve, and maintain historic or prehistoric sites, buildings, objects, and properties of national historical or archeological significance and . . . establish and maintain museums in connection therewith." This Act set the tone for federal policies related to historic and prehistoric site preservation.

Reservoir Salvage Act of 1960 and the Archeological and Historic Preservation Act of 1974 (as amended) (P.L. 86-532 and P.L. 93-291, 88 Stat. 174) provided for the preservation of significant scientific, prehistoric, historic, and archeological materials and data that might be lost or destroyed as a result of federally-sponsored dam construction or other federally-sponsored projects.

National Historic Preservation Act of 1966 (P.L. 89-665, 80 Stat. 915), as amended in 1992 (P.L. 102-575) declared a national policy of historic preservation, including encouragement of preservation on the state and private levels. It authorized the Secretary of the Interior to expand and maintain the National Register of Historic Places. It established the Advisory Council on Historic Preservation and designated SHPOs. It required federal agencies to consider the effects of their undertakings on properties listed or eligible for listing on the National Register. By incorporating Executive Order 11593, it instructed all federal agencies to support the preservation of cultural properties and directed them to identify and nominate to the National Register properties under their jurisdiction which may

be eligible. The 1992 amendments redefined "federal undertaking" and emphasized the interests of American Indians, Native Hawaiians, and Native Alaskans. It also introduced the concept of TCPs as National Register eligible properties and included additional provisions for confidentiality of site locational information.

Archeological Resources Protection Act of 1979 (P.L. 96-95, 93 Stat. 712) defined archeological resources as any material remains of past human life or activities that are of archeological interest and are at least 100 years old, required federal permits for their excavation or removal from federal lands, and set severe criminal and civil penalties for unauthorized removal. It provides for confidentiality of site locational information and calls for federal agencies to develop plans for archeological surveys of public lands.

Legislation Pertaining to Native Americans

Numerous laws and treaties provide for the establishment of Indian reservations and legal protection for the rights of Native Americans to express, believe, and exercise traditional religious practices. Federal agencies are responsible for consulting with tribal governments and traditional religious leaders to determine appropriate actions necessary for protecting and preserving Native American religious cultural rights and practices. These laws include the following:

American Indian Religious Freedom Act of 1978 (P.L. 95-341, Stat. 469) declared "the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including, but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites."

Native American Graves Protection and Repatriation Act (P.L. 101-601, 104 Stat. 3049) assigns ownership or control of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are recovered from federal or tribal lands to lineal descendants or culturally affiliated Native American groups. It provides the framework for repatriation of objects held within federal or federally-funded collections to the affiliated Native American group.

Environmental and Other Legal Authorities

National Environmental Policy Act of 1969 (P.L. 91-190, 31 Stat. 852) declared a federal policy to "preserve important historic, cultural, and natural aspects of our national heritage" by requiring federal agencies to utilize a systematic, interdisciplinary approach to ensure the integration of natural and social sciences in planning and decision making which may have an impact on the human environment.

Grand Canyon Protection Act of 1992 (P.L. 102-575) addresses protection of GRCA, GLCA, interim operating criteria for Glen Canyon Dam, long-term monitoring and research for resource protection, and replacement of power generation lost through adoption of long-term Glen Canyon Dam operating criteria, as well as other administrative provisions related to preserving the Grand Canyon. The Act required that the final GCDEIS be completed by October 30, 1994.

TRIBAL LEGAL AUTHORITIES AND TRIBAL RESOLUTIONS

In addition to federal laws and regulations, numerous tribal laws, regulations, and resolutions have been created to conserve and protect cultural resources. A brief list of these is included below:

Navajo Nation Cultural Resources Protection Act (CMY-19 88)

Navajo Nation Policy to Protect Traditional Cultural Properties (ACMA-39-86)

Navajo Nation Policies and Procedures Concerning the Protection of Cemeteries, Gravesites, and Human Remains (AVMA-39-86)

Pueblo of Zuni Policy Statement Regarding the Protection and Treatment of Human Remains and Associated Funerary Objects (M70-92-L164)

Others (Havasupai, Hopi, Navajo, Southern Paiute, and Zuni) to be added by each tribe. (Brief descriptions of each Act can be included.)

PROGRAMMATIC AGREEMENT ON CULTURAL RESOURCES

The PA is a legally binding document which took effect upon the signature of the Advisory Council on Historic Preservation on February 9, 1994. It is included with this document as Appendix A. It contains stipulations (requirements for action) that, upon their completion and implementation, will satisfy NHPA requirements. These stipulations are summarized below:

Identification and Evaluation

In addition to the 323 significant properties identified by the NPS, nine additional properties within the area of potential effects (APE) which were not evaluated as to National Register eligibility in the initial inventory shall be evaluated, in conjunction with the SHPO. Historic properties in the remaining 37 miles of the APE (the lower part of the river corridor adjoining Hualapai lands from Separation Canyon to Pierce Ferry) not previously inventoried shall be identified and evaluated. TCPs shall be identified and evaluated through ethnographic studies conducted with the participation of the tribes. TCP evaluations will be submitted to the SHPO for determinations of eligibility.

This Monitor Plan must be a product of the Centers Collaboration with NPS/BOR/Tribes

Monitoring and Remedial Action

A plan for monitoring the effects of Glen Canyon Dam operations on historic properties within the APE and for carrying out remedial actions to address the effects of ongoing damage to historic properties shall be developed by Reclamation and the NPS, and reviewed by the PA signatories. This plan will provide for the identification and evaluation of previously unrecorded properties, and will specify a consultation process for both ongoing monitoring and proposed remedial actions. The MRAP will generate data regarding downstream effects, identify ongoing impacts to historic properties (including TCPs), and develop and implement remedial actions for treating historic

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properties subject to damage. These data will be incorporated into Reclamation's Long-Term Operating and Monitoring Plans governing dam releases. (The MRAP is described in greater detail in Chapter IV of this document.)

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Reclamation and the NPS shall incorporate the results of the identification, evaluation, and monitoring and remedial action efforts into a HPP for the long-term management of cultural resources within the river corridor. The HPP shall establish consultation and coordination procedures, long-term monitoring and mitigation strategies, management mechanisms, and goals for long-term management of historic properties within the APE.

Reclamation and the NPS shall take into consideration all comments received during a 60-day review period of the HPP, then (for the final document), a 30-day review period of the HPP. The HPP shall be reviewed upon issuance of a Record of Decision for the GCDEIS, and will be revised, if necessary, based on the decision.

Dispute Resolution

Mechanisms are included in the PA to resolve objections by any of the signatories to plans, specifications, or actions proposed pursuant to the PA.

Review of the Programmatic Agreement on Cultural Resources

The signatories may review activities carried out pursuant to the PA; the Advisory Council on Historic Preservation will review activities, if requested. Until the HPP is implemented, Reclamation and the NPS will provide biannual summary reports of their progress toward completing the terms of the PA to the signatories.

A yearly meeting will be held among the signatories to review the PA and the results of the monitoring and remedial actions. Stipulations 6, 7, and 8 respectively discuss procedures for amendment, termination, and failure to carry out the terms of the PA.

CHAPTER III

Historic Properties Included in the Historic Preservation Plan

HISTORY OF CULTURAL INVENTORIES IN THE RIVER CORRIDOR

Considering the cultural significance the Grand Canyon holds for the world as a World Heritage Site and for the American people as one of the premier national parks, there has been, until recently, little archeological work done in the Grand Canyon compared to other areas of the Southwest. Former GRCA anthropologist Robert Euler traces this problem to the federal bureaucracy stereotyping GRCA as "a natural science park as opposed to a historical one, an unfortunate bifurcation that may have set back archeological work there for almost a half a century" (Ahlstrom et al. 1993:66). Nevertheless, work has been carried out over the decades since Grand Canyon became a national park in 1919, and a considerable portion of this effort has taken place in the river corridor.

John Wesley Powell (1869-1872) and Robert Brewster Stanton (1889-1890) were the first Euroamericans to observe and report on the remains of prehistoric cultures and the presence of extant ones in the river corridor. However, as noted by Helen Fairley, "Although the reports of Powell and other early adventurers helped focus public attention on the prehistoric remains of the Grand Canyon, they contributed little to our overall understanding of regional prehistory" (Fairley et al. 1994:4).

Walter Taylor conducted the first official archeology in the river corridor in June of 1953. This cursory look at sites was termed a reconnaissance of the Colorado River. The project, sponsored by the University of Arizona and the NPS, encompassed the river corridor from Lee's Ferry to Pierce Ferry. In what must have been a race-like frenzy, the motor boat excursion covered the 280 miles from start to finish in seven days. Averaging approximately 40 miles a day plus camping and decamping, the expedition members must have had little time for archeological work. Based on the results of this survey, Taylor determined that the Grand Canyon's inner corridor was a zone of "limited occupation." Taylor's concept and carry-through of the plan was unusual for the times, and he deserves praise for his honest title, *Hail and Farewell, and a Brief Survey Through the Grand Canyon of the Colorado River* (1958).

The hiatus of archeological work in the river corridor beginning after Taylor's whirlwind trip ended in 1960 when Douglas Schwartz conducted a survey of "agricultural" lands on Nankoweap Delta. This project was cosponsored by the NPS and the University of Kentucky. Schwartz had done previous survey work in Cataract Canyon (Havasu Canyon) as well as Shinumo and White Creeks. He had also excavated four caves in the Redwall in an effort to retrieve split twig figurines (Schwartz 1954).

At Nankoweap, nearly 50 sites were recorded as agricultural. Schwartz framed dates for the occupation at A.D. 900 to 1200. His focus on agriculture was astute and an area of study that has been neglected not only in the Grand Canyon, but on the Colorado Plateau in general.

The following year, Schwartz conducted another survey (June 1961) using rubber rafts to investigate "likely areas of habitation" (Ahlstrom et al. 1993:151). The survey considered both banks of the Colorado River from Nankoweap Creek to Unkar Delta and an unspecified area of the Little Colorado River. Only 19 sites were discovered compared with the over 100 that have been recorded in the same stretch to date (Schwartz 1963; Fairley et al. 1994).

In 1965, Euler and Taylor revisited Nankoweap Delta. They re-recorded and added a few sites to Schwartz's inventory, condemned his ceramic analysis, expanded on the ceramic typology, and reframed the dates of occupation to include Basketmaker III and Pueblo IV times (Euler and Taylor 1966).

In addition to his work with Taylor, Euler had been working intermittently on surveying portions of the river corridor and side canyons in conjunction with the projected Marble Canyon Dam project between 1960 and 1966. Euler pioneered the innovative use of a helicopter in 1963. This technique had the positive effect of covering lots of ground quickly, but the convenience was often negated by the exclusion of smaller and more obscure non-structural sites that were overlooked, and hence omitted from the official record. Many of the field maps generated from this period are simple, with the notation "not to scale" or "did not land at site." Over 250 sites were documented during this project. Fifty of these properties had been previously recorded.

In the summers of 1967 and 1968, Schwartz returned to the canyon to undertake the monumental task of a major excavation on Unkar Delta. The sites, consisting of large villages and their associated agricultural features, had been initially recorded by Taylor in 1953 and again by Euler in 1960. Schwartz's important and comprehensive work at Unkar Delta was not only the first major excavation in the river corridor, but remains the largest and most extensive. Establishing a chronology and determining paleoenvironment were the focus of the project, which is described in great detail in *Archeology of the Grand Canyon: Unkar Delta* (Schwartz, Chapman, and Kepp 1980).

Schwartz was back in the canyon in 1969 to excavate Bright Angel Pueblo. This project revealed two distinct occupations and episodes of construction along with the identification of locally produced ceramics. This work is described in *Archeology of the Grand Canyon: The Bright Angel Site* (Schwartz, Marshall, and Kepp 1979).

In 1969, Euler organized an excavation project for Stanton's Cave, located in Marble Canyon. Over a period of five weeks in the summer of 1969 and the early fall of 1970, Euler and a crew from Prescott College documented the presence of Archaic hunting groups in the river corridor. These Archaic people are represented by a few simple tools and the beautiful split twig figurines they left behind in the cave. Euler's work at Stanton's Cave is another crucial addition to understanding regional and local prehistory. Further information on this work can be found in *The Archeology, Geology, and Paleobiology of Stanton's Cave, Grand Canyon National Park, Arizona* (Euler 1984).

In 1984, Anne Trinkle Jones and a crew of NPS archeologists conducted minor excavations at four sites in the river corridor plus a single site located up a major side canyon. This work preceded stabilization work that GRCA planned to do the following field season at these sites. Although the excavations were of a limited nature, the valuable contribution of digging stratified deposits from several locations along the river narrowed another gap in the record. This field work produced two reports (Jones 1986a and b).

From August of 1990 through May of 1991, NPS archeologists, in conjunction with Northern Arizona University (NAU) and the GCES, conducted an intensive archeological survey along the Colorado River corridor from the base of Glen Canyon Dam to Separation Canyon. This inventory was the first comprehensive survey completed within the river corridor and was funded by Reclamation. The purpose of the survey was to systematically identify cultural resources potentially affected by the operation of Glen Canyon Dam. Survey crews consisting of three crew members and a boatman transected the rough terrain from river level up to the supposed predam maximum flood height, estimated to be the 300,000 cfs level.

The project, under the direction of GRCA archeologist Janet Balsom and field director Fairley, documented a total of 475 archeological sites over a 255 mile stretch of the river encompassing approximately 10,500 acres. The contribution of this project is fourfold: (1) it added a considerable new body of information to the existing record; (2) it tied together much of the sporadic work done previously; (3) it represented an example of the cooperative efforts between Reclamation, the NPS, NAU, the various tribal governments, and the Arizona SHPO; and (4) the survey project generated the baseline data to allow the current monitoring project to effectively begin.

Since the completion of this large survey, a testing project to determine the National Register eligibility of nine sites in the river corridor has been completed (Leap 1994). A cultural resources inventory of Hualapai lands encompassing the lower 37 miles of river corridor between Separation Canyon and Pierce Ferry has also been done (Hualapai Tribe's Cultural Resources Program 1994). Nine archeological sites were recorded during this survey and these sites are in the process of eligibility determination by Reclamation and the SHPO.

Should this be continued Ethnography Research

As the PA stipulates, ethnographic research that documents ancestral tribal use of the river corridor has been supported by the GCES and undertaken by the Hopi Tribe, the Hualapai Tribe, the Navajo Nation, the Southern Paiute Consortium (which includes the Kaibab and Shivwitz Tribes of Southern Paiutes), and Zuni Pueblo. To date, draft or final reports have been submitted by the Hopi Tribe (Ferguson 1995), the Navajo Nation (Roberts et al. 1995), the Southern Paiute Consortium (Stoffle et al. 1995a, 1995b), and Zuni Pueblo (Hart 1995, McKinley 1995a, 1995b). Tribes with documented presence in the river corridor but who have not undertaken ethnographic studies include the Havasupai and the San Juan Southern Paiute.

These descriptions pertain only to work in the actual river corridor. A body of archeological work has been done on the rims and in other areas of GRCA and is available for study in various publications and at regional repositories. A good synopsis of this work can be found in *An Archeological Overview of Grand Canyon National Park* (Ahlstrom et al. 1993).

DEFINITION OF CLASSES OF CULTURAL RESOURCE PROPERTIES

Cultural resources within the river corridor can be thought of in two general ways for the purposes of this document. The first way reflects definitions of the professional archeological community and includes the archeological sites of all time periods recorded during archeological surveys of the river corridor. The second way reflects definitions of the Native Americans who have ancestrally lived in or visited the Grand Canyon, and includes the TCPs of all time periods recorded during ethnographic research.

Temporal Categories of Archeological Sites

Rather than categorize cultural resources by their architecture, features present, or by other characteristics, it was decided to group them by temporal categories (time periods). Often temporal categories include sites that cannot be linked by archeologists with any particular existing culture or cultures; temporal categories may also include sites from many cultures.

In some cases, professional archeologists cannot determine that cultural resources are affiliated with particular existing tribes based on artifact analysis or other scientific evidence. Lack of information about cultural affiliation characterizes early sites (Paleoindian and Archaic) and sites with no culturally or temporally diagnostic artifacts, i.e., sites that have artifacts that could have been made by any of the indigenous people inhabiting the area.

Recent archeological research (i.e., Schiffer 1976, 1983; Flenniken and Raymond 1986) has shown that the definition of temporal and cultural affiliation by artifact types is often inaccurate because of the influences of trade and exchange, different use-lives of artifacts, the reuse of artifacts from previous time periods, and visual similarities between artifact types of different time periods. Nevertheless, diagnostic artifact types are the primary means archeologists have of determining temporal and cultural affiliation from inventory data.

Given these caveats regarding the temporal and ethnic interpretation of cultural resources by archeologists, we offer first a description of the range of features found within the river corridor, then a brief culture history of occupation of the river corridor.

Feature Types within the River Corridor.—Feature types described below may occur by themselves or in association with other feature types.

Structures.—This category includes habitations that are constructed as well as rock shelters that show modification and/or evidence of occupation. Habitations include single course room outlines; roomblocks; partitioned or walled-in spaces utilizing boulders, outcrops and overhangs; wickiups and wickiup rings; and cabins. Structures also include cists and granaries. These features are found singly and in groups. Other kinds of structures that are more difficult to define as well as to categorize include enigmatic and isolated alignments, stacked rock, erosion controls, water diversions, hunting blinds, brush and stone corrals, sweat lodges, bridges, and the built remains of operations such as mining, stock raising, railroad construction, scientific endeavors, and dam construction along with other enigmatic structural remains.

Artifact Scatters.—This category is defined by the presence of ceramic sherds, flaked stone tools and debris, ground stone, or historic trash occurring on the surface. Other features and structures may or may not be associated with artifact scatters. This feature type is common and encompasses places which have only a few artifacts to those with several thousand items. Examples of sites in this category include "sparse lithic scatter with sherds present," "dense sherd concentration with fragmented groundstone," "projectile point with hand tools and flakes," and "purple glass fragments and hole-in-top cans."

Thermal/Fire Features.—This category is defined by the presence of features relating to fire use including hearths, roasting pits, fire-altered rock discard piles, and concentrations of fire-altered rock. Roasting features are commonly found singly and in groups ranging in size from one to eight meters in diameter. They have variable profiles looking much like small volcanoes or scooped out circular pits. These features often have a rock discard or maintenance pile adjacent to the main feature and may or may not have associated artifacts. This category is not meant to include burned structures, but would include burned cultural units found in cutbanks prior to testing.

Rock Art.—This category encompasses all pictographs, petroglyphs, and inscriptions including: single isolated elements; small groups; large panels; subtle marks; remnant smudges; and historic inscriptions by miners, surveyors, and others. Although the term *Rock Art* is considered inappropriate by some Native American groups and usually refers only to the inscriptions of indigenous peoples, it is used here for lack of a better term.

Burials.—Human burials are not common, but they do occur in isolation as well as with other kinds of features. Their special and heightened significance warrants a separate category.

Other.—Other features that occur in the river corridor are not easily categorized. These include bedrock mortars; bedrock grinding facets/slicks; trails; equipment, food, and tool caches (including isolated pots and pot caches); isolated individual artifacts of significant import; and any other enigmatic non-structural cultural manifestations that defy the broader categories.

Cultural History of Archeological Sites in the River Corridor.—Archeological resources along the river corridor date from the Archaic to Recent Periods (i.e., within the past 50 years). The remains of both Native American and Euroamerican populations are found beginning with the introduction of Euroamerican goods in the nineteenth century; prior to that time, only Native American sites are found. The 1990-1991 archeological survey recorded 592 cultural components at 475 sites.

Paleoindian Components.—Paleoindian sites (sites which predate 8,000 B.C.) are documented across the Colorado Plateau and throughout the Southwest. They are, however, absent from the record of preservation along the Colorado River corridor in GRCA. One single fragment of a Folsom Point from the Marble Canyon area suggests the possibility of Paleoindian occupation in the Grand Canyon.

The lack of Paleoindian sites may be a function of limited demographic use of the river corridor. The corridor may have been sparsely populated and the patterns of Paleoindian land use may have been such that few remains of occupation were left. Alternatively, the river may have destroyed any evidence of Paleoindian occupation. The river corridor is a high energy fluvial system in which no

geological deposits that predate Archaic times have been documented (Richard Hereford, personal communication, May 1995). Paleoindian people may have been present, but their passing either was not preserved in the archeological record or we have not yet identified evidence of it.

Archaic Components.—Of all components recorded, three percent are Archaic; these components date from 8,000 B.C. to A.D. 0. Archaic occupation is represented in the river corridor, but not to the extent that it is found in other locations in the canyon and especially on the Kanab Plateau where it is a dominant archeological manifestation. Along the river corridor, the defining Archaic artifact is the split twig figurine. The figurines, found only in caves in the Redwall limestone, are made into the shape of a deer or bighorn sheep. Over 100 figurines were recovered from Stanton's Cave (AZ:C:05:003) (Euler 1984).

Ancestral Puebloan Components.—These components make up 38 percent of all components found along the landscape of the inner canyon and are defined by the presence of ceramics, other artifacts, or architectural features which archeologists have associated with that culture. These components date from A.D. 700 to A.D. 1200.

A hiatus of human occupation in the river corridor during parts of the 12th and 13th centuries is followed by a continuous presence of Hualapai and Havasupai (Cerbat) and Southern Paiute components (16 percent) that date from A.D. 1400 to the present. During this period, components that can be characterized by archeologists as Hopi comprise two percent of those recorded; those that can be characterized as Navajo comprise one percent.

Often multiple temporal and/or cultural components are found at a single site. In the western reaches of GRCA it is not uncommon to find Western Kayenta materials on the surface with Pai (Cerbat) or Southern Paiute artifacts. To a great extent ceramic evidence is the best tool available to determine time period and cultural affiliation. For the ancestral Pueblo people whose ceramic assemblages have been highly scrutinized by archeologists, the use of sherds as cultural and temporal indicators has been very effective. For other indigenous groups such as the Pai (Cerbat) and the Southern Paiute whose ceramic traditions changed slowly over the centuries, the use of sherds as a temporal indicator is of less value. For instance a Pai (Cerbat) site from A.D. 1420 does not look appreciably different from one occupied in A.D. 1750. Even when cultural affiliation is apparent, a temporal assignment without the support of radiocarbon dates is often nothing better than an educated guess.

Occasionally, tradewares found on sites can help in fine tuning the time of occupation of a certain location. For example, at AZ:A:16:171, an imported Hopi sherd was found on the surface of a Pai (Cerbat) site containing no other datable artifacts. The sherd proved to be a Polacca Polychrome tradeware, a Hopi copy of an older Zuni style. Assuming that the sherd accurately reflects the overall dates of site occupation, this artifact gives a much more refined date to the site of A.D. 1780 to 1850. A temporal designation would otherwise not have been possible without a radiocarbon date.

Euroamerican Components.—These components date from A.D. 1850 to 1965 and comprise 14 percent of components recorded. These features and assemblages pertain to mining and trapping, tourism, the stock industry, and railroad and dam construction. They contain machined artifacts and features or inscriptions in English. Components of unknown time period and cultural affiliation comprise 26 percent of those recorded in the river corridor.

Traditional Cultural Properties, Resources, and Values

Definition and Application.—For most Native American groups, the common definition of *traditional cultural properties* used by governmental agencies and the preservation community is vastly inadequate for reflecting those portions of the traditional landscape that are of significance to indigenous people. The most commonly utilized treatise discussing the concept of TCPs is NPS Bulletin 38 (Parker and King 1992). This bulletin is a major step forward in the recognition that not all important historic resources are manmade and that Native American history is of importance to more than just Western trained scientists. Bulletin 38 still falls short of its stated goals, however, primarily because its starting point is an ethnocentrically biased Western perspective on historical significance, and this perspective serves as a baseline to judge Native Americans' history.

In Bulletin 38, *traditional cultural properties* are defined as properties associated "with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community." Additionally, in order to be eligible for the considerations afforded properties that are eligible to the National Register, the entity must be a property with defined boundaries, it must retain integrity important to the community, and it must meet at least one of the criteria of eligibility. Taken in combination, these constraining requirements essentially limit TCPs to only those places that land managers think should be TCPs, not what Native Americans know are TCPs.

For Native American cultures, history is integrally tied to the present and is used to maintain and reaffirm all aspects of cultural identity, both spiritual and physical. As Native American history is inextricably tied to the natural landscape at all scales, it is culturally contradictory to segregate out certain aspects and arbitrarily define them as singularly important or significant; this is an imposed construct. It is within a specific context that any given feature, resource, or aspect of the landscape is imbued with cultural significance; and this context can vary both temporally and within a culture.

As an example, the entire Grand Canyon is of traditional and historical significance to the tribes in the area, and hence is a TCP. Within it are archeological sites that are integrally a part of the culture of the ancestors of present-day Native Americans; these too are TCPs. On these sites, resources such as certain plants or animals may appear seasonally. These may also be considered separate TCPs dependant on cultural circumstances including the ceremonial cycle and ceremonial activities as well as specific cultural duties of the person witnessing these resources. The essence is that the TCP concept, as currently embraced, is a management construct that does not articulate well with the dynamic nature in which Native Americans view the landscape.

In order to better incorporate the broader concept of a TCP into the rigidly defined NHPA process, the concept of "historic property" in its fullest sense needs to be embraced. At issue is the apparent double standard employed when evaluating a non-Native American historic property versus a Native American historic property (a TCP). Take for instance a building typifying the construction and style at a certain period in time. In order for this building to qualify under the procedures in common usage for TCPs, it would have to be shown that the building is required for the continuation of the American culture and still fulfills the same integral function within the community that it originally did. Obviously, this is rarely the case. The building's importance is in the much less tangible, though no less important recognition that knowledge of the past is important to preserve. Recognition of Native American historical resources requires the same evaluative latitude by allowing those ancestors whose legacy is the subject to decide what is historically significant.

As the TCP concept is currently interpreted by most federal and state cultural resource managers, it is essentially limited, with a few exceptions, to those aspects of traditional culture needed for ceremonial activities. This narrow focus, while supporting Native American religious freedom rights, a critical issue in its own right, does little for furthering Native American participation in the broader goals of cultural and historic preservation.

In recognizing the integral relationship between a tribe and what it considers to be TCPs, this HPP provides the opportunity for each tribe to define and evaluate its own TCPs. The unique culture, values, and history of each tribe have specifically shaped their views of TCPs as a concept, and of individual TCPs. Below are TCP statements reflecting each of the tribal perspectives:

Specific Tribal Examples.—

Havasupai.—The Havasupai Tribe has lived, worked, and participated in cultural activities in the Grand Canyon for centuries, a practice that continues to the present day. In all aspects of our cultural, spiritual, recreational, and traditional Havasupai (or Cohonino) life, the tribe considers everything in and around the Grand Canyon as sacred. It is the entire environment (including the ecology, wildlife, geology, etc.) that is considered sacred and to be protected and honored by all people. Our "guardian of the Grand Canyon" Kachina still safeguards the interest of the tribe in any activity that goes on in the canyon.

Hopi.—For the Hopi Tribe, a TCP is any aspect of their cultural history that is of significance, as determined by the Hopi people and religious leaders, to the current culture by virtue of its role in the development and/or continuation of traditions that provide the historic foundation for the Hopi culture. TCPs can include, but are not limited to, landscapes, natural features, springs, ancestral archeological sites and burials, shrines, resource collection areas, resources, and the knowledge that accompanies and defines the significance of these components of Hopi culture and history.

Hualapai.—The Hualapai people have geographic affiliation and territorial claim to the Grand Canyon and the Colorado River; these affiliations and claims originate in the Hualapai Creation Account, recounted in Hualapai oral traditions. Fourteen Hualapai Bands comprise the Hualapai Tribe, each having a distinct dialect and territorial homeland in northwestern Arizona. Hualapai social identity correlates to several factors that include common language, kinship ties, social roles, past and present habitations, an intercanyon network of trails, social gatherings and ceremonial activities, utilization and distribution of natural resources (especially water, native plant products, wildlife, game, fish, and minerals), farming, technology, production of material goods, trade, and political and military alliances.

The Hualapai Tribe has continually maintained its traditional territorial, historical, and cultural affiliation with the lands, waters, riparian, and riverine resources of the Colorado River system (inclusive of those within the Grand Canyon) by occupancy and use. The Hualapai Tribe has made continual use of the waters of the Colorado River system throughout Hualapai ancestral homelands, from the juncture of the Colorado and Little Colorado Rivers (rivermile 61.5) downriver to the confluence of the Colorado River with the Bill Williams and Santa Maria Rivers, the western and southwestern limits of the traditional Hualapai territory.

Cultural properties and places (past and present) do not necessarily consist of individual, discreet areas of concern for the Hualapai people, but in reality include the whole traditional landscape and cultural environment. Cultural properties are not limited to the material resources, but extend beyond the realm of Western beliefs into the world of spirituality and spiritual beings. Archeological sites and "sacred sites" have continuing timeless (eternal) significance to the lifeways, beliefs, and values of the Hualapai people who hold, cherish, and continue to practice traditional Hualapai lifeways.

Hualapai TCPs shall include the territorial affiliation with the Grand Canyon and Colorado River system, Hualapai Indian Reservation, ethnobotany, wildlife, cultural geography, ethnic landscapes, archeology, ancestral cremations and burials, and mineral resources.

Navajo.—No TCP definition was provided by the Navajo Nation.

Southern Paiute Consortium.—To the Southern Paiute Nation, a TCP can take on many forms and can be physical, metaphysical, or a combination of these. A TCP is a place of high cultural significance that is pivotal to the physical and spiritual well being of the people. It plays a pivotal role in traditional practices and beliefs by its sheer use as a traditional property by ancestors. The property need not necessarily be site or place specific, but rather is usually inclusive of many resources and may encompass only a 12-inch area or it may extend for several hundred miles.

Zuni.—A TCP is any place, object, material, or lifeform that has importance in Zuni traditions and culture, as determined significant by Zuni religious leaders. TCPs can be at any scale, can be nested within each other, and can overlap. Thus, for example, on one scale the Grand Canyon in its entirety can be considered a TCP, as can the whole river system including the Colorado River up the Little Colorado River, continuing up the Zuni River to Zuni Pueblo itself, and then on to the springs that feed this waterway. Within the Grand Canyon, an archeological site may be a TCP as would be a shrine within the site, and as are the deer who wander on and off the site throughout the canyon and beyond.

The Zuni Tribe claims cultural affiliation with all so called Paleoindian, Archaic, Basketmaker, prehistoric Puebloan, Fremont, Anasazi, Mogollon, Hohokam, Sinagua, Western Pueblo, Puebloan, and historic Zuni archeological sites, features, and objects within the area of consideration for the PA under which the HPP is prepared. Archeological sites, features, and objects that may not be attributable to a specific prehistoric culture by archeologists, because of lack of culturally diagnostic artifacts, may also be culturally affiliated with Zuni. Any archeological and human remains that are culturally affiliated with Zuni, as identified by either archeologists or Zuni religious leaders, are considered TCPs.

EVALUATION OF THE PRESENT DATA BASE

Archeological Surveys

Methodology.—For this discussion, the present data base includes site survey records and monitoring data from the GRCA and GLCA files related to sites located along the Colorado River. Much of this information was generated from the GCES-supported River Corridor Survey Project (the 1990-1991 survey), although earlier information was incorporated from the existing files. These data cover a particular geographic area with the recent information focused primarily on erosional impacts to archeological sites in a dam-controlled riverine environment. Although the information was derived primarily from limited (surface) field observation, the systematic coverage and computerization of site and monitoring data make this data base one of the most consistent and well documented archeological projects in the Grand Canyon.

Strengths and Gaps in the Present Data Base.—Strengths in the data base include a large geographic area of coverage (i.e., the river corridor), consistency in data recording, and the computerization of site and monitoring records. The gaps in the data base are related mainly to the nature of the survey and monitoring effort. Geographic coverage is exclusively related to the river corridor up to the approximate 300,000 cfs high water mark. The cultural affiliation(s) and occupational dates of some sites are still unknown. Many sites, in particular earlier occupations such as Archaic and Basketmaker, may be buried and are therefore absent from the archeological record.

Data collected during the survey and subsequent monitoring sessions were derived from surface inspection of sites typical of site survey and repeat visits of selected sites for monitoring purposes. The monitoring population is of sufficient size to obtain valid erosion/impact data and is representative of the range of river corridor archeological sites. The location of sites is well documented. Less well known is what these sites represent and how they are affected by erosional processes. Questions of cultural affiliation, site function, population mobility, seasonality of use, and occupation still remain unanswered for some sites.

Efforts Needed to Close Data Base Gaps.—Any remedial action proposed as part of this program needs to be based upon a sound understanding of erosional processes and strict geographic control. Several years of monitoring work have shown what natural and human impacts are occurring in the canyon environment. Integration of this information with the geomorphic model provides the foundation for determining the degree of impact and an approach to preservation. For erosional impacts, this may involve additional geographically controlled geomorphic studies at particular sites such as mapping arroyo cross-sections. For visitor related impacts, education and increased interpretation of the fragility of the remains may help foster a conservation ethic.

Determinations of Eligibility and Significance.—Determinations of eligibility and significance for the sites located within the project area were made based upon an evaluation of all site information. Of the 475 sites recorded as part of the river corridor survey, 336 sites were considered to have direct, indirect, or potential impacts from river flows. A recommendation for National Register eligibility was presented to the Arizona SHPO by the NPS. Concurrence was received for 323 of the sites recommended for inclusion on the National Register of Historic Places.

Traditional Cultural Properties Surveys

Havasupai

No TCP surveys have been conducted by the Havasupai to date.

Hopi

Methodology.—The Hopi Tribe has followed a two-pronged approach to identify traditional cultural resources and properties in the project area. At Hopi, interview work has been conducted with representatives from each of the Hopi Mesas and villages to elicit cultural information. In addition, infield examination of the project area has been made by representatives of the Hopi Tribe to evaluate and identify important resources.

The interview work at Hopi has been primarily oriented to gather information necessary for completion of the GCDEIS. Information gathered included general feelings about the Grand Canyon and its relationship to Hopi culture and its development, opinions about how Glen Canyon Dam is and should be operated, and specific places and resources of traditional cultural value. Seventy interviews have been conducted, some in English and others in Hopi, and all have been transcribed into written format. These interviews include representatives from all of the Hopi villages and from 25 different clans. Eight Hopi women have been among the people interviewed.

The infield portion of the project has consisted of the participation of Hopi representatives on four river trips. During these trips, information was collected concerning interpretation and management approaches for the cultural resources in the river corridor, traditional cultural information concerning places and resources in the canyon, and more generally, culturally appropriate approaches to operation and management of Glen Canyon Dam and the Grand Canyon. In total, 19 Hopi have participated in these research trips representing 13 clans from eight of the villages.

Strengths and Gaps in the Present Data Base.—There are two areas that have the potential to yield additional information concerning resources of traditional cultural importance to the Hopi people. First is additional interview work at Hopi. In Hopi society, traditional knowledge is held in a non-uniform manner. Specific society/clan members are solely responsible as the repository for various types of esoteric knowledge. Therefore, unless these people are part of the sample, information may not be obtained. This information should not be considered "missing" data however. It exists and is known by the people who are entrusted to retain it; it is only "missing" in the sense that it has not been recorded by researchers. Whether these data are relevant to the current project or are appropriate for recording can only be decided by those who hold the information.

The second area in which there can be considered a gap in the data is for resources that are of traditional cultural importance, but for which there is no traditional mechanism for archiving classes of specific information. Resource classes such as ancestral archeological sites, plant, animal, and mineral resources are commonly identified to be of traditional cultural importance, but information concerning locational specifics is often not retained within the traditional knowledge system once the area in which they are located is no longer occupied. Relocation of these areas and resources requires direct interaction with the areas by those who value the resources.

Efforts Needed to Close Data Base Gaps.—Future efforts that can be employed to ascertain whether there are significant or relevant gaps in the current data set would focus on interviewing and providing field visits to under- or non-represented clan and society members. In this way, it could be determined if the data being obtained were new or redundant. The most efficient approach, however, is to orient research into topic-specific questions so that a more focused selection process for Hopi consultants may be followed.

Determinations of Eligibility and Significance.—Evaluation of the significance of a TCP must be made within the context of the culture to which the resource is integrated. For the Hopis then, the only appropriate experts on what are significant resources and sites in Hopi history and culture are the Hopis themselves; they are uniquely qualified to evaluate Hopi history. What follows is a general examination of some classes of resources important in Hopi culture and history, within the framework established by the federal legislation. It must be stressed, however, that for any given resource, only a Hopi can adequately determine its significance and that aspects of its significance may be esoteric or privileged in nature and revealing these may reduce or even completely invalidate its cultural significance.

> *Criterion (a): this can be applied to properties that are associated "with events that have made a significant contribution to the broad patterns of [Hopi] history."*

Most aspects of Hopi culture are the result of the migration period of the clans undertaken as partial fulfillment of the Hopis' covenant with *Ma'saw*. Ceremonies and clan histories that are at the center of, and integral to Hopi culture, were obtained during these migrations. Therefore, resources, both natural and human-produced, that relate to these migrations are potentially eligible. Such things as ancestral archeological sites, as a tangible record of these migrations, are identified as TCPs by the Hopi Tribe. Likewise, natural features and places where events occurred that are recounted in clan histories and other folk stories are felt to be TCPs. It should be noted that the nature of oral history (and history in general) necessarily focuses on those portions of history and culture that are of significance; if it were not of great significance, it would not have been recounted through multiple generations.

> *Criterion (b): this can be applied to properties that are associated "with the lives of persons significant in [Hopi] past."*

All ancestral archeological sites are associated directly with *Ma'saw* and the Hopis' covenant to leave their footprints across the land. Additionally, many locations are associated with various actions of such figures as the War Twins, Salt Woman, and Kachinas. All these types of areas are considered to be TCPs by the Hopi.

> *Criterion (c): for the Hopis, the portion of this criteria that most directly applies identifies resources that are "representative of a significant and distinguishable entity whose components may lack individual distinction."*

Here again, ancestral archeological sites that may be individually anonymous are identified as part of the greater clan migrations that are central to all that is Hopi. This category can also apply to many natural resources that figure prominently, or even vitally, into the Hopi culture. The Hopi Tribe

identifies such things as certain types of plants, animals, minerals, springs, and other resources to be TCPs, as they figure integrally into Hopi culture and history.

> *Criterion (d): "potential to yield information important in prehistory or history" of the Hopi people.*

Many classes of natural resources, including archeological sites and natural features, have the potential to maintain traditional information and inform the Hopi people about their history through both Western scientific methods (i.e., archeological, ethnohistorical, and ethnobotanical research) and through their involvement in the traditional learning methods employed within the Hopi culture (i.e., storytelling, ceremonial teaching, and apprenticeships).

Hualapai

Methodology.—No information was provided by the Hualapai Tribe.

Strength and Gaps in the Present Data Base.—No information was provided by the Hualapai Tribe.

Efforts Needed to Close Data Base Gaps.—No information was provided by the Hualapai Tribe.

Determinations of Eligibility and Significance.—No information was provided by the Hualapai Tribe.

Navajo

Methodology.—No information was provided by the Navajo Nation.

Strength and Gaps in the Present Data Base.—No information was provided by the Navajo Nation.

Efforts Needed to Close Data Base Gaps.—No information was provided by the Navajo Nation.

Determinations of Eligibility and Significance.—No information was provided by the Navajo Nation.

Southern Paiute Consortium

Methodology.—No information was provided by the Southern Paiute Consortium.

Strength and Gaps in the Present Data Base.—The Southern Paiute Consortium is of the opinion that if information concerning TCPs is released by the Consortium for incorporation into a data base that is accessible to the public, then information concerning the physical locations of the TCPs must be masked by being broad and obscure. Reasons for eligibility to the National Register must be extremely ambiguous and most likely copyright protected.

Efforts Needed to Close Data Base Gaps.—No information was provided by the Southern Paiute Consortium.

Determinations of Eligibility and Significance.—The determination of eligibility for Southern Paiute TCPs needs to be made by knowledgeable Southern Paiute cultural consultants who through oral history and the practice of Southern Paiute traditions, possess the teachings and knowledge that certain properties are of great regard to the Southern Paiute. Upon determination that a property is a TCP, the Southern Paiute Consortium makes a decision on whether or not to publicly document the TCP.

Zuni

Methodology.—The Zuni Tribe has conducted river trips and hiking trips into the area of effect. These trips can by no means be considered anything other than an initial reconnaissance effort by the tribe. Only a small number of Zuni religious leaders have been on these trips and only a small portion of the area of effect has actually been visited. These trips have included religious leaders, archeologists, ethnohistorians, and wildlife biologists. The archeological data base is under review as is the historical documentation of Zuni's relationship to the Grand Canyon. A report has been prepared and will be made available under the GCES being conducted by Zuni.

Strength and Gaps in the Present Data Base.—The reliability of the data base for Zuni TCPs can only be known to the religious leaders, and this information is proprietary and confidential to them.

Efforts Needed to Close Data Base Gaps.—For Zuni religious leaders, there are no gaps in the data base. Simply by virtue of their existence, even, for example, if their actual physical locations are not known, all TCPs are an integral part of Zuni religion, tradition, and culture. For Western trained cultural resource managers, on the other hand, there are many gaps in the data base, especially if all the specific locational and other information is not present. These "management data base gaps" may be filled by the appropriate religious leaders at their discretion in culturally appropriate ways on an as needed basis as determined necessary by the Zuni religious leaders. Any Zuni information or knowledge concerning a TCP is the intellectual property of the Zuni Tribe and may be restricted or released only under conditions set by the religious leaders and the tribe.

Determinations of Eligibility and Significance.—For Zuni TCPs, the only way a determination of significance can be made is by an appropriate religious leader. The Western approach of establishing set conditions for eligibility and significance of a property, as well as establishing fixed boundaries, is not appropriate for Zuni. From a traditional cultural perspective, fixed conditions and boundaries for a TCP are extremely difficult if not impossible to establish. Significance is context dependent and may change, for example, through time, by treatment, and by a particular religious leader's specific responsibilities for that TCP.

TCP significance is not just the physical aspect of the TCP; it is also defined as certain esoteric, privileged, and confidential information that may not be released to anyone other than the specific religious leaders entrusted with that information and knowledge. This type of information potential is radically different from the potential to yield information in the Western sense (see 36 CFR 60.4(d)).

In the Zuni way, any unrestricted release of esoteric, privileged, or confidential information and knowledge destroys the significance of the TCP and the significance of the knowledge itself. Consequently, this information and knowledge cannot be released to those who do not have the responsibility for its maintenance.

DAM OPERATION ZONES AND CULTURAL RESOURCE SENSITIVITY

A total of 475 sites were identified as part of the archeological inventory of the Colorado River corridor. The sites inventoried include 139 sites located along the river corridor outside the potential impact area. A total of 336 sites comprise the number of properties that are either impacted or potentially impacted by river flows. Within this group, 263 sites exist on sediment deposits subject to erosion.

Within each group, and especially within the group of 263 sites most subject to erosion, there is variability in the degree of erosion-related impacts and in the degree of visitor-related impacts. Visitor access is limited or closed at the most fragile sites with the highest data potential.

No maps of the river corridor that show site sensitivity to river flows as determined by elevation have been produced to date. Such maps would be very useful from a management perspective. However, the site membership in each zone is the pool that determines the frequency of site monitoring (as detailed in the MRAP).

CHAPTER IV

Monitoring and Remedial Action Plan

ARTICULATION OF THE MONITORING AND REMEDIAL ACTION PLAN WITH THE HISTORIC PRESERVATION PLAN

The development of the MRAP is stipulation two of the PA. The MRAP, completed in final form in August 1994, is an integral part of the HPP since it details how monitoring and remedial actions will be undertaken for cultural resources within the river corridor. It is incorporated into the HPP as Appendix B. Following is a brief summary of the intent and requirements of the MRAP.

PURPOSE OF THE MONITORING AND REMEDIAL ACTION PLAN

The MRAP outlines how data on impacts to cultural resources will be collected. The MRAP further specifies that the data will be used to predict the kinds and intensity of site erosion. Finally, it requires that sites needing remedial action will be identified, that appropriate remedial actions will be taken at these sites, and that the degree of success of these actions will be evaluated as time goes by.

Should this be modified?

Data collection sections of the MRAP describe a process for selecting sites to monitor from the pool of National Register eligible sites in the river corridor based on a priority list, with actively eroding sites being first on the list. Other factors that increase a site's probability of selection for monitoring include site location in a control group outside the APE, previous remedial actions at the site, high potential for adverse impacts due to non-geomorphological factors, specific tribal concerns, and ongoing cultural or other kinds of research activities.

The **site monitoring methodology** section requires total station mapping for all sites that are actively eroding, all sites chosen within the control group, and all sites evaluated as requiring yearly monitoring. Collection of data on artifact density and distribution within artifact recording units is required, as is completion of standardized monitoring forms and use of baseline photographic reference points to make site observations.

Logistics for Grand Canyon and Glen Canyon site monitoring are described in the plan, including the number of monitoring trips, their duration, the field crew, and any other stipulations that might apply such as consultation with the Navajo Nation or the Hualapai Tribe prior to monitoring sites on tribal lands. If arrangements can be made in advance, signatories may accompany any monitoring trip.

The **remedial action** section of the MRAP specifies that remedial actions will be undertaken when monitoring identifies adverse impacts to sites. The type of remedial action will be formulated by the NPS in consultation with the tribes and in keeping with overall research domains established in

Chapter V of the HPP. Potential remedial actions may include redirection or removal of trails, development of public interpretation, closure of the site to the public, and numerous other actions listed in the MRAP.

Remedial actions will be implemented as can be scheduled on trips. If immediate action is required, discussions among signatories will formulate acceptable strategies and time frames. If emergency action is required, the land managing agency (NPS) or tribe is responsible for taking appropriate remedial actions. The other signatories should be notified prior to the action, if possible, or as soon after the action as feasible.

The MRAP also requires a comprehensive program of site testing for sites subject to flooding and erosion without realistic possibilities for stabilization. Stabilization workshops will be designed and coordinated by Reclamation and the NPS, as needed (with the participation of the tribes), to implement the stabilization program and to train staff.

CONSULTATION AND COORDINATION PROCEDURES IN THE MONITORING AND REMEDIAL ACTION PLAN

The consultation and coordination procedures for site monitoring are initiated upon completion of three reports.

Trip reports are prepared by the NPS with input from tribal representatives following each monitoring trip (or, for the Glen Canyon section, a minimum of two reports will be prepared for the season). These reports will include site condition, the need for remedial actions at sites, and the effectiveness of previous remedial actions. Trip reports are provided to all signatories for review.

Annual reports based on the fiscal year calendar are prepared by GLCA and GRCA. These reports synthesize monitoring results and remedial actions for the previous year, list sites to be monitored in the coming year, describe proposed changes in methodology, and prioritize remedial actions planned for the coming year. Draft annual reports are due to be distributed to PA signatories on August 1 of each year.

Seek to be approved to assess monitoring methods and propose changes

Signatories have 30 days to comment on the report, the proposed remedial actions, and their priority. If requested, meetings will be scheduled to discuss the proposed remedial actions. If no concerns are voiced, or after resolution of differences, the remedial actions will occur in the agreed upon priority as can be scheduled on upcoming trips. Signatories will meet at least once to discuss the contents of the draft final report prior to its completion. Reclamation and the NPS will coordinate these meetings.

After review by all signatories to the PA, Reclamation and the NPS will ensure that appropriate information from the annual report (to be finalized by September 30 of each year) is incorporated into the annual report to Congress required by the GCPA (Section 1804(c)(2)). Reclamation and the NPS will forward recommendations for changes in the operation of Glen Canyon Dam to the Adaptive Management Work Group (AMWG) identified in the EIS. The AMWG will submit management recommendations on dam operations to the Secretary of the Interior.

center should provide this assessment & have major contribution

A five-year synthesis will be compiled by the NPS to address the topics of management, methodology, theory, and education. Monitoring and remedial action data collected to date will be used in developing this report. Data will be analyzed and evaluated in terms of the research domains discussed in Chapter V of the HPP, and recommendations for changes in the overall cultural resources program will be made.

As part of the HPP, the MRAP will be reviewed every five years by the signatories of the PA and modified if necessary. Changes in the MRAP may also be considered during the review of the NPS annual report by PA signatories.

CHAPTER V

Long-Term Management Goals

FEDERAL AGENCY RESPONSIBILITIES

Cultural Resources and the Bureau of Reclamation/National Park Service Mission

Bureau of Reclamation

> *The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public (Reclamation 1995: inside back cover).*

As it pertains to the GCDEIS and the GCPA, Reclamation's mission is to operate Glen Canyon Dam for water storage and power generation in such a way that downstream resources (including cultural resources) are protected, or adverse impacts to these resources are mitigated.

Management Conditions and Organization.—Reclamation's Upper Colorado Regional Office was named lead agency for the completion of the GCDEIS because Glen Canyon Dam is within the boundaries of the Upper Colorado Region. The Lower Colorado Regional Office, especially the Grand Canyon Area Office (both based in Boulder City, Nevada), will share responsibility for management of downstream resources as long-term monitoring continues because the Lower Colorado Region is responsible for Reclamation activities downstream of Glen Canyon Dam. Long-term monitoring responsibilities will therefore be shared among the Upper Colorado Regional Office, the Lower Colorado Regional Office, and the Grand Canyon Monitoring and Research Center (Research Center), with the Upper Colorado Regional Office assuming primary responsibility for cultural resources until such time as cultural resource staff are in place at the Research Center. The cultural resources specialist on the Research Center staff will be the primary liaison with the Upper Colorado Regional Office concerning long-term management of cultural resources within the river corridor.

Limits of Reclamation's Responsibility Regarding Long-Term Management of Cultural Resources in the River Corridor.—Reclamation's NHPA Section 106 responsibility is limited to impacts to cultural resources caused by dam operations. These impacts are discussed in Chapter I above and consist of erosion due to sediment loss conditions created by the dam. The dam is not likely to be the cause of all erosion that occurs within the river corridor, and part of the purpose of ongoing geomorphological studies of cultural resources is to understand more clearly which impacts are and are not related to dam operations.

Regarding cultural resources, Reclamation's responsibility to Native American entities rests in Section 106 of the NHPA, which calls for Native American consultation on actions which will impact sites in which Native Americans have an interest. Responsibility for Native American Graves Protection and Repatriation Act (NAGPRA) consultation and American Indian Religious Freedom Act (AIRFA) compliance rests with Reclamation for the portions of the river corridor not administered by the NPS, i.e., the Navajo Reservation between Glen Canyon Dam and GRCA and the Hualapai Reservation along the Colorado River (See U.S. Department of the Interior Field Solicitor, 1995, for a discussion of boundaries). Otherwise, responsibilities for NAGPRA and AIRFA compliance are assumed by the NPS.

Reclamation's interpretation of its overall Indian Trust responsibility, as stated in the GCDEIS (pp. 318-319), is that Reclamation has no Indian Trust Assets for areas within the river corridor, because dam operations do not affect currently designated reservation lands.

National Park Service

The NPS, represented by GRCA and GLCA, has management objectives based upon both the ecosystem that existed prior to construction of Glen Canyon Dam and the ecosystem that has developed since construction of the dam. Objectives are to attempt to maintain the essential dynamic elements and processes that existed predam through restoration, maintenance, and protection. The NPS is committed to managing the Colorado River ecosystem and its attendant cultural resources as a coherent whole that, to the extent possible, perpetuates natural systems and the preservation of predam components.

Adaptive Management Organization and Responsibilities

Many uncertainties exist regarding the downstream impacts of water releases from Glen Canyon Dam. The concept of *adaptive management* is based upon the need for operational flexibility to respond to future monitoring and research findings and variable biological and physical conditions. This concept is a direct result of the EIS and is clearly delineated in the GCPA which states that Glen Canyon Dam will be operated in such a manner as to protect, mitigate adverse impacts to, and improve the values for which the GLCA and GRCA were established. These values include, but are not limited to, natural and cultural resources and visitor use (Section 1802(a)).

The Adaptive Management Program (AMP), as detailed in the final EIS, is a means of satisfying the GCPA requirements of a long-term monitoring program (Section 1805). The objective of the AMP is to evaluate and implement modifications to Glen Canyon Dam operations based upon conditions of the downstream resources as identified by research and monitoring. Long-term monitoring, research, and adaptive management will be designed and implemented to provide an organization and process for cooperative and integrated protection and management of resources affected by the operation of Glen Canyon Dam.

In addition to the requirements placed upon Glen Canyon Dam operations by the GCPA, the PA on Glen Canyon Dam operations was developed to satisfy federal compliance responsibilities with Section 106 of the NHPA and its implementing regulations found in 36 CFR 800.

Much overlap exists between the long-term monitoring and research program detailed in the final EIS and the PA. The AMP works with the PA to not only monitor, but to develop modifications to Glen Canyon Dam operations in order to protect, mitigate adverse impacts to, and improve the values of natural, recreational, and cultural resources. The AMP is a product of the final EIS and the GCPA. In contrast, the PA is dictated by the NHPA and represents federal historic preservation mandates. Federal agency responsibilities are clear and direct related to cultural resource preservation as detailed in the NHPA. Regardless of the schedule for implementation of the Record of Decision, federal agency responsibilities related to NHPA compliance are specific.

An organizational structure needs to be set in place prior to initiation of any phase of long-term monitoring of the effects of Glen Canyon Dam operations which integrates all of the resources of concern. All of the existing information collected over the last 13+ years of the GCES will form the basis for any long-term monitoring program.

Upon signature of the Record of Decision, the resource management agencies and other stakeholders will establish an AMWG to oversee the management and archiving of the long-term monitoring program and data. This group will evaluate the recommendations for changes in dam operations to ensure compliance with the objectives of the 1992 GCPA (see Sections 1802, 1804, and 1805) and Section 106 of the NHPA as discussed above.

Reclamation anticipates that the Research Center will be the administrative center of the long-term monitoring program, with oversight by the AMWG. The long-term monitoring and research program based at the Research Center will encompass administrative responsibilities for data management and reporting of monitoring and research results. The program will provide the basis and process for developing annual reports to Congress and the Governors of the Colorado River Basin states which outline the preceding year's and the projected year's operations undertaken pursuant to the GCPA. The Research Center, as currently planned, will have a staff consisting of a director, administrative support, and scientific support (including cultural resources).

All work related to implementation of the HPP will be fully integrated with the long-term monitoring and research program and the AMP.

Standard Operating Procedures for Glen Canyon Dam

Standard operating procedures for Glen Canyon Dam, at present, are the Interim Operating Criteria. These criteria specify daily and hourly operations as follows:

> *Minimum flows would be no less than 8,000 cfs between 7 a.m. and 7 p.m. and 5,000 cfs at night. The maximum rate of release would be limited to 20,000 cfs during fluctuating hourly releases. Any releases greater than 20,000 cfs (other than for emergencies) would be steady on a daily basis and would be made in response to high inflow and storage conditions (Reclamation 1995:30).*

These criteria were designed to protect downstream resources until completion of the final EIS and Record of Decision (Reclamation 1995:30). The preferred alternative is the Modified Low Fluctuating Flow Alternative, described in the final EIS (pp. 27-29 and 33-44).

Daily and Hourly Operations.—The Modified Low Fluctuating Flow Alternative specifies minimum releases of 8,000 cfs between 7 a.m. and 7 p.m. and 5,000 cfs at night; maximum releases of 25,000 cfs; daily fluctuations (cfs/24 hours) of 5,000, 6,000, or 8,000, depending on the monthly release volume; and ramp rates (cfs/hour) of 4,000 up and 1,500 down (final EIS, p. 27-28). Rapid fluctuation of river level is therefore not planned under normal operating procedures. Much of the HPP is based upon these parameters. Quoting from the final EIS:

> *The Modified Low Fluctuating Flow Alternative was developed to reduce daily flow fluctuations well below no action levels and to provide special high steady releases of short duration, with the goal of protecting or enhancing downstream resources while allowing limited flexibility for power operations. This alternative would have the same annual and essentially the same monthly operating plan as described under the No Action Alternative but would restrict daily and hourly operations more than any of the previously described fluctuating flow alternatives (pp. 27-28).*

The preferred alternative is not considered standard operating procedure until the Record of Decision is signed for the final EIS. The Record of Decision cannot be signed until completion of a Government Accounting Office audit which is expected to occur in September 1996.

Beach Building/Habitat Maintenance Flows.—The final EIS preferred alternative calls for periodic controlled high releases of two types under standard operating procedures.

Habitat maintenance flows have the objective to "reform backwaters and maintain sandbars, which are important for camping beaches and wildlife habitat" (p. 28). Habitat maintenance flows are "high, steady releases within powerplant capacity (33,200 cfs) for one to two weeks in March" (p. 29). Restrictions on habitat maintenance flows are described on p. 29 of the final EIS.

Beach/habitat-building flows are "scheduled high releases of short duration designed to rebuild high elevation sandbars, deposit nutrients, restore backwater channels, and provide some of the dynamics of a natural system" (final EIS, p. 40). These are high releases of short duration (several days) once every four to five years. Magnitudes of such flows would be "at least 10,000 cfs greater than the allowable peak discharge in a minimum release year for a given alternative but not greater than 45,000 cfs." The reasons for this flow magnitude are discussed in the final EIS (p. 40).

A test flow scheduled for spring 1996 will be conducted to test the predictions made in the final EIS. Assuming that the test flow yields predicted (beneficial) results, recommendations for future beach/habitat-building flows would come from the AMP and would be implemented through the Annual Operating Plan, as described on p. 41 of the final EIS.

Both kinds of high flows are considered beneficial to cultural resource sites, since the intention of both is to build sediment that would otherwise be lost to the system, thus enhancing the preservation of cultural resource sites. However, since neither of these flows has yet to be tried, the actual effect is unknown. Since these flow augmentations and any flow reduction pursuant to extreme drought conditions require planning and advance notice, specific studies will be initiated to monitor conditions at cultural resource sites that may be impacted by any planned high- or low-flow events. These studies will be developed in consultation with signatories to the PA.

Conditions Outside Standard Operating Procedures

Events and conditions which lie outside the range of standard operating procedures for Glen Canyon Dam may have an effect on cultural resource sites. They include the following:

Extreme drought conditions could lead to a reduction in flows from the dam to less than the 5,000 cfs minimum bypass. This could have particular impact on traditional plant resources along the river.

Flash floods on permanent tributaries of the Colorado River such as the Paria River and the Little Colorado River could precipitate a rapid fluctuation in river levels. This could result in bank cutting on archeological sites along the river. Under predam conditions, the impacts to these sites might have been buffered by natural sedimentation at sites.

Flash floods on intermittent washes and gullies could accelerate arroyo cutting at archeological sites on the high terraces above the river, directly impacting site features. The impacts to these sites might have been buffered by natural sedimentation at sites under predam conditions.

How are these departures from impacts of the proposed alternative justified?

Unplanned operations might include changes in dam releases for emergencies related to dam safety, electrical system malfunctions, and search and rescue operations. Any disruption would be of short duration (usually less than four hours) and would have no foreseeable impact on cultural resources.

Since flow reduction pursuant to extreme drought conditions requires planning and advance notice, specific studies will be initiated to monitor conditions at cultural resource sites that may be impacted by any low-flow event. These studies will be developed in consultation with signatories to the PA, in the same way that studies for high-flow events will be developed.

Flash flood events as described above, however, cannot be anticipated. Impacts to cultural resource sites as a result of bank cutting, arroyo cutting, and erosion are a primary element of the MRAP described elsewhere in this document. Any observable impacts as a result of flash flooding or any other unusual conditions which may affect river corridor use and visitation will be documented through the monitoring program. Special attention will be paid after observable flash floods to measure any changes at sites where these events have occurred. Any remedial actions proposed will be reviewed by the signatories of the PA, as required by the MRAP.

Consultation Prior to High- or Low-Flow Events

Habitat Maintenance Flows.—The effects of habitat maintenance flows on cultural resource sites will be discussed in the annual monitoring and remedial action reports of both GRCA and GLCA. A section on flow effects will describe the results of the past year's flow, if such a flow has occurred. A section on anticipated effects will describe the projected effects of the coming year's flow, if such a flow is anticipated, and will include mitigation measures proposed to avoid or mitigate adverse effects anticipated to be caused by the flow.

Beach-Habitat/Building Flows.—As soon as a beach-habitat/building flow is scheduled as part of the Annual Operating Plan (developed in the summer for the following water year), the AMWG will ensure that PA signatories are informed of the planned high-flow event, the schedule for submitting proposals for research associated with the event, and the schedule for planning the event. The AMWG will ensure that PA signatories are notified of all event planning meetings in which they have a stake.

Is this not the responsibility of the Contractor?

GRCA and GLCA will formulate proposals consisting of brief site-by-site summaries of adverse effects anticipated from the high-flow event plus mitigation measures proposed to avoid or mitigate these effects and monitoring measures proposed to gather data on the overall effects of the high-flow event. These proposals shall be submitted to the AMP and to the other PA signatories no later than November 1 of the year prior to the planned high-flow event.

proposals for monitoring should go to contractor!

Tribes may develop proposals for mitigation measures to avoid or mitigate adverse effects on TCPs, as well as monitoring measures to gather data on the overall effects of the high-flow event. Such proposals shall be submitted to the AMP ~~and the~~ other PA signatories by November 1 of the year prior to the planned high-flow event.

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The AMP and all PA signatories will have at least 30 days to review the proposals. Before December 15 of the year prior to the planned high-flow event, the PA signatories will make a decision as to the scope and schedule of mitigation and monitoring measures for cultural resources deemed necessary, after review of all proposals submitted. Reclamation and the NPS will consolidate all proposals into one integrated cultural resources proposal by February 15 of the year of the planned high-flow event.

The monitoring programs should be developed and funded by the contractor.

Mitigation and monitoring measures will be scheduled for the period from December 15 of the year prior to the planned high-flow event until 60 days following the event. Draft reports on the results of mitigation and monitoring associated with the high-flow event will be due on August 1 following the event and will be distributed to the other PA signatories for review. Final reports will address review comments received (if appropriate) and will be due September 30 following the event. Reclamation and the NPS will consolidate the reports into one integrated cultural resources report by December 31 following the event.

Extreme Drought Conditions.—The same course of action will be followed for extreme drought conditions as for beach-habitat/building flows. Planning for such conditions will be initiated by the AMWG when they are detailed in the Annual Operating Plan. The following actions and deadlines will be the same as for beach-habitat/building flows.

Section 106 Compliance.—If the above planning and mitigation actions are taken prior to planned high-flow events or extreme drought conditions, the PA signatories agree that Reclamation will have met its Section 106 responsibilities regarding these events. The AMWG is responsible for scheduling test flows to allow adequate time to plan and implement mitigation and monitoring.

Long-Term Research Goals/Domains

These protocols + guidelines should be controlled by the entire

Long-term research goals and domains are important to delineate. They form a framework that determines what kinds of data should be routinely collected through monitoring, data recovery, and remedial actions, and how these data should be collected in order to address specific questions of interest. The following two sections describe two kinds of research domains: theoretical and cultural; and methodological. There is clearly overlap in the domains. The first section is organized around research on the cultural history of the Grand Canyon. The second section is organized around research on site formation processes and the methodology of monitoring and remedial action. The PA signatories will review and establish research priorities every five years at the time the NPS five-year synthesis report and HPP are reviewed (see Chapter IV for a description of this report).

Archeological research within the river corridor proposed by any signatory or by outside researchers will be reviewed by all the signatories. Proposals will be submitted to all signatories and to three peer reviewers for a 30-day review period; comments and recommendations from signatories and from peer reviewers will be synthesized and submitted to the proposal submitter by Reclamation and the NPS within 60 days of initial submittal. The submitter will then submit a revised proposal that considers these comments to the NPS for permitting.

Theoretical and Cultural.—*(Note: this section was contributed by NAU faculty associated with PA activities through GRCA's cooperative agreement with NAU.)*

How do these relate to impacts of alternatives? Dam operations?

Based on the recent Grand Canyon survey report (Fairley et al. 1994), five major categories or domains of investigation have been identified: chronometrics; the transition to agriculture; Pueblo adaptation, mobility, and seasonality; late prehistoric to historic use of the river environment; and cultural affiliation. Many more topics could potentially be addressed, and we may change our research emphases and plans as the research evolves. For now, however, the following five areas are of interest.

Chronometrics of the Grand Canyon.—The Colorado Plateau over the past 90 years has served as an extraordinary laboratory for the development of archeological chronometry. Important advances came first from the development of tree-ring dating, then from some of the earliest applications of the radiocarbon method to archeological contexts. In recent years, comprehensive studies have been concluded on Black Mesa and elsewhere that fill in gaps, extend the chronometric envelopes, and provide theoretical and methodological advances in both radiocarbon and tree-ring chronometry (Dean 1969, 1978; Smiley 1985, 1992, 1993; Smiley and Ahlstom, in prep.). These previous studies, while applicable directly to the Grand Canyon province, do not address some primary gaps in the chronometric matrix.

The studies just cited provide general models for the use of wood in both dendrochronological and radiocarbon dating. They relate the distribution of wood age in the regional wood biomass to the materials recovered from archeological sites. They give the archeologist a means for assessing the precision and accuracy of radiocarbon and tree-ring dates from questionable and solid contexts alike. They provide the foundation for building more accurate, higher resolution chronologies than could be developed previously.

The Grand Canyon province, however, contains growth and wood preservation microenviromnents that have not previously been systematically investigated. These include deep canyons at altitudes far below the average Colorado Plateau elevations as well as the riverine, waterlogged, driftwood environments known to cause spectacular archeological dating anomalies (Smiley 1985, Long et al. 1979). This research domain would concentrate on developing parameters for wood age in the environments local to the Grand Canyon province to make possible the accurate and precise radiocarbon chronometry of Archaic and early agricultural (Basketmaker II) sites. This kind of research would improve the utility of the extant suite of dates from such sites, and would form the basis for the interpretation of all future dates from such sites on wood or wood charcoal. Since wood and wood charcoal constitute the only datable materials from many of these sites, the research should be of significant value to the project as a whole.

Is Baseline research on all cultures critical to dating the same of a site?

The research would consist of the collection of representative wood samples from the natural biomass that would provide age and growth history data to use in developing a wood age model. The dates would be derived by the Laboratory of Tree-Ring Research at the University of Arizona, Tucson. Research would focus initially on collecting appropriate wood samples (approximately 800 to 1,000 samples) for radiocarbon and tree-ring dating. Radiocarbon dates on previously recovered materials from sites and on any tested or collected sites would also be pursued.

In summary, the proposed development of wood age and archeological date assessment models would fill a remaining major gap in Colorado Plateau chronometry. The proposed study is intended as a useful contribution not only to the archeology of the Grand Canyon, but as a significant advance in the development of radiocarbon and tree-ring applications in scientific archeology. The outcome of this research would be a model useful for calibrating radiocarbon dates and other chronometric information, based on factors such as wood species. This research would provide the methodological means for obtaining more precise chronological control in an environment that is inherently challenging and difficult with respect to dating.

Transition to Agriculture.—An extremely important question in world prehistory concerns the reasons and processes surrounding a transition from a mobile, hunting and gathering lifeway to a more sedentary, agricultural adaptation. It has been noted that the Grand Canyon generally lacks material remains that can confidently be assigned to the period of agricultural transition in the northern Southwest, traditionally referred to as Basketmaker II.

An important academic question? How does it relate to preferred alternative needs.

The Grand Canyon environment, varied though it may be, differs markedly from the topographic, hydrologic, and edaphic environments of the Greater Colorado Plateau. Just as the Colorado Plateau required early agriculturalists to solve farming and foraging problems in new ways, so did the Grand Canyon. Grand Canyon agricultural adaptations during the period 2000-3000 B.P. may have led to organizational and subsistence innovations unique to the canyon itself.

The current state of knowledge of early farming in the canyon stands where the Greater Plateau situation stood about a decade ago when we had little coherent chronometric data (Smiley 1993). The small sample of potential Basketmaker II sites, the even smaller sample of dates from the sites, and the fact that nearly all of the dates are on wood charcoal, limits the extent of even the most resourceful and creative inference. Fairley and others (1994:100) have raised the problem that the basic nature of early Grand Canyon agricultural societies remains undefined, undated, and undifferentiated from the potential Archaic groups that may have existed contemporaneously.

Knowing the timing and duration of the early agricultural period constitutes one of the most important priorities. Establishing chronological control always paves the way for anthropological studies of, for example, social/organizational, subsistence, technological, and settlement change. A primary research problem, establishing a baseline chronometry of early agriculture in the Grand Canyon environment, can be directly addressed through the radiocarbon dating of materials from known sites. The process of dating archived materials requires a detailed assessment of context, material quality and quantity, and comprehensive knowledge of the Basketmaker/Archaic material record.

Our experience in these areas suggests that agriculture will be dated to a millennium or more before A.D. 0 in the Grand Canyon. We do not currently know whether early farmers moved into the canyons, or adopted in place, the materials and technologies of agriculture. Their neighbors, such as the White Dog phase peoples to the south, and others to the north and east, did so between 3000 and 4000 B.P.

Knowing the articulation between the highly mobile early Basketmaker peoples of the White Dog phase and the groups in the Grand Canyon will provide a great deal of insight into the nature of the agricultural transition in the northern Southwest. Establishing the connections will also help bridge the gap between the chronology and organizational structure of groups north of the Colorado and San Juan Rivers and the groups in the Four Corners area.

In important respects, the agricultural transition in the Grand Canyon comprises a critical void in our understanding of the agricultural transition across the northern Southwest. Filling in chronometric and cultural gaps will make a major contribution to the study of early Southwestern agriculture.

This research domain would concentrate on obtaining datable materials from features at pre-ceramic sites that show the likelihood, based on stratigraphic position and diagnostic artifacts, that they date to late Archaic or Basketmaker II times.

Pueblo Adaptation, Mobility, and Seasonality.—Most of the archeological research conducted to date in the Grand Canyon has focused on the archeological sites and other remains dating to the Anasazi Pueblo II and III periods. This period has provided the most abundant and visible archeological remains within and around the canyon. A wide variety of highly visible site types, including those featuring architectural remains such as masonry pueblos and kivas, exists in various environmental settings within the canyon, including the river corridor. It has been observed that most of these sites date to the late Pueblo II and early Pueblo III periods, with occupation probably spanning a period from about A.D. 1050 to 1200 or perhaps 1225 (Fairley et al. 1994:106-108).

There is little evidence of Anasazi occupation below the canyon rim prior to Pueblo II, and no evidence of an Anasazi occupation or heavy use of the lower Canyon environments after Pueblo III. Various and often conflicting models have been proposed for the concentration of sites during the PII and early PIII time periods. Most have emphasized environmental shifts in conjunction with new varieties of cultigens (Fairley et al. 1994:107). An empirical issue bearing on the interpretation of Anasazi sites within the canyon concerns the mix of mobility versus sedentism, and hunting and gathering versus agriculture. There exist major disagreements regarding the nature of Pueblo adaptation in the Grand Canyon, and the relationships between sites within the canyon and above its rim.

This research domain would attempt to clarify the nature of Pueblo adaptation within the canyon by judicious collection of archeological materials relevant to reconstructing subsistence practices and seasons of occupation. Although sites within the river corridor have previously been excavated, much of the work was done before the development of modern methods of paleoethnobotanical analysis. Test excavations and the recovery of charcoal rich samples from selected features, such as Pueblo-age roasting pits, could provide materials useful for inferring subsistence practices, temporal affiliation, and seasons of site occupation or use.

An especially intriguing question concerns what appear to be multi-component sites that have both Pueblo and protohistoric or early historic remains. These sites often have hearths, roasting pits, and other features showing fire-cracked rock and charcoal. The specific temporal and cultural affiliations of individual features at these sites are unclear, as are issues related to the nature of the adaptive systems that they represent. It is possible that the Anasazi were using the river environment in much the same ways as later Native American groups, but it is also possible that Anasazi use of precisely the same points on the landscape (i.e., those areas we refer to as "sites") were quite different from later groups in terms of subsistence, activities, and seasons of occupation or use. Careful observations of surface artifacts and features, recovery of charred food remains, recovery of datable charcoal, and other studies are needed to sort out the horizontal patterning of Anasazi activities at such sites, and thus to discriminate them from the later protohistoric or early historic activity areas.

This research, in conjunction with studies done at other categories of Anasazi sites outside the river corridor (i.e., those in the upper reaches of the canyon exhibiting masonry architecture), should contribute important information on the seasons and nature of Anasazi subsistence and settlement activities within the canyon, and thus contribute to a better resolution of major debates regarding the role of agriculture and sedentism in the canyon adaptation.

Late Prehistoric to Historic Use of the River Environment.—As outlined above, there exist major unresolved questions regarding the nature of activities at individual sites within the canyon that have been classified as protohistoric or early historic. Some of these issues are at the most basic level of archeological interpretation, i.e.: What were the geographical origins of the people responsible for creating these sites? What is the horizontal patterning of activities? What were the seasons of occupation or use? What foods were processed and consumed at these sites? Answering such questions should clarify the role of these sites in much larger systems of subsistence and settlement, and thus make clear the ways in which prehistoric Anasazi and historically documented Native American groups were similar or dissimilar.

This research might also clarify the extent of territorial boundaries, and how these might have changed through time. Since European contact, there have been major disruptions of Native peoples' activities in and around the canyon. Protohistoric and historic age sites within the canyon provide important and unique material evidence of these changes, and supplement historic accounts which are sparse to begin with and often incomplete. There is much potential to add to the record of how historically documented Native American groups were able to live in this exotic and harsh environment, and how Euroamerican contact changed the traditional lifeways of these groups.

This research domain would parallel the program outlined above for Anasazi sites. It would focus on careful documentation of the artifact assemblages visible at the surface of the sites, and on the judicious collection of charcoal and macrobotanical samples for the purposes of inferring dates of site

use, dietary practices, and seasons of site occupation or use. This could be accomplished in tandem with systematic monitoring activities, since many of the relevant artifact observations could be designed to serve monitoring purposes as well. We would recommend that lithic and ceramic assemblages be carefully observed and categorized in terms of a standard set of recorded attributes, and that observations be made within provenience units small enough to allow the discrimination of individual activity areas. Data on ceramic temper types, projectile point styles, and lithic raw material types would be an important source of information relevant to inferring geographical origins of the populations of these sites, and so these observations should also be built into the proposed field research.

Cultural Affiliation.—An extremely important issue concerns the cultural affiliation of the many groups who used the canyon and left the material remains that we now regard as historic properties. Some of the research outlined above has great potential for resolving a number of issues surrounding the use of archeological data to infer cultural affiliation. Though archeologists are confined to the study of material remains, we are often quite successful in specifying the geographical origins of particular material objects. In conjunction with comparative archeological and ethnographic data from surrounding areas, we are often able to make reasonable conclusions regarding cultural affiliation. We would propose that much of the research outlined above be designed with an explicit focus on the issue of cultural affiliation, and that many of the field and laboratory observations be made with such issues in mind. These observations (i.e., those regarding ceramic temper, lithic raw material types, stylistic attributes of projectile points, etc.) can be coordinated easily with a systematic program of monitoring activities.

Methodological.—*(Note: This section was contributed by Signa Larralde.)*

This section focuses on research domains that link cultural resources with other GCES research within the river corridor. It also focuses on methods for recognizing how sites are formed and how they deteriorate. It is important to evaluate the effectiveness of our methods for observing and mitigating these processes.

Resource Mapping.—The purpose of this research domain is to produce resource maps for the river corridor based on extant GCES research on the availability of arable land, stone and clay resources, and wild plant and animal resources. Such maps will form the baseline for the variability of human use of the river corridor through time. Of particular interest is the mapping of agricultural fields through pollen or phytolith analysis. Much of this information may already be available, but it needs to be synthesized into a format that can be easily used by cultural resources researchers.

In addition, existing research of hydrologic/stage changes needs to be linked with cultural resources data. All data need to be linked via geographic network to facilitate geographic comparisons within the river corridor and to allow for the recognition of strong patterns in the data.

Site Formation.—This research domain deals with how sites are formed through time and how natural and cultural processes both build and collapse the archeological record. Areas of interest include the tempo and reasons for site abandonment and reoccupation, the effect of prehistoric floods and droughts on the archeological record of site occupation, and research into the ways that people and fluvial and aeolian geomorphology have interacted to create archeological sites.

Site Erosion/Sedimentation.—This research domain specifically requires integration of GCES data on sedimentation and erosion with archeological data for refinement of the site erosion/sedimentation model. The research should address both predam erosion/sedimentation and postdam erosion/sedimentation. It should measure erosion and sedimentation on and around sites and contrast these measurements with those from off-site areas. Research that incorporates the effect of daily/hourly dam operations; high-flow events; extreme drought conditions; and flash floods on river tributaries, arroyos, and gullies should be encouraged. Data already exist from GCES and need to be synthesized with cultural resources data and made available to cultural resources researchers.

Innovative Monitoring Practices.—Research that refines and quantifies site monitoring practices should be encouraged. This research domain should result in ways to quantitatively measure differences between monitoring episodes and in ways to identify the causes of those differences. Research could, for example, concentrate on ways to best employ the extensive photographic records from stationary cameras, decrease the impacts of monitoring itself to sites, increase the efficiency of monitoring and lower the cost, and use information gathered through monitoring to address other research questions. Research could range from small scales such as the monitoring of artifact movement to large scales such as the monitoring of riverbank slumpage or debris flows.

Remedial Actions: Innovations and Evaluation of Effectiveness.—Research that measures and refines the effectiveness of remedial actions is an important goal of the cultural resources program. GRCA, GLCA, and tribal groups all have various remedial actions in place at archeological sites. Quantification of their effectiveness over both the short- and the long-term is necessary for effective long-term management. Research on where and how best to control erosion at sites is encouraged. A pressing need exists presently to prioritize remedial actions through a combination of information about site damage plus a ranking of the research and traditional value of various sites.

Responsibilities for Long-Term Data Management

Reclamation and the NPS each have legal responsibilities for management of river corridor cultural resources. The PA and the HPP have been written to satisfy agency responsibilities regarding long-term operations of Glen Canyon Dam and protection of cultural resources. These responsibilities include long-term management of data resulting from monitoring and remedial actions. In addition, the tribes have the responsibility of maintaining monitoring data on TCPs important to them.

Does the center have responsibility for all data?

Data Maintained by the National Park Service.—Data collected by the NPS and relating to historic properties (archeological and TCPs) located with NPS units will be maintained within the NPS (GRCA/GLCA). Site location information and details concerning the nature of archeological sites is considered confidential and will be maintained as dictated by federal law.

Data collected as part of the monitoring and remedial action program and currently maintained by the NPS exists in a variety of formats. Presently included within the NPS data base are:

Survey and monitoring data bases (raw data including paper copies of site forms and site maps plus monitoring forms), the documentation that goes with these data bases (such as photographs), and off-site back-ups of the data;

Paper Documents: Original field forms, notes, drawings;

Reports: Survey reports, annual reports, trip reports, descriptive statistics for each monitoring year, and lab manual/procedures;

Maps: Topographic maps with site plots;

Aerial photos with site plots;

Photographs: Photographs, negatives, color slides, and copies of archival photographs taken prior to 1990; and

Geographic Information System (GIS) Data Base: GRCA has incorporated all river corridor site locations into the existing NPS GIS data base.

All computer data bases, minus the locational information, can be copied to 3-1/2-inch diskettes. Current information exists in several different software programs. WordPerfect, SYSTAT, Paradox, and Data Base are in use at the present time.

Should DBM efficiencies be evaluated both in use and costs?

Paper documents will be catalogued as original documentation and archived in the GRCA Museum Collection. Duplicates of site information will be available for use by PA signatories and other authorized researchers at the NPS cultural resources offices in Flagstaff, Arizona, and at GRCA.

Copies of all reports will be available at GRCA, Reclamation's Upper Colorado Regional Office, and the Research Center. Topographic maps and aerial photos have site locations and cannot be duplicated or made available for public use. Locational information is confidential and will not be disseminated.

Photographic information consists of 3 x 5-inch black-and-white photos mounted on 5 x 8-inch cards, a set of duplicate prints stored in polypropelene sleeves in binders, negative strips also in polypropelene, color slides, and photo prints from other sources (duplicates). The duplicates are used in the field, and the photocards are available in the lab for perusal. The negatives are stored in an archival format and filed in a fire-proof cabinet. In the future, photographic information will be stored on CD-ROM.

Tribal Participation in Long-Term Data Management.—Each tribe will maintain its own monitoring files, including trip reports and site condition files for sites important to that tribe. The status of data maintenance, including progress towards setting up and maintaining a long-term data base and problems encountered, will be described by each tribe in its annual report to Reclamation. Reclamation and the Research Center will both maintain a catalog of annual reports from tribes.

Because the tribes have a deep interest in the archeological site data maintained by the NPS, they will have access to site data in all formats maintained by the NPS. Tribes will guarantee confidentiality by means of a Memorandum of Agreement with the NPS that states that confidential locational information will not be disseminated to unauthorized parties.

The NPS will extend a yearly invitation to tribal members to tour facilities at GRCA, GLCA, and the NPS NAU Office so that they may observe the kinds of data being archived and the kinds of data available for their use. Data management will be reviewed every five years by all signatories at the time of the five-year synthesis report/HPP review; concerns will be addressed.

Why should there be exceptions

Reclamation and the Research Center will maintain a master file of all data, where data are located, and who has access to specific data.

Data to be Maintained in the Grand Canyon Monitoring and Research Center.—GCES has maintained extensive data archives on natural and physical science topics pertaining to the river corridor. GCES has also maintained a GIS that georeferences scientific studies and provides linkages to hydrologic data bases.

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OK

GIS information regarding site location will be entered into the GCES GIS, with safeguards on access to data. Integration of other cultural resources data with GCES data is highly desirable since sediment and other studies have direct bearing on the preservation of cultural resources, and cultural resources, in turn, may aid in dating or otherwise documenting processes that are the subject of studies in other disciplines. The extent to which the Research Center will maintain copies of data also maintained by the NPS needs to be resolved by the PA signatories.

At a minimum, all reports and pertinent information related to long-term monitoring and adaptive management will be forwarded by the NPS and the tribes to the Research Center. Information will be transferred by the NPS and the tribes to the Technical Work Group and the Research Center concerning impacts, remedial actions, and any information which should be utilized to evaluate changes in Glen Canyon Dam operating criteria.

Access to Data.—Access is restricted to signatories of the PA. Due to the sensitive nature of the cultural information included in the NPS data bases, access to data will be restricted to the agencies and signatories. Authority to restrict information can be found in both the Archeological Resources Protection Act and the NHPA.

The tribes have submitted the following policy statements concerning access to TCP data bases they individually maintain:

Havasupai.—The Havasupai Tribe has been hesitant to reveal areas of tribal significance such as burial locations, sacred sites, cultural resources, etc. It is considered sacrilegious to reveal areas to anyone who has not received the authority or knowledge to keep this information confidential. To reveal these areas in documents means someone, without the proper understanding and respect, could come along and disturb these places which were meant never to be abused or disturbed.

Hopi.—The Hopi Tribe feels that information concerning TCPs is the intellectual property of the tribe and/or those members whose responsibility it is to retain it. Therefore, the Hopi Tribe will retain the primary responsibility for maintaining this type of information. If it is determined by the tribe that a TCP may be impacted as a result of actions covered by the PA, then through consultation a plan to mitigate impacts will be initiated. After tribal approval, relevant and appropriate information may be released. General management input will be maintained through tribal involvement in the Long-Term Monitoring and Adaptive Management Programs for the operations of Glen Canyon Dam.

Hualapai.—No information was provided by the Hualapai Tribe regarding access to data maintained by the tribe.

Navajo.—No information was provided by the Navajo Nation regarding access to data maintained by the tribe.

Southern Paiute Consortium.—Confidential information is considered and investigated in-house by the Southern Paiute Consortium and may be publicly documented only after it has been determined by the Southern Paiute Nation's Elders Advisory Council and Tribal Council(s) that its release will be non-detrimental to the Southern Paiute people.

Zuni.—Because information about Zuni TCPs is, for the most part, proprietary and confidential, the Zuni Tribe does not expect to release this information. Such information is the intellectual property of the Zuni Tribe. Consequently, maps, tables, and other data regarding specific Zuni TCPs will not be available for use by other agencies or individuals.

Zuni expects that it will be fully and regularly involved in adaptive management and long-term monitoring, and the activities associated with the Research Center as provided for in the final GCDEIS and subsequent documents regarding these aspects of future efforts. Only through continued Zuni involvement in long-term monitoring can the tribe ensure that its TCPs and other culturally-affiliated cultural resources are being protected and conserved in ways congruent with traditional Zuni values.

Research Reporting.—This section covers standards and guidelines for reporting research on cultural resources in the river corridor. Federal agencies and tribes will submit research reports according to the standards and guidelines discussed below. Outside researchers will follow the procedures discussed below for requesting access to cultural resource information and for submitting research reports.

Cultural Research and Other Long-Term Research.—When cultural resources data are used in the interpretation of other kinds of data produced through other long-term monitoring efforts, the authors of these reports will provide draft copies for review to the PA signatories prior to producing final copies of the reports. The PA signatories will have 30 days to review the draft and submit comments to the report authors.

The Research Center will have the responsibility of monitoring long-term monitoring research to ensure that PA signatories are informed when cultural resources data are used and to ensure that the PA signatories receive draft copies of reports for review.

Reporting of Cultural Research.—PA signatories will adhere to the Secretary of the Interior's Standards and Guidelines for reporting cultural resources information. Documents to be produced and schedules for submission and review of these documents are described in the MRAP.

Protocols should be more automatic and should be involved

As described earlier in Chapter V, research on specific topics is encouraged. Should outside researchers (including students or staff from NAU) wish to use the cultural resources data base, application will be made to the NPS. The NPS will forward the application to the PA signatories, who will have 30 days to review the request before approval or rejection by the NPS.

The NPS permitting guidelines will apply; three peer reviewers will review research proposals and provide recommendations and comments during the same 30-day period that the proposal is reviewed by PA signatories. Requests to use tribal data bases should be made to individual tribes.

Needs to be revisited

Reports resulting from use of the data will be submitted in draft form to the NPS. The NPS will be responsible for notifying the signatories of receipt of the draft. Signatories will then have 45 days to request and review the draft. Comments will be submitted to the NPS and relayed to the author(s).

Projection of Funding and Staffing Requirements

Monitoring and Research

All funding to complete NHPA Section 106 tasks required by the PA comes from CRSP power revenues administered by Reclamation. The only other funds available for cultural resources work associated with the PA consist of funds provided by the NPS to fulfill its NHPA Section 110 responsibilities, funds provided by tribes, and funds provided to tribes from Reclamation's Lower Colorado Region for specific projects. Because the final EIS and the PA were written to address effects of the operations of Glen Canyon Dam, it is anticipated that the CRSP will be the primary source of funding for the resulting cultural resources program described in this HPP.

Money for monitoring effort

Tasks Remaining Before "Normal" Monitoring.—Several tasks remain to be accomplished before the monitoring program reaches the point of "normal" ongoing operations. These tasks include visiting all the sites that may be affected by river flows and making recommendations as to the monitoring frequency required for each site, visiting sites in the control group, completion of total station mapping of actively eroding sites and scheduling of repeat mapping trips, completion of nomination of the district to the National Register of Historic Places, transfer of responsibilities for administration to the AMWG and Research Center, completion of a plan for discovery of cultural materials and human remains that includes provisions for compliance with the NAGPRA, and establishment of ongoing tribal monitoring of TCPs.

Needs to be revisited

Completion of Monitoring Recommendations.—All sites monitored will be selected from the 475 sites identified as part of the archeological inventory of the Colorado River corridor. A total of 336 sites comprise the number of properties that are either impacted or potentially impacted by river flows (identified as the "I" group). Within the "I" group, 263 sites exist on sediment deposits subject to erosion (identified as the "SI" group).

An additional 139 sites comprise the number of properties located along the river corridor outside the potential impact area (identified as the "N" group). A ten percent random sample was chosen from the "N" group. These sites are monitored on a biannual basis. These sites will provide a control group for comparison with those sites in impact categories.

Normal monitoring will begin after all the "SI" and "I" groups are visited. In fiscal year 1997 all sites from the "SI" group will have been visited at least once and the appropriate monitoring frequency for long-term monitoring will have been recommended. The remaining sites within the "I" category will be sampled for monitoring on a yearly basis at a ten percent level with replacement; thus, monitoring of the "I" group will be completed in fiscal year 2005.

Regular monitoring will continue with sites currently on the monitoring list, the control "N" group, and new sites from the "SI" and "I" groups until all sites have been monitored at least once and given long-term monitoring recommendations. Monitoring schedules are flexible and are subject to change depending on the most recent observations.

The NPS's recommendations regarding frequency of monitoring for sites will be clearly described in the NPS's annual reports so that the PA signatories will have the opportunity to review recommendations.

Time-table

End of fiscal year 1997: All sites from the "SI" group will have been visited at least once and recommendations regarding the frequency of monitoring made.

End of fiscal year 2005: All sites from the "I" group will have been visited at least once and recommendations regarding the frequency of monitoring made.

Funding and staffing requirements per fiscal year

The overall goal of the program is to do the minimum monitoring required to ensure that the sites are in stable condition. Therefore, funding required for the monitoring program is expected to decrease as recommendations to cease monitoring of sites or to monitor sites less frequently are completed. Reclamation will respond to and recommend ways to increase efficiency of the monitoring program while ensuring that the level of monitoring is sufficient to meet the requirements of the PA. Reclamation and the NPS will oversee the monitoring program and will provide professional staff to assist with monitoring and remedial actions when appropriate or requested by the signatories.

Completion of Total Station Mapping.—Total station mapping will be accomplished (in priority order as recommended by the NPS) for all sites determined to be threatened by active erosion, all sites chosen within the control group, and all sites evaluated as requiring yearly monitoring. Until all the sites are monitored (projected for the end of fiscal year 2005), it is difficult to determine when total station mapping will be completed. For example, the last site visited in 2005 may be recommended for mapping.

Total station mapping with direct linkage to geographic control is an excellent technique to depict features, artifact concentrations, diagnostic cultural material, significant natural features, erosional features, and datum points for photo-referencing where appropriate. It will be used to generate the planform geometry of gully systems and bed elevation. Site topography will be mapped at a contour interval suitable for identifying erosional changes, which may vary by site location.

could this be automated?

Repeat total station mapping will occur yearly for threatened sites that exhibit active erosion. Repeat mapping will also occur at the control sites (five to ten sites from the "N" category) at five-year intervals.

Appropriate and efficient methods will be employed for mapping sites. These methods may require on-the-ground total station mapping in conjunction with regular monitoring trips. It is also our intent to explore other less intrusive methods for mapping such as repeat aerial photography (stereo photo interpretation) with initial on-the-ground mapping of survey control points. Site locational information will be integrated with the NPS and GCES GISs, and site contour maps will be integrated with the GCES GIS.

Maps will be made available to the NPS and to the PA signatories for review. Access to map data will be restricted as described above.

needs to be revised

Time-table

End of fiscal year 1997: Base maps of the high priority sites recommended by the NPS will be completed.

End of fiscal year 1998: First repeat mapping of high priority sites recommended by the NPS will be completed.

End of fiscal year 2005: The NPS will complete recommendations for mapping of all sites within the river corridor.

End of fiscal year 2006: Base maps of all recommended sites in river corridor will be completed.

GCES will not split.

Funding and staffing requirements per fiscal year

Reclamation will supply equipment and operators, initially through the GCES, as well as an archeologist to oversee mapping. The NPS will supply archeologists as requested to support the mapping efforts. The NPS will supply a list of threatened sites to be reviewed and accepted by the PA signatories. The goal of this program is not to produce contour maps of every site in the river corridor, but to produce maps of sites that are rapidly deteriorating due to erosion.

In fiscal years 1994 and 1995, maps of approximately 15 sites were completed and maps of an additional 15 sites were partially completed. Reclamation plans to build on this existing information by moving towards a system where mapping takes place separately from the NPS

regular monitoring trips so that mapping can be completed in a timely and efficient fashion without conflicting with monitoring schedules.

Initial costs to set up survey controls along the river corridor and to do initial air photo flights will be higher than ongoing costs. It is possible that ongoing costs can be reduced by combining cultural resources air photo flights with flights needed for monitoring other kinds of resources.

A main source of costs is lab work in transforming air photos into contour maps of sites. Cross-sections and volumes of erosions can be calculated from these maps, thus quantifying the amount and location of erosion at specific sites. The lab time of GCES surveyors and outside contractors will be required to produce and interpret these maps.

Nominations to the National Register.—Determinations of eligibility for inclusion on the National Register of Historic Places have been completed for 336 of the archeological sites located within the river corridor. Formal nomination of the properties to the National Register will occur in the form of a multiple property district nomination for the river corridor.

Integration of TCP information is critical to an integrated National Register district. The tribes are responsible for integrating information, as appropriate, into the district nomination. As the nomination is prepared, the NPS and Reclamation will consult with the tribes and all parties will agree on an adequate time-table for integrating TCP information into the nomination. In the event that this time-table is not met or that tribes decide not to nominate places, the nomination will proceed as scheduled with the information that has theretofore been submitted by tribes. If a tribal group decides not to nominate any places, that tribe will notify Reclamation in writing of its decision, with copies of the notification sent to the NPS and SHPO.

The NPS, with support from Reclamation and the tribes, will take the lead on preparing the National Register nomination. All of the signatories of the PA will be involved in drafting and reviewing the nomination.

Time-table

End of fiscal year 1998: The district will be listed on the National Register.

Funding and staffing requirements per fiscal year

Because determinations of eligibility have been made for archeological sites within the river corridor and the sites have already been documented, much of the background work for a nomination has already been completed. It is anticipated that one NPS archeologist working for six months will be able to integrate information provided by the tribes and complete the nomination forms.

Determinations of eligibility have not been made for TCPs other than archeological sites. The tribes are in the process of supplying information and recommendations to Reclamation so that Reclamation can complete SHPO consultation on determinations of eligibility for these

places. As of February 1996, four of five tribal entities contracted by Reclamation have completed the ethnographic reports that will enable them to make these recommendations.

Tribes may not wish to divulge the information that would allow these places to be listed on the National Register (approximate location and evaluation according to National Register criteria). If this is the case, while the places may be protected under AIRFA and other laws pertaining to Native American religious freedom, they will not be protected under the NHPA. Should tribes wish to nominate places in the future, Reclamation and the NPS will request that additional places be listed in the district nomination.

Notification of Archeological Discoveries.—36 CFR 800 Regulations implementing the NHPA state the following concerning archeological discoveries:

> *When the Agency Official's identification efforts in accordance with 800.4 indicate that historic properties are likely to be discovered during implementation of an undertaking, the Agency Official is encouraged to develop a plan for the treatment of such properties if discovered and include this plan in any documentation prepared to comply with 800.5 (800.11 (a, b)).*

The NPS will develop procedures for implementation of a discovery plan that incorporates elements of both the NHPA (described above) and the NAGPRA. The Hualapai Tribe and the Navajo Nation are responsible as land managers for the lands affected by dam operations within their respective jurisdictions. Reclamation, as the lead agency under Section 106 of the NHPA, will develop NAGPRA agreements with the Hualapai Tribe and the Navajo Nation for project impacts that may effect their respective lands. NAGPRA compliance is not a substitute for compliance with Section 106 of the NHPA or other cultural resource legislation (Spurr 1993).

Upon planned archeological investigation, federal land agents must consult with appropriate Native American groups regarding the treatment and disposition of human remains and other cultural items recovered. The Native American groups must also consent to the excavation and removal of these items (43 CFR Part 10, Subpart B, December 4, 1995).

Any disturbance to human remains, sacred objects, or objects of cultural patrimony will be addressed under NAGPRA regulations. Under the NAGPRA, the inadvertent discovery of human remains and other cultural items during a land-disturbing activity requires cessation of the activity. The person conducting the activity must take "reasonable" protection measures and notify the federal agency with management authority over the land. The agency has 24 hours to notify the relevant tribe(s) that the discovery has occurred. The agency receives a formal acknowledgement of the notification (called "certification" in the NAGPRA) and waits 30 days prior to resuming the activity. Disposition of the newly discovered human remains or other cultural items must be resolved in accordance with the ownership provisions of the NAGPRA.

Time-table

End of fiscal year 1997: The NPS will formulate a discovery plan under the NHPA and the NAGPRA for NPS-administered lands in GRCA and GLCA. The NPS will provide draft copies of the plan to the signatories for review by the end of fiscal year 1997.

Reclamation is responsible for coordinating with the Hualapai and with the Navajo Nation to formulate a discovery plan for discoveries resulting from dam operations on Hualapai and Navajo lands. Reclamation will provide draft copies of such a plan to the Hualapai and the Navajo Nation for review by the end of fiscal year 1997.

Funding and staffing requirements per fiscal year

No funding or staffing requirements are anticipated for completion of this task beyond the funding and staffing supplied by Reclamation for monitoring.

Transfer of Responsibilities to the Grand Canyon Monitoring and Research Center.— Reclamation's Upper Colorado Region has administered Reclamation's part of the cultural resources program since its inception. As the Research Center is established and a cultural resources specialist is hired as full-time permanent staff at the Research Center, these administrative duties will be largely transferred to that person. Duties will include reviewing reports; negotiating and administering budgets, cooperative agreements, and contracts with the NPS, the tribes, and outside contractors (if needed); and maintaining the Research Center's cultural resources data base. This person, jointly with the cultural resources representative on the Technical Work Group, will be responsible for informing the AMWG of cultural resources issues affecting the operations of Glen Canyon Dam. Reclamation will continue to be ultimately responsible for meeting its NHPA Section 106 obligations as stipulated in the PA. Reclamation will therefore oversee the Resource Center's cultural resources activities.

Needs to be reworded

Time-table

End of fiscal year 1996: Director of the Research Center is in place and vacancy announcements for hiring cultural resources staff have been released.

End of fiscal year 1997: Cultural Resources staff is in place and in full operation.

Funding and staffing requirements per fiscal year

Needs to be reworded and revisited

No Research Center funding will be required for cultural resources until the cultural resources staff has been hired and is in place. At that point, Research Center funding will include the salary of the cultural resources staff plus funding to support the PA requirements outlined in the HPP. As for other elements of the cultural resources program, the CRSP will be the primary source of funds.

Establishment of Tribal Monitoring Programs.—Monitoring programs for tribal TCPs are in the process of being established for each tribe. As mandated by the PA, each tribal signatory also participates in PA signatory meetings, reviews of required documents (such as the annual monitoring and remedial action report, monitoring trip reports, and the HPP), and integrates tribal elders into the review and monitoring process as needed.

Tribes were requested to submit proposals for monitoring and participation in the cultural resources program for fiscal year 1996. Fiscal year 1996 is the transition year during which tribes move from staffing and administration required to complete ethnographic research projects in the canyon to reduced staffing and administration required to participate in the monitoring and review program.

The Request for Tribal Proposals for fiscal year 1996 is included in this document as Appendix D. This Request for Tribal Proposals serves as a guideline for preparation of similar proposals in the future. Tribes will be expected to submit yearly proposals for participation in the program that address all parts of the Request for Tribal Proposals. Past participation and performance in the program will be considered by Reclamation as a criterion for future funding.

Time-table

Fiscal years 1996 and 1997: Tribes establish long-term monitoring programs for cultural resources identified during ethnographic studies and determine level of efforts required for long-term monitoring. Tribes establish monitoring data bases that will be maintained and updated with data collected during monitoring trips.

(Needs to be clarified)

End of fiscal year 1997: Long-term monitoring schedules and criteria established by tribes; monitoring data bases established and maintained.

Funding and staffing requirements per fiscal year

Reclamation funding will or should be for restoration - funding + RM - funding (CRP) should be from under.

Reclamation will fund tribal participation as required by the PA. The PA requires that tribes, as signatories, attend PA signatories meetings, review documents, and monitor TCPs. Tribes may also recommend and participate in remedial actions designed to collect data and/or to stabilize or protect places from erosion. Proposals will be solicited at approximately the same time every year, will be reviewed by Reclamation, and will be funded at a level deemed appropriate to meet the requirements of the PA.

"Normal" Monitoring.—This section describes ongoing elements of the cultural resources program expected to continue into the future to make sure that the requirements of the GCPA and various historic preservation laws are met, as well as to ensure that the requirements outlined by the PA are met.

Monitoring and Remedial Action Program.—Monitoring of Archeological Sites.—To date, the NPS has administered an extensive monitoring program supporting the MRAP. The program has been described at length above and is presented in Appendix B. It includes approximately four monitoring trips per year, with specific sites chosen for on-the-ground monitoring and documentation by standard forms and repeat photography. Site condition is compared with the previous monitoring

episode and recommendations are made regarding site stability and deterioration, as well as regarding remedial actions that should be taken to stabilize the site.

This program is a fundamental part of the PA and is necessary in order to identify minimum levels of monitoring needed, as well as to identify and prioritize remedial actions that the PA signatories determine need to be taken in order to protect or mitigate adverse effects on sites.

Remedial Actions and Data Recovery.—Two remedial action trips have been sponsored by Reclamation and the NPS to date, although the NPS has previously undertaken remedial actions at sites affected by trailing and erosion. As sites requiring remedial actions are identified and prioritized, remedial action is expected to become an increasingly important part of the cultural resources program, while the monitoring portion of the program will shrink. The NPS currently identifies and prioritizes sites requiring remedial action in their annual reports; the reports are then reviewed by PA signatories.

Reclamation will program funds for remedial actions and data recovery yearly for sites adversely impacted by dam operations. Starting with fiscal year 1995, remedial actions are expected to be conducted at prioritized sites every year, although the level and scope of such actions may vary.

Large scale episodes of site destruction are difficult to predict. Some years, large amounts of funding will be required in order to stabilize or conduct data recovery at damaged sites where damage could not be predicted. These unexpected remedial actions will need to be funded by Reclamation from existing program funds. A remediation contingency fund should be established for these kinds of expensive emergencies, if possible. Remediation funds that are not used in annual budgets should be added to this contingency fund.

Tribes' Monitoring Programs.—As described above, tribes will participate in the cultural resources part of the program and will establish and maintain their own data bases containing monitoring information on TCPs. Tribes will recommend and prioritize site protection and remedial action measures in their yearly reports to Reclamation. These recommendations will be reviewed by the PA signatories at the same meeting at which the NPS annual report is reviewed.

Grand Canyon Monitoring and Research Center.—The continuing role of the Research Center in administering the cultural resources program is described in "Transfer of Responsibilities to the Grand Canyon Monitoring and Research Center" above. The Research Center is expected to be fully operational in its role as administrator of the cultural resources program by the end of fiscal year 1997. Reclamation's representative will continue to oversee compliance with the PA and the activities of the Research Center.

Repeat Mapping of Threatened Sites.—Repeat mapping of threatened sites is expected to be an increasingly important tool for quantifying and predicting erosion, hence identifying remedial actions that need to be taken. The Research Center cultural resources specialist will administer repeat mapping field work and lab work, in conjunction with Reclamation and the NPS, and will provide the results of the work to the signatories for review. Schedules for repeat mapping should be in place by fiscal year 2005. Some sites will have already been mapped repeatedly by that time. All base maps should have been completed by that time. This program should be fully operational as to frequency and extent of repeat mapping needed by the end of fiscal year 2005.

CHAPTER VI

Evaluation of the Historic Preservation Plan

We anticipate that the HPP will need to be periodically reviewed and adjusted in order to meet the needs of the PA signatories, as well as to continue to protect cultural resources in an effective manner.

After the HPP has been reviewed and accepted by all signatories in fiscal year 1996, an HPP review will take place every five years on a calendar basis. The first review period will therefore take place in January of 2001. Reclamation will provide the PA signatories with a notice of the review period during which comments on the HPP may be submitted. At the end of the review period, Reclamation and the NPS will meet with the signatories to discuss comments received.

In the event that changes considered substantial by the signatories are required, Reclamation and the NPS will cooperate to provide signatories with a schedule for completing the changes and reviewing the new document. The new document will be completed and ready to circulate for review within six months of the date of the HPP review meeting. The revised document will be in place within one year of the HPP review meeting.

The Dispute Resolution section of the PA outlines the means for resolving other disputes that may arise in the course of operation of the cultural resources program.

List of Preparers

Name	Affiliation	Contribution
Nancy Andrews	Northern Arizona University	Temporal categories of archeological sites
Roger Anyon	Zuni Pueblo	Traditional cultural properties
Jan Balsom	Grand Canyon National Park	Editing, writing various sections
Angelita Bullets	Southern Paiute Consortium	Traditional cultural properties
Chris Coder	Grand Canyon National Park	History of cultural inventories in the river corridor
Christian Downum	Northern Arizona University	Long-term research goals/domains: theoretical and cultural
Warren Hurley	Bureau of Reclamation Western Colorado Area Office — Southern Division	Operating procedures, Glen Canyon Dam
Loretta Jackson	Hualapai Tribe	Traditional cultural properties
Jayne Kelleher	Bureau of Reclamation Upper Colorado Regional Office	Technical writing, editing, desktop publishing
Signa Larralde	Bureau of Reclamation Upper Colorado Regional Office	Editing, writing various sections
Lisa Leap	Grand Canyon National Park	Writing various sections
Roland Manakaja	Havasupai Tribe	Traditional cultural properties
Michael Yeates	Hopi Tribe	Traditional cultural properties

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Appendixes

Appendix A

Programmatic Agreement on Cultural Resources

PROGRAMMATIC AGREEMENT
AMONG
THE BUREAU OF RECLAMATION, THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, THE NATIONAL PARK SERVICE,
THE ARIZONA STATE HISTORIC PRESERVATION OFFICER, HAVASUPAI TRIBE, HOPI TRIBE, HUALAPAI TRIBE, KAIBAB PAIUTE TRIBE, NAVAJO NATION, SAN JUAN SOUTHERN PAIUTE TRIBE, SHIVWITS PAIUTE TRIBE AND ZUNI PUEBLO
REGARDING
OPERATIONS OF THE GLEN CANYON DAM

WHEREAS, the Secretary of Interior has directed the preparation of an Environmental Impact Statement (EIS) on the effects of the operation of the Glen Canyon Dam on the downstream environmental and ecological resources, and historic properties of Glen Canyon and Grand Canyon; and

WHEREAS, the Grand Canyon Protection Act of 1992 (P.L. 102-575 Title XVIII) mandates the continued monitoring and management of resources located within the area of impact covered by this agreement and requires completion of the EIS by October 1994; and

WHEREAS, the purpose of the EIS is to ". . . reevaluate the operation of the Glen Canyon Dam to determine specific options that could be implemented to minimize—consistent with law—adverse impacts on the downstream environmental and cultural resources and Native American interests in Glen and Grand Canyons." (Interim Preliminary Draft EIS 7/92); and

WHEREAS, the Bureau of Reclamation (Reclamation), Upper Colorado Region, administers the releases of water from the Glen Canyon Dam and has determined that the operation of the Dam (the Program) may have effects upon properties included in or eligible for inclusion in the National Register of Historic Places and has consulted with the Advisory Council on Historic Preservation (Council), the National Park Service (NPS), and the Arizona State Historic Preservation Officer (SHPO) pursuant to 36 CFR § 800.13 of the regulations (36 CFR Part 800) implementing Section 106 of the National Historic Preservation Act (ACT) (16 U.S.C. 470f); and

WHEREAS, Reclamation is the lead Federal agency for the Program for purposes of Section 106; and

WHEREAS, the NPS is responsible for the administration and management of historic properties within the boundaries of the Glen Canyon National Recreation Area and the Grand Canyon National Park pursuant to Section 110 of the Act; and

WHEREAS, given their mutual responsibilities, Reclamation and the NPS have determined to coordinate their respective roles in the management and consideration of historic properties which may be affected by the Program; and

WHEREAS, the Hualapai Tribe is responsible for the administration and management of historic properties within the boundaries of its reservation lands affected by the Program; and WHEREAS, prior to performing any work required under the terms of this agreement within the boundaries of the Hualapai Indian Reservation, Reclamation or the NPS shall notify the Hualapai Tribe of such work and obtain appropriate Tribal permits before entering the boundaries of the Hualapai Indian Reservation. The Tribe will require that a Hualapai Tribe member monitor be present when necessary for any culturally sensitive work, as determined by the Tribe.

WHEREAS, the Navajo Nation is responsible for the administration and management of historic properties within the boundaries of the Navajo Nation pursuant to the Cultural Resources Protection Act (CMY-19-88); and

WHEREAS, the Navajo Nation agrees to NPS administration and management of any Navajo Nation historic properties which may be included under the terms of this agreement until such time as the Navajo Nation assumes such responsibility; and

WHEREAS, the Havasupai Tribe, Hopi Tribe, Hualapai Tribe, Kaibab Paiute Tribe, Navajo Nation, San Juan Southern Paiute Tribe, Shivwits Paiute Tribe and the Zuni Pueblo (the Tribes) participated in consultation and are signatories to this Programmatic Agreement;

NOW, THEREFORE, Reclamation, the Council, NPS, SHPO, and the Tribes agree that the Program shall be administered in accordance with the following stipulations to satisfy Reclamation's Section 106 responsibilities for all individual aspects of the Program.

Stipulations

Reclamation, as lead Federal agency for purposes of the Program, shall ensure that the following stipulations are carried out.

1. IDENTIFICATION AND EVALUATION

a. The NPS has identified a total of 313 contributing properties, referred to as the Grand Canyon River Corridor District (District), within the area of potential affects (APE). Nine additional properties within the boundaries of the District remain unevaluated. The NPS shall assist Reclamation in obtaining the necessary information to complete the evaluation of these nine sites for determining their eligibility for listing on the National Register as contributing properties to the District or as eligible on their own merits. Reclamation shall submit such evaluations to the SHPO for determinations of eligibility. In the event that Reclamation and the SHPO do not agree on the eligibility of any property, or if the Council or Keeper so request, Reclamation shall obtain a formal

determination of eligibility from the Keeper of the National Register in accordance with 36 CFR § 800.4(c). Determinations of eligibility for the remaining nine properties shall be completed by August 1993.

b. Reclamation and the NPS, in consultation with the SHPO, shall identify and evaluate historic properties in the remaining 37 miles of the APE not previously intensively inventoried (Attachment A). Properties identified within the 37-mile corridor shall be evaluated on their own merits and as contributing elements to the District pursuant to 36 CFR § 800.4(c). An intensive inventory of the entire APE shall be completed by August 1993. Ongoing identification and evaluation efforts shall be a part of the management program identified at Stipulations 2 and 3.

c. In consultation with the Tribes and SHPO, Reclamation and the NPS shall identify and evaluate properties within the APE which retain traditional cultural values. Such properties shall be evaluated under criteria A, B, C, and D of the National Register Criteria pursuant to 36 CFR Part 60, and taking into consideration "National Register Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties."

(1) Traditional cultural properties shall be identified by Reclamation and the NPS through the conduct of ethnographic studies. Ethnographic studies shall solicit and include the participation of and consultation with the Tribes to collaborate in the identification and evaluation of traditional cultural properties.

(2) Reclamation shall submit such evaluations to the SHPO for determinations of eligibility. In the event that Reclamation and the SHPO do not agree on the eligibility of any property, or if the Council or Keeper so request, Reclamation shall obtain a formal determination of eligibility from the Keeper of the National Register in accordance with 36 CFR § 800.4(c). Such study and evaluations shall be completed by October 1994.

2. MONITORING AND REMEDIAL ACTION

a. Within three months of the execution of this Programmatic Agreement, Reclamation and the NPS, in consultation with the SHPO and Tribes, shall develop a Plan for monitoring the effects of the Glen Canyon Dam operations on historic properties within the APE and for carrying out remedial actions to address the effects of ongoing damage to historic properties. The purpose of the Monitoring and Remedial Action Plan shall be to generate data regarding the effects of Dam operations on historic properties, identify ongoing impacts to historic properties within the APE, and develop and implement remedial measures for treating historic properties subject to damage. Such data shall be incorporated into Reclamation's Long-Term Operating and Monitoring Plans governing dam releases identified in the EIS. The EIS is scheduled for completion in October 1994.

b. The Monitoring and Remedial action Plan (Plan) shall provide for the identification and evaluation of previously unrecorded properties overlooked by previous surveys or exposed subsequent to the surveys, and include measures by which any adverse effects identified during the monitoring effort shall be avoided or minimized. Remedial measures shall be implemented to mitigate ongoing

adverse effects and may include, but not be limited to, bank stabilization, check dam construction, and data recovery, as appropriate. The Plan shall specify an expedited consultation process among the parties to this agreement to accommodate situations requiring remedial actions.

c. Reclamation shall submit a draft of the Plan to the parties in this agreement for review and comment. Each party shall have 60 days from receipt of the Plan to comment. Reclamation may assume the concurrence of any party which does not issue comments within 60 days of their receipt of the Plan.

(1) Reclamation shall take into consideration all comments received in their development of a final draft Plan, and submit the final draft Plan to the reviewing parties for a second review opportunity. Each reviewing party shall have 20 days from receipt to review the final draft Plan and issue comments to Reclamation.

(2) If any reviewing party objects to the adequacy of the final draft Plan, Reclamation shall consult with the objecting party, and the other parties to this Programmatic Agreement as necessary to resolve the objection pursuant to Stipulation.

(3) When all objections are resolved, Reclamation shall implement the Monitoring and Remedial Action Plan.

3. MANAGEMENT

a. Reclamation and the NPS shall incorporate the results of the identification, evaluation, and monitoring and remedial action efforts into a Historic Preservation Plan (HPP) for the long-term management of the Grand Canyon River Corridor District and any other historic properties within the APE. The HPP shall be developed in consultation with the parties to this Programmatic Agreement. The HPP shall integrate Reclamation's lead agency role pursuant to Section 106 of the Act and the NPS's stewardship role pursuant to Section 110 of the Act. Specifically, the HPP shall provide management direction responsive to the NPS's responsibilities under Sections 110(a)(1) and 110(a)(2); and NPS's and Reclamation's responsibilities under Sections 110(b) and 110(d).

b. The HPP shall establish consultation and coordination procedures, long-term monitoring and mitigation strategies, management mechanisms and goals for long-term management of historic properties within the APE.

c. Reclamation and the NPS shall submit a draft of the HPP to the parties to this agreement for 60 days review. The parties to this agreement shall have 60 days from receipt to issue comments to Reclamation and the NPS regarding the adequacy of the HPP. Reclamation and the NPS may assume the concurrence of any party which does not issue comments within 60 days of receipt of the HPP.

(1) Reclamation and the NPS shall take into consideration all comments received in their development of a final draft HPP, and submit the final draft HPP to the reviewing parties for a second review opportunity. Each reviewing party shall have 30 days from receipt to review the final draft HPP and issue comments to Reclamation and the NPS.

(2) If any reviewing party objects to the adequacy of the final draft HPP, Reclamation and the NPS shall consult with the objecting party, and the other parties to this agreement as necessary to resolve the objection pursuant to Stipulation 4. When all objections have been resolved, Reclamation and the NPS shall implement the HPP.

d. The development and review of the HPP shall be completed prior to the issuance of a Record of Decision for the GCD-EIS, or December 1994, whichever comes first. Upon issuance of a Record of Decision, the HPP shall be reviewed by the parties to this agreement and revised, if necessary, based on the decision. The review of a revised HPP shall be conducted in accordance with the procedures of Stipulation 3.C.1. and 2.

4. DISPUTE RESOLUTION

a. Should any party to this agreement object within 30 days to any plans, specifications, or actions proposed pursuant to this agreement, Reclamation and the NPS shall consult with the objecting party to resolve the objection. If any party involved in the dispute determines that the dispute cannot be resolved, Reclamation shall forward all documentation relevant to the dispute to the Council. Within 30 days after receipt of all pertinent documentation, the Council will either:

(1) Provide Reclamation and the NPS with recommendations, which Reclamation will take into account in reaching a final decision regarding the dispute; or

(2) Notify Reclamation and the NPS that it will comment pursuant to 36 CFR § 800.6(c)(2) with reference to the subject of the dispute.

Any recommendation or comment provided by the Council will be understood to pertain only to the subject of the dispute; Reclamation's responsibility to carry out all actions under this agreement that are not the subjects of the dispute shall remain unchanged.

b. At any time during implementation of the measures stipulated in this agreement should an objection to any such measure or its manner of implementation be raised by a member of the public, Reclamation and the NPS shall take the objection into account and consult as needed with the objecting party, SHPO, the Tribes, or the Council to resolve the objection.

5. REVIEW OF THE AGREEMENT

a. The Council, SHPO, NPS and Tribes may review activities carried out pursuant to this Programmatic Agreement, and the Council will review such activities if so requested. Reclamation will cooperate with the Council, SHPO, NPS and Tribes in carrying out their reviewing activities.

b. Reclamation and the NPS shall cooperatively provide biannual summary reports of their progress toward completing the terms of this agreement to each of the parties to this agreement. The biannual reports shall identify accomplishments and actions completed and provide schedules of completion for all remaining tasks. The first biannual report shall be submitted to the parties of this agreement six (6) months after the date of the Council's signature on this agreement and every six months thereafter until the HPP has been implemented.

c. A yearly meeting will be held among the signatories to review the agreement and the results of the monitoring and remedial actions.

How does the center request amendment?

6. AMENDMENT

Any party to this Programmatic Agreement may request that it be amended, whereupon the parties will consult in accordance with 36 CFR § 800.13 to consider such amendment.

7. TERMINATION

Any party to this Programmatic Agreement may terminate this agreement by providing 30 days written notice to the other parties, provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, Reclamation will comply with 36 CFR § § 800.4 through 800.6 with regard to individual undertakings covered by this Programmatic Agreement.

8. FAILURE TO CARRY OUT TERMS

In the event Reclamation and the NPS do not carry out the terms of this Programmatic Agreement, Reclamation will comply with 36 CFR § § 800.4 through 800.6 with regard to individual undertakings covered by this Programmatic Agreement.

Appendix B

Monitoring and Remedial Action Plan

(August 1994 — Revised Final Version)

I. INTRODUCTION

This plan guides the ongoing process for the identification, monitoring, and remedial actions on cultural resources impacted, or potentially impacted, as a result of the operation of Glen Canyon Dam.

The Bureau of Reclamation (Reclamation) is the lead agency in the preparation of the Glen Canyon Dam Environmental Impact Statement. The National Park Service (NPS) is the principle land manager in the study area, including portions of Glen Canyon National Recreation Area (GLCA) and Grand Canyon National Park (GRCA). The Hualapai Tribe and the Navajo Nation are responsible as land managers for the lands affected by dam operations within their respective jurisdictions. Along with the Advisory Council on Historic Preservation and the Arizona State Historic Preservation Officer, Reclamation, the NPS, and the following tribes (the Tribes) are signatories to a Programmatic Agreement regarding water releases from Glen Canyon Dam:

- Havasupai Tribe
- Hopi Tribe
- Hualapai Tribe
- Kaibab Paiute Tribe
- Navajo Nation
- San Juan Southern Paiute Tribe
- Shivwits Paiute Tribe
- Zuni Pueblo

Needs to be reworked

As an action to meet the lead agency's responsibility with regard to Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended 1992) and the NPS's Section 110 responsibilities, and to fully implement Title XVI of P.L. 102-575, Reclamation, the NPS, and the Tribes agree to cooperate in the design and implementation of this long-term monitoring and remediation plan. As primary land manager, the NPS will additionally 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.

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, as described below. This plan is divided into two primary sections: monitoring and remedial actions.

II. MONITORING

A. *Purposes and Goals*

Innovation of center & Not agencies

1. Data collection in support of evaluation of impacts to historic properties located within the Colorado River corridor.

The fundamental goal of the monitoring program is to collect data that will be used to identify potential and ongoing erosional impacts to significant cultural resource sites along the Colorado River (River) between the river and the predam flood zone at approximately the 300,000 cubic feet per second line.

Two categories of threats have been defined based upon their relation with River flows (Fairley et al. 1991). They are:

a. Adverse impacts such as inundation or bank cutting directly caused by the River; downcutting of peripheral arroyos due to lack of sediment replenishment, and a continuously lower base level for the River; and/or modified recreational use patterns caused by River flow regimes;

b. Potential adverse impacts to sites as predicted by the geomorphic model of site erosion (Hereford et al. 1993). Monitoring of these sites will be used to guide and initiate the appropriate preservation measures aimed at preserving the sites *in situ*.

2. Development of predictive model of geomorphic processes related to archeological site erosion.

Geomorphological processes define the environment in which the cultural resources are found (i.e., Hereford et al. 1993). Predictive models of where erosion occurs will be developed which will result in more efficient monitoring, the potential for early remedial intervention, and potentially reduced loss of irreplaceable cultural resources.

3. Implementation of appropriate remedial actions related to documented site impacts, monitoring, and evaluation of effectiveness of procedures.

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.

B. *Site Selection*

All sites will be selected from the group of 475 sites identified as part of the archeological inventory of the Colorado River corridor. A total of 336 sites comprise the number of properties that are either impacted or potentially impacted by river flows (identified as the "I" group). Within the "I" group, 263 sites exist on sediment deposits subject to erosion (identified as the "SI" group).

An additional 139 sites comprise the number of properties located along the river corridor outside the potential impact area (identified as the "N" group). These sites will provide a control group for comparison with those sites in impact categories. A ten percent sample will be chosen from the "N" group at random and monitored on a yearly basis. The remaining sites within the "N" group will not be monitored.

All "SI" sites will be monitored at a frequency defined by their individual characteristics. Every site in this category, however, will be visited once within the first five years of the monitoring program in order to define the appropriate monitoring frequency for long-term monitoring. The remaining sites within the "I" category will be sampled for monitoring at a ten percent level on a yearly basis with replacement.

1. Annual Selection of Sites for Monitoring. Each year, the priority for selection of sites to be monitored will be dictated by the following:

a. All sites within the actively eroding category will be monitored at least once a year, possibly more depending on erosional activity.

b. Sites which 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.

c. Sites which have high potential for adverse impacts due to non-geomorphological factors such as changing river camp or visitor access locations will be monitored as needed.

d. Sites which have been identified by any of the Tribes for specific tribal concerns will be monitored at the level requested by the individual tribe.

e. Sites which have other research potentials will be monitored as research questions are formulated related to other monitoring activities.

f. Sites which may be affected by other research activities such as geomorphic mapping or high flow sediment deposition studies will be monitored as needed.

g. Sites sampled at a ten percent level as described above from the "N" and "I" groups will be included in the annual selection.

After selection of sites for yearly monitoring is made based upon the above criteria, the remaining sites will be selected in a random fashion from the as yet unmonitored group of "SI" sites until all these sites have received monitoring evaluation within the first five years of the program. Further definition of site selection and monitoring frequency will be determined within the Historic Preservation Plan (HPP).

2. The NPS will take the lead in the annual selection of sites to be monitored, taking into consideration the above criteria and other logistical constraints. The listing of proposed sites along with the rationale for their selection will be forwarded to the other signatories for review, modifications, and additions. Tribal input on traditional cultural sites that need to be monitored will occur at this time. The listing, as well as the rationale for selection, will be completed in time to be included in the annual report, described below.

3. Site selection may be modified in the future contingent on data requirements of research domains identified in the HPP, or unanticipated events, or at the request of any of the signatories to the Programmatic Agreement.

C. *Site Monitoring Methodology*

1. Site Recordation

a. All sites to be monitored have been mapped to scale with tape and compass or otherwise recorded (in the case of rock art/inscriptions) from permanent datum points that are tied into the global positioning network maintained by the NPS.

Total station mapping will be accomplished (in priority order) for all sites determined to be actively eroding, all sites chosen within the control group, and all sites evaluated as requiring yearly monitoring. Included in the maps will be: features, artifact concentrations, diagnostic/exotic material culture, significant natural features, erosional features, and datum points for photo-referencing where appropriate. Site topography will be mapped at a contour interval appropriate for identifying changes resulting from erosion.

To accomplish the total station mapping defined above, Reclamation will supply equipment and archeologist/operators with the NPS supplying archeologists to support the mapping efforts.

At every site where total station maps are generated, repeat mapping will occur on a yearly basis for those sites with active erosion or yearly monitoring schedules, or within a five-year period for the control sites.

At each of the applicable sites, at least one permanent artifact recording unit will be established and tied into the permanent datum. The function of this artifact recording unit is to document and quantify changes in artifact density and distribution related to site formation processes.

Archeological 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.

b. Detailed observations within sites will be organized around a series of baseline photographic reference points which are recorded on the site map and tied to the permanent datum. Additional points may be identified to focus on existing or developing areas of concern. Photographs will provide an objective basis for visually documenting change.

c. At selected sites, remote cameras will be installed to document change at shorter intervals than provided during the standard monitoring sessions.

d. Aerial photographic methods will be employed to document change where appropriate.

e. Other monitoring methods may be employed when appropriate or available.

2. Logistics: Down River Monitoring (Grand Canyon)

a. Number of Monitoring Trips: A minimum of four trips per year will be required to adequately complete the site monitoring agenda. Additional trips may be arranged for any remedial actions or 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. It is estimated that approximately 100 archeological sites can be monitored per fiscal year. A range of 60 to 75 river days annually can be expected dependent on trip duration.

b. Duration: Trips will run 10 to 18 days dependent on mode of transport (row or motor).

c. Field Crew: Each trip will be directed by a qualified NPS archeologist. Qualification as a NPS trip leader will require a minimum of 60 days river corridor monitoring experience between Glen Canyon Dam and Separation

Canyon. Reclamation will provide professional staff to assist with both monitoring and remedial actions when appropriate or requested by the signatories.

3. Logistics: Upriver Monitoring (Glen Canyon)

a. Number of Monitoring Trips: Upriver areas (Glen Canyon Dam to Lees Ferry) are accessible by boat on day trips. Trips will be accomplished as necessary based upon the number of sites to be monitored and any detailed examination of terrace arroyos, documentation and photography of major cutbank areas, and implementation of remedial actions as discussed below. Any sites located within lands identified as Navajo Nation will be monitored specifically in consultation with Navajo Nation representatives. Any collection or ground disturbing activities at sites on Navajo land will take place only with the prior written authorization of the Navajo Nation. Sites included within these lands are AZ:C:2:11 (F. 5,6,14), AZ:C:2:12, AZ:C:2:41, AZ:C:2:48, AZ:C:2:57, AZ:C:2:58, AZ:C:2:59, AZ:C:2:60 (F. 1, 2, 4, 6, 7, 8), AZ:C:2:72, AZ:C:2:76, AZ:C:2:78, AZ:C:2:82, AZ:C:2:86, AZ:C:2:87, AZ:C:2:90, AZ:C:2:91, AZ:C:2:99, AZ:C:2:100, AZ:C:2:106, and AZ:C:2:108.

b. Duration: Trips will be run on a day-to-day basis from Lee's Ferry throughout the monitoring period, with single-day trips the norm.

c. Field Crew: Each trip will be directed by a qualified NPS archeologist, with trips being conducted from spring through fall of each year.

4. Signatory Participation. Any signatory to the Programmatic Agreement may accompany any monitoring trip if they so request and logistical arrangements can be made. Requests should be received by the NPS no later than one month prior to trip launch.

D. *Review Process*

1. Trip Reports. Trip reports will be prepared by the NPS, with input from tribal representatives, when appropriate, following each of the monitoring trips. For the upriver section of Glen Canyon, a minimum of two interim monitoring reports will be prepared for the season.

These reports will summarize the actions taken on the trip 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.

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.

2. Annual Reports. 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. It will also list the sites that will be monitored in the upcoming year, changes in methodology if necessary, and remedial actions that are projected to be required in the upcoming year. At least one meeting of the signatories will occur to discuss the contents of the document prior to completion of the draft final report, scheduled for August 1 of each year. The NPS will take the lead in preparation of the report and coordination of meetings.

3. The annual report (finalized by September 30, 1996), once approved by all of the signatories, 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 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.

4. Five-Year Synthetic Report. Every five years, the NPS will compile a synthetic report aimed at addressing the following areas: management, methodology, theory, and education. The information utilized in the development of this report will draw on the monitoring and remedial actions implemented up to that point. The data will be analyzed and evaluated in terms of the research domains for the canyon discussed in the HPP (as defined in the Secretary of the Interior's Standards for Archeology and Historic Preservation 1983).

III. REMEDIAL ACTIONS

A. *Purposes*

Remedial actions will be undertaken when the monitoring identifies adverse impacts to significant cultural resources. The type of action will be based on the recommendations provided in the monitoring report in an interactive process with the Tribes. Analysis of the data recovered from all remedial actions will be guided by the overall research domains established in the HPP.

B. *Potential Remedial Actions*

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
- Conduct complete data recovery

When a remedial action is identified, a written plan of appropriate scope will be prepared for review prior to implementation.

C. *Consultation Process*

1. Consultation will occur in the form of review and comment on the trip reports and annual reports.

2. Emergency Situations. 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. The other signatories should be notified prior to the action, if possible, or as soon after the action as feasible.

D. *Implementation*

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. 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.

IV. ADDITIONAL MANAGEMENT NEEDS

A. *Comprehensive Site Testing*

A comprehensive program of site testing will be conducted to assess the integrity of the properties and the forces affecting them. Sites will be selected for testing if the level of existing degradation is determined to be beyond stabilization (this may be a precursor to data recovery), or if there exists a potential for flooding and erosion without realistic possibilities for stabilization. All proposed actions, findings, and recommendations will be sent to the signatories for review.

B. *Site Stabilization Workshop*

Reclamation and the NPS will design and conduct a stabilization workshop to assess and develop a viable stabilization program for working in riverine wilderness areas, and train agencies and tribal cultural resources staffs in appropriate stabilization techniques for the arid West. Subsequent workshops will be planned and conducted as requirements for stabilization and staff training needs change. The first workshop will be accomplished by the end of fiscal year 1995.

V. CONSULTATION ON DEVELOPMENT OF THE MONITORING AND REMEDIAL ACTION PLAN

The parties to this plan have been given the opportunity to review and comment on the development and content of this plan. As detailed in the plan, all parties will be given the opportunity to review and comment on all actions set forth in the plan. Every effort will be made to accommodate the concerns of all parties, recognizing that failure to do so may result in invoking the provisions of the dispute clause of the Programmatic Agreement.

Bibliography

Archeology and Historic Preservation. 1980. Secretary of the Interior's Standards and Guidelines. *Federal Register* 48 (190):44717-44720.

Fairley, Helen, Peter Bungart, Christopher Coder, Jim Huffman, Terry Samples, and Janet Balsom. 1991. *The Grand Canyon River Corridor Survey: Archeological Survey Along the Colorado River Between Glen Canyon Dam and Separation Canyon.* Glen Canyon Environmental Studies Technical Report, Bureau of Reclamation, Salt Lake City, Utah.

Hereford, Richard, Helen Fairley, Kate Thompson, and Janet Balsom. 1993. *Surficial Geology, Geomorphic and Erosion of Archeologic Sites Along the Colorado River, Eastern Grand Canyon, Grand Canyon National Park, Arizona.* United States Geological Survey Open File Report.

Appendix C

Standard Report Format for Annual Reports

I. Abstract

II. Fiscal Year Scope of Work

A. Site Selection
B. Field and Lab Methods
C. Total Station Mapping
D. Surface Analysis Units
E. Stationary Camera

III. Impacts to Cultural Resources

A. Physical Impacts
B. Visitor-Related Impacts
C. Summary of Impacts
D. Geomorphic Research
E. Photographic Documentation

IV. Site Specific Results and Recommendations

V. Management Summary

A. Measures to Reduce Site Impact
B. Measures to Protect Site Integrity
C. Fiscal Year Monitoring Work Plan
D. Monitoring Program Assessment
Remedial Actions Implemented
Summary and Conclusions

VI. Bibliography

VII. Appendixes

A. Sample Monitor Form
B. Work Plan for Next Fiscal Year

Appendix D

Standard Request for Tribal Proposals

Scope of Work — Tribal Cultural Resources Monitoring and Participation in Cultural Resources Programmatic Agreement Administration — Glen Canyon Dam Operations

Important: Please use this format for fiscal year 1996 cultural resources proposals to Glen Canyon Environmental Studies, due August 21, 1995.

1. Title of Proposal

2. Name and Title of Preparer

3. Source of Proposal

4. Objectives of Proposal

Proposal should address all aspects of tribal participation in the cultural resources program as delineated in the Programmatic Agreement. Proposal should also include any hypotheses being tested.

5. Contents of Proposal

a. List of sites and site locations (to the extent confidentiality allows) to be monitored during the yearly trip and justification for monitoring those sites. Sites should include traditional cultural properties, traditional resources, and/or archeological sites which have ancestral or other cultural relation to the tribe to be monitored.

b. Description of monitoring techniques and content of monitoring data base to be collected (to the extent confidentiality allows).

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c. Description of extent of tribal participation in Programmatic Agreement signatory meetings, review of external reports, and participation in internal meetings.

d. Description of how tribal data base on traditional cultural properties and monitoring results will be maintained, including information on maintenance in the Geographic Information System and information on maintenance of archives.

e. Budget, to include personnel costs, administrative and support costs, travel, and consultant fees.

6. Deliverables

Annual Monitoring Report. Prepare a report which includes all the data categories in Appendix C, the standard format outlined in the Historic Preservation Plan (for examples see fiscal year 1994 annual reports from Glen Canyon National Recreation Area and Grand Canyon National Park).

Report will include results of the tribal monitoring trip, to the extent confidentiality allows, and summary and management recommendations from the tribal monitoring trip as well as from tribal participation in any National Park Service trips during the past year. Areas of overlapping interest among affiliated groups will be identified in the report.

Also include a brief statement of the objectives, major accomplishments, problems encountered, fiscal status, prioritized recommendations for actions required of Reclamation or the National Park Service in the coming year, synopsis of a work plan for the coming year, and an inventory of property acquired during the reporting period.

Areas of concern with other National Park Service/Reclamation activities outside the cultural resources program should be described. If a test flow has been conducted during the past year, any impacts observed during monitoring should be reported.

Due Date: The annual monitoring report will be due on August 1 of each year. Six copies of the report will be submitted to Reclamation's Upper Colorado Regional Office and two copies will be submitted to the Grand Canyon Monitoring and Research Center.

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.