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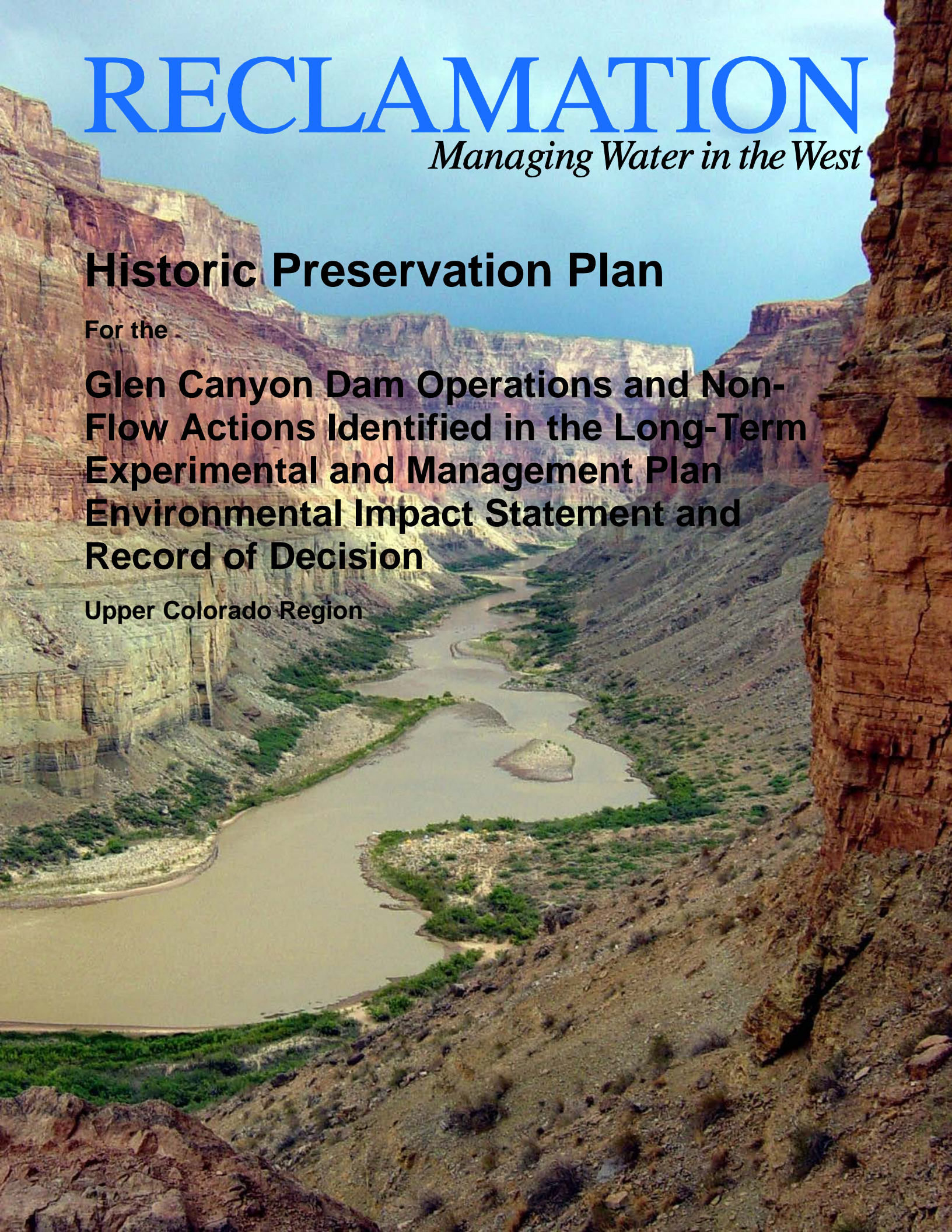
Managing Water in the West

Historic Preservation Plan

For the

Glen Canyon Dam Operations and Non-Flow Actions Identified in the Long-Term Experimental and Management Plan Environmental Impact Statement and Record of Decision

Upper Colorado Region



Mission Statements

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honor its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

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.

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**HISTORIC PRESERVATION PLAN
for the
GLEN CANYON DAM OPERATIONS
AND NON-FLOW ACTIONS IDENTIFIED
IN THE LONG-TERM EXPERIMENTAL
AND MANAGEMENT PLAN
ENVIRONMENTAL IMPACT STATEMENT
AND RECORD OF DECISION**

November 5, 2018

Prepared by:
U.S. Department of the Interior
Bureau of Reclamation, Upper Colorado Region

National Park Service
Glen Canyon National Recreation Area
Grand Canyon National Park
Hualapai Indian Tribe of the Hualapai Indian Reservation
Navajo Nation
Hopi Tribe of Arizona
Kaibab Band of Paiute Indians
Paiute Indian Tribe of Utah
San Juan Southern Paiute Tribe of Arizona
Pueblo of Zuni
Western Area Power Administration
Colorado River Energy Distributors Association, Inc.
Bureau of Indian Affairs, Western Regional Office
National Parks Conservation Association
Grand Canyon River Guides, Inc.
Grand Canyon Wildlands Council, Inc.

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ABBREVIATIONS

2016 ROD	2016 Long-term Experimental and Management Plan Record of Decision
2017 PA	2017 Programmatic Agreement
ACHP	Advisory Council on Historic Preservation
AMS	Accelerator Mass Spectrometry
AMWG	Adaptive Management Work Group
APE	Area of Potential Effects
ARPA	Archeological Resources Protection Act of 1979
ASMIS	Archeological Sites Management Information System
CFMP	Comprehensive Fish Management Plan
CRE	Colorado River Ecosystem
CRMP	Colorado River Management Plan
CRSP	Colorado River Storage Project
DEMs	Digital Elevation Models
DODs	DEMs-of-Difference
DOE	Determination of Eligibility
DOI	U.S. Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
FWS	U.S. Fish and Wildlife Service
GCD	Glen Canyon Dam
GCDAMP	Glen Canyon Dam Adaptive Management Program
GCDEIS	Glen Canyon Dam Environmental Impact Statement
GCES	Glen Canyon Environmental Studies
GCMRC	Grand Canyon Monitoring and Research Center
GCNP	Grand Canyon National Park
GLCA	Glen Canyon National Recreation Area
GCPA	Grand Canyon Protection Act of 1992
GCRCAP	Grand Canyon National Park River Corridor Archeology Project
GIS	Geographic Information System
GPS	Global Positioning System
GRCA	Grand Canyon National Park
HDCCR	Hualapai Department of Cultural Resources
HFE	High-flow experiment
HPP	Historic Preservation Plan
HPTP	Historic Property Treatment Plan
ICC	Indian Claims Commission

LDS	The Church of Jesus Christ of Latter-day Saints
LiDAR	Light Detection and Ranging
LTEMP	Long-term Experimental Management Program
MNA	Museum of Northern Arizona
MO	Management Objective
MOA	Memorandum of Agreement
MPDF	Multiple Property Documentation Form
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act of 1966
NPS	National Park Service
NRHP	National Register of Historic Places
NNAD	Navajo Nation Archeology Department
PA	Programmatic Agreement
PEP	Protocol Evaluation Panel
RCMP	River Corridor Monitoring Project
Reclamation	Bureau of Reclamation
ROD	Record of Decision
SHPO	State Historic Preservation Office(r)
SPC	Southern Paiute Consortium
TCP	Traditional Cultural Property
TEK	Traditional Ecological Knowledge
TEM	Terrestrial Ecosystem Monitoring
THPO	Tribal Historic Preservation Office
TWG	Technical Work Group
USGS	U.S. Geological Survey
ZCRAT	Zuni Cultural Resources Advisory Team
ZCRE	Zuni Cultural Resources Enterprises

Units of Measure

cfs	cubic feet per second
cm	centimeter(s)

CHAPTER 1: INTRODUCTION AND BACKGROUND

This Historic Preservation Plan (HPP) is intended to serve as the guiding document for the implementation of the historic preservation program under the Glen Canyon Dam Adaptive Management Program (GCDAMP — see Appendix A for additional definitions) and the 2016 Long-term Experimental Management Plan Final Environmental Impact Statement (LTEMP EIS) and Record of Decision (ROD) (Reclamation 2016a and 2016b). It builds on the past successes of the GCDAMP cultural resources program by identifying the role that historic preservation has played and will continue to play in the operation of Glen Canyon Dam (GCD). This HPP references the administrative roles, regulatory context, and consultation protocols that guide the historic preservation program and GCDAMP projects, and it fulfills stipulation IV of the 2017 Programmatic Agreement (2017 PA, Reclamation 2017). Most importantly, this HPP establishes historic preservation goals, recommendations, research needs, and the implementation of specific policies and actions for achieving these goals with input from 2017 PA consulting parties.

In 2016, the Bureau of Reclamation (Reclamation) and the National Park Service (NPS) completed the Long-Term Experimental and Management Plan (LTEMP) through an Environmental Impact Statement (EIS) for operations of Glen Canyon Dam, the largest unit of the Colorado River Storage Project (CRSP). On December 15, 2016, Secretary of the Interior Sally Jewell signed the 2016 ROD for the LTEMP EIS. This new 2016 ROD established a framework for adaptively managing GCD operations and other management and experimental actions for the next 20 years to minimize impacts on resources within the area affected by dam operations, commonly referred to as the Colorado River Ecosystem (CRE), including those of importance to American Indian Tribes. In accordance with the 2016 ROD, Reclamation terminated the existing 1994 PA and replaced it with a new programmatic agreement, which covers all “Undertakings” (as defined at 36 CFR 800.16y) that are funded, permitted, or licensed by Reclamation in implementing the 2016 ROD. The 2017 PA became effective on September 6, 2017, when signed by the Advisory Council on Historic Preservation (ACHP).

For the purposes of this HPP and as identified in the 2017 PA, the Area of Potential Effects (APE) for the operation of GCD under the LTEMP is identified as “the area of direct and indirect effects to the character or use of historic properties on the Colorado River Corridor in the Canyons from Glen Canyon Dam to the western boundary of Grand Canyon National Park (GRCA), including direct or indirect effects that may be caused to historic properties by the Undertaking from rim-to-rim of the Canyons” (Reclamation 2017). From a regulatory perspective with regard to GCDAMP Undertakings, Reclamation is the lead federal agency for compliance with Section 106 of the National Historic Preservation Act of 1966 (NHPA, 54 USC § 306108) and its implementing regulations (36 CFR Part 800).

1.1 REGULATORY FRAMEWORK

The purpose of this HPP is to ensure that Reclamation manages this historic preservation program and historic properties according to legislative mandates and in a spirit of stewardship; to clarify Reclamation's roles and responsibilities related to historic preservation; and to provide direction for consistent implementation of Reclamation's program management responsibilities. The authority to implement and administer this HPP resides with Reclamation as the lead federal agency.

1.1.1 Federal Responsibilities

Beginning in the early 1900s, numerous federal laws were enacted to preserve and protect cultural resources (including, but not limited to, historic properties). Of these, the NHPA, as amended, may be the most comprehensive. It declared as policy that the federal government would administer cultural resources under its ownership, control, or administration, and in a spirit of stewardship for the inspiration and benefit of present and future generations. This Act, and the Reclamation Manual Policy Cultural Resources Management (LND P01) and Directive and Standard Cultural Resources Management (LND 02-01) affirm Reclamation's commitment to comply with the laws, regulations, executive orders, policies, and directives.

1.1.2 Tribal Responsibilities

As lead federal agency, Reclamation is responsible for impacts on historic properties caused by GCD operations and GCDAMP activities. That said, some of the Tribes have cultural resource guidelines and ordinances and some are officially participating in the NPS Tribal Historic Preservation Office (THPO) Program, and those individuals have the authority to comment/concur on impacts on cultural resources/historic properties within their jurisdiction. For example, the Hualapai Tribe and Navajo Nation both have laws and regulations governing the protection of such resources. As consulting parties to the 2017 PA, the Zuni, Hopi, and the Southern Paiute also maintain guidelines and ordinances pertaining to cultural resources and participation in the GCDAMP. Summaries of these guidelines and ordinances follow.

1.1.2.1 Hualapai

On February 18, 1998, the Hualapai Tribal Council approved and enacted Resolution No. 13-98, the Hualapai Heritage Resources Ordinance. This ordinance establishes the Cultural Resources Department of the Hualapai Tribe; defines the Department's powers and duties; delegates authority to the Department and to the Director as head of the Department, including authority to develop rules to carry out the Ordinance; designates the Director to serve as the Hualapai Tribal Preservation Officer for purposes of the National Historic Preservation Act; directs the Department to establish a Hualapai Register of Heritage Places; authorizes appropriations from Tribal funds and establishes a cultural resources revenue account; establishes a clearance requirement for undertakings that may affect cultural resources on

Hualapai Tribal lands; prohibits certain kinds of activities that may affect cultural resources; authorizes the establishment of a permit program to control activities that are prohibited unless a permit has been issued; authorizes civil and criminal penalties for the enforcement of the Ordinance; authorizes administrative appeals procedures and judicial review; and provides a limited waiver of sovereign immunity authorizing actions in Tribal Court for injunctive relief (but not for money damages) to ensure that Tribal agencies and enterprises comply with the procedural requirements of the Ordinance. Some of the provisions of the Ordinance required the Department to develop rules to implement those provisions. The Department followed the procedures for rulemaking as set out in the Ordinance and developed rules, which were approved by the Tribal Council in November 2014 as Resolution No. 74-2014 (Nov. 7, 2014). In August 2017, the Final Revisions in the Rules Implementing the Hualapai Cultural Heritage Resources Ordinance and Explanatory Paper was completed.

1.1.2.2 Navajo

In 1998, the Navajo Nation passed CMY 19-99, the Navajo Nation Cultural Resources Protection Act, according to which the Navajo Tribal Council “finds and declares that:

1. The spirit and direction of the Navajo Nation are founded upon and reflected in its cultural heritage;
2. The cultural heritage of the Navajo Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the Navajo People;
3. Cultural properties of the Navajo Nation are being lost or substantially altered, often inadvertently, with increasing frequency;
4. The preservation of this irreplaceable cultural heritage is in the interest of the Navajo Nation and its people so that its vital legacy of cultural, educational, esthetic, inspirational, economic, and energy benefits will be maintained and enriched for future generations of Navajos;
5. In the face of ever increasing energy development, economic development, sanitation and public health developments, the present tribal governmental and non-tribal governmental programs to preserve the Navajo Nation’s cultural resources are inadequate to ensure future generations a genuine opportunity to appreciate and enjoy the rich heritage of the Navajo Nation;
6. Increased knowledge of our cultural resources, the establishment of better means of identifying and administering them, and fostering their preservation will improve the planning of federal, tribal, state, and other projects and will assist economic growth and development and expeditious project implementation; and

7. Although the major role in cultural resource preservation has been borne by the federal and state governments, and both must continue to play a role, it is nevertheless essential that the Navajo Nation expand and accelerate its cultural resource preservation programs and activities.”

In addition, the Navajo Nation Tribal Council approved the Navajo Nation Policy for the Protection of Jishchaa’ in 1988. This policy is implemented pursuant to the Navajo Nation Cultural Resources Protection Act (CRPA, CMY-19-88). It is intended to complement provisions set forth in the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA, P.L. 101-601), the Archeological Resources Protection Act of 1979 (ARPA, P.L. 96-95), the NHPA (P.L. 89-665, as amended), and others.

1.1.2.3 Hopi

In 1974, the Hopi Tribe passed Ordinance 26, which delineates the policy for the protection of places and objects of sacred, historical, and scientific interest on the Hopi Reservation. While it only applies to reservation lands, the reasons for its adoption are as relevant off the reservation as on. It states that “the public interests and the interests of the Hopi Indian Tribe and its members and the interests of all persons living within the jurisdiction of the Hopi Indian Tribe require that the Tribe adopt a means whereby all sites, locations, structures and objects of a sacred, historical or scientific interest or nature will be protected from desecration, destruction, theft, or other harm or interference ...”

1.1.2.4 Paiute

In 1991, three Southern Paiute Tribes — the Kaibab Band of Paiute Indians, the Paiute Indian Tribe of Utah (representing the Shivwits Band of Paiute Indians), and the San Juan Southern Paiute Tribe led the establishment of studies to identify how their cultural resources were affected by GCD and to recommend strategies required for the management and protection of these resources (Austin and Drye 2011). These studies and strategies recognized and reaffirmed that Southern Paiute resources in the Colorado River corridor are one Traditional Cultural Property (TCP), not many discrete and divided sites and resources. Informed by extensive tribal consultations and detailed field research, in 1993, the Kaibab Band of Paiute Indians and the Paiute Indian Tribe of Utah created the Southern Paiute Consortium (SPC) to ensure the protection of the Southern Paiute traditional lands, and more effective government-to-government interactions with Reclamation.

1.1.2.5 Zuni

The following two Zuni Tribal Council Resolutions are relevant and applicable to this HPP. On November 17, 1992, the Zuni Tribal Council passed Resolution No. M70-92-L164, which documented the Zuni Tribal Council’s official approval of a document entitled *Pueblo of Zuni, New Mexico, Policy Statement Regarding the Protection and Treatment of Human Remains*

and Associated Funerary Objects, November 1992 as the policy of the Zuni Tribe and directed the Zuni Archeology Program (now Zuni Cultural Resource Enterprise) to administer and distribute this document as appropriate.

On September 21, 2010, the Zuni Tribal Council passed Resolution No. M70-2010-C086, which states that the Zuni Tribal Council

- I. ASSERTS that the Grand Canyon, from rim-to-rim, and all specific places located therein including the confluence of the Colorado and Little Colorado Rivers, topographic and geologic features, springs, archeological sites, mineral and plant collection areas, and any other places it so identifies as historically, culturally, or spiritually important to the Zuni Tribe within the Grand Canyon must, as a matter of the United States government's trust responsibility toward the Zuni Tribe, be assumed by all federal agencies to be eligible for the National Register of Historic Places.

1.1.3 Indian Trust Assets and Trust Responsibility

Reclamation acknowledges its federal Indian trust responsibility and the importance of Indian trust assets within the APE. The United States “has charged itself with moral obligations of the highest responsibility and trust” toward Indian tribes (*Seminole Nation v. United States*, 1942) for the protection of Tribal and individual Indian lands, assets, resources, and treaty rights. Secretaries of the Interior “have recognized the trust responsibility repeatedly and have strongly emphasized the importance of honoring the United States’ trust responsibility to federally recognized Tribes and individual Indian beneficiaries” (Section 3, Secretarial Order 3335). It is Reclamation’s policy to protect Indian trust assets from adverse impacts of Reclamation programs and activities, thereby better enabling the Secretary of the Interior to fulfill his responsibility to Indian tribes (Reclamation – Indian Trust Asset Policy). Indian trust assets are defined as the legal interests in property, physical assets, or intangible property rights held in trust by the United States for federally-recognized Indian Tribes or individual Indians.

1.1.4 GCDAMP, 2016 ROD and PA

According to Reclamation (undated), the GCDAMP “was officially established in 1997, under the direction of the Secretary of the Interior, in compliance with the Grand Canyon Protection Act of 1992 and the 1996 Record of Decision which initiated the process ‘whereby the effects of dam operations on downstream resources would be monitored and assessed.’ The implementation of the GCDAMP provides for flexibility in adapting the dam’s operations in order to facilitate continued scientific research and monitoring without preventing the dam from achieving its primary purposes. As environmental experimentation and study continues, it is important to recognize that the Secretary must continue to operate Glen Canyon Dam to meet the purposes established by Congress.” As indicated in the 2016 ROD, the GCDAMP will continue with this purpose under the LTEMP, in part by developing this HPP for resources identified within the APE as defined in the 2017 PA (Reclamation 2017). This scope includes associative values that Tribes ascribe to historic properties in the Canyons (Glen, Marble, and Grand),

including potential impacts from experimental, research, monitoring, and management actions (Reclamation 2017).

Activities that are eligible for funding from power revenues are described in Stipulation I.C of the PA:

As stated in the LTEMP ROD the AMP-Proposed “activities that are eligible for funding from power revenues are those actions related to dam operations or the mitigation of dam operations within the CRE [Colorado River Ecosystem]. These will be funded in compliance with Section 204 of Public Law (PL) 106-377. Appropriated funds or other sources of funding may also be used for GCDAMP [AMP] activities as specified in Section 1808 of the GCPA [Grand Canyon Protection Act of 1992] and Section 204 of PL 106-377” (LTEMP ROD: Section 6.1(b)).

As the principal land manager, the NPS is responsible for managing cultural resources under its jurisdiction and is a party to the 2017 PA. There is overlap between the NPS Colorado River Management Plan (CRMP) and GCDAMP programs in geographic scope, pertaining to the river corridor, and in administrative use. The CRMP addresses issues related to access and use of the river including resource protection and visitor experience. The CRMP is a visitor use management plan specifying actions to conserve resources while enhancing visitor opportunities along the river corridor. It outlines a framework for providing the public with an opportunity to experience the natural and cultural features in the river corridor. Administrative use of the river corridor is also managed through the CRMP and follows a process of application, review, and permitting for all research and education conducted within the Grand Canyon park boundary, including work being conducted under the GCDAMP that has the potential to affect historic properties (NPS 2005).

To resolve potential adverse effects to contributing elements of historic properties, and as identified in Stipulation V of the 2017 PA, Reclamation and parties to the 2017 PA are in the process of drafting a new Memorandum of Agreement (MOA) that will supersede the 2012 Non-Native Fish Control MOA. This potentially new MOA, while mirroring some of the actions of the NPS’s Non-Native Aquatics Environmental Assessment (EA), will address Reclamation’s responsibilities under the NHPA. This potentially new MOA is described further in the Past Research and Treatment sections in Appendix F of this HPP.

1.2 TRIBAL PARTICIPATION

This section (1.2 Tribal Participation) describes the Tribal perspectives on how their historic relationship with the federal government informs relationship in the context of matters of the Canyons.

Native American tribal nations occupy a unique legal and historical position in the American political system. The U.S. Constitution enshrines the political or “government-to-government” relationship between the federal government and Native American nations and makes that relationship distinct from the one the federal government has with states and foreign

nations. At the time of the drafting of the U.S. Constitution, only international sovereigns had the ability to enter into political relationships with Native American nations and therefore, the Constitution was drafted so that the federal government would have responsibility for Native American affairs.

Westward expansion (Manifest Destiny) by the United States changed this relationship when regarding Native American Tribes as international sovereigns became inconsistent with federal policy, which led to the issuing of a series of opinions by the U.S. Supreme Court that came to be known as the “Marshall Trilogy,” after their primary author, Chief Justice John Marshall. The Marshall Trilogy clarified the relationship between Native American Tribes and federal and state governments and provided a basis for the unique tripartite relationship among these U.S. sovereigns. These principles have provided a backdrop for the dynamic political relationship between the federal government, the states, and Native American Tribes that has existed over the past 200 years.

In recognition of this complex historical legal and political relationship, Congress through the passage of legislation has required federal agencies to consult with Native American Tribes on federal actions that may affect tribal nations. Paramount among the legislation passed by Congress and directly applicable to this HPP is NHPA.

Past barriers to meaningful consultation have been a by-product of the effects of epistemological and institutional policies that traditionally rely on Western science to provide the foundation for informing Adaptive Management Work Group (AMWG) recommendations. Consultation obligations stipulated as part of both the National Environmental Policy Act of 1969 (NEPA) and NHPA Section 106 processes are meant to mitigate these epistemological, institutional, and spatially biased tendencies that may marginalize and exclude Native American perspectives, values, and concerns.

The GCDAMP, GCPA, NHPA, and the 2017 PA all contain language mandating consultation with concerned Native American Tribes concerning the identification, evaluation, and treatment of historic properties, including those of traditional religious and cultural importance. The Tribes are involved in processes to identify, evaluate, monitor, and participate in the long-term management of historic properties and sacred areas and specifically within the APE for the operations of GCD. In 1994, the Tribes became signatories to the 1994 PA, which specifically delineated the historic preservation responsibilities of Reclamation. Likewise, the Tribes are signatories to the 2017 PA, which supersedes the 1994 PA. The Tribes’ participation in the GCDAMP and LTEMP are essential to ensuring that their traditional values and concerns are represented at the various program functions and that effective government-to-government consultation on federal undertakings that may affect resources important to the Tribes is taking place.

Native peoples consider all natural resources as culturally significant. Native peoples’ cultural-natural symbiotic relationships traditionally are embedded in the landscape (both above and below the surface of land and water) and are germane to the continued survival of their inherent cultural identities. The Canyons do not exist in isolation but rather exist and function as an integral part of a larger cultural area (which the consulting Tribes refer to as homelands).

These homelands include the Colorado River, Little Colorado River, the Canyons, and the geographical area that extends beyond the limits of the Undertaking (Figure 1.1). This area should not be conceptualized merely as multiple discrete or detached archeological sites, TCPs, and/or sacred places; but rather viewed as interconnected, culturally symbiotic areas of traditional religious and cultural value. Reclamation, through consultation with the State Historic Preservation Officer (SHPO), determined that the Canyons from Glen Canyon Dam to River Mile 277, and the lower gorge of the Little Colorado River, are a rim-to-rim, National Register of Historic Places (NRHP)-eligible site as a TCP under Criteria (a), (b), (c), and (d) (36 CFR § 60.4), in a consensus Determination of Eligibility (DOE) on July 28, 2011.

In accordance with the U.S. Department of the Interior (DOI) Secretarial Order 3342, Reclamation and the NPS acknowledge and respect Native peoples' views and beliefs concerning the Canyons, and with this mutually understood perspective, the Tribes, Reclamation, and NPS have worked together, along with other consulting parties, to develop this HPP.

Reclamation recognizes that Native American Tribes have a deep time association with the Canyons and Colorado River, which endows them with the special expertise required to identify historic properties of traditional religious and cultural importance to their respective cultures. As such, and fundamental to the successful implementation of this plan, Reclamation acknowledges and respects Native American perspectives and traditional knowledge and recognizes such knowledge as having equal standing with Western forms of knowledge production, and by inclusively integrating and synthesizing traditional knowledge into GCDAMP planning and management decisions.

In the implementation of this HPP, Reclamation will in good-faith strive to give meaningful, inclusive, and comprehensive consideration to traditional Native American values, beliefs, and worldviews as part of NHPA process. Reclamation will, in good faith, also make a meaningful effort to identify and consider associated implications for the tangibility and integrity of various forms of cultural and historical resources. These actions may include considering (1) what cultural and historical properties and resources must be accounted for as part of the NHPA process from each participating Native American Tribe's perspective, (2) which cultural resources are eligible for NRHP listing from each participating tribal perspective, and (3) the guidance of Bulletin 38 and its directives on how to account for the intangible-tangible nexus that renders cultural resources significant from each participating tribal perspective.

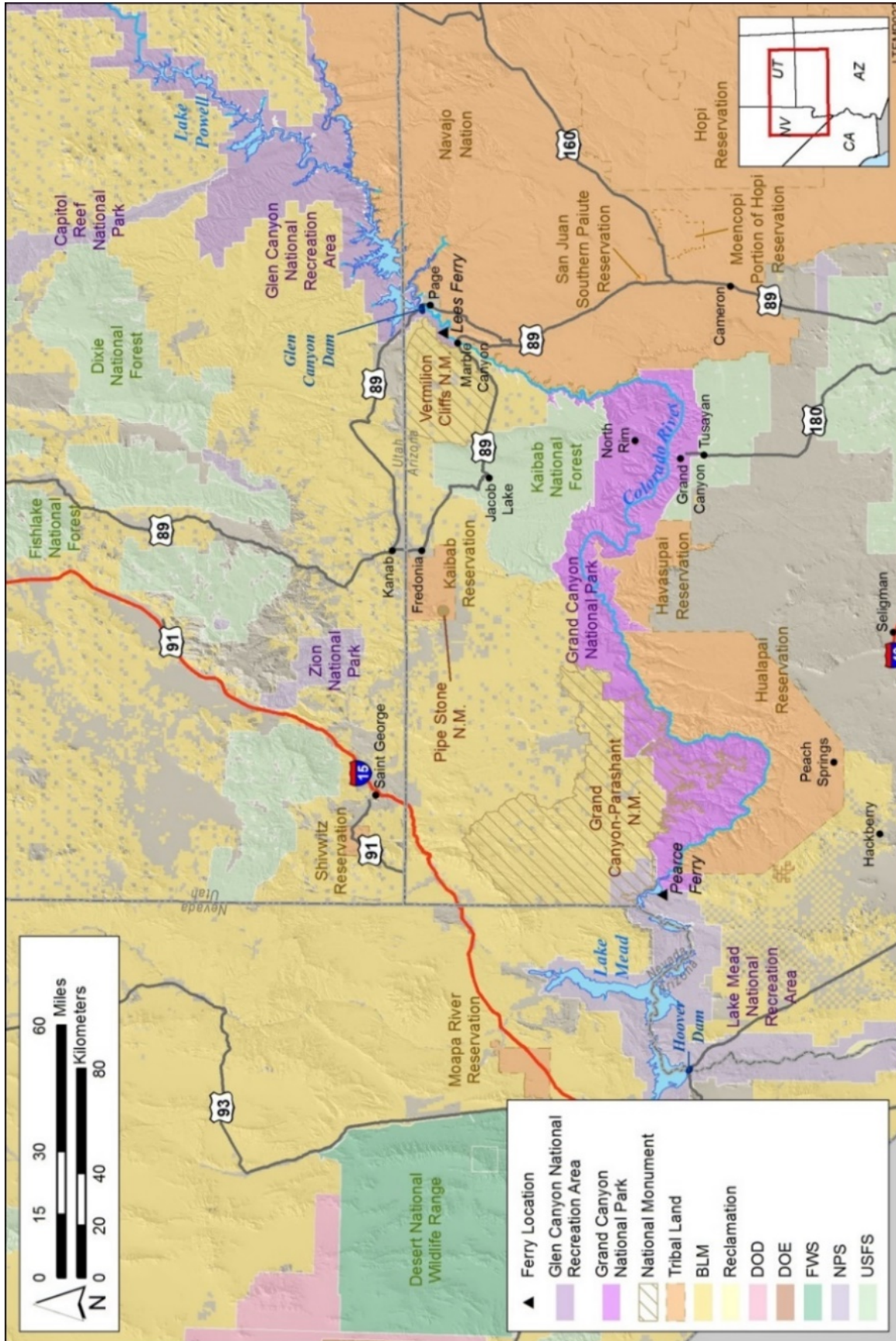


FIGURE 1.1 Generalized Locations of Glen Canyon Dam, Lake Powell, the Colorado River between Lake Powell and Lake Mead, and Adjacent Lands (Source: Reclamation 2016a).

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CHAPTER 2: GOALS

This HPP establishes goals, objectives, and guidance for the historic preservation program under the GCDAMP program. Major themes throughout this HPP include the protection and preservation *in situ* of historic properties, including archeological sites and locations of traditional religious and cultural importance, and preserving and incorporating traditional knowledge, values, and indigenous perspectives into research and monitoring; both of these themes enrich the lives of individuals and communities with connections to the Canyons as well as visitors, by creating and maintaining connections to the past and the ancestors that created that history.

The four main historic preservation goals of this HPP are:

Goal 1: Identify Historic Properties within the APE

Goal 2: Preserve Historic Properties within the APE

Goal 3: Implement Treatment Plans to Resolve Adverse Effects within the APE

Goal 4: Foster Awareness of and Appreciation for Historic Properties within the APE

These goals were identified from a number of programs related to cultural resource preservation in the Colorado River Corridor, including the GCPA, GCDAMP, and Core Monitoring Information Needs, and are described in detail in the sections that follow. The specific steps following each goal will be implemented to achieve these objectives and to direct future projects.

2.1 MANAGEMENT INTENTS

The NPS and Tribal land managers strive for the long-term, *in situ* preservation of cultural resources on their respective lands. The cultural resources (historic properties) under consideration in this program are listed or are eligible for listing in the NRHP, and Reclamation seeks to maintain the aspects of integrity embodied within the properties for which they are eligible. Many or most of the historic properties are considered ancestral sites and are part of a living landscape connecting the past with the ongoing cultural traditions of the present; therefore, the goal to resolve adverse effects includes maintenance of the cultural connections between resources within the CRE and the Tribes. Reclamation, in turn, aims to avoid adverse effects on historic properties and, when this is not possible, to implement treatment measures as outlined in this HPP.

Management intents vary between land managers with varying goals, priorities, and mission statements regarding cultural resources. To assist with identifying possible variations in treatment plans, management intents are briefly summarized by land managers below.

2.1.1 National Park Service — Statement of Management Intent

As established by the Organic Act (39 Stat. 535, 16 U.S.C. 1), the fundamental purpose of the NPS includes a mandate to protect and preserve park resources and values. Archeological sites will be managed *in situ* unless disturbances require action to preserve information, associative values and integrity. Treatments will proactively limit future disturbance from natural or human impact and will be conducted within the context of planning and consultation (NPS 2006). To this end, the management intent of the NPS for historic properties within these park units is preservation in place, with monitoring and implementation of treatment strategies when needed to achieve the overarching preservation goal.

2.1.2 Hualapai Tribe — Statement of Management Intent

In many ways similar to the NPS, the Hualapai Tribe values *in situ* preservation of cultural resources. For the Hualapai, these resources include not only ancestral archeological sites, but plants, animals, water sources, rock formations, and other aspects of the natural world with which they have traditionally interacted and which have contributed to their identity and view of their universe. All of these are believed to be sentient entities that are part of the living world— past, present, and future. Therefore, management actions that affect these resources are a subject of great concern, and the Tribe feels a moral obligation to serve as stewards of the land that has provided for them since time immemorial.

Recognizing that, in the twenty-first century, there are many stakeholders and forces that currently affect or have the potential to affect the vast array of resources along the Colorado River, the Hualapai Tribe seeks to perform an active role in resource management, preferably in partnership with other stakeholders when opportunities arise. We believe that such combined efforts will result in the best outcomes to meet the objectives of *in situ* preservation and, in some cases, restoration.

2.1.3 Navajo Nation — Statement of Management Intent

The following is just one example of how the Diné people relate to the Grand Canyon and how they continue to maintain and depend on that relationship today. The relationship that the Diné people share with the canyon is intrinsic to their cultural identity as well as their spiritual and physical well-being.

At the beginning of the Animas River, coming into the San Juan River and into the head waters of the Green River into the Colorado River, Lake Powell, Glen Canyon, Marble Canyon, and Grand Canyon, through the Lower Colorado River and Lake Mead all the way through into the Gulf of California and the Pacific Ocean, Navajo Nation views this space as a Traditional Cultural Landscape complete with its tributaries associated within the context of the canyon corridors, the river systems, riparian species, wildlife, fisheries, botanical, and biological entities, insects, birds, vertebrates, invertebrates, as well as all creatures within the canyon as culturally significant to the Navajo people, as captured in the following:

The Colorado River and the Little Colorado River have specific functions in the ceremonial sphere of the Navajo people...the river is a protector of our people. The river forms a natural boundary that... helps to define the extent of Navajoland; Offerings are made to the river...the water is used in a lot of ways and can lead to a good way of life for all people, and that is why people make offerings to the river. If this is not done, then the people will scatter. The offerings are much like the ones offered to the sacred mountains (Roberts et al. 1995).

The basis of this position for the Navajo people is consistent with the oral testimonies within ceremonial, clan origin, and emergence stories passed down from generation to generation since time immemorial. Within the Diné paradigm, it is not only a right to access and manage, but indeed a moral obligation as entered into by their ancestors and the deities that created the canyon; similarly, it is the right of the river to receive the ceremonial offerings and processes of the Diné people.

2.2 GOAL 1: IDENTIFY HISTORIC PROPERTIES WITHIN THE APE

The identification and documentation of historic properties constitute the first step in the preservation of resources within the Canyons. Identification includes a variety of processes including field surveys, monitoring, archival research, ethnography, synthesis of past work, and many other aspects completed or initiated over the past 20-plus years beginning with the 1994 PA and the 1996 ROD. The following steps will build upon actions already taken to achieve a more comprehensive understanding of cultural resources within the Canyons:

- Identify historic context within the APE: a number of sources have been utilized to document the historic context of the Canyons (Appendix B). This historic context continues to be refined as additional information becomes available.
- Identify the location of cultural resources in the Canyons, including properties of traditional religious and cultural importance, and evaluate their eligibility for the NRHP.
- Develop/modify monitoring protocols: A series of monitoring protocols have been designed by Tribes and agencies (Appendix C) to document historic properties and any effects to these properties and other tribally important locations caused by the implementation of the LTEMP and GCDAMP activities. These protocols continue to be refined over the lifespan of this program.
- Continue to evaluate the condition and integrity of historic properties in the CRE by monitoring erosion, visitor impacts, and other relevant variables.
- Evaluate the condition and integrity of TCPs.

- Update, as needed, descriptions of previously identified archeological sites and locations of traditional religious and cultural importance (synthesis of past work). Descriptions include a listing of past mitigation activities, current site condition, threats or disturbances noted, any potential effect(s) on the resources, treatments recommended, and treatments completed.
- Complete all documentation to assist in the identification of historic properties. A listing of the known historic properties is contained in Appendix D.
- Locate, designate, and maintain the Canyons' historic and cultural sites, districts, and landscapes. A number of archeological site types have been identified with previous research; definitions of the site types can be found in Appendix E.
- Develop/expand a Geographic Information System (GIS) data presentation indicating the locations of all identified historic properties.
- Identify all stipulations from the 1994 PA that were not completed.
- Update and expand consultation with the Arizona SHPO and THPOs for the determination of significance, eligibility, effect, and resolution.
- Identify previous research associated with GCDAMP activities. A synthesis of past research is found in Appendix F.
- A series of research domains have been developed by Tribes and agencies (Appendix G) to address historic properties and the use of the Canyons.
- Prioritize future cultural resources work on the basis of criteria included in, but not limited to, the properties identified in the previous steps.

2.3 GOAL 2: PRESERVE HISTORIC PROPERTIES WITHIN THE APE

Once historic properties are identified under Goal 1, preservation measures will need to be defined.

- Integrate historic preservation into the GCDAMP program.
- Preserve, protect, manage, and treat historic properties to ensure their continued existence for the inspiration and benefit of present and future generations.
- Preserve and maintain historic properties that serve as significant physical reminders of the cultural, emotional, and spiritual importance of the Canyons.

- Preserve *in situ* all downstream cultural resources and meaningfully consider and address Native American cultural resource concerns in the Canyons.
- Integrate tribal knowledge systems in the GCDAMP program.
- For participating Native American Tribes, protect and provide physical access to the Colorado River and properties in the river corridor for religious and heritage purposes.
- Develop a cultural sensitivity training procedure for all GCDAMP activities and workers within the Canyons.
- Educate the public about the significance and sensitivity of the Canyons' cultural resources.

2.4 GOAL 3: IMPLEMENT TREATMENT PLANS TO RESOLVE ADVERSE EFFECTS WITHIN THE APE

- If *in situ* preservation is not possible, design treatment and/or mitigation strategies that integrate the full consideration of the values of all concerned Tribes incorporating both Western science and traditional indigenous knowledge approaches to resolve adverse effects. A guide to creating a Historic Properties Treatment Plan is identified in Appendix H.
- Develop and/or maintain a point of contact list of positions at the federal level in case new discoveries are made of cultural resources (Appendix I).
- Develop and/or maintain a receptiveness toward diverse approaches to resolving adverse effects.
- Develop research strategies that maximize data collection from mitigation and monitoring efforts.
- Develop research designs and goals/domains to resolve potential adverse effects.
- Develop and/or maintain a plan of action for discoveries of human remains by GCDAMP activities. Appendix J through Appendix M contain NAGPRA Plan of Actions for each of the various land managing entities.
- Develop associative values studies to mitigate potential adverse effects or to identify mitigation strategies to resolve potential adverse effects on properties of traditional religious and cultural importance.

- Develop and implement a procedure to (digitally) archive existing ethnographic data, which may include audio/video recordings of tribal members, to prevent the loss of data/records.
- Develop potential project lists. Appendix N contains potential future projects.

2.5 GOAL 4: FOSTER AWARENESS OF AND APPRECIATION FOR HISTORIC PROPERTIES WITHIN THE APE

Education is an important guiding principle for historic preservation and should be implemented concurrent with the identification and preservation work mentioned above. This HPP is the culmination of more than 20 years of cultural resources work within the Canyons. Encouraging general public involvement through learning about the historic properties may help the community feel more connected to the Canyons and, in turn, foster public involvement in other aspects of the GCDAMP program. The following items are initiatives that serve to enhance the appreciation and knowledge of historic properties and the Canyons. This step can be broadly identified as establishing an outreach and education program.

- Continue to gain understanding of the relationship between systems in the Canyons and use by Tribes (e.g., recognize changing relationships; integration of cultural and natural resources).
- Report and maintain knowledge about the cultural resources using Western and traditional knowledge systems.
- Establish methods for highlighting locations of historical significance (from signage, markers, and interpretive materials to publications).
- Recognize, respect, and actively integrate multiple histories and values (e.g., different needs exist for each situation and group; different kinds of expertise are needed; there are multiple ways to preserve history; promote cultural continuity within diversity).
- Improve the understanding of factors effecting cultural resources through ethnographic work, monitoring, and other research methods.
- For participating Native American Tribes, protect and provide physical access to cultural resources and properties for religious purposes within the river corridor.
- Recognize the Tribes' physical relationships to historic properties—access reinforces cultural identity.
- Engage Tribal and non-tribal communities in the outreach and education program. Appendix O contains a list of potential public outreach ideas.

- Recognize the Tribes' deep time relationships to historic properties—access reinforces cultural identity.
- Increase efforts to educate and promote cultural preservation values among the general public. Develop robust public outreach program and recognize the public benefit of this program.
- Review the AMWG's Goals for Cultural Resources.
- Expand continuity of tradition in terms of access and accommodation.
- Use heritage film documentation as a mitigation strategy and educational tool, when appropriate.

All goals and steps taken will create a dynamic program to identify-preserve-resolve-foster awareness, which will ultimately improve all aspects of historic preservation in and around the Canyons.

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CHAPTER 3: ACTION PLAN – FOR IDENTIFYING AND REPORTING ADVERSE EFFECTS AND DEVELOPING HISTORIC PROPERTY TREATMENT PLANS

Reclamation will respond to notifications of potential effects on historic properties that may result from GCDAMP activities. Of primary importance is to preserve properties *in situ*. However, when preservation *in situ* is not possible, treatment or mitigation measures, as identified below, may be necessary.

As required under Stipulation I and IV of the 2017 PA, this section of the HPP (and captured in the flow chart in Figure 3.1) guides the ongoing process for all aspects of identification, consultation, development, considerations, and Historic Property Treatment Plan (HPTP) development when resolving or mitigating adverse effects to historic properties as a result of GCDAMP activities.

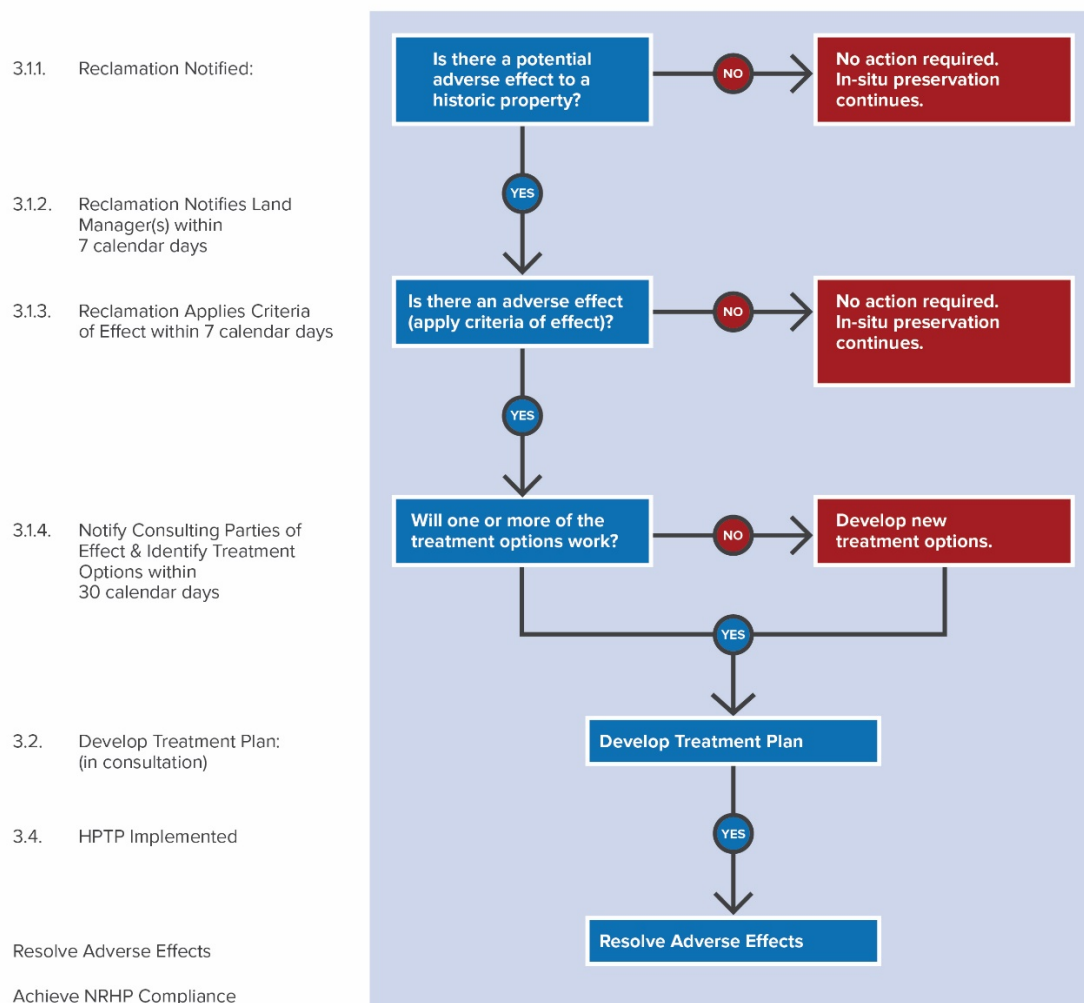


FIGURE 3.1 Flow Chart for the Identification of Potential Adverse Effects, Consultation, and Treatment Options

Adverse effects that occur but are *not* the result of GCDAMP activities will be handled according to the Land Manager's protocols.

3.1 IDENTIFICATION OF ADVERSE EFFECTS FROM A GCDAMP UNDERTAKING

Coordinated site monitoring and data collection will be performed by all of the participating entities and used to identify potential and/or ongoing adverse effects to the historic properties along the Colorado River below GCD within the APE as identified in the 2017 PA. Both direct and indirect effects on the character or use of historic properties will be considered in identifying potential treatments.

3.1.1 Reclamation Notified

Upon notification of an effect (see Appendix I for contact information), Reclamation will consider the following:

- Types of effects.
- Causes of effects.
- Ability to terminate effects.
- Duration for which stabilization might be effective.
- Potential for catastrophic vs. gradual loss.
- Significance values as a historic property and/or cultural site.
- Cultural association and cultural values.
- The specific criteria (a–d) that are being affected (see Section 3.1.3.1).
- The specific aspect of integrity that is being affected (see Section 3.1.3.2).
- The specific condition of the site (see Section 3.1.3.3).

3.1.2 Land Manager(s) Notified

If Reclamation receives notification from anyone, other than the NPS or THPO, about an effect to a cultural resource, Reclamation will notify the NPS (or other land managing entity) within seven calendar days following the notification.

3.1.3 Application of the Criteria of Effects and Consultations

If, in consultation with the NPS or THPO, Reclamation finds that a GCDAMP program activity caused affects to a cultural resource, Reclamation will apply the criteria of effects and consult with all parties to the 2017 PA. When applying the criteria of effects, Reclamation will evaluate the significance of the cultural resource and assess its integrity, both of which are defined in Section 3.1.3.1. Reclamation will also consider its condition, which will be utilized to prioritize needed treatment. After Reclamation applies the criteria of effects, Reclamation will consult with all parties to the 2017 PA about its assessment. These parties will have 30 days to

respond to the assessment. After the 30-day comment period, Reclamation will consider all comments received and consult with the SHPO or appropriate THPO on its NRHP eligibility and finding with respect to effects. The SHPO or THPO will have 30 days to respond to Reclamation's evaluation and finding. When a cultural resource is found significant, and a finding of **no adverse effect** is made, *in-situ* preservation will continue for the historic property. If a finding of **adverse effect** is made, Reclamation, through continued consultation with the parties to the 2017 PA, will identify and evaluate treatment options to resolve the adverse effects. These treatment options are listed in Section 3.3.

3.1.3.1 Potential Loss of Significance

The criteria used within the NRHP program (36 CFR 60.4) is the ability of a property to convey its historical significance. A historic property will be considered for treatment and/or mitigation if site monitoring information indicates a loss or potential loss of significance to the character and use of the historic property.

The criteria are defined in NPS Bulletin 15 as the following:

- Criterion A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
- Criterion B. That are associated with the lives of persons significant in our past; or
- Criterion C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- Criterion D. That have yielded, or may be likely to yield, information important in prehistory or history.

3.1.3.2 Potential Loss of Integrity

In addition to having the historic importance embodied in one or more of the significance criteria referenced in Section 3.1.3.1 above, a property must retain its integrity. Integrity is the ability of a property to convey its historical associations or attributes. The evaluation of integrity is somewhat subjective and is grounded in an understanding of a property's physical features and how they relate to its historical associations or attributes. An adverse effect occurs when:

...an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association [36 CFR § 800.5(a)(1)].

3.1.3.3 Property Condition Assessment

In addition to the NRHP significance and integrity discussed above, Reclamation also gathers information on the condition of the resource. These site condition assessments assist Reclamation in developing a priority list of properties in need of resolving adverse effects or potential adverse effects. The following site condition assessments were developed by GRCA and are employed by Reclamation as a standard for monitoring information (note: human activities referenced here refer to human activities that can be tied to dam operations or non-flow activities of the GCDAMP):

GOOD: A historic property is considered to be in Good condition when the property shows no evidence of noticeable deterioration by natural forces and/or human activities. The historic property is considered currently stable, and its present archeological values are not threatened. The aspects of integrity that make the property significant have not been diminished. No adjustments to the currently prescribed historic property treatments are required in the near future to maintain the property's present condition.

FAIR: A historic property documented in Fair condition will have recommendations for treatments directly associated with observed disturbances. The type of disturbance and the disturbance level are both considered when making treatment recommendations and when identifying implementation timelines and subsequent monitoring intervals needed to maintain site integrity. The historic property shows evidence of deterioration by natural forces and/or human activities. The aspects of integrity that make the property significant are being diminished. If the identified impacts continue without the appropriate corrective treatment (mitigation), the historic property will degrade to a poor condition and the property's NRHP eligibility may be threatened.

POOR: A historic property in Poor condition require immediate mitigation to resolve adverse effects from identified disturbance(s). The property shows evidence of severe deterioration by natural forces and/or human activities. The aspects of integrity that make the historic property significant are diminished. If the identified impacts continue without the appropriate corrective treatment (mitigation), the historic property is likely to undergo further degradation, and the property's NRHP eligibility may be threatened. Data potential for historical or scientific research will be lost.

3.2 DEVELOPING HPTPs

The development of an HPTP to resolve adverse effects will occur in consultation with the parties to the 2017 PA so that appropriate types of treatment are considered and carried out. This process will be initiated by Reclamation within 30 calendar days following a determination of adverse effect to a historic property as per Section 3.1.3. During the development of this HPTP it became clear to Reclamation that such a generic document for implementation as identified in Stipulation IV A(3) of the 2017 PA would not work due to the complexity of the resources and time constraints. Reclamation, instead provides a template or guide for the development of an HPTP which can be found in Appendix H.

The HPTP will describe the affected historic property(ies). This HPTP will identify the specific treatment measures for individual historic properties and/or specific groups of historic properties. This HPTP will provide a listing of each historic property, including information on the following:

- Distinctive name or number.
- A brief description of the property and significance/integrity.
- Locational data.
- Land ownership.
- Adverse effects.
- Appropriate treatments (i.e., ethnography, stabilization, data recovery, etc.).
- Research goals, questions; data needs.
- Monitoring.
- Curation.

The need for tribal monitoring or treatment of any historic property will be based upon the property type and the effects on the property's integrity. The appropriate treatment measures may include, but are not limited to, one or more of the following actions described in subsequent sections.

3.2.1 Land Management Actions

As a method of treatment to further promote protection and preservation of historic properties *in situ*, Land Management Actions may be taken by the appropriate management agency to regulate or to deter use of, an area that contains cultural resources. Each tribal and federal agency with management responsibilities maintains its own set of regulations, which include:

Reclamation

Reclamation determines specific options for dam operations, non-flow actions, and appropriate experimental and management actions that will meet the GCPA's requirements and minimize impacts on resources within the area affected by dam operations under LTEMP, including those of importance to American Indian Tribes.

Grand Canyon National Park

Grand Canyon National Park annually maintains a "Compendium of Designated Closures, Use and Activity Restrictions, Permit Requirements and Other Regulations." Closures may be permanent and necessary for the protection of significant cultural resources. They may also be seasonal to protect a resource during a vulnerable period, such as while endangered birds are breeding or bats are wintering. Restrictions may limit the number of visitors to an area, or the use may be limited to day use only. Other examples of land manager restrictions include specific activities such as accessing the Deer Creek narrows, boating in

the Little Colorado River channel, and enforcing seasonal road closures on the rim of the Grand Canyon.

Glen Canyon National Recreation Area

The Glen Canyon National Recreation Area (GLCA) maintains an annually updated “Superintendent’s Compendium” specifying archeological sites within the NRA that are open to visitation. The list of open sites is derived from “Glen Canyon National Recreation Area Archeological Resources Protection Plan” (GLCA 1996) and its amendments or its successor document(s). The plan describes criteria that sites must meet to be open to visitation; site openness may be modified at any time at the Superintendent’s discretion.

Hualapai Land Manager Actions

The Hualapai Tribe actively supports and participates in nondestructive preservation actions that contribute to documentation and understanding of the various types of cultural resources along the Colorado River, particularly if these actions are considered beneficial to the Hualapai people. Since the early 1990s, the Hualapai Department of Cultural Resources has conducted monitoring along the river to identify impacts and potential impacts that may threaten *in situ* preservation. These monitoring efforts have often included representatives from other agencies, as well as experts from the scientific community, all of which has led to shared knowledge and understanding about various perspectives, issues, and management strategies.

Because the Hualapai people view cultural resources as both tangible and intangible, and include plants, animals, and other aspects of the natural world, a broader approach is necessary beyond treatment of archeological remains. This view may include restoration of native plants, closure of culturally sensitive areas, and education and outreach with what is commonly known as “the river community.”

Concerning historic properties specifically, the Hualapai Tribe is concerned that a narrow interpretation of NRHP eligibility criteria has too often been applied, especially toward ancestral archeological sites. Too often, eligibility evaluations have only considered Criterion D, which implies that sites are only significant if they have scientific value. From the Hualapai Tribe’s perspective, these places are also important for the role they played in history (Criterion A), and they continue to maintain significance for their contribution to the Tribe’s identity and their potential to educate present and future generations. This aspect of the significance of places and other resources is an integral part of the Hualapai cultural resource monitoring program, which routinely involves Hualapai elders and youth to learn about the resource issues along the river and to maintain cultural continuity with traditional and historic connections to the Canyons. Considering the extremely limited access that most tribal members have to most of the river corridor, any loss or reduction of the monitoring program as it stands would constitute an adverse effect.

Concerning ancestral archeological sites, the Hualapai Tribe in the past has objected to scientific studies that involve subsurface data recovery, excavation, or collection. Stabilization and erosion control are considered much better preservation strategies. To the extent that these actions would be feasible, a shared stewardship approach would be desirable, whether on reservation lands or on NPS-managed lands. Gradual deterioration of sites resulting from entirely natural processes are not necessarily considered a rationale to intervene and would be evaluated on a case-by-case basis. On the other hand, impacts caused by dam operations, trailing, or other human-caused effects would likely call for some type of remedy.

Navajo Land Manager Actions

Contained within the Navajo Nation CMY 19-99, *the Navajo Nation Cultural Resources Protection Act*, the Navajo Tribal Council finds and declares that the policy of the Navajo Nation, in cooperation with the states, federal government, other Indian Tribes, and private organizations and individuals, is to:

- A. Use appropriate measures to foster conditions under which our modern society and our cultural resources can coexist in productive harmony and fulfill the social, economic, and other requirements of present and future generations;
- B. Provide leadership in the preservation of cultural resources of the Navajo Nation;
- C. Administer Navajo Nation-owned, administered, or controlled cultural resources in a spirit of stewardship and for the inspiration of present and future generations;
- D. Contribute to the preservation of non-Navajo Nation-owned cultural resources and give maximum encouragement to organizations and individuals undertaking preservation by private means;
- E. Encourage the public and private preservation and utilization of usable elements of the Navajo Nation's stock of historic buildings and structures.

3.2.2 HPTP

The following section identifies the process and considerations for the development of HPTPs to resolve adverse effects or potential adverse effects on historic properties. This process is developed as an overarching discussion of the types of involvement necessary to meaningfully bringing tribal traditional knowledge to bear on historic properties within a compliance context. Because each property/site is unique, the specifics of what goes into a research design, questions, data needs, methodologies, types of analyses, and distribution of results will be fully developed at the time that specific historic properties are identified for treatment. However, a general research design based on site type will be presented here.

It is critical that Tribes be involved in the determination of what types of treatments should occur at historic properties being affected by GCDAMP activities. From a tribal perspective, archeological site treatment programs implemented to date have lacked the integration of tribal knowledge and cultural values into the study of historic properties. What has been developed within this HPP is an incorporation of tribal perspectives throughout the Section 106 process, including in plans for resolution/mitigation activities. Using the knowledge of the descendants of the people who created the historic properties being studied will assist in interpreting the physical remains constituting historic properties.

Systematic incorporation of tribal values into the selection process for historic properties being considered for mitigation, as well as the appropriateness of resolution, mitigation, or excavation actions to include the differing cultural viewpoints, is a component of this HPP. With this document, a clear tribal protocol for assessing the conditions and types of historic properties where excavation would be appropriate has been developed among the tribal participants.

Once a determination is made by Reclamation that data recovery is necessary, specifically excavation, the methodology discussed in 3.3.4 will be followed.

3.2.3 Site-Specific Research Design Selection

To date, the development of research designs for data recovery at archeological sites has been driven almost exclusively by “traditional” archeological questions and approaches, that is, addressing only NRHP Criterion D. This HPP addresses other aspects of a property’s significance (criteria A–C), where applicable, as well as increasing the scope of research questions under Criterion D to include culturally relevant research topics from tribal perspectives, as appropriate.

For each treatment plan and project, the development of the general research design will occur cooperatively with the Tribe(s) and other stakeholders so that traditional archeological and tribal research questions are addressed in an integrated manner. Tribal representation as co-principal investigators, or other key personnel roles, will be utilized in the development of site-specific research designs and will be reflected in the scope of work for the HPTP. While the specifics of any given research design/excavation plan need to be driven by the type of site under investigation, it should minimally address the aspects of the site’s significance and integrity.

3.2.3.1 Associated Values (Criteria A–C)

The cultural values ascribed to a site/place by Tribes directly relate to its eligibility as a historic property and therefore must be considered when developing any research design that affects historic properties that are ascribed such values. Implementation of this aspect of a research design would likely occur through ethnographic methods. Many research questions about settlement, movement, and regional interaction may be fruitfully pursued through combining archeological and ethnographic approaches and is reflected in the research themes contained in Appendix G.

3.2.3.2 Information Values (Criterion D)

The questions asked by researchers are typically driven by the state of understanding within the discipline of archeology and not by the descendants of those who occupied the historic properties that may require mitigation. Incorporation of tribal perspectives into research questions has taken place to broaden our understanding of the properties and use of the Canyons. Adopting this position is not suggesting that the methodology for conducting archeology be changed, only that the research that guides the work incorporate tribal interests about their own history from the onset.

Contained within this HPP, holistic research designs/themes have been developed to incorporate both traditional archeological questions (e.g., see research domains in Fairley 2003 and Damp et al. 2007) and those questions of tribal concerns which may be recovered through archeological excavation or the associated ethnographic research. This approach includes the multivocality described elsewhere in this document and will assist in the identification of the appropriate tribal individuals or portions of the society that have the knowledge related to the topics of interest. In addition, the research design lays out the excavation strategy, sampling scheme, and analytic procedures; the tribal component of the research may identify other aspects not previously included in the research.

3.2.4 Site Types

While detailed descriptions for treatment plans will be determined on a case-by-case basis, the treatment plans will follow this simplified procedure based on consultation with parties to the 2017 PA and the following components as described above: site types, research themes, identified effects including site condition, and treatment categories. Information concerning site priority for treatment can be found in Appendix P.

Based on approximately 30 years of research within the Canyons, a number of known site types have been identified through many archeological surveys (Fairley et al. 1994 and others). These site types are identified in Section F.1, Appendix F of this document and defined in Appendix E. Once determined eligible for the NRHP by Reclamation, through consultation, the known site types are then associated with possible research themes, questions, and data needs as presented in Appendix G. As identified in monitoring reports, threats to historic properties are generally related, directly or indirectly, to erosion or indirectly to site visitation under GCDAMP activities. Potential treatment plans for each site type are identified in Table 3.1. Table 3.1 identifies the site type. Site type is followed by potential research themes and then treatment options. For example, potential research themes for a petroglyph/pictograph site may consist of population and demography, social organization or religion, and cosmology. Potential treatment options may consist of one or more of the following: graffiti removal, data recovery, additional site documentation, ethnographic documentation, and associative values studies. As a reminder, only adverse effects and potential adverse effects on historic properties resulting from GCDAMP activities are covered under this HPP.

TABLE 3.1 Potential Treatment Plan based on Research Themes and Site Types

Site Type (as defined in Appendix E)	Potential Research Themes	Potential Treatments (defined in Section 3.3)
Structural Habitation		
Residential/Community Complex	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Habitation – Multiple Units	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Habitation – Single Units	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Structural Non-Habitation		
Agricultural Structures	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Ranching Structures	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Storage Structures	G.2.1, G.2.2, G.2.3, G.2.4	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Transportation/Communication Structures	G.2.1, G.2.2, G.2.4, G.2.5	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Special-Use Structures	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Hunting/Fishing/Gathering Features	G.2.1, G.2.2, G.2.3, G.2.4, G.2.6	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Other Structures	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Non-Structural Habitation		
Open Air (Camp)	G.2.1, G.2.2, G.2.3, G.2.4, G.2.6	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Protected	G.2.1, G.2.2, G.2.3, G.2.4, G.2.6	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Non-Structural, Non-Habitation		
Artifact Scatter	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Lithic Scatter	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Ceramic Scatter	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Burial	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Extractive Site	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Petroglyph/Pictograph/Inscription	G.2.3, G.2.4, G.2.6	3.3.5, 3.3.8, 3.3.10, 3.3.11

TABLE 3.4.2 (Cont.)

Site Type (as defined in Appendix E)	Potential Research Themes	Potential Treatments (defined in Section 3.3)
Historic Inscription	G.2.3	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.8, 3.3.9, 3.3.11
Submerged Resource	G.2.1	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.7, 3.3.8, 3.3.9, 3.3.11
Traditional Cultural Property	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Trails	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11
Other	G.2.1, G.2.2, G.2.3, G.2.4, G.2.5, G.2.6	3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.11

HPTPs are developed on a case-by-case basis within the scope of work for each project. Reclamation will coordinate with parties to the 2017 PA when treatment plans are necessary for mitigation of potential adverse effects under GCDAMP activities. Reclamation will also require permits from the appropriate land-managing entity for all mitigation activities.

3.3 TREATMENT OPTIONS

Potential treatment options to consider are as follows.

3.3.1 Vegetation Management

Vegetation management refers to the planting of native plants, in accordance with GRCA, GLCA and tribal land managers' protocols to improve infiltration, decrease erosion, and protect features *in situ*. Vegetation management may also include the removal of vegetation as a tool to prevent damage to historic buildings and structures, to allow for additional sandbar deposition, or to prevent the infestation of invasive plants.

3.3.2 Erosion Control

Erosion control is a technique supported at CRE site locations since 1997. Placement of rock or brush within rills and gullies is intended to aid in the deposition of fine-grained sediments and to slow erosion of soil matrices. Structure schematics and use information have been documented by NPS (2016) and Pederson et al. (2006).

3.3.3 Stabilization

Stabilization is used to prevent the continuing degradation of a site. It may be a form of erosion control; a restoration of structural integrity; or prevention of further degradation using trail diversions, mulch or vegetation, backfilling, or watershed treatments.

3.3.4 Data Recovery

Data recovery refers to the systematic collection of site data and includes a suite of techniques from excavation to documentation to geomorphological studies. The goal of data recovery is the collection of information before it is lost.

3.3.5 Surface Collection

Surface collection is a form of data recovery. Collection may also be made when there is a discovery of a significant artifact class or item not common to CRE cultural resources that requires further information gathering through detailed documentation or from appropriate tribal experts. Collections may not be permanent but instead involve only temporary removal of artifacts from their *in situ* context. No collections will be made without an NPS permit or tribal permit, as applicable.

3.3.6 Excavation

Excavation is the systematic documentation and removal of subsurface cultural deposits carried out under an approved research design or treatment plan using professional archeological methods. Excavation will be site based and may also be used to determine NRHP eligibility.

3.3.7 Additional Site Documentation

Additional site documentation as a treatment includes collection of additional information to supplement the site record. This activity may include archeological documentation of newly identified site components such as tangible features or artifacts, or ethnographic documentation about intangibles identified by tribal experts. This additional documentation may be in the form of videos, podcasts, etc.

3.3.8 Mapping and Remote Sensing

Mapping and remote sensing data collection collects site surface and landscape data. This mitigation may be used to supplement existing site records with fine-scaled mapping

to address specific deficiencies or acquire new information about site context and geomorphology.

3.3.9 Ethnographic Documentation

Ethnographic documentation may be used as a treatment measure to further our understanding of past and present tribal use of the Canyons. An example of an ethnographic documentation project is the Hualapai Archive Project. This documentation may be viewed as a partial mitigation strategy for the potential adverse effects to properties of traditional and cultural significance, in that preserving and reinforcing the importance of such places helps to maintain their standing as NRHP properties.

3.3.10 Associative Values Studies

Associative values studies may be used as a treatment measure and includes the documentation of intangible features and addresses the significance of historic properties under Criteria A–C. Associative values studies are to mitigate identified adverse effects to historic properties or to identify and/or offer mitigation measures to resolve adverse effects to historic properties.

3.3.11 Stewardship and Education

Stewardship and education as a treatment includes Cultural sensitivity training for all GCDAMP project participants, development of interpretive materials, and youth outreach. This treatment option is a mitigation strategy that may be used to document and/or interpret cultural resources.

3.4 IMPLEMENTATION OF IMMEDIATE TREATMENT MEASURES AND PRIORITY TREATMENT

This section discusses situations in which immediate treatment is necessary and thus the prioritization of properties needing treatment.

3.4.1 Emergency Treatment Options

Land managers may perform certain limited emergency actions to minimize or mitigate the effects. These actions include recordation and stabilization of the resource prior to notifying Reclamation. These actions include the following:

- Collection of artifacts and radiocarbon, macrobotanical, and flotation samples from non-burial archeological deposits that are likely to severely damaged or destroyed in the near future (e.g., a hearth eroding out of a streambank).
- Stabilization using non-ground-disturbing methods such as the placement of temporary erosion control structures or the covering of exposed resources with materials such as sediment, vegetation, or tarps.
- Temporary closure of the area including placement of temporary, non-ground-disturbing barriers and signs.

When a land manager performs any of these actions, they will document the perceived GCDAMP activity that may have caused the adverse effect. The land manager will notify Reclamation of this action within 30 calendar days of the emergency measures taken and provide Reclamation with documentation to support their claims that a GCDAMP activity caused the adverse effect(s). Reclamation will then follow the processes described in Sections 3.1 through 3.4.

3.4.2 Continue Consultation

Reclamation will continue consultation, as identified in this HPP, with parties to the 2017 PA. Reclamation will review GCDAMP activities in accordance with 36 CFR 800.3(a) and 36 CFR 800.3(a)(1) to determine whether the GCDAMP activities are the “type of activity that has the potential to cause effects on historic properties” or whether “the undertaking is a type of activity that does not have the potential to cause effects on historic properties.”

In addition to the resulting HPTPs, Reclamation will, after accepting future project proposals, including the Triennial Work Plans and Budgets, begin the consultation process with parties to the 2017 PA.

3.4.3 Project Priority

In the event that there is a shortage of funds, a project priority list for treatment plans was developed and incorporated into Appendix P. Project priority is based on the combination of several factors including inundation levels, light detection and ranging (LiDAR)-measured surface elevation changes, aeolian site classifications, site conditions, and tribal perspectives.

Inundation Level. Inundation level was first identified with archeological survey work completed by Fairley et al (1994) and later refined with a GIS analysis of 232 sites. Inundation level is defined as the level of Colorado River flow which inundates at least a portion of an archeological site. Five levels of priority have been developed for this category and are based on the amount of water flowing in the Colorado River through the Canyons: 25,000 cubic feet per second (cfs), 45,000 cfs, 97,000 cfs, 125,000 cfs, and 170,000 cfs and above. For example, at least four archaeological sites in the GRCA experience slight inundations from flows up to

25,000 cfs. Flows at this level occur often, and as such, these archeological sites would have the highest level of priority under this factor. The next level of inundation priority is 45,000 cfs. At this level, there are at least 19 archeological sites in the GRCA that experience some amount of inundation from flows up to 45,000 cfs. This level of flows occurs during the highest High Flow Experiments.

LiDAR Elevation Changes. Collecting of high-resolution terrestrial LiDAR scans began during an initial testing phase from 2007 through 2010. During this time, the focus of this project was on refining field methods, determining the amount of surface change that could be reliably detected over rugged topography, and identifying and evaluating potential measurement errors. Detection of surface changes over 10% of the site area that experiences less than 3 cm is utilized in this priority category (Collins et al. 2012). The highest priority for this category is a greater than 3-cm loss of surface elevation (1) over 10% of the site area. The next levels are (2) a 0–3-cm loss of elevation over 10% of the site area, (3) a 0-cm net loss of elevation over 10% of the site area, (4) a 0–3-cm gain of surface elevation over 10% of the site area, and (5) a greater than 3-cm gain in surface elevation over 10% of the site area.

Aeolian Deposits. A hypothesis from 1993 (the Hereford hypothesis) focused on the role of wind-blown sand in reducing the erosion potential of alluvial terraces. Aeolian sand deposits have been identified as having a possible positive effect on archeological sites. Aeolian sand can cover archeological sites to “absorb rainfall and reduce the potential for rainfall-induced gullying” (H. Fairley, per comm., in unpublished report submitted to Reclamation, 2018). Research by Draut and others (Draut 2012, Sankey and Draut 2014, East et al. 2016) have identified the role that aeolian sands play in affecting archeological sites. Draut developed five general classifications of sites based on their propensity to receive aeolian sand from sand bars. For example, Type 1 sites have no barriers to impede aeolian sand transport. This site type would be the most likely to receive aeolian sand. Types 2 and 3 contain some type of barriers but still allow some aeolian sand deposit on sites. Type 4 sites are not currently positioned to receive sand from sand bars, and Type 5 sites are not situated in a sand-dependent context.

Site Conditions. Site condition data have long been collected to identify the noticeable deterioration by natural forces and/or human activities. Sites in good condition are stable and the lowest level of priority to conduct mitigation. Sites in poor condition demonstrate the highest degree of erosion or are subjected to inundation or vandalism. These sites have the highest priority for mitigation if the poor condition results from factors attributable to effects from GCDAMP activities.

Tribal Perspectives. While much of the priority list focuses on archeological sites, this category focuses on the intangible data of historic properties. The properties with the highest degree of effect will be the highest priority for mitigation.

3.4.4 Contracts, Interagency Agreements, or Financial Assistance Agreements

A historic preservation contingency fund has been established for compliance activities within the GCDAMP. Compliance with the 2017 PA Stipulation I B for mitigation of potential

adverse effects requires the mitigation of identified adverse effects to historic properties. This fund allows Reclamation to develop agreements/contracts to carry out treatment plans and to mitigate adverse effects to historic properties as identified in this HPP. Currently, Reclamation staff fills the position of Grants Officer's Technical Representative (GOTR) or Contracting Officer's Technical Representative (COTR). Scopes of work are developed containing the requirements identified in this HPP.

3.4.5 Final Reports on Mitigation of Adverse Effects

Like other aspects of the project, the analysis and report preparation will be integrated. In addition to the "traditional" types of archeological analysis, appropriate tribal representatives will assist in the analysis of collected artifacts or ethnographic information as necessary to address the tribally based research questions and tribal perspectives included in the treatment plan. This effort will be focused on ethnographically based research dealing with those artifacts and data resulting directly from the mitigation activities.

The goal of final mitigation report preparation is an integrated document that combines the ethnographic and archeological information. The research design will have been developed with integrated goals. Tribal representatives will take an active role in the write-up. Some types of data (e.g., esoteric information) may not be integrated. However, the goal is to provide the broadest possible understanding of the history.

Beyond the final mitigation report, tribal representatives may also produce other types of documentation that better address the cultural values that are often lost when a historic property is excavated (this may be information recovered through the ethnographic studies). This effort may include educational and outreach materials geared toward maintaining the cultural history and knowledge that are no longer retained at the property. The appropriate forum and audience will vary but may include media and/or public presentations, peer-reviewed articles, lay publications, school materials or curriculum development, items tailored to subsets of the Tribe (e.g., clans or societies, potters, weavers, range technicians), or confidential reports that are maintained within tribal archives.

Results of the final reports will be shared at the Annual Meeting described in the 2017 PA. These reports will also be distributed following the plans identified in the Public Outreach section (Appendix O) of this HPP.

3.4.6 Curation

Curation. All material remains, samples, and associated records, as defined in *Curation of Federally-Owned and Administered Archeological Collections* (36 CFR § 79.4), resulting from the surveys, monitoring, or treatments to resolve potential adverse effects associated with GCDAMP activities shall be curated as follows:

1. Material remains, samples, and copies of associated records resulting from the surveys, monitoring, or treatments to resolve adverse effects associated with LTEMP projects conducted on federal lands shall be curated in accordance with federal curation policies (36 CFR § 79) in an appropriate curation facility identified by the land managing agency. Control over the collection shall be transferred to the land managing agency.
2. Material remains, samples, and copies of associated records resulting from the surveys, monitoring, or treatments to resolve adverse effects associated with LTEMP projects conducted on tribal lands shall be retained by the appropriate Tribe and curated in accordance with tribal policies.
3. Associated records that are prepared or assembled in connection with a federal or federally authorized prehistoric or historic properties resource survey, excavation, or other study are the property of the U.S. Government, regardless of the location of the resource (36 CFR § 79.3(2)).
4. Material remains subject to NAGPRA shall be maintained in accordance with NAGPRA, 36 CFR § 79, and/or the 2007 NPS MOA until they are repatriated to the appropriate Tribe(s).

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CHAPTER 4: DISCOVERIES

With the establishment and implementation of the Resource Monitoring Programs, discoveries of cultural resources and human remains are likely to increase. Procedures for systematically treating these discoveries are developed through the consultation process. The following sections detail the actions that, at a minimum, will be taken if previously unknown cultural resources are discovered, or if GCDAMP activities directly or indirectly effect historic properties, or if human remains are discovered.

4.1 DISCOVERY OF A NEW CULTURAL RESOURCE (WITH NO OBSERVED HUMAN REMAINS)

There are several ways in which GCDAMP activities may lead to discovery of a previously unidentified cultural resource (archeological site, sacred site, paleontological site, resource of tribal concern, etc.). These activities may include river monitoring trips, the monitoring of experimental flows, or other scientific/tribal activities.

If a previously unidentified cultural resource is discovered (other than during an archeological survey project), this process will be followed:

- When a discovery is reported to Reclamation or the land manager, together the agencies will assess the discovery and determine which agency is responsible for its documentation. If it is determined as Reclamation's responsibility, the process in Chapter 3 will be followed. If a discovery is made during a GCDAMP activity, Reclamation will contact NPS and Tribes. For all other discovery situations, NPS should be the entity to notify the Tribes and confirm that NPS and Reclamation are evaluating the site and assessing any potential effects.
- As determined by Reclamation, if an in-progress GCDAMP research activity results in the discovery and is causing effects on the discovery, the activity shall cease (if practical) and the process in Chapter 3 will be followed.
- Reclamation shall ensure that the cultural resource and effects are documented by qualified personnel and will follow the appropriate land manager's recording procedures. If a monitor or visitor finds a new cultural resource — say, on NPS land —and it is not being affected by Reclamation, NPS would be responsible for documenting it.
- For archeological sites in the GRCA, recordation procedures will follow the NPS 2016 Protocols Document Report 2016-01-GRCA (Dierker and Brennan 2016) or its successor.

- For archeological sites in GLCA, recordation will fulfill the requirements specified in the Arizona State Museum's *Archaeological Site Recording Manual* (Arizona State Museum 1993) and the *Utah Archaeology Site Form Manual* (Interagency Heritage Resources Work Group 2018) or their successors (internally, GLCA uses the Utah Archaeology Site Form as the form of record for all sites within the recreation area).
- For non-archeological sites, recordation procedures will include, but are not limited to, the following:
 - A thorough and accurate description of the nature, location, and condition of the site.
 - Documentation of the prehistoric or historic context in which the site exists.
 - Documentation of the site's integrity.
 - Documentation and evaluation of the site data potential and scientific research value.
 - Completion of a site condition assessment.
 - Formulation of treatment recommendations and preservation strategies as appropriate.
- Reclamation will, through consultation with parties to the 2017 PA, apply the NRHP criteria and assess integrity to determine eligibility of the discovered site/property (36 CFR 60; see Section 3.1.3.1 of this document).
- If the cultural resource is determined through consultation with the SHPO or THPO as eligible for NRHP listing, it will be added to this HPP's site list and included under the appropriate monitoring protocol(s) and/or treatment options described in Section 3.3.

4.2 DISCOVERY OF A NEW EFFECT ON A HISTORIC PROPERTY

There may be a number of ways in which GCDAMP activities may affect known historic properties, including the periodicity of inundation and exposure, changing vegetation cover, streambank erosion, slumping, water quality, and visitor use that can be shown to be a result of increased time off-river due to high flows, which thus allows more time to explore and interact with historic properties.

Effects can be both tangible and intangible and can not only change the physical characteristics of properties but may have social, spiritual, and cultural impacts on individuals with a deep connection to the resource (see Section 3 and 4 of the LTEMP EIS (Reclamation 2016a) and Chapter 3 of this document). From a tribal perspective, Tribes have reported through their monitoring programs that certain types of damage and/or disturbance affected the associated values of the property.

Given the frequent monitoring by both NPS and Tribal monitoring programs, new effects to historic properties will likely be found. These effects may include those mentioned above or new effects that have not yet been observed. If a GCDAMP activity is having a previously unanticipated direct or indirect effect on an historic property, the process in Chapter 3 will be followed.

4.3 DISCOVERIES OF NATIVE AMERICAN HUMAN REMAINS AND OTHER NAGPRA-RELATED ITEMS

On the basis of ethnographic information and more than 50 years of archeological excavations and monitoring in the Canyons, the presence of Native American human remains, associated funerary objects, unassociated funerary objects, sacred objects, and objects of cultural patrimony are expected. Given this potential and pursuant to the Native American Graves Protection and Repatriation Act of 1990 (Public Law 101-601; 25 U.S.C. 3001-3013) and its implementing regulations, “Native American Graves Protection and Repatriation Regulations” (43 CFR § 10), the land managers (based on land ownership status) will ensure that the NAGPRA Plans of Action are implemented for GCDAMP activities, including all ground-disturbing activities. This implementation applies to all NAGPRA items, Section 2 (3) and 43 CFR 10.2 (d) and identified in Appendix A (Definitions).

In case of an inadvertent discovery or intentional excavation of Native American human remains, NAGPRA Plans of Action for each land managing agency are attached as Appendix J through Appendix M.

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REFERENCES

Adams, W.Y., and N.K. Adams, 1959, *An Inventory of Prehistoric Sites on the Lower San Juan River, Utah*, Museum of Northern Arizona Bulletin No. 31, Museum of Northern Arizona, Flagstaff, Ariz.

Adams, W.Y., and E.B. Danson, 1960, *Ninety Years of Glen Canyon Archaeology, 1869–1959*, Museum of Northern Arizona Bulletin Number 33; Glen Canyon Series Number 2, Flagstaff, Ariz.

Adams, W.Y., A.J. Lindsay, Jr., and C.G. Turner, II, 1961, *Survey and Excavations in Lower Glen Canyon, 1952–1958*, Museum of Northern Arizona Bulletin 36, Museum of Northern Arizona, Flagstaff, Ariz.

Aikens, C.M., 1966, *Virgin-Kayenta Cultural Relationships*, University of Utah Anthropological Papers No. 79, Salt Lake City: University of Utah Press.

Allen, K., 2013, “Paiutes Seek Land, Acknowledgement from Diné Neighbors,” *Navajo Times*, October 31. Available at www.navajotimes.com/news/2013/1013/103113paiutes.php, accessed July 15, 2017.

Altschul, J.H., and H.C. Fairley, 1989, *Man, Models, and Management: An Overview of the Archaeology of the Arizona Strip and the Management of Its Cultural Resources*, Statistical Research Technical Series 11, Tucson, Ariz.: SRI Press.

Anderson, K.C., 2006, *Geoarchaeological Investigations of 53 Sites between Glen Canyon Dam and Paria Riffle*, Navajo Nation Archaeology Department Report No. 05-229, Draft Report submitted to M. Berry, Bureau of Reclamation, Upper Colorado Region, Salt Lake City, Utah, March.

Anderson, M.F., 1998, *Living at the Edge: Explorers, Exploiters, and Settlers of the Grand Canyon Region*, Grand Canyon Association, Grand Canyon, Ariz.

Anderson, M.F., 2000, *Polishing the Jewel: An Administrative History of Grand Canyon National Park*, Grand Canyon Association, Grand Canyon, Ariz.

Anderson, M.F., 2008, “Natural Disaster within Transitional Societies: The Havasupai Indians at Supai, Arizona,” in *Reflections of Grand Canyon Historians: Ideas, Arguments, and First-Person Accounts*, Todd R. Berger (ed.), Grand Canyon Association, Grand Canyon, Arizona.

Arizona State Museum, 1993, *Archaeological Site Recording Manual*, Version 1.1, Arizona State Museum, University of Arizona. Available at http://www.statemuseum.arizona.edu/media/statemuseum/_file/site_recording_manual.pdf. Accessed October 5, 2018.

- Austin, D., A. Phillips, III, D. Seibert, and K. Bullets, 2007, *Southern Paiute Participation in the Glen Canyon Adaptive Management Program: A Ten Year Review*, prepared for the Bureau of Reclamation by the Bureau of Applied Research in Anthropology, University of Arizona, Tucson, Ariz., and the Southern Paiute Consortium, Kaibab, Ariz.
- Austin, D., and B. Drye, 2011, "The Water That Cannot Be Stopped: Southern Paiute Perspectives on the Colorado River and the Operations of Glen Canyon Dam," *Policy and Society* 30(4): 285–300.
- Austin, D., S. Borgias, and K. Bullets, 2018, *Report on the Ethnographic Research by the Southern Paiute Consortium to Inform Management of the Traditional Cultural Property and Other Tribal Historic Properties in the Colorado River Corridor Below Glen Canyon Dam to Lees Ferry, Arizona*, prepared for the National Park Service, U.S. Department of the Interior, by the Bureau of Applied Research in Anthropology, University of Arizona, and Anthropological Research LLC on behalf of the Southern Paiute Consortium.
- Austin, D.E., E. Dean, and J. Gaines, 2005, *Yanawant: Paiute Places and Landscapes in the Arizona Strip*, Volume Two of the Arizona Strip Landscapes and Place Name Study, prepared for the Bureau of Land Management by the Bureau of Applied Research in Anthropology, University of Arizona, Tucson, Ariz.
- Baker, T., 2009, *Architectural Typology and Chronology of Prehistoric Storage Features in the Lower Escalante River Drainage*, Master's Thesis, Department of Anthropology, Northern Arizona University, Flagstaff, Ariz.
- Balsom, J.R., and S. Larralde (eds.), 1996, *Mitigation and Monitoring of Cultural Resources in Response to the Experimental Habitat Building Flow in Glen and Grand Canyons, Spring 1996*, Final Report submitted to the Grand Canyon Monitoring and Research Center, Bureau of Reclamation, Flagstaff, Ariz., Dec. 31.
- Balsom, J.R., E. Brennan, J. Dierker, and I. Hough, 2017, "Life Along the Colorado River," in: Smiley, F.E., C.E. Downum, and S.G. Smiley (eds.), *The Archaeology of the Grand Canyon: Ancient Peoples, Ancient Places*, Grand Canyon Association, Grand Canyon, Ariz., pp. 201–239.
- Basso, K.H., 1996, *Wisdom Sits in Places: Landscapes and Languages among the Western Apaches*, Albuquerque: University of New Mexico Press.
- Begay, R.M., and A. Roberts, 1996, "The Early Navajo Occupation of the Grand Canyon Region," in: Towner, R.H. (ed.), *The Archaeology of Navajo Origins*, Salt Lake City: University of Utah Press, pp. 197–210.
- Berry, C.F., and M.S. Berry, 1986, "Chronological and Conceptual Models of the Southwestern Archaic," in: Condie, C.J., and D.D. Fowler (eds.), *Anthropology of the Desert West: Essays in Honor of Jesse D. Jennings*, Anthropological Papers No. 110, Salt Lake City: University of Utah Press, pp. 253–327.

Billingsley, G.H., E.E. Spamer, and D. Menkes, 1997, *Quest for the Pillar of Gold: The Mines and Miners of the Grand Canyon*, Grand Canyon Association, Grand Canyon, Ariz.

Bonham, C.D., 1989, *Measurements for Terrestrial Vegetation*, New York: John Wiley and Sons.

Bulletts, C., M. Osife, S. Anderson, A.M. Phillips, III, C. Cannon, K. Bulletts, and D. Austin, 2012, *2012 Southern Paiute Consortium Colorado River Corridor Evaluation Program Annual Report of Activities*, Southern Paiute Consortium, Pipe Spring, Ariz., and Bureau of Applied Research in Anthropology, University of Arizona, Tucson, Ariz., Oct. 24.

Bulletts, K., C. Bulletts, D. Austin, and A. Phillips, III, 2008, *2008 Southern Paiute Consortium Colorado River Corridor Resource Evaluation Program Annual Report of Activities*, Southern Paiute Consortium, Pipe Spring, Ariz., and Bureau of Applied Research in Anthropology, University of Arizona, Tucson, Ariz., Sept. 20.

Bungart, P., L. Jackson-Kelly, D. Hubbs, and C. Cannon, 2015, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2014 Report*, report on file at the Hualapai Department of Cultural Resources.

Bunte, P., 2006, "Narrative, Place, and Identity in a Southern Paiute Community," in: L. Harper (ed.), *Santa Barbara Papers in Linguistics*, pp. 53–65, Volume 18: Proceedings from the

Bunte, P. and R. Franklin, 1987, *From the Sands to the Mountain: Change and Persistence in a Southern Paiute Community*. Lincoln: University of Nebraska Press.

Burchett, T.W., 1994, *Glen Canyon National Recreation Area Consultation Trip Report with the Navajo Nation Historic Preservation Department Concerning GCES Monitoring of Archaeological Sites from Glen Canyon Dam to the Paria River*, prepared for National Park Service, manuscript on file, Glen Canyon National Recreation Area, Page, Ariz.

Burchett, T.W., 1995a, *Glen Canyon National Recreation Area: FY94 Glen Canyon Environmental Studies Monitoring of Archaeological Sites from Glen Canyon Dam to the Paria Riffle*, prepared for Glen Canyon National Recreation Area, Page, Ariz., manuscript on file, Glen Canyon National Recreation Area, Page, Ariz.

Burchett, T.W., 1995b, *Glen Canyon National Recreation Area: FY95 Glen Canyon Environmental Studies Monitoring of Archaeological Sites from Glen Canyon Dam to the Paria Riffle*, prepared for Glen Canyon National Recreation Area, Page, Ariz., manuscript on file, Glen Canyon National Recreation Area, Page, Ariz.

Burchett, T.W., 1996, *FY96 Glen Canyon Environmental Studies Monitoring of Archaeological Sites from Glen Canyon Dam to the Paria Riffle*, prepared for National Park Service, Glen Canyon National Recreation Area, Page, Ariz., manuscript on file, Glen Canyon National Recreation Area, Page, Ariz.

Burchett, T.W., 1997, *Glen Canyon National Recreation Area: FY97 Grand Canyon Research and Monitoring Center (GCMRC) Monitoring of Archaeological Sites from Glen Canyon Dam to the Paria Riffle*, prepared for Glen Canyon National Recreation Area, Page, Ariz., manuscript on file, Glen Canyon National Recreation Area, Page, Ariz.

Cartledge, T.R., 1979, "Cohonina Adaptation to the Coconino Plateau: A Re-evaluation," *Kiva* 44:297–317.

Christensen, K., L. Jackson, A.M. Phillips, III, and D. Kennedy, 2006, *Hualapai Tribe Terrestrial Monitoring Synthesis 2001–2005*, report on file at Hualapai Department of Cultural Resources.

Christensen, K., L. Jackson, and A.M. Phillips, III, 2008, *Hualapai Tribe Terrestrial Monitoring Synthesis 1996–2008*, report on file at Hualapai Department of Cultural Resources.

Coder, C.M., 1994, "Historical Archaeology," in: Fairley, H.C., P.W. Bungart, C.M. Coder, J. Huffman, T.L. Samples, and J.R. Balsom (eds.), *The Grand Canyon River Corridor Survey Project: Archaeological Survey along the Colorado River between Glen Canyon Dam and Separation Canyon*, National Park Service, Grand Canyon, Ariz., pp. 113–146.

Coder, C.M., and N.B. Andrews, 1993, *Summary Report for 1992: GCES Monitoring of Archaeological Sites from Lees Ferry to Separation Canyon, Grand Canyon National Park*, prepared for Grand Canyon National Park by the National Park Service and Northern Arizona University, Grand Canyon, Ariz.

Coder, C.M., L.M. Leap, N.B. Andrews, and D.C. Hubbard, 1994, *1993 Summary Report: Monitoring of Archaeological Sites Along the Colorado River Corridor in Grand Canyon National Park*, Cooperative Work Order 8005-8-002, prepared for Grand Canyon National Park by the National Park Service and Northern Arizona University, July.

Coder, C.M., L.M. Leap, N.B. Andrews, and D.C. Hubbard, 1995, *1994 Summary Report: Monitoring of Archaeological Sites Along the Colorado River Corridor in Grand Canyon National Park*, Cooperative Work Order 8005-8-002, prepared for Grand Canyon National Park by the National Park Service and Northern Arizona University, March.

Coder, C.M., L.M. Leap, N.B. Andrews, D.C. Hubbard, and J.L. Kunde, 1996, *1995 Summary Report: Monitoring of Archaeological Sites Along the Colorado River Corridor in Grand Canyon National Park*, Cooperative Work Order 8005-8-002, prepared for Grand Canyon National Park by the National Park Service and Northern Arizona University.

Cole, D.N., 1989, *Wilderness Campsite Monitoring Methods: A Sourcebook*, General Technical Report INT-259, U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Ogden, Utah, April.

- Collins, B.D., and Kayen, R., 2006, *Applicability of Terrestrial LIDAR Scanning for Scientific Studies in Grand Canyon National Park, Arizona*, U.S. Geological Survey, Open File Report 2006-1198, 27 pp., Menlo Park, Calif. Available at <http://pubs.usgs.gov/of/2006/1198/>, accessed October 26, 2017.
- Collins, B.D., K.B. Brown, and H.C. Fairley, 2008. Evaluation of Terrestrial LIDAR for Monitoring Geomorphic Change at Archaeological Sites in Grand Canyon National Park, Arizona: U.S. Geological Survey, Open File Report 2008-1384, 60 p. [<http://pubs.usgs.gov/of/2008/1384/>].
- Collins, B.D., D. Minasian, and R. Kayen, 2009. Topographic Change Detection at Select Archaeological Sites in Grand Canyon National Park, Arizona, 2006-2007: U.S. Geological Survey, Scientific Investigations Report 2009-5116, 97p. [<http://pubs.usgs.gov/sir/2009/5116/>].
- Collins, B.D., S. Corbett, H.C. Fairley, D. Minasian, T.P. Dealy, and R. Kayen, 2012. Topographic Change Detection at Select Archeological Sites in Grand Canyon National Park, Arizona, 2007-2010: U.S. Geological Survey, Scientific Investigations Report 2012-5133 150pg; (<http://pubs.usgs.gov/sir/2012/5133>).
- Collins, B.D., D.R. Bedford, S.C. Corbett, C. Cronkite-Ratcliff, and H.C. Fairley, 2016, "Relations between Rainfall-runoff-induced Erosion and Aeolian Deposition at Archaeological Sites in a Semi-arid Dam-controlled River Corridor," *Earth Surface Processes and Landforms* 41:899–917.
- Cordell, L.S., 1997, *Prehistory of the Southwest, Second Edition*, New York: Harcourt Press.
- Coues, E. (trans.), 1900, *On the Trail of a Spanish Pioneer: The Diary and Itinerary of Francisco Garcés*, New York: F.P. Harper.
- Coulam, N.J., and A.R. Schroedl, 2004, "Late Archaic Totemism in the Greater American Southwest," *American Antiquity* 69(1):41–62.
- Damp, J., J.L. Pederson, and G. O'Brien, 2007, *Geoarchaeological Investigations and Archaeological Treatment Plan for 151 Sites in the Grand Canyon, Arizona*, report presented to M. Berry, Bureau of Reclamation, Upper Colorado River Region, Salt Lake City, Utah, March.
- Damp, J., J. Pederson, and G. O'Brien, 2009, *Excavations at Four Sites in Glen and Grand Canyons*, manuscript on file, Glen Canyon National Recreation Area, Page, Ariz.
- Danson, E.B., 1958, "The Glen Canyon Project," *Plateau* 30(3):75–78.
- Davis, S.W., M.E. Davis, I. Lucchitta, R. Finkel, and M. Caffee, 2000, "Early Agriculture in the Eastern Grand Canyon," *Geoarchaeology* 15:783–798.

De Vore, S.L., N. Baker, and R. Sucec, 2016a, *Feasibility of Geophysical Investigations at the Ninemile Terrace Site (AZ C:02:032), Glen Canyon National Recreation Area, Arizona*. U.S. Department of the Interior, National Park Service, Midwest Archeological Center, Lincoln, Neb.

Dierker, J.L., 2012, *Grand Canyon National Park Cultural Resource Monitoring 2012 Annual Report*, submitted to the U.S. Department of the Interior, Bureau of Reclamation, Salt Lake City, Utah.

Dierker, J.L., 2013, *Grand Canyon National Park Cultural Resource Monitoring for Implementation of the Colorado River Management Plan and the Backcountry Management Plan: Fiscal 2013 Report*, U.S. Department of the Interior, National Park Service, Grand Canyon, Ariz..

Dierker, J.L., 2014, *Grand Canyon National Park Cultural Resource Monitoring for Implementation of the Colorado River Management Plan: Fiscal Year 2014 Report*, U.S. Department of the Interior, National Park Service, Grand Canyon, Ariz..

Dierker, J.L., and E. Brennan, 2016, *Cultural Resource Management Program: Protocols Document*, Grand Canyon National Park Report 2016-01-GRCA, National Park Service, Grand Canyon, Ariz.

Dierker, J.L., and L.M. Leap, 2002, *Fiscal Year 2002 Archeological Site Monitoring and Management Activities Along the Colorado River in Grand Canyon National Park*, submitted to the U.S. Department of the Interior, Bureau of Reclamation, Salt Lake City, Utah.

Dierker, J.L., and L.M. Leap, 2003, *Fiscal Year 2003 Archeological Site Monitoring and Management Activities Along the Colorado River in Grand Canyon National Park*, U.S. Department of the Interior, National Park Service, Grand Canyon, Ariz..

Dierker, J.L., and L.M. Leap, 2004, *Archaeological Site Monitoring and Management Activities along the Colorado River in Grand Canyon National Park*, U.S. Department of the Interior, National Park Service, Grand Canyon, Ariz.

Dierker, J.L., and L.M. Leap, 2005, *Fiscal Year 2004 Archeological Site Monitoring and Management Activities Along the Colorado River in Grand Canyon National Park*, RCMP Report No. 90, Flagstaff, Ariz., submitted to the U.S. Department of the Interior, Bureau of Reclamation, Salt Lake City, Utah.

Dierker, J.L., and L.M. Leap, 2006, *Fiscal Year 2005 Archeological Site Monitoring and Management Activities Along the Colorado River in Grand Canyon National Park*, RCMP Report No. 91, Flagstaff, Ariz., submitted to the U.S. Department of the Interior, Bureau of Reclamation, Salt Lake City, Utah.

- Dierker, J.L., L.M. Leap, and N.B. Andrews, 2001, *2001 Archeological Site Monitoring and Management Activities Along the Colorado River in Grand Canyon National Park*, Grand Canyon National Park, RCMP #75, Flagstaff, Ariz.
- Dierker, J.L., L.M. Leap, and N.B. Andrews, 2002, *2002 Archeological Site Monitoring and Management Activities Along the Colorado River in Grand Canyon National Park*, Grand Canyon National Park, RCMP #87, Flagstaff, Ariz.
- Dobyns, H.F., and R.C. Euler, 1970, *Wauba Yuma's People: The Comparative Sociopolitical Structure of the Pai Indians of Arizona*, Studies in Anthropology No. 3, Prescott College, Prescott, Ariz.
- Dodge, W.A., 2007, *Black Rock: A Zuni Cultural Landscape and the Meaning of Place*, Jackson: University Press of Mississippi, 266 pp.
- Doelle, W.H. (ed.), 2000, *Final Report: Cultural Resource Program Assessment*, manuscript on file, Grand Canyon Monitoring and Research Center, Flagstaff, Ariz.
- Dongoske, K.E., 2011, *Cultural Resource Monitoring of the Colorado River Ecosystem through Grand Canyon*, prepared by Pueblo of Zuni, Zuni Heritage and Historic Reservation Office, Zuni, N. Mex., for Bureau of Reclamation, Upper Colorado Regional Office, Salt Lake City, Utah, Aug.
- Draut, A.E., 2012, "Effects of River Regulation on Aeolian Landscapes, Colorado River, Southwestern USA," *Journal of Geophysical Research—Earth Surface*, v. 117, F02022, doi:10.1029/2011JF002329.
- Draut, A.E., and D.M. Rubin, 2008, *The Role of Aeolian Sediment in the Preservation of Archeological Sites along the Colorado River Corridor in Grand Canyon National Park, Arizona*, USGS Professional Paper 1756, 71 pp.
- East, A.E., B.D. Collins, J.B. Sankey, S.C. Corbett, H.C. Fairley, and J. Caster, 2016, *Conditions and Processes Affecting Sand Resources at Archaeology Sites in the Colorado River Corridor below Glen Canyon Dam, Arizona*, U.S. Geological Survey Professional Paper 1825, 104 pp. Available at <https://pubs.er.usgs.gov/publication/pp1825>, accessed May 24, 2018.
- East, A.E., J.B. Sankey, H.C. Fairley, J.J. Caster, and A. Kasprak, 2017, *Modern Landscape Processes Affecting Archaeological Sites along the Colorado River Corridor Downstream of Glen Canyon Dam, Glen Canyon National Recreation Area, Arizona*, U.S. Geological Survey Scientific Report 2017-5082. Available at <https://pubs.er.usgs.gov/publication/sir20175082>, accessed May 29, 2018.
- Emslie, S.D., J.I. Mead, and L. Coats, 1995, "Split-Twig Figurines in Grand Canyon, Arizona: New Discoveries and Interpretations," *Kiva* 61:145–173.

- Euler, R.C., 1966, *Southern Paiute Ethnohistory*, Anthropological Papers, Number 78, April, Glen Canyon Series Number 28, Salt Lake City: University of Utah Press.
- Euler, R.C., 1974, "Future Archaeological Research in the Grand Canyon," *Plateau* 46:139–148.
- Euler, R.C., 1981, "Havasupai-Cohonina Relationships in Grand Canyon," in: Schroeder, A.H. (ed.), *Collected Papers in Honor of Erik Kellerman Reed*, Papers of the Archaeological Society of New Mexico No. 6, Albuquerque: Albuquerque Archaeological Society Press, pp. 167–175.
- Euler, R.C., 1984, *The Archaeology, Geology, and Paleobiology of Stanton's Cave, Grand Canyon National Park, Arizona*, Monograph No. 6, Grand Canyon Natural History Association, Grand Canyon, Ariz.
- Euler, R.C., and A.P. Olson, 1965, "Split-Twig Figurines from Northern Arizona: New Radiocarbon Dates," *Science* 148:368–369.
- Ewing, H.P., 1961, "The Origin of the Pai Tribes," Dobyns, H.F., and R.C. Euler (eds.), *Kiva* 26:8–23.
- Fairley, H.C., 2003, *Changing River: Time, Culture, and the Transformation of Landscape in the Grand Canyon. A Regional Research Design for the Study of Cultural Resources along the Colorado River in Lower Glen Canyon and Grand Canyon National Park, Arizona*, Statistical Research Inc., Technical Series 79, Tucson, Ariz.
- Fairley, H.C., 2007, Overview and Status of the Cultural R&D Project. Presentation to the Glen Canyon Dam Adaptive Management Program Technical Work Group, October 7, 2007. http://www.usbr.gov/uc/rm/amp/twg/mtgs/07oct02/Attach_03b.pdf.
- Fairley, H.C., and H. Sondossi, 2010, Applying an ecosystem framework to evaluate archaeological site condition along the Colorado River in Grand Canyon National Park, Arizona. In Melis, T.S., J.F. Hamill, G.E. Bennett, L.G. Coggins, Jr., P.E. Grams, T.A. Kennedy, D.M. Kubly, and B.E. Ralston, eds., *Proceedings of the Colorado River Basin Science and Resource Management Symposium*, November 18-20, 2008, Scottsdale, Arizona: U.S. Geological Survey Scientific Investigations Report 2010-5135, pp. 333-341, accessed on July 15, 2010, at <http://pubs.usgs.gov/sir/2010/5135/>.
- Fairley, H.C., P.W. Bungart, C.M. Coder, J. Huffman, T.L. Samples, and J.R. Balsom, 1994, *The Grand Canyon River Corridor Survey Project: Archaeological Survey along the Colorado River between Glen Canyon Dam and Separation Canyon*, prepared in cooperation with the Glen Canyon Environmental Studies Program, Grand Canyon National Park, submitted to the U.S. Department of the Interior, National Park Service, Agreement No. 9AA-40-07920, Dec.
- Ferguson, T.J., 1998, *Öngtupqa Niqw Pisisvayu (Salt Canyon and the Colorado River): The Hopi People and the Grand Canyon*, Hopi Cultural Preservation Office, Kykotsmovi, Ariz.

Ferris, W.A., 1842, "Chanion of the Colorado," *Western Literary Messenger*, July 20, 1942, excerpt from an unpublished work entitled *Life in the Rocky Mountains*.

Franklin, R., and P. Bunte, 1994, "When Sacred Land is Sacred to Three Tribes: San Juan Paiute Sacred Sites," In: *Sacred Sites, Sacred Places*, Carmichael, D., J. Hubert, B. Reeves, and A. Schanche (eds.), pp. 245–258, London: Routledge.

GLCA (Glen Canyon National Recreation Area), 1996, Glen Canyon National Recreation Area Archaeological Resources Protection Plan, manuscript on file, Glen Canyon National Recreation Area, Page, Ariz.

Geib, P.R., 1990, *Prehistoric and Historic Archaeological Remains of Glen Canyon Downriver from Glen Canyon Dam*, Northern Arizona University Archaeology Laboratory, Flagstaff, Ariz., submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colo.

Geib, P.R., 1994, "Paleoindian Remains in Glen Canyon," in: *Glen Canyon Revisited: Summary and Conclusions of Recent Archaeological Investigations in the Glen Canyon National Recreation Area*, pp. 3-1–3-7, Northern Arizona University Archaeological Report No. 1047, Archaeology Laboratory, Department of Anthropology, Northern Arizona University, Flagstaff, Ariz., manuscript on file, Glen Canyon National Recreation Area, Page, Ariz.

Geib, P.R., 1996a, *Glen Canyon Revisited*, Anthropological Papers No. 119, Salt Lake City: University of Utah Press.

Geib, P.R., 1996b, "Archaic Occupancy of the Glen Canyon Region," in: Geib, P.R. (ed.), *Glen Canyon Revisited*, Anthropological Papers No. 119, Salt Lake City: University of Utah Press.

Geib, P.R., 1996c, "The Early Agricultural Period: Transition to Farming," in: Geib, P.R. (ed.), pp. 53–77, *Glen Canyon Revisited*, Anthropological Papers No. 119, Salt Lake City: University of Utah Press.

Geib, P.R., 1996d, "Formative Cultures and Boundaries: Reconsideration of the Freemont and Anasazi," in: Geib, P.R. (ed.), pp. 98–114, *Glen Canyon Revisited*, Anthropological Papers No. 119, Salt Lake City: University of Utah Press.

Geib, P.R., 1996e, "Early Formative Occupancy of Glen Canyon," in: Geib, P.R. (ed.), pp. 78–97, *Glen Canyon Revisited*, Anthropological Papers No. 119, Salt Lake City: University of Utah Press.

Geib, P.R., 1996f, "Summary," in: Geib, P.R. (ed.), pp. 195–202, *Glen Canyon Revisited*, Anthropological Papers No. 119, Salt Lake City: University of Utah Press.

Geib, P.R., 2011, *Foragers and Farmers of the Northern Kayenta Region: Excavations along the Navajo Mountain Road*, Salt Lake City: University of Utah Press.

- Gellis, A.C., A. Cheama, V. Laahty, and S. Lallo, 1995, "Assessment of Gully-Control Structures in the Rio Nutria Watershed, Zuni Reservation, New Mexico," *Water Resources Bulletin* 31(4):633–646.
- Gilpin, D., 1994, "Lukachukai and Salina Springs: Late Archaic/Early Basketmaker Habitation Sites in the Chinle Valley, Northeastern Arizona," *Kiva* 60:203–218.
- Graham, R.G., and D.E. Kupel, 2000, *Historic Structures Report: Lee's Ferry and Lonely Dell Ranch, Glen Canyon National Recreation Area, Arizona*, prepared by Alliance Architects, LLC, Phoenix, Ariz., for the U.S. Department of the Interior, National Park Service, Intermountain Region, Glen Canyon National Recreation Area, Sept. Available at https://www.nps.gov/parkhistory/online_books/glca/Lees_ferry_hsr.pdf, accessed May 29, 2018.
- Grams, P., and J.C. Schmidt, 1999, *Integration of Photographic and Topographic Data to Develop Temporally and Spatially Rich Records of Sand Bar Change in the Point Hansbrough and Little Colorado River Confluence Study Reaches*, Final Report to Grand Canyon Monitoring and Research Center, Utah State University, Logan, Utah, 249 pp.
- Grams, P.E., J.C. Schmidt, D.J. Topping, and S. Goeking, 2004, *The Degraded Reach: Rate and Pattern of Bed and Bank Adjustment of the Colorado River in the 25 km Immediately Downstream from Glen Canyon Dam*. Available at https://www.usbr.gov/uc/rm/amp/amwg/mtgs/05mar02/Attach_05b.pdf, accessed May 29, 2018.
- Grams, P.E., J.C. Schmidt, and D.J. Topping, 2007, "The Rate and Pattern of Bed Incision and Bank Adjustment on the Colorado River in Glen Canyon Downstream from Glen Canyon Dam, 1956–2000," *Geological Society of America Bulletin* 119:556–575.
- Gunnerson, J.H., 1959, *1957 Excavations, Glen Canyon Area*, University of Utah Anthropological Papers No. 43 (Glen Canyon Series No. 10), Salt Lake City.
- Harmon, B.C., and R. Washam, 2018, *Archeological Monitoring Plan for the Glen Canyon Reach, Glen Canyon National Recreation Area, Page, Arizona, Coconino County*, Version 1.0., manuscript on file, Glen Canyon National Recreation Area, Page, Ariz.
- Hart, R.E., 1995, *Zuni Glen Canyon Environmental Studies Ethnohistorical Report*, Institute of the North American West, Seattle, Wash., submitted to the Glen Canyon Environmental Studies Office, Bureau of Reclamation, Flagstaff, Ariz., and Zuni Heritage and Historic Preservation Office, Zuni, N. Mex.
- HDCR (Hualapai Department of Cultural Resources), 1993, *Ethnographic and Oral Historical Survey for Glen Canyon Environmental Studies and the Glen Canyon Dam Environmental Impact Statement*, submitted to the Bureau of Reclamation, Glen Canyon Environmental Studies Office, Flagstaff, Ariz.

HDCR, 1998, *Hualapai Tribe's Traditional Cultural Properties in Relation to the Colorado River, Grand Canyon, Arizona*, submitted to Bureau of Reclamation, Upper Regional Office, Salt Lake City, Utah.

HDCR, 2014, *The Hualapai Cultural Atlas*, Phase II, Final Report, June.

Hereford, R., and R.H. Webb, 2003, *Map Showing Quaternary Geology and Geomorphology of the Lonely Dell Reach of the Paria River, Lees Ferry, Arizona, with Comparative Landscape Photographs*, U.S. Geological Survey Geologic Investigations Series I-2771, scale 1:5,000. Available at <http://pubs.usgs.gov/imap/i2771/>, accessed October 26, 2018.

Hereford, R., H.C. Fairley, K.S. Thompson, and J.R. Balsom, 1991, *The Effect of Regulated Flows on Erosion of Archeological Sites at Four Areas in Eastern Grand Canyon National Park, Arizona: A Preliminary Analysis*, U.S. Geological Survey, Flagstaff, Ariz., submitted to the Glen Canyon Environmental Studies Program, U.S. Department of the Interior, Bureau of Reclamation, Flagstaff, Ariz.

Hereford, R.H., H.C. Fairley, K.S. Thompson, and J.R. Balsom, 1993, *Surficial Geology, Geomorphology, and Erosion of Archaeological Sites along the Colorado River, Eastern Grand Canyon, Grand Canyon National Park, Arizona*, U.S. Geological Survey Open-File Report 93-517.

Hereford, R.H., G.E. Bennett, and H.C. Fairley, 2014, Precipitation variability of the Grand Canyon region, 1893 through 2009, and its implications for studying effects of gullying of Holocene terraces and associated archeological sites in Grand Canyon, Arizona: U.S. Geological Survey Open-File Report 2014-1006, 23 p., <http://dx.doi.org/10.3133/ofr20141006>.

Hinton, L., and L. Watahomigie, 1984, *Spirit Mountain: An Anthology of Yuman Story and Song*, Tucson, Ariz.: University of Arizona Press.

Hollenshead, M., 2007, *Exploration of Paleoindian and Early Archaic in the Greater Grand Canyon Region: Recent Evidence from Grand Canyon and Implications for Prehistoric Land Use*, copy on file at the National Park Service, Grand Canyon National Park, Ariz.

Hopkins, M.P., 2013, *An Ethnographic Overview and Assessment of American Indian Histories and Land Uses within Glen Canyon National Recreation Area and Rainbow Bridge National Monument*, prepared for the National Park Service at the University of Arizona, Tucson, Ariz.

Hopkins, M., T.J. Ferguson, and S.B. Koyiyummtewa, 2013, *Hopisimuy Wu'ys'mat Hisat Yang Tupqa'va Yeesiwnghwu (Hopi Ancestors Lived in These Canyons): Hopi History and Traditions at Glen Canyon National Recreation Area and Rainbow Bridge National Monument*, Hopi Cultural Preservation Office, Kykotsmovi, Ariz.

Hopkins, M.P., and S.L. Hedquist, 2018, *Zuni Ethnographic Research in the Colorado River Corridor from Glen Canyon Dam to Lees Ferry, Arizona to Inform Management of the Glen*

Canyon-Colorado River Traditional Cultural Property and Other Zuni Historic Properties, prepared for National Park Service, U.S. Department of the Interior.

Hubbard, D.C., 1997, “Photographic Replication Methods Used to Assist in the Management of Cultural Resources along the Colorado River, Grand Canyon National Park,” in: Harmon, D. (ed.), *Making Protection Work: Proceedings of the Ninth Conference on Research and Resource Management in Parks and Public Lands*, The George Wright Society, Hancock, Mich., pp. 85–86.

Hubber, A., 1997, *National Register of Historic Places Registration Form: Lee’s Ferry and Lonely Dell Ranch*, prepared July (date entered November 4, 1997). Available at <https://npgallery.nps.gov/NRHP/AssetDetail?assetID=6a8bb864-daa5-4518-bdb4-18ff61bf2c50>, accessed October 5, 2018.

Hubbs, D., 2017, *Hualapai Tribal Affiliation with Glen Canyon, Arizona*, Hualapai Department of Cultural Resources, Peach Springs, Ariz.

Hubbs, D., C. Cannon, and B. Wakayuta, 2017a, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2016 Report*, report on file at the Hualapai Department of Cultural Resources.

Hubbs, D., C. Cannon, B. Wakayuta, and S. Ka-Voka Jackson, 2017b, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2017 Report*, report on file at the Hualapai Department of Cultural Resources.

Huckell, B.B., 1996, “Archaic Prehistory in the North American Southwest,” *Journal of World Prehistory* 10:305–373.

Huffman, J., 1993, *Between River and Rim: A Comparative View of Subsistence Systems in Grand Canyon, Arizona*, unpublished Master’s Thesis, Northern Arizona University, Department of Anthropology, Flagstaff, Ariz.

Interagency Heritage Resources Work Group, 2018, *2018 Utah Archaeology Site Form Manual*, Salt Lake City. Available at https://heritage.utah.gov/wp-content/uploads/SiteFormManual_20180601.pdf?x41005, accessed October 5, 2018.

Ives, J.C., 1861, *Geological Report upon the Colorado River of the West, Explored in 1857 and 1858 by Lieutenant Joseph C. Ives, Corps of Topographical Engineers, Under the Direction of the Office of Explorations and Surveys, A.A. Humphreys, Captain Topographical Engineer, In Charge*, Government Printing Office, U.S. Senate Executive Document #90, 36th Congress, 5 Parts (also available as a 2002 digital archive edited by K.C. McKinney, U.S. Geological Survey Open-File Report 02-25, Version 1.0).

Jackson, L., 1994, *Hualapai Tribe Cultural Resources Program River Trip Report GCES – 1993, July 30–August 6, 1993 Revised Report: 1994*, report on file at the Hualapai Department of Cultural Resources.

Jackson, L., C. Mayo, and A.M. Phillips, III, 1997, *Effects of 1997 Glen Canyon Dam Water Releases on Historic Goodding Willow at Granite Park, Colorado River Mile 209L*, Grand Canyon Monitoring and Research Center, Flagstaff, Ariz.

Jackson, L., A.M. Phillips, III, and K. Christensen, 2000, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2000 Report*, report on file at the Hualapai Department of Cultural Resources.

Jackson, L., D.J. Kennedy, and A.M. Phillips, III, 2001, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2001 Report*, report on file at the Hualapai Department of Cultural Resources.

Jackson, L., D.J. Kennedy, and A.M. Phillips, III, 2004a, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2002 Report*, report on file at the Hualapai Department of Cultural Resources.

Jackson, L., D.J. Kennedy, and A.M. Phillips, III, 2004b, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2003–2004 Report*, report on file at the Hualapai Department of Cultural Resources.

Jackson, L., J. Tschopp, S. Wilder, D.J. Kennedy, and A.M. Phillips, III, 2006, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2005 Report*, report on file at the Hualapai Department of Cultural Resources.

Jackson-Kelly, L., 2008, “Hualapai Tribe’s Participation in the Adaptive Management Program: A Stakeholder’s Perspective,” presented at the Glen Canyon Dam Adaptive Management Work Group Meeting, Sept. 9–10.

Jackson-Kelly, L., and K. Christensen, 2007, *Terrestrial Monitoring Protocols Developed for Cultural Resources, Ethnobotany, and Wildlife Monitoring in Grand Canyon by the Hualapai Tribe, 2007*, report on file at the Hualapai Department of Cultural Resources.

Jackson-Kelly, L., D.J. Kennedy, A.M. Phillips, III, K. Christensen, and D. Hubbs, 2007, *Monitoring Protocols, Traditional Hualapai Ecological Knowledge, and the Monitoring Program for the Ecosystem in the Colorado River Corridor, 2007*, report on file at the Hualapai Department of Cultural Resources.

Jackson-Kelly, L., D. Hubbs, C. Cannon, and A.M. Phillips, III, 2009, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2009 Report*, report on file at the Hualapai Department of Cultural Resources.

Jackson-Kelly, L., D. Hubbs, C. Cannon, and A.M. Phillips, III, 2010, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2010 Report*, report on file at the Hualapai Department of Cultural Resources.

Jackson-Kelly, L., D. Hubbs, C. Cannon, A.M. Phillips, III, and W.G. Wright, 2011, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2011 Report*, report on file at the Hualapai Department of Cultural Resources.

Jackson-Kelly, L., D. Hubbs, C. Cannon, and A.M. Phillips, III, 2013, *Evaluating Hualapai Cultural Resources along the Colorado River May and August 2012*, report on file at the Hualapai Department of Cultural Resources.

Jackson-Kelly, L., D. Hubbs, and C. Cannon, 2014, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2013 Report*, report on file at the Hualapai Department of Cultural Resources.

Jackson-Kelly, L., P. Bungart, D. Hubbs, C. Cannon, and B. Wakayuta, 2016, *Evaluating Hualapai Cultural Resources along the Colorado River: FY2015 Report*, report on file at the Hualapai Department of Cultural Resources.

Jennings, J.D., 1966, *Glen Canyon: A Summary*, Anthropological Papers No. 81, University of Utah, Salt Lake City, Utah.

Jennings, J.D., 1978, *Prehistory of Utah and the Eastern Great Basin*. University of Utah Anthropological Papers No. 98, Salt Lake City, Utah.

Jones, A.T., 1986, *A Cross-Section of Grand Canyon Archeology: Excavations at Five Sites along the Colorado River*, Publications in Anthropology No. 28, Western Archeological and Conservation Center, National Park Service, Tucson, Ariz.

Kasprak, A., J. Caster, S. Bangen, and J.B. Sankey, 2017, "Geomorphic Process from Topographic Form: Automating the Interpretation of Repeat Survey Data in River Valleys," submitted to *Geophysical Research Letters*.

Knaut, A.L., 1995, *The Pueblo Revolt of 1680: Conquest and Resistance in Seventeenth-Century New Mexico*, Norman, Okla.: University of Oklahoma Press.

Kroeber, A.L. (ed.), 1935, *Walapai Ethnography*, Memoirs of the American Anthropological Association, American Anthropological Society, 293 pp.

Leap, L.M., and C.M. Coder, 1995, *Erosion Control Project at Palisades Delta along the Colorado River Corridor Grand Canyon National Park*, report prepared by GCES Project Archaeologists, Cultural Resource Management, Grand Canyon National Park, November 30.

Leap, L.M., and L.A. Neal, 1992, *Testing and Charcoal Sampling at C:3:32, River Mile -9.8LB and C:2:100, River Mile -0.4LB, Glen Canyon National Recreation Area*, manuscript on file at National Park Service, Glen Canyon National Recreation Area, Cultural Program Files, Page, Ariz.

Leap, L.M., T.W. Burchett, J.L. Kunde, N.B. Andrews, and D.C. Hubbard, 1998, *1998 Summary Report: Archaeological Site Monitoring and Management along the Colorado River Corridor below Glen Canyon Dam*, Cooperative Agreement 8210-97-002, Grand Canyon National Park, Ariz., Glen Canyon National Recreation Area, Page, Ariz., and Northern Arizona University, Flagstaff, Ariz.

Leap, L.M., J.L. Kunde, D.C. Hubbard, N. Andrews, C.E. Downum, A. Miller, and J.R. Balsom, 2000, *Grand Canyon Monitoring Project 1992–1999: Synthesis and Annual Report FY99*, Grand Canyon National Park and Northern Arizona University RCMP Report No. 66, submitted to Bureau of Reclamation, Salt Lake City, Utah, May.

Leap, L.M., J.L. Dierker, and N.B. Andrews, 2003, *Archeological Site Monitoring and Management Activities along the Colorado River in Grand Canyon National Park*, prepared by GCES Project Archaeologists, Cultural Resource Management, Grand Canyon National Park.

Lindsay, A.J., Jr., 1969, *The Tsegi Phase of the Kayenta Cultural Tradition of Northeastern Arizona*, Ph.D. Dissertation, University of Arizona, Anthropology Department, Tucson, Ariz.

Lindsey, B., and F. Fisher, 1999, *Soil Description, Palisades Creek Area*, report submitted to the National Resources Conservation Service.

Lyneis, M.M., 1996, "Pueblo II-Pueblo III Change in Southwestern Utah, the Arizona Strip, and Southern Nevada," in: *The Prehistoric Pueblo World, A.D. 1150–1350*, Adler, M.A. (ed.), pp. 11–28, Tucson: University of Arizona Press.

Madsen, D.B., and D. Rhode, 1994, *Across the West: Human Population Movement and the Expansion of the Numa*, Salt Lake City: University of Utah Press.

Mapatis, E., 1982, *Hualapai Ethnobotany*, translated by L. Watahomigie, M. Powskey, and J. Bender, Hualapai Bilingual Program, Peach Springs School District, Peach Springs, Ariz.

Mardorf, C.A., 2010, *National Register of Historic Places Nomination Form – Lees Ferry and Lonely Dell Ranch Historic District*, National Park Service, on file at Glen Canyon National Recreation Area, Page, Ariz.

Martinez, D.J., 2017, *Synthesis of Archaeological, Geoarchaeological, Geomorphic, and Ethnographic Investigations at Ninemile Terrace, Glen Canyon National Recreation Area*, manuscript on file, Glen Canyon National Recreation Area, Page, Ariz.

McGregor, J.C., 1951, *The Cohonina Culture of Northwestern Arizona*, Lexington: University of Kentucky Press.

McGregor, J.C., 1967, *The Cohonina Culture of Mount Floyd, Arizona*, Lexington: University of Kentucky Press.

Mink, P.B., II, 2013, *Remote Sensing Five Archaeological Sites along the Colorado River*, KAS Report No. 239, prepared by Kentucky Archaeological Survey jointly administered by Kentucky Heritage Council and University of Kentucky, Department of Anthropology, Lexington, Ky., for Grand Canyon National Park, Grand Canyon, Ariz.

Moffitt, S.A., and L.R. Moffitt, 2004, *The Archaeology of Mather Point: Results from the Canyon View Information Plaza Project*, National Park Service, Grand Canyon National Park, Ariz.

Mueller-Dombois, D., and E. Ellenberg, 1974, *Aims and Methods of Vegetation Ecology*, New York: John Wiley and Sons.

Muhn, J.A., 1977, *National Register of Historic Places Inventory—Nomination Form: Lonely Dell Ranch Historic District*, prepared April 27 (date entered May 19, 1978). Available at <https://npgallery.nps.gov/GetAsset/a362b456-80b0-4e22-a879-f951f11f9775>, accessed May 30, 2018.

Navajo Nation, 1998, *Navajo Nation Cultural Resources Protection Act*, CMY 19-88.

Neal, L.A., and D. Gilpin, 2000, *Cultural Resources Data Synthesis within the Colorado River Corridor, Grand Canyon National Park and Glen Canyon National Recreation Area, Arizona*. SWCA, Inc., Environmental Consultants, Flagstaff, Ariz.

Neff, L.C., and C.C. Corey, 2004, *Archaeological Investigations at 3-Mile Bar: Testing at Sites AZ C:02:84 and C:02:40 (GC) Glen Canyon National Recreation Area, Arizona*, Publications in Anthropology 86, National Park Service, Intermountain Region, Western Archeological and Conservation Center, Tucson, Ariz.

Neff, L.C., and M.A. Wilson, 2002, *Archaeological Investigations at Ferry Swale Bench—Glen Canyon National Recreation Area, Arizona*, Western Archaeological and Conservation Center (tDAR ID: 4342), Publications in Anthropology, Volume 81, doi: 10.6067/XCV8513WZJ.

Neff, T., J.H. Collette, K. Spurr, K.C. Anderson, D.R. Keller, and B.W. Kranzler, 2016, *Archaeological Excavations at Nine Sites Along the Colorado River in Grand Canyon National Park: The MNA – NPS Grand Canyon River Corridor Archaeological Project*, Grand Canyon National Park, Ariz.

NPS (National Park Service), 1991, Letter to the Arizona State Historic Preservation Office, Oct. 23.

NPS, 2005, *Grand Canyon National Park Final Environmental Impact Statement Colorado River Management Plan Grand Canyon National Park*, November.

NPS, 2006, *Management Policies*, U.S. Department of the Interior, National Park Service.

NPS, 2010, *National Park Service Cultural Landscapes Inventory, Lees Ferry and Lonely Dell Ranch, Glen Canyon National Recreation Area*, report on file, Glen Canyon National Recreation Area, Page, Ariz.

NPS, 2016, “Erosion Control Structure Implementation Best Management Practice Details,” In: *Grand Canyon National Park Standard Operating Procedures for Cultural Resource Management*, SOP 5 Mitigation Strategies.

Parker, P.L., and T.F. King, 1990, “Guidelines for Evaluating and Documenting Traditional Cultural Properties,” *National Register Bulletin* No. 38, National Park Service, Washington, D.C.

Pederson, J., and G.R. O’Brien, 2014, “Patterns in the Landscape and Erosion of Cultural Sites along the Colorado River Corridor in Grand Canyon, USA,” *Geoarchaeology* 29:431–447.

Pederson, J.L., P.A. Petersen, W.W. Macfarlane, M.F. Gonzales, and K. Kohl, 2003, *Mitigation, Monitoring, and Geomorphology Related to Gully Erosion of Cultural Sites in Grand Canyon*, report to the U.S. Geological Survey, Grand Canyon Monitoring and Research Center, Flagstaff, Ariz., 241 pp.

Pederson, J.L., P.A. Peterson, and J.L. Dierker, 2006, “Gullying and Erosion Control at Archaeological Sites in Grand Canyon, Arizona,” *Earth Surface Processes and Landforms* 31(4):507–525.

Pederson, J., G. O’Brien, T. Neff, and K. Spurr, 2011, *Grand Canyon Geoarchaeology Project Report on Data Recovery at Nine Cultural Sites in Grand Canyon and Lower Glen Canyon 2008–2010*, submitted to Bureau of Reclamation, Upper Colorado Region, Salt Lake City, Utah, Sept.

Pershern, S., 2016, *Ongoing Submerged Monitoring of the Charles H. Spencer*. U.S. Department of the Interior, National Park Service, Submerged Resource Center, Lakewood, Colo.

Pershern, S., J. Keller, and D. Conlin, 2015, *Assessment and Long-Term Management Strategy Recommendations for the Charles H. Spencer Site: A 20th Century Paddle Wheel Steamer on the Banks of the Colorado River, Glen Canyon National Recreation Area*, Submerged Resources Center Technical Report No. 35, U.S. Department of the Interior, National Park Service, Submerged Resource Center, Lakewood, Colo.

Phillips, A.M., III, 1994a, *Hualapai Ethnobotanical Native Species Plant Study, Initial Reconnaissance River Trip*, Trip Report, June 12–15, 1994, Botanical and Environmental Consulting, Flagstaff, Ariz.

Phillips, A.M., III, 1994b, *Hualapai Ethnobotanical Native Species Plant Study, Second Reconnaissance Trip*, Trip Report, September 10–14, 1994, Arthur M. Phillips, III, Ph.D., Botanical and Environmental Consulting, Flagstaff, Ariz.

- Phillips, A.M., III, 1995a, *Hualapai Ethnobotanical Native Species Plant Study, Third Reconnaissance River Trip*, Trip Report, April 10–17, 1995, Botanical and Environmental Consulting, Flagstaff, Ariz.
- Phillips, A.M., III, 1995b, *Hualapai Ethnobotanical Native Species Plant Study, National Canyon to Pearce Ferry Trip Report, April 10–18, 1995 (Also Reporting on June 12–15, 1994 and September 10–14, 1994)*, report on file at the Hualapai Department of Cultural Resources.
- Phillips, A.M., III, and L. Jackson, 1996, *Evaluation and Mitigation Efforts for March 1996 Colorado River Test Flow Experiment, December 1996*, report on file at the Hualapai Department of Cultural Resources.
- Phillips, A.M., III, and L. Jackson, 1997, *Monitoring Hualapai Ethnobotanical Resources along the Colorado River Annual Report 1997*, report on file at the Hualapai Department of Cultural Resources.
- Phillips, A.M., III, and L. Jackson, 1999, *Monitoring Hualapai Ethnobotanical Resources along the Colorado River Final Report: 1998–1999*, report on file at the Hualapai Department of Cultural Resources.
- Piper, J., R. Martin, A. Roan, J. Begay, R. Goodman, K. Kelley, and H. Franics, 2018, *An Ethnographic Inquiry for Portions of the Glen Canyon National Recreation Area from Glen Canyon Dam to Lees Ferry in LeChee, Coppermine, and Boadaway/Gap Chapters, Coconino County, Arizona*, DCRM 2018-07, Navajo Nation Heritage and Historic Preservation Department, Window Rock, Ariz.
- Pitroff, T., 2015, *Review of Archaeological Sites for Inclusion in the Area of Potential Effect for Glen Canyon Dam Operations under the Long-Term Experimental and Management Plan (LTEMP)*, manuscript, on file, Glen Canyon National Recreation Area, Page, Ariz.
- Powell, J.W., 1961, *The Exploration of the Colorado River and its Canyons*, New York: Dover Publications, Inc.
- Powell, S., and F.E. Smiley (eds.), 2002, *Prehistoric Culture Change on the Colorado Plateau: Ten Thousand Years on Black Mesa*, Tucson: University of Arizona Press.
- RDI Native Peoples Technical Assistance Office, nd, San Juan Southern Paiute Tribe Community Profile. Available at: <https://nptao.arizona.edu/san-juan-southern-paiute-tribe> .
- Raab, L.M., T.C. Klinger, M.B. Schiffer, and A.C. Goodyear, 1980, “Clients, Contracts, and
- Reclamation (U.S. Bureau of Reclamation), 2011, Letter to Arizona State Historic Preservation Office, *Re: Determination of Eligibility and Effect on Historic Properties Regarding Proposed Adoption of a High Flow Protocol for Glen Canyon Dam, Coconino and Mohave Counties, AZ*, June 27.

Reclamation, 2015, *Glen Canyon Dam Adaptive Management Program*, Bureau of Reclamation, Upper Colorado Region, Salt Lake City, Utah. Available at <https://www.usbr.gov/uc/rm/amp/twg/mtgs/14jan30/index.html>, accessed May 30, 2018.

Reclamation, 2016a, *Glen Canyon Dam Long-Term Experimental and Management Plan Environmental Impact Statement*, U.S. Department of the Interior, Bureau of Reclamation, Upper Colorado Region; National Park Service, Intermountain Region.

Reclamation, 2016b, *Record of Decision for the Glen Canyon Dam Long-Term Experimental and Management Plan Final Environmental Impact Statement*, U.S. Department of the Interior, Bureau of Reclamation, Upper Colorado Region; National Park Service, Intermountain Region.

Reclamation, 2017, *Programmatic Agreement Among U.S. Department of the Interior Bureau of Reclamation and National Park Service; Western Area Power Administration; The Advisory Council on Historic Preservation; the Hualapai Tribal Historic Preservation Officer; The Navajo Nation Tribal Historic Preservation Officer; the Hopi Tribe; the Kaibab Band of Paiute Indians; The Paiute Indian Tribe of Utah; the Pueblo of Zuni; and the Arizona State Historic Preservation Officer Regarding the Glen Canyon Dam Operations and Non-Flow Actions Identified in the Long Term Experimental and Management Plan Environmental Impact Statement and Record of Decision*, U.S. Department of the Interior, Bureau of Reclamation, Upper Colorado Regional Office, Salt Lake City, Utah, May 11.

Reclamation, undated, “A Century of Cooperation: Grand Canyon Protection Act of 1992,” *Managing Water in the West*, Bureau of Reclamation, Lower Colorado Region. Available at https://www.usbr.gov/lc/phoenix/AZ100/1990/grand_canyon_protection_act_1992.html, accessed October 25, 2018.

Reilly, P.T., 1999, *Lee’s Ferry: from Mormon Crossing to National Park*, Utah State University Press, Logan, Utah.

Roberts, A., R.M. Begay, and K.B. Kelley, 1995, *Bits’ÍIs NinÉÉzi (The River of Neverending Life)*, Navajo History and Cultural Resources of the Grand Canyon and the Colorado River, submitted by Navajo Nation Historic Preservation Department, Window Rock, Ariz., to Glen Canyon Environmental Studies Program, Upper Colorado Regional Office, Bureau of Reclamation, August 9.

Rosenthal, H.D., 1990, *Their Day in Court: A History of the Indian Claims Commission*, New York and London: Garland Publishing, Inc., 310 pp.

Rusho, W.L., and C.G. Crampton, 1981, *Desert River Crossing: Historic Lee’s Ferry on the Colorado River*, Santa Barbara: Peregrine Smith, Inc.

Samples, T., 1992, *Cohonina Archaeology: The View from Sitgreaves Mountain*, unpublished Master’s Thesis, Northern Arizona University, Department of Anthropology, Flagstaff, Ariz.

- Sankey, J.B., and A. Draut, 2014, "Gully Annealing by Aeolian Sediment: Field and Remote-sensing Investigation of Aeolian-hillslope-fluvial Interactions, Colorado River Corridor, Arizona, USA," *Geomorphology* 220:68–80. doi: 10.1016/j.geomorph.2014.05.028
- Schaafsma, P., 1987, *Indian Rock Art of the Southwest*, School of American Research, Albuquerque: Santa Fe and University of New Mexico Press.
- Schaafsma, P., 1990, "Shaman's Gallery: A Grand Canyon Rock Art Site," *Kiva* 55(3):213–234.
- Schroeder, M.R., 1997, *The Archaic at Grand Canyon: A View from the Rim*, paper presented at the 1997 Pecos Conference, Chaco Canyon National Historic Park, New Mexico.
- Schroedl, A.R., 1977, "The Grand Canyon Figurine Complex," *American Antiquity* 42:254–265.
- Schwartz, D.W., 1989, *On the Edge of Splendor: Exploring Grand Canyon's Human Past*, School of American Research, Santa Fe, N. Mex.
- Schwartz, D.W., A.L. Lange, and R. DeSaussure, 1958, "Split-Twig Figurines in the Grand Canyon," *American Antiquity* 23:264–274.
- Schwartz, D.W., R.C. Chapman, and J. Kepp, 1980, *Archaeology of Grand Canyon: Walhalla Plateau*, School of American Research, Santa Fe, N. Mex.
- Seminole Nation v. United States, 316 U.S. 286 (1942).
- Simonis, D., 2001, *Immaculate Conception: Problems with Archaeological Conceptions Concerning the Pai and Cohonina*, paper presented at the 66th Annual Meeting of the Society for American Archaeology, New Orleans, La.
- Smiley, F.E., 2002, "The First Black Mesa Farmers: The White Dog and Lolomai Phases," in: Powell, S., and F.E. Smiley (eds.), *Prehistoric Culture Change on the Colorado Plateau: Ten Thousand Years on Black Mesa*, Tucson: University of Arizona Press, pp. 37–65.
- Smiley, F.E., and R.V.N. Ahlstrom, 1998, *Archaeological Chronometry: Radiocarbon and Tree Ring Models and Applications from Black Mesa, Arizona*, Center for Archaeological Investigations Occasional Paper No. 16, Carbondale, Ill.: Southern Illinois University Press.
- Smiley, F.E., C.E. Downum, and S.G. Smiley (eds.), 2017, *The Archaeology of the Grand Canyon: Ancient Peoples, Ancient Places*, Grand Canyon Association, Grand Canyon, Ariz.
- Spurr, K., and J.H. Collette, 2007, *Condition Assessment and Significance Evaluation for Cultural Resources between Glen Canyon Dam and Paria Riffle, Glen Canyon Recreation Area, Arizona*, Navajo Nation Archaeology Department Report No. 05-123, prepared by the Navajo Nation Archaeology Department, Northern Arizona University Branch Office, Window Rock, Ariz., for the Bureau of Reclamation, Upper Colorado Region, Salt Lake City, Utah, March 30.

Stevens, R.H., J.A. Mercer, and Hualapai Tribe's Office of Cultural Resources, 1998, *Hualapai Tribe's Traditional Cultural Properties in Relation to the Colorado River, Grand Canyon, Arizona Final Report: 1998*, report on file at the Hualapai Cultural Resources Department.

Stoffle, R.W., and M.J. Evans, 1990, "Holistic Conservation and Cultural Triage: American Indian Perspectives on Cultural Resources," *Human Organization* 49(2):91–99.

Stoffle, R.W., D.B. Halmo, M.J. Evans, and D.E. Austin, 1994, *Pia'Paxa`Uipi (Big River Canyon): Southern Paiute Ethnographic Resource Inventory and Assessment for Colorado River Corridor, Glen Canyon National Recreation Area, Utah and Arizona, and Grand Canyon National Park, Arizona*, University of Arizona, Bureau of Applied Ethnology, Tucson, Ariz., submitted to Bureau of Reclamation, Glen Canyon Environmental Studies Office, Flagstaff, Ariz., June.

Stoffle, R.W., D.E. Austin, B.K. Fulfroft, A.M. Phillips, III, and T.F. Drye, 1995a, *Itus, Atv, Te'ek (Past, Present, Future) Managing Southern Paiute Resources in the Colorado River Corridor*, prepared by Southern Paiute Consortium, Pipe Spring, Ariz., and University of Arizona, Bureau of Applied Research in Anthropology, Tucson, Ariz., for Bureau of Reclamation, Glen Canyon Environmental Studies, Flagstaff, Ariz., Sept.

Stoffle, R., L.L. Loendorf, D.E. Austin, D.B. Halmo, A.S. Bullets, and B.K. Fulfroft, 1995b, *Tampituxwinap: Southern Paiute Rock Art in the Colorado River Corridor*, prepared for the Glen Canyon Environmental Studies, Bureau of Reclamation by the Bureau of Applied Research in Anthropology, University of Arizona, Tucson, Ariz.

Stoffle, R.W., D.B. Halmo, and D.E. Austin, 1997, "Cultural Landscapes and Traditional Cultural Properties: A Southern Paiute View of the Grand Canyon and Colorado River," *American Indian Quarterly* 21(2): 229–249.

Stoffle, R.W., K. Carroll, A. Eisenberg, and J. Amato, 2004, *Ethnographic Assessment of Kaibab Paiute Cultural Resources in Grand Staircase-Escalante National Monument, Utah*, prepared for the Kaibab Paiute Tribe and the U.S. Department of the Interior, Bureau of Land Management, Grand Staircase National Monument, by the Bureau of Applied Research in Anthropology, University of Arizona, Tucson, Ariz.

Stoffle, R.W., K. Van Vlack, A. Carroll, F. Chmara-Huff, and A. Martinez, 2005, *Yanawant: Paiute Places and Landscapes in the Arizona Strip*, Volume One of the Arizona Strip Landscapes and Place Name Study, prepared at the Bureau of Applied Research in Anthropology for the Bureau of Land Management.

Sullivan, A.P., III, 1986, *Prehistory of the Upper Basin, Coconino County, Arizona*, Archaeological Series No. 167, Arizona State Museum, Cultural Resource Management Division, University of Arizona, Tucson, Ariz.

- Tainer, E.M., 2010, *High-Resolution Holocene Alluvial Stratigraphy at Archaeological Sites in Eastern Grand Canyon, Arizona*, M.S. Thesis, Utah State University, Department of Geology, Logan, Utah, 165 pp.
- Thompson, K.S., and A.R. Potochnik (eds.), 2000, *Development of a Geomorphic Model to Predict Erosion of the Pre-Dam Colorado River Terraces Containing Archaeological Resources*, SWCA Cultural Resources Report No. 99-257, prepared by SWCA, Inc., Environmental Consultants, Flagstaff, Ariz., for Grand Canyon Monitoring and Research Center, Flagstaff, Ariz., Feb. 18.
- Turner II, C.G., 1963, *Petroglyphs of the Glen Canyon Region*, Bulletin No. 38 (Glen Canyon Series No. 4), Museum of Northern Arizona, Flagstaff, Ariz.
- Turner II, C.G., 1971, "Revised Dating for Early Rock Art of the Glen Canyon Region," *American Antiquity* 36:469–471.
- Two Bears, D., 2007, "Navajo Occupation of Glen Canyon," in: *Condition Assessment and Significance Evaluation for Cultural Resources Between Glen Canyon Dam and Paria Riffle, Glen Canyon National Recreation Area, Arizona*, Spurr, K., and J.H. Collette (eds.), pp. 31–33, Navajo Nation Archaeology Department Report No. 05-123, prepared for the Bureau of Reclamation, Upper Colorado Region, Navajo Nation Archaeology Department-Northern Arizona University Branch Office, Flagstaff, Ariz.
- Van Vlack, K., 2012, "Southern Paiute Pilgrimage and Relationship Formation," *Ethnology* 51(1/2):129–140.
- Vance, M.M., 2013, *Archaeological Inventory of the Glen Canyon National Recreation Area Accessible Shorelines*, Archaeological Reports 1328 and 1338, Northern Arizona University, Flagstaff, Ariz.
- West, G.A., 1925, "Cliff Dwelling and Pueblos in Grand Canyon, Arizona," *Yearbook*, Milwaukee Public Museum, Milwaukee, Wisc.
- Wheeler, S.M., 1939, "Split-Twig Figurines," *Masterkey* 13(1):42–45.
- Wheeler, S.M., 1949, "More about Split-Twig Figurines," *Masterkey* 23(1):153–158.
- Wulf, L., and J. Moss, 2004, *Archaeological Site Monitoring and Management along the Colorado River Corridor below Glen Canyon Dam*, FY2004 Annual Monitoring Report, National Park Service, Flagstaff, Ariz.
- Yeatts, M., 2018a, "Maintaining Hopi Stewardship of Öngtupqa (the Grand Canyon)," in: Kuwanwisiwma, L.J., T. J. Ferguson, and C. Colwell (eds.), *Footprints of Hopi History: Hopihiniwtiput Kukveni'at*, Tucson: University of Arizona Press, pp. 39–51.

Yeatts, M., 2018b, *Hopi Glen Canyon Ethnographic Research Project*, Hopi Cultural Preservation Office, Kiqötsmovi, Ariz.

Yeatts, M., and K. Huisinga, 2007, *A Hopi Long-Term Monitoring Program for Öngtupqa (the Grand Canyon)*, prepared for the Bureau of Reclamation under Contract No. 06-SQ-40-0180.

Yeatts, M., and K. Huisinga, 2013, *2013 Report of the Hopi Long-Term Monitoring Program for Öngtupqa (the Grand Canyon)*, prepared by the Hopi Cultural Preservation Office, Kykotsmovi, Ariz., for the Glen Canyon Dam Adaptive Management Program, Bureau of Reclamation, Dec.

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APPENDIX A: DEFINITIONS

A

Adaptive management: Method or system for examining alternative strategies for meeting measurable goals and objectives and then, if necessary and in response to new information and/or changing circumstances, adjusting actions according to what is learned.

Adaptive Management Work Group (AMWG): Federal advisory committee to the Secretary of the Interior. Incorporates those stakeholders with interest in the operation of Glen Canyon Dam and downstream resources and includes public involvement.

Adverse impact: Abnormal, harmful, or undesirable effect that results from taking a particular action.

Aeolian processes: Erosion, transport, and deposition of sediment by the wind. Commonly occurs in areas with sparse or nonexistent vegetation, a supply of fine sediment, and strong winds.

Affected environment: Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action. Also, the chapter in an Environmental Impact Statement (see definition below) describing current environmental conditions. A description of the affected environment *must* (1) include information necessary to assess or understand impacts, (2) contain enough detail to support the impact analyses, and (3) highlight environmentally sensitive resources.

American Indian: Of, or relating to, a Tribe, people, or culture that is indigenous to the United States.

AMWG: See Adaptive Management Work Group.

Archeological resource: Any material remains or physical evidence of past human life or activities that are of archeological interest, including the record of the effects of human activities on the environment. An archeological resource is capable of revealing scientific or humanistic information through archeological research.

Archeological site: A place (or group of physical sites) in which evidence of past activity is preserved (either prehistoric or historic or contemporary); that has been, or may be, investigated using the discipline of archeology; and that represents a part of the archeological record.

Archeology: Study of human cultures through the recovery and analysis of their material remains.

Archaic: In American archeology, a cultural stage following the earliest known human occupation in the Americas (about 5500 B.C. to A.D. 100); this stage was characterized by a

hunting and gathering lifestyle and seasonal movement to take advantage of a variety of resources.

Artifact: Object produced or shaped by human beings and of archeological or historical interest.

Associative Value: Values assigned to properties significant for their association or linkage to events (National Register Criterion A) or persons (National Register Criterion B) important in the past.

B

Baseline: Information identified or found at the beginning of a study or experiment that serves as a basis against which to measure or compare subsequent findings.

C

Clovis technological complex: A widespread, distinctive early Paleoindian culture defined by a distinct form of fluted stone projectile points; named for Clovis, New Mexico, the city near which they were found. Clovis technology dates to around 13,500 years ago.

Colorado River Ecosystem (CRE): Community of aquatic, riparian, and terrestrial fauna and flora of the Colorado River mainstream corridor and its tributaries, along with that system's processes and environments. In general, the CRE encompasses the Colorado River primarily from the forebay of Glen Canyon Dam to the western boundary of Grand Canyon National Park and includes the area where Glen Canyon Dam operations affect physical, biological, recreational, cultural, and other resources.

Cultural property: The tangible evidence or expression of cultural heritage such as works of art, buildings, or their ruins.

Cultural resource: Any sites, districts, buildings, structures, objects, or features significant in history, architecture, archeology, culture, or science. Also, Native American sacred sites or special use areas that provide evidence of the prehistory and history of a community.

E

Effect: Environmental consequences that result from a proposed action.

Endangered Species Act of 1973 (ESA): Federal program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. Requires consultation with the U.S. Fish and Wildlife Service (FWS) and/or the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service to determine whether endangered or threatened

species or their habitats will be affected by proposed activity and what, if any, mitigation measures are needed to address the impacts.

Environmental Impact Statement (EIS): Detailed document required of federal agencies under the National Environmental Policy Act (see definition below) for major proposals or legislation that will or could significantly affect the environment. An EIS is prepared with public participation and must disclose significant issues and impacts on the human environment that may result from the proposed action or its alternatives. An EIS includes descriptions of the following: the environmental impact of the proposed action; any adverse impacts that cannot be avoided by the proposed action; alternative courses of action; relationships between local, short-term use of the human environment and the maintenance and enhancement of long-term productivity; and the irreversible and irretrievable commitment of resources that would occur if the action were accomplished.

Erosion: Gradual destruction or wearing away of a material (e.g., rock or sand) or object (e.g., beach) by water, wind, or other natural agents.

Ethnobotany (ethnobotanical): The plant lore and agricultural customs of a people; the study of such lore and customs.

Ethnohistory: The use of both historical and ethnographic data such as maps, music, paintings, photography, folklore, and oral tradition to understand a culture on its own terms and according to its own cultural code.

Experimental flow: Investigational releases (e.g., high-flow experiments) designed to explore, test, and assess the relationships between dam operations and downstream resources in and along the Colorado River within the Grand Canyon National Park (GCNP) and Glen Canyon.

G

Glen Canyon Dam: Second-highest concrete-arch dam in the United States. Located about 15 miles upstream from Lees Ferry, this 710-foot-high structure is the key feature of the Colorado River Storage Project. Constructed to harness the power of the Colorado River to provide for the water and power needs of people in the western United States.

Glen Canyon Dam Adaptive Management Program (GCDAMP): Provides an organization and process for cooperative integration of dam operations, downstream resource protection and management, and monitoring and research information. Also outlines methods to improve the values for which the Grand Canyon National Park and Glen Canyon National Recreation Area (see definitions below) were established.

Glen Canyon National Recreation Area (GLCA): Area that encompasses hundreds of square miles from Lees Ferry in Arizona to the Orange Cliffs of southern Utah; used for water-based and backcountry recreation.

Grand Canyon Monitoring and Research Center (GCMRC): Science provider for the GCDAMP. Operated by the U.S. Geological Survey, the GCMRC provides relevant scientific information about the status and trends of natural, cultural, and recreational resources found in portions of the GCNP and GLCA affected by Glen Canyon Dam operations.

Grand Canyon National Park (GCNP): A National Park since 1919, the area contains unique combinations of erosional forms. It is 277 river miles long and up to 18 miles wide. The area encompasses 1,218,375 acres on the Colorado Plateau in northwestern Arizona; the land is semiarid and consists of raised plateaus and structural basins.

Grand Canyon National Park Enlargement Act: An act of Congress enacted in 1975 to further protect the Grand Canyon by enlarging the park in the state of Arizona.

Grand Canyon Protection Act of 1992 (GCPA): Directs the operation of Glen Canyon Dam in accordance with the additional criteria and operating plans specified in section 1804 and exercises other authorities under existing law in such a manner as to protect, mitigate adverse impacts to, and improve the values for which the GCNP and GLCA were established, including, but not limited to, natural and cultural resources and visitor use.

H

High flow: Pulses or temporary influxes of water that typically occur after periods of precipitation and are contained within the natural banks of the river (i.e., do not cause flooding). In a river, these events can lead to a temporary reduction in downstream temperature and increase in salinity, dissolved oxygen, and turbidity. High flows suspend and deliver large amounts of sediment and organic matter downstream, which can redeposit on sandbars and beaches. They can also restore and enhance riparian vegetation and can prevent undesirable vegetation from invading river channels. In addition, high-flow events can work to reshape and maintain native fish habitats, stimulate food base production, and suppress numbers of nonnative fish.

High-flow experiment (HFE): High-volume test releases (31,500 to 45,000 cubic feet per second [cfs]) from the Glen Canyon Dam that are performed under sediment-enriched conditions. HFEs are specifically designed to benefit downstream resources by, for instance, maintaining and rebuilding sandbars and beaches in downstream reaches.

Historic: The time period after the appearance of written records. In the New World, this generally refers to the time period after the beginning of European settlement (approximately 1600 A.D.).

Historic property: Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the *National Register of Historic Places* (see definition below) maintained by the Secretary of the Interior. The term includes artifacts, records, and remains that are related to and located within such properties.

Historic resource: In the United States, material remains and the landscape alterations that have occurred since the arrival of Europeans.

I

Impact: Effect, influence, alteration, or imprint caused by an action.

In-situ: In its natural position or place; unmoved, unexcavated, remaining at the site or subsurface.

Indian trust assets: Lands, natural resources, or other assets held in trust or restricted against alienation by the United States for Native American Tribes or individual Native Americans.

Indian trust resource: Those natural resources, located either on or off Indian lands, retained by or reserved by or for Indian tribes through treaties, statutes, judicial decisions, and Executive Orders; such resources are protected by a fiduciary obligation on the part of the United States.

Indigenous: Native to an area.

Indirect effect (impact): Effect that occurs away from the place of action; indirect effects are related to, but removed from, a proposed action by an intermediate step or process. An example would be changes in surface water quality resulting from soil erosion at construction sites.

L

Landmark (historic): Significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States.

Landmark (visual): Type of reference point external to the observer. Usually a simply defined physical object that can be seen from many angles and distances over the tops of smaller elements and used as a radial reference.

Landscape: Traits, patterns, and structure of a specific geographic area, including its biological composition, its physical environment, and its anthropogenic or social patterns.

Law of the River: As applied to the Colorado River, the collective set of documents that apportions the Colorado River waters and regulates the use and management of the Colorado River among the seven Basin States and Mexico. The law comprises numerous operating criteria, regulations, and administrative decisions included in Federal and state statutes, interstate compacts, court decisions and decrees, an international treaty, and contracts with the Secretary of the Interior.

Lead agency (or agencies): Federal agency (or agencies) either preparing or taking primary responsibility for preparing National Environmental Policy Act of 1969 (NEPA) compliance documents.

Lees Ferry: Reference point marking division between the Upper and Lower Colorado River basins. The point is located in the mainstream of the Colorado River near the mouth of the Paria River in Arizona. The historic location of Colorado River ferry crossings (1873 to 1928) and the current site of the U.S. Geological Survey stream gage above the Paria River confluence.

M

Mitigation: Mitigation is the reducing of risk of loss, of significance, or of integrity from the occurrence of any event. Treatment is a form of mitigation.

Multivocality: An approach to archeological thought and practice that explicitly recognizes and highlights the narratives of the past which are intrinsically multilayered and dialogic—that is, always informing and informed by other works—and that different landscapes both define and express a multitude of meanings of place for the different peoples for whom they hold importance.

N

National Environmental Policy Act of 1969 (NEPA): Act passed by Congress in 1969 that sets national policy, procedures, tools, and compliance measures to support environmental protection, including the following: (1) encouraging productive harmony between people and their environment; (2) promoting efforts that will prevent or eliminate damage to the environment and the biosphere and stimulate the health and welfare of people; (3) enriching the understanding of the ecological systems and natural resources important to the nation; and (4) establishing a Council on Environmental Quality. NEPA requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. To meet this requirement, federal agencies prepare one of the following: a categorical exclusion, an Environmental Assessment (EA), or an EIS.

National Historic Preservation Act (NHPA) (54 USC § 306108): Federal law providing that property resources with significant national historic value be placed on the *National Register of Historic Places*. NHPA does not require permits; rather, it mandates consultation with the proper agencies whenever it is determined that a proposed action might affect a historic property.

National Register criteria for historic significance: Criteria applied to evaluate properties for the *National Register of Historic Places* that include significance in American history, architecture, archeology, engineering, and culture.

National Register of Historic Places (NRHP): Official list of the nation's cultural resources worthy of preservation. Authorized under the National Historic Preservation Act of 1966, the NRHP is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed in the NRHP include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture.

Native: Species of plants or wildlife that originated in the particular area or region in which they are growing or living.

Native American: See definition for American Indian.

Native American Graves Protection and Repatriation Act (NAGPRA): Act that established the priority for ownership or control of Native American cultural items excavated or discovered on federal or tribal land after 1990 and the procedures for repatriation of items in federal possession. The act allows for the intentional removal or excavation of Native American cultural items from federal or tribal lands only with a permit or upon consultation with the appropriate Tribe.

P

Paleoindian period: A late Pleistocene stage of cultural evolution in the Americas at the end of the last ice age, when the first traces of human activity begin to appear in the archeological record characterized by big-game hunting and the use of fluted projectile points.

Programmatic Agreement (PA): Document that records the terms and conditions agreed upon to resolve the potential adverse effects of a federal agency program, complex Undertaking, or other situations in accordance with Section 800.14(b), "Programmatic Agreements," of 36 CFR Part 800, "Protection of Historic Properties."

Project area: Area in which a proposed action would occur and directly affect the environment. The project area for the Glen Canyon Dam Long-Term Experimental and Management Plan (LTEMP) EIS is Lake Powell, Lake Mead, and the Colorado River and its corridor in between.

Protohistoric: Period between prehistory and history, during which a culture or civilization has not yet developed writing but other cultures have already noted its existence in their own writings. The protohistoric culture may also be in the process of developing its own writing techniques and creating its own written records.

R

Record of Decision (ROD): Document separate from but associated with an EIS that publicly and officially discloses the responsible agency's decision on its analysis of alternatives through the environmental impact statement.

S

Sacred landscape: Natural places recognized by a cultural group as having spiritual or religious significance.

Sacred site: Any specific, discrete, narrowly delineated location on federal land that is identified by an Indian Tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion, provided that the Tribe or appropriate authoritative representative of an Indian religion has informed the agency of the existence of such a site.

Site: In archeology, any location of past human activity.

State Historic Preservation Office(r) (SHPO): The state office(r) charged with the identification and protection of prehistoric and historic resources in accordance with the National Historic Preservation Act.

T

Technical Work Group (TWG): Subcommittee comprising technical representatives of the Adaptive Management Work Group (AMWG) to develop criteria and standards for monitoring and research programs.

Traditional Cultural Property (TCP): Site or resource that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that are (1) rooted in that community's history, and (2) important in maintaining the continuing cultural identity of the community.

Traditional use area: Broad landscapes over which contemporary people and their ancestors have hunted, fished, and gathered.

Treatment. Treatment implies a certain class of mitigative activities that involve active intervention into the physical fabric of a site.

Tribal land: Defined in the NAGPRA as (1) all lands within the exterior boundaries of any Indian reservation; (2) all dependent Indian communities; and (3) any lands administered for the benefit of Native Hawaiians pursuant to the Hawaiian Homes Commission Act, 1920, and section 4 of Public Law 86-3. In the National Historic Preservation Act, tribal land is defined as (1) all lands within the exterior boundaries of any Indian reservation, and (2) all dependent Indian communities.

Tribe: Term used to designate a federally recognized group of American Indians and their governing body. Tribes may be comprised of more than one band.

APPENDIX B: HISTORIC CONTEXT OF THE CANYONS

Archeological data can provide significant evidence of past lifeways, but it can tell only part of a much larger story. Within this holistically viewed landscape are culturally important natural resources and significant cultural landscapes that serve as the settings for tribal histories and spiritual narratives. Oral accounts of tribal history and understandings of traditional landscapes, combined with archeological data, provide a comprehensive representation of the past. This traditional knowledge is presented by each Tribe individually and is referred to in this document as Deep History.

B.1 DEEP HISTORY (CREATION OF THE CANYON, THE PLACES AND ITEMS, AND PEOPLE)

The following narratives at heart reflect the traditional knowledge that indigenous communities maintain about their role and place in the landscape. As such, full understanding is only accessible to those within the cultures that maintain it, and keeping alive important traditional knowledge is paramount to the cultures whose knowledge it is. This knowledge is a self-maintained history of each indigenous group and is also considered a critical aspect in defining an area of traditional religious and cultural value in the Western historic preservation structure.

The need to maintain traditional knowledge suggests at least one aspect of the management of the Grand Canyon, and places and resources within it, in which tribal values can be advanced within the historic preservation framework. Originally, traditional knowledge was passed on through intricate social systems unique to each group. Because of the cumulative influence of events detailed in the subsequent sections (and many others), many systems of traditional knowledge transmission, aspects of the knowledge itself, and the way in which people do or can interact with the Canyons have been fundamentally altered. Therefore, facilitating tribal maintenance of important and significant cultural information is a priority. Further, understanding its changing role(s) through time may contribute to better management and preservation of the resources. Tribes will be given the latitude to take the lead in defining what the needs are for preserving information and what are or are not culturally appropriate approaches.

B.1.1 Hopi

The Hopi began their association with the Grand Canyon when their ancestors emerged into this, the Fourth World, from the *Sipapuni*, in the heart of the Grand Canyon. There, they encountered *Ma'saw*, who instructed the Hopi ancestors to travel across his lands, leaving their "footprints" and imbuing the land with their spiritual stewardship. In this way, and if they adopted *Ma'saw's* humble lifestyle, the Hopi ancestors would be given the right to occupy the land and serve as its stewards. During their travels, the Hopi ancestors branched out across the entire landscape, settling in diverse areas and gaining unique knowledge. The homesites,

petroglyphs, artifacts, shrines, and other cultural manifestations that they left behind (footprints), are the substantiation of the agreement that they made with *Ma'saw*. The archeological sites in the Grand Canyon are evidence of just one small piece of this Migration phase.

It was during the Migrations that unique histories were lived and ritual knowledge was obtained. This knowledge was brought to the center place, the Hopi Mesas, as Clans were granted the right to settle there. Because each Hopi Clan is a product of different migratory paths and events, they each have a distinct knowledge base and play different roles in Hopi society.

Traditional narratives, relying on aspects of Clan knowledge and history, reference numerous places in the Grand Canyon, places where deities reside, descriptions of how various rock formations came into being, why the Hopi Salt Mine is located where it is, the roles that the Colorado and Little Colorado Rivers play in Hopi society, and appropriate behavior to follow when in the Grand Canyon. Much of this information is esoteric, not shared beyond appropriate people within the Clans and at the appropriate times.

The archeological sites, the footprints, are integral to the Hopi's tenure on the land. Not only were they used by their ancestors as homes while they were alive, but they continue to be occupied in the spiritual realm. The resources that nourished and sustained the original occupants are still valued for the ongoing role they play in the circle of life. Of particular importance is water, in all forms, which is the foundation of life.

The Grand Canyon is a cultural focus of the Hopi not only for the central role it plays in many aspects of Hopi history, but also because it is the final destination in the afterlife. The Grand Canyon needs to be maintained appropriately because it is the eternal home for all those who came before and will be coming in the future.

B.1.2 Hualapai

The Hualapai regard as their place of origin a place of springs at the base of a mountain range in the southeast corner of Nevada, overlooking the Colorado River valley. In English, the mountain is known as the Newberry Mountains. In Hualapai, it is called *Wukahme'* (Hinton and Watahomigie 1984:1–38), adapted to English as Spirit Mountain. *Wukahme'* is also considered the place of origin for other Tribes of the Yuman language family, of which the Hualapai are a member. The English name for the spring is Grapevine Spring, actually a series of springs, located in Grapevine Canyon, which is now a featured hiking and sightseeing destination within Lake Mead National Recreation Area. Grapevine Canyon is also known for the extensive and highly stylized petroglyphs found near its mouth.

The earliest known written account of the origin story was taken down by Henry P. Ewing, an Indian agent for the Hualapai and Havasupai, in 1903 (Ewing 1961). The version narrated in Hinton and Watahomigie (1984) was told by Paul Talieje, a Hualapai elder, singer, and storyteller born in the 1880s. *Wukahme'* continues to be revered and frequently visited by Hualapai and other Yuman-language-speaking tribal members to this day, even though the area is also popular with non-Indian sightseers and hikers.

In all known versions of the story, the earth was covered in water, although an old man, called Kathad Kanave in one version (Ewing 1961), looked across an empty expanse alone. By piercing the earth with the sharp tip of a bighorn sheep horn, he was able to cause the water to drain and the land to gradually dry out.

The old man passed away, though, and the Creator made two additional beings, an older brother and younger brother, Maḍvila and Judaba:h. After a time, the older brother Maḍvila had a dream that they should gather many reeds and place them toward the east. During the night, the reeds became people: men, women, and children. Being the older brother, Maḍvila assumed the role of leader and teacher of the newly formed people.

Maḍvila became more and more elderly, and one day he stepped on a frog, crushing its stomach. Later, Maḍvila's own stomach became violently ill and he passed away. Judaba:h declared that the body should be burned; thus, the first cremation took place.

It was then up to Judaba:h to look after the people. He led them down to the Colorado River to the east, where they stayed for a time. As their numbers grew, he decided that the people should disperse in different directions. The Hualapai were instructed to roam the lands along the river (the area south and east of the Colorado River). One of the main areas, told in a separate story, was Maḍwiḍa (Meriwhiteca Canyon), a short distance from the Colorado River in the western Grand Canyon (Hinton and Watahomigie 1984:39–55).

Another telling of the origin of the people, written down in 1929, is in agreement with Ewing's account in most respects (Kroeber 1935:12–26).

Aboriginal Territory

The current Hualapai Reservation encompasses approximately one million acres in the western Grand Canyon region, but the aboriginal territory was about seven times that. It is traditionally held that the entire area extending from the Colorado River to the north and west, down to the Bill Williams River to the south, and the Little Colorado River to the east were once part of the Hualapai homeland.

The ancestral Hualapai were historically divided into 14 bands, each of which typically identified with a geophysical area such as a spring, creek, or mountain range. These were further subsumed under larger sub-Tribe groups: the Plateau People, the Middle Mountain People, and the Yavapai Fighter Sub-Tribe (Dobyns and Euler 1970). For the purpose of this document, we will limit discussion to consideration of the bands of the Plateau People Sub-Tribe, which occupied the territory in and surrounding the Grand Canyon and the Colorado River above Lake Mead. From west to east, these bands were the Grass Springs, Clay Springs, Milkweed Springs, Peach Springs, and Pine Springs bands. Prior to the reservation period, and even leading up to contemporary times, some Pai considered the Havasupai one of the 14 bands as well (as noted in Dobyns and Euler 1970).

It should be noted that the “band” and “sub-Tribe” concepts are distinctly anthropological constructs, devised as the result of the drive by Western science to categorize things. Given such categories, it would be easy to perceive that these designations were static through time and

place. However, societal makeup was fluid throughout history, and the use of landscapes varied considerably throughout the seasons and at times in response to longer-term changes in environmental, climatic, and resource conditions.

Another consideration is that early anthropologists attempted to elicit knowledge about social organization as far back in time as possible (Kroeber 1935; Dobyns and Euler 1970); however, by the time they conducted their studies, the Hualapai were well into the period of contact and influence by Euro-Americans, including the loss of lands, means of subsistence, and mobility. Gathering concrete information based on the actual memories of living people, therefore, was largely limited to the 1850s and later by the time of Kroeber's students' study in 1929 (published in 1935).

In addition, these early studies mainly took place at or near existing communities and vehicle-accessible landscapes. It seems that little to no ethnographic work was actually conducted along the Colorado River (except perhaps at the mouth of Diamond Creek or further downstream in the Lake Mead area, areas which are accessible by vehicle). However, significant knowledge about life along and near the river was obtained through interviews with those who at one time lived, hunted, and gathered food there, or were told stories by their elders and ancestors.

Historically Significant Places along the Colorado River in the Grand Canyon

In both early and more recent conversations with Hualapai knowledgeable about past lifeways, a consistent picture of an emphasis on hunting and gathering, along with horticulture in favorable locations, is portrayed. Important food plants included agave, piñon nuts, stick-leaf mentzelia, mesquite beans, prickly pear fruit, and a number of other seed plants, herbs, and cacti. Deer, antelope, bighorn sheep, rabbits, and other small game were hunted in various parts of the Hualapai territory. Bighorn in particular were important in the rugged Grand Canyon country. Family groups moved around seasonally, moving to upland areas for piñon harvesting in the fall and to lower elevations for agave in the spring.

Also consistent in Hualapai oral history was the occupation of many of the southern tributaries of the Colorado River in the Grand Canyon, as well as the main river corridor. Some of the places that were most frequently mentioned included Mohawk Canyon, Diamond Creek, and Meriwhitica (Mađwiđa in Hualapai). Mađwiđa is particularly important as it was the place where all of the Tribes in the area once lived together, but then were separated and sent to live in other areas, as told in a number of oral accounts (e.g., Hinton and Watahomigie 1984:39–55). The various locations mentioned often had specific historic events associated with them.

The significance of historic Hualapai occupation of the Grand Canyon is well documented through oral history, some of which was collected as early as the beginning of the 20th Century, and through archeological evidence. In many cases, the two lines of evidence converge quite well. The typical pottery ware made by the ancestral Hualapai, Tizon Brown Ware, was commonly found at sites in the western Grand Canyon on the left (south) bank of the Colorado River (Fairley et al. 1994), along with roasting pit features associated with the preparation of agave (and probably other foods). Like the other Tribes that participate in the Glen Canyon Dam Adaptive Management Program (GCDAMP), the Hualapai regard archeological sites as traditional cultural properties (TCPs).

As a result of its own ethnographic studies and annual monitoring river trips, the Hualapai Department of Cultural Resources (HDCR) has compiled a list of TCPs located along the Colorado River, which includes archeological sites, although this list is subject to revisions and additions as new information becomes available.

European and Euro-American Contact

The earliest known documented European to make contact with the Hualapai was the Franciscan explorer Father Francisco Garcés in 1776 (Coues 1900). Garcés made his way to the lower Colorado River and, initially with the help of Mojave guides, headed overland and entered Hualapai country to the east, eventually enlisting the service of Hualapai guides. Garcés apparently made his way into Peach Springs Canyon, then on to visit Supai, ultimately reaching the Hopi villages. His effect on the Hualapai was apparently not particularly notable, although he did observe that Hualapai people living in the Hualapai Mountains were wearing cloth of Hopi manufacture (Coues 1900:319–320), evidence of existing extensive trade networks among the region's Tribes.

The next notable incursion into Hualapai country apparently did not occur until Lieutenant Joseph C. Ives led a survey expedition in 1857 (Ives 1861). Generally following the 35th Parallel during the survey, Ives was led by Hualapai guides to the Colorado River at the mouth of Diamond Creek.

George M. Wheeler, who also led an ambitious mapping expedition, employed Mojave guides to reach the mouth of Diamond Creek in 1871. Of course, the running of the Colorado River by Major John Wesley Powell is perhaps the most famous endeavor to have occurred during that time.

Interestingly, Powell did not mention encountering Hualapai living by the river during his trip, but that may be attributable to external events unfolding some distance from the river. By the late 1860s, increasing contacts between the Hualapai and white settlers, ranchers, and miners resulted in escalating conflicts, and war with the U.S. Army had been ongoing for several years. This set of circumstances undoubtedly had a disruptive effect on the Hualapai people's ability to carry on their normal lives. How this affected their occupation of the Grand Canyon itself is unknown, but Diamond Creek, and possibly other areas, such as Granite Park, were places of refuge, as told through oral history.

Many Hualapai were relocated to Camp Beale Springs near Kingman in the early 1870s, and later forcibly marched in 1874 to be incarcerated at La Paz near Parker, Arizona, where they were held for a year until they escaped in the spring of 1875. After their escape, they returned to their homeland to find much of their former range usurped by miners and ranchers, including their springs, hunting and gathering areas, and farming areas.

Although their aboriginal way of life was changed forever, the Hualapai people still regard the Grand Canyon and Colorado River with great reverence. The river is known as Ha'yidaa, the backbone. It is integral to the identity of the Hualapai people.

B.1.3 Navajo

Nihok'áá Diné é Bila' Ashdlaa'íí, or the earth surface people as referred to within Dine culture, have intimately interacted with the Colorado River Bits'íís Ninéézi (The River of Neverending Life) as ecological stewards and ceremonial custodians since time immemorial. Historical Diné ways of interacting with the land-base can be understood through the Fundamental, natural, and sacred ceremonial laws bestowed upon the Navajo people since the beginning of the emergence of the first world or Ni hodilil (Black World).

The present Navajo world begins at Hajiinai, the Place of Emergence. The people began their journey through several underworlds until they finally emerged into this world. Through the passage of each world after Ni hodilil — Ni Hododlizh (Blue World), Ni Holtso (Yellow World), Ni Halgagh (White World), and finally the fifth and present world Ni Hodisqous (Glittering World) — the Navajo people have carried the teachings and ways of being with them as they entered the present world we see today. After this world was given to the Navajo people by the Holy People, they cleared the water away. The Humpback God stood in the center of the world and dragged his cane from east to west and created the canyon. The water drained and created rivers and creeks, which then became the veins of the earth. In the canyon there are also places of clan origins and migrations. Navajo clans are named exogamous descent groups with membership inherited through one's mother and affiliations with the clans of one's father, mother's father, and father's father. These are the clans that originate from this area: Tl'izilani (Manygoats), along with a branch of the Anaasazi Tachii'nii clan. Sodizin, prayers, are still offered and will continue to be in the future. Plants for food and medicine and minerals such as salt and red ocher are still gathered for use in ceremonies and in everyday life (Roberts et al. 1995).

B.1.4 Southern Paiute

The traditional lands of the Southern Paiute people are considered *Puaxante Tevipe* (holy land) and are bounded by more than 600 miles of *Piapaxa* (Colorado River) from the Kaiparowits Plateau in the north to Blythe, California, in the south. According to traditional beliefs, Southern Paiute people were created in this traditional land and, through this creation, the Creator gave Paiute people a special supernatural responsibility to protect and manage the lands and waters, and all that is on and within them. Within this Southern Paiute homeland, the Colorado River, its tributaries, and its canyons have special importance (Stoffle et al. 1997:238–241; Stoffle et al. 1994).

Southern Paiute people express a preservation philosophy regarding *Puaxante Tevipe* and the water, minerals, animals, plants, artifacts, and burials existing there. Water, minerals, plants, and animals are perceived as having their own human-like life-force, and the *Pia-Paxa'a* (Colorado River) is one of the most powerful water sources within Southern Paiute traditional lands. Elders tell children about its power and the gifts it provides when spoken to and treated with great respect (Stoffle et al. 1995a). Traditionally, Southern Paiutes lived, farmed, collected plants, and hunted along the Colorado River. For this reason, the banks of the Colorado River are full of culturally meaningful human artifacts and natural elements (Stoffle et al. 1994).

When Southern Paiutes were forced away from their farms and hunting lands on the Colorado Plateau, many of them moved into *Pia-Paxa'a 'Uipi* (Grand Canyon). They were soon forced out of the *Pia-Paxa'a 'Uipi* as well when control of the region was taken by the U.S. federal government to create a forest preserve, a national monument, and then a national park. Still, Southern Paiutes remain connected to these lands, perform traditional ceremonies there, and strive to carry out their sacred responsibilities as given to them by the Creator (Stoffle et al. 2004:42; Stoffle et al. 1994:29).

Of vital importance in Southern Paiute culture are the many ways that Southern Paiute places are connected. In 1995, the Southern Paiute Consortium (SPC), on behalf of its member Tribes (the Kaibab Band of Paiute Indians and the Paiute Indian Tribe of Utah), submitted a statement to the Bureau of Reclamation that, due to the significance of the Colorado River and its canyons in Southern Paiute culture, the entire region was considered a TCP (Austin et al. 2007:15). For Southern Paiutes, a TCP can take on many forms and can be both physical and metaphysical. A TCP is a place of high cultural significance that is vital to the physical and spiritual well-being of the people. It plays a pivotal role in traditional practices and beliefs.

In an attempt to capture the way that Southern Paiutes conceptualized the entire Colorado River Corridor, Stoffle et al. (1997:47) labeled it a storyscape. Native American stories serve as verbal maps and also provide an alternative representation of the physical landscape, thereby helping people remember the story surrounding each feature and connecting the features together (Basso 1996). Southern Paiute place names mark many sites along the Colorado River Corridor. For example, Paria River comes from the Paiute word *Pari'ya* translating to “elk river” (Austin et al. 2005:66). Southern Paiute presence in the Colorado River Corridor is partially marked by the many contemporary place names, such as Nankoweap, Chuar, Tapeats, and Unkar, which derive from Paiute terms (Stoffle et al. 1994: 56). For Southern Paiutes, the landscape that includes the Grand Canyon is connected through the salt songs and is part of various pilgrimage routes. Such routes include seeps, springs, falls, and rock formations (Stoffle et al. 2005:183–189; Van Vlack 2012:137–138).

Sites along the Colorado River and its tributaries are of high cultural significance, and new generations of Southern Paiutes are taught about them. These sites were connected both locally and regionally as part of a system of trade and resource use, and Southern Paiutes continue to understand these sites as linked to each other and to the broader area. As a Kaibab Paiute tribal representative noted in 2017:

We told the BOR [Bureau of Reclamation] that the whole canyon [which includes Glen Canyon, Marble Canyon, and the Grand Canyon] was a TCP. How can you have one place and one place and one place [indicating areas physically separated from one another] when our stories go all the way through. It's all connected.

The lands, waters, and canyons of the *Pia-Paxa'a 'Uipi* were culturally important, are culturally important, and will continue to be culturally important to Southern Paiute people.

B.1.5 Zuni

From the time that the Zunis (*A:shiwi*) emerged onto the surface of the Earth, the Grand Canyon and the Colorado River have been sacred. According to the narratives that describe the emergence of the Zuni people (*A:shiwi*) from Earth Mother's fourth womb, sacred items that identify the Zuni people — the *Etdo:we*, *Kya Etdo:wa*, *Chu Etdo:wa*, and *Mu Etdo:wa/La Etdo:wa* (sacred bundles) and *Eledeliwe* — were the first to emerge; the people then came out into the sunlight world at a location in the bottom of the Grand Canyon near present-day Ribbon Falls. The creation narratives also describe the Zunis' (*A:shiwi*) subsequent search for the center of the world, *Idiwan'a* (the Middle Place). The people moved up the Colorado River and then up the Little Colorado River, periodically stopping and settling at locations along these rivers. At the junction of the Little Colorado and the Zuni Rivers, many of the supernatural beings, or *Koko*, came into existence. After a long search, the Zunis located the middle of the world and settled there. The Middle Place is located in today's village of Zuni. From the Pueblo of Zuni, the *A:shiwi* continue to maintain very strong and direct cultural and spiritual ties to the Grand Canyon, Colorado River, and Little Colorado River because of their emergence and migration narratives.

The creation and migration narratives of Zuni (*A:shiwi*) are learned by rote, word for word, and passed on from generation to generation exactly as they were told hundreds of years ago. Anthropologists have collected portions of these narratives over the past hundred years, transcribing the oral recitation. In so doing, scholars have marveled at the fact that the narratives have remained virtually unchanged over so many years. These narratives not only describe the locations of shrines and especially sacred areas, but also explain why areas such as the Grand Canyon are sacred. Zuni prayers often contain long lists of sacred areas, shrines, springs, and other places of religious significance to the Zuni people.

The practice of Zuni religion is not limited to one day a week. Zunis have an amazingly complex organization of clans, medicine societies, kiva groups, and priesthoods — all interlocking and overlapping. Similarly, each part of the Zuni universe is interconnected. Plants, animals, and colors are associated with the various cardinal directions. Minerals, clay, rocks, plants, and water are used in prayers to the supernatural beings. Prayers are accompanied by offerings of prayer sticks, which are made with the feathers of many birds attached to carved sticks, which, in turn, are painted with ceremonial pigments. It is no wonder, then, that virtually the entire environment at the bottom of the Grand Canyon is sacred to the Zuni. The animals, birds, insects, rocks, sand, minerals, plants, and water in the Grand Canyon all have special meaning to the Zuni people.

Trails used by the Zunis for religious purposes have special significance and are cared for by means of particular blessings and prayers. The trail from Zuni to the Grand Canyon thus has a continuously important religious meaning to the Zuni people. Once a trail is blessed, it remains blessed permanently. The Zuni people have important concerns regarding the ancient Zuni trail from their village to the bottom of the Grand Canyon.

To a great extent, Zuni ceremonial activity is carried out in order to ensure adequate rainfall. Zunis pray not only for their own lands, but for all people and all lands. Their prayers

are especially aimed at bringing precipitation to the Southwest. In order to successfully carry out the prayers, offerings, and ceremonials necessary to ensure rainfall for crops and a balanced universe, Zunis must collect samples of spring water, plants, soil, rocks, and other materials from various locations. Samples of spring water from the bottom of the Grand Canyon carried in sacred gourds during Zuni ceremonials have special significance to Zuni religious life and a very special meaning to the Zuni people.

As a result, Zuni identity holds together in co-relation to and co-constitution with their ancestral landscape through oral tradition, emergence, acts of migration and pilgrimage, ancestral site reactivation, and ceremonial activities; Western constructs that judge and characterize places, spaces, and times as gridded, measured, linear, or fixed cannot account for the ongoing integrity of association that Zunis share with different tangible aspects of the ancestral landscape through circularity and reactivation in and as enfolding space-time.

In this context, it is important to understand that Zuni modes of knowledge production and experience may integrate and adapt Western scientific modes of encounter or ways of knowing, understanding, and experiencing time and space. However, the Zuni system of knowledge has relevance far beyond Western scientific ways of knowing. As Dodge (2007:39) notes in his investigation of the Zuni cultural landscape of *a'quin:na*, or “Black Rock”:

The Zuni people may find ... scientific projects interesting, even useful, as they blend their own culture with the Western world, but their involvement with ... landscape[s] goes beyond the age of rocks and the residue of past geological processes. Their connection to the land comes from a spirituality that is inherent in the land—a true *appropriation* of the landscape.... The cultural landscape that has been created over the centuries by Zuni culture has transformed the rocks and trees, the earth and sky, into a life-world that is inseparable from the mythic world. This is a world in which the landscape is an integral part of Zuni culture and, therefore, life itself.

The worldview implications of the indelible links among narratives and ceremonies expressing and connecting Cultural Truths to tangible ancestral sites and features such as rock markings, trails, shrines, and cairns and natural cultural features such as springs and rivers must be given attention to adequately account for how landmarks and landscapes of traditional religious and cultural importance function as part of both Zuni history *and* Zuni sacred geography. Because all things of time *and* space are forever cyclical — and continuously linked — processes in and of the ever-present, material landmarks and their complex geographical associations tied to particular traditional practices and beliefs are of central importance for understanding, appreciating, identifying, and assessing the Zuni relationship to the Grand Canyon.

In summary, the Zuni River, Zuni Heaven (*Ko'lu:wala:wa*), the Little Colorado River, the Colorado River, and the Grand Canyon have been important to Zuni culture and religion for time immemorial. Zuni religious beliefs, narratives, ceremonies, and prayers are intrinsically tied to the entire sacred geography of the Grand Canyon, including the Zunis' familial relationship with the aquatic beings, birds, animals, soils, rocks, vegetation, and water. The Grand Canyon is

very sacred, and the Zuni people are concerned with activities that may affect the resources in this sacred place. Similarly, the Zuni people are concerned about activities that take place within the Grand Canyon that may have an impact on the Zuni people.

B.1.6 Archeological Context (12,000 B.C. to A.D. 1538)

Archeology is one of several western scientific disciplines used to explore the past. Archeologists attempt to explain patterns and behaviors of the past human societies through the material remains left by previous inhabitants of the Earth. To this end, the following summary is a western science perspective of archeological definitions of human occupation of the Canyon's landscape and are excerpted from Neff et al. (2016:1.28–1.31). More details about each of these time periods can be found elsewhere (e.g., Fairley 2003; Smiley et al. 2017).

Paleoindian Period (12,000–8,000 B.C.)

As vast glacial ice sheets retreated to the north and east, the Colorado Plateau offered open meadows, desert, and dense forest biomes. In some places, the canyon walls were covered in forests, and water pockets were plentiful. People moved in small mobile groups across large tracts of land. They hunted large animals such as mammoth, sloth, bear, and wolves. Although lacking evidence of structures or large campsites, this time period is characterized by distinctive spear points used to hunt the megafauna (Cordell 1997; Jennings 1978). These distinctive spear points have been found across the Southwest and Great Plains. While evidence for Paleoindian use of the Grand Canyon is scant, there is a growing body of evidence for Paleoindian and very early Archaic occupation of what Hollenshead (2007:3) called the “Greater Grand Canyon Region.” A Clovis point fragment found near Desert View was fashioned from chert derived from the Chuska Mountains along the Arizona–New Mexico border, suggesting that either the finished point or raw material was brought or traded into the area; if the former, it may indicate a wide-ranging annual round by hunter-gatherers of that period. Also found in the canyon was a partial Folsom point collected in the area of Little Nankoweap Canyon (Hollenshead 2007:18, Balsom et al. 2017:202). Three additional sites in the western Grand Canyon are also believed to contain Paleoindian artifacts.

Within the Glen Canyon National Recreation Area (GLCA), the Paleoindian period is represented by Clovis, Folsom, Plano, and, potentially, Western Stemmed projectile points. Although most sites and isolated artifacts dating to this period are north of the San Juan River, an isolated Folsom-style point was found on the east rim of Glen Canyon near Lees Ferry, on Navajo Nation land just outside GLCA boundaries (Geib 1994 1:3.1–3.2).

Archaic Period (8,000–1,000 B.C.)

As a response to changing environmental conditions, the material culture and lifeways of the canyon inhabitants also changed. Relatively small groups of people established themselves in mobile camps; used smaller, but distinctive projectile (dart) points; and, in some locations in the

Southwest, began experimenting with cultivating plants. Their economy focused largely on a seasonal round, that is, moving to different places during the year to follow game and seek ripening plant foods. The diet during the Archaic period centered on game species such as deer, rabbits, lizards, and bighorn sheep and plant foods such as agave, pine nuts, and ricegrass (Geib 1996a). At sites dating from this time period, we find processing stones such as one-handed manos and grinding slabs, which suggest increased emphasis on plant processing and more reliance on plants as a food source. We also find evidence of plant remains from buried hearths. Early attempts at agriculture began during the Archaic period (Huckell 1996), although conclusive evidence of such early activities has yet to be identified in the Grand Canyon.

The Archaic period in the Southwest is typically divided into Early, Middle, and Late on the basis of changes in material culture. While one-third of the pre-Puebloan projectile points from the Grand Canyon are Early Archaic, fewer than 10 percent date to the Middle Archaic (Schroeder 1997). This reflects a fall-off of sites, artifacts, and radiocarbon-dated material remains that is typical for the Colorado Plateau during the middle phase of the Archaic. The “lull” during the Middle Archaic may reflect a true population decline, perhaps a migratory abandonment on the heels of regional climate change (see Berry and Berry 1986); however, other scenarios have been offered, such as increased transhumance or long-term relocation into more mesic locales (see Geib 1996b, 2011). Occasional Middle Archaic points are known from the canyon vicinity, most interestingly from the Walhalla Plateau at an elevation of 8000–8250 feet (Schroeder 1997). As is the case elsewhere on the Colorado Plateau, there is much greater evidence for use of the canyon during the Late Archaic; almost 50 percent of the Archaic sites and isolated finds can be attributed to this period (Schroeder 1997).

The most spectacular Late Archaic manifestations in the Canyons are large polychrome rock art figures (Schaafsma 1990) and the split-twig figurine complex (Euler 1984). The figurines, typically fashioned from split willow branches in the form of antelope and deer, are found in Late Archaic contexts in sheltered settings, most commonly from limestone solution caverns within the Redwall Formation. Figurines were reported as long ago as the 1930s (Wheeler 1939, 1949), and Schwartz et al. (1958) described some initial finds within the Grand Canyon. Euler’s work at Stanton’s Cave remains the most extensive investigation of what is now known as the Grand Canyon Figurine Complex (Euler 1984; Euler and Olson 1965; Schroedl 1977; also see Coulam and Schroedl 2004; Emslie et al. 1995). In all, more than 470 figurines have been found in Grand Canyon National Park (GCNP). Other Archaic period sites in the Grand Canyon include hunting blinds, lithic scatters at the edges of meadows and water holes, temporary camps, and rock art, including the impressive panels of Barrier Canyon-style figures that occur mainly in tributary drainages. More recently, numerous radiocarbon dates have been obtained from buried Archaic features along the Colorado River as part of studies related to the impacts of Glen Canyon Dam (GCD) on downriver resources (Fairley 2003:57–63; Pederson et al. 2011), as captured in the following:

Beginning around [8000 B.C.], a hunting-gathering lifestyle is evident within Glen Canyon. The origins for this lifeway are unclear, as there appears to be little to no continuity with previous populations. Initially, Archaic period people in the region made repeated use of cave and alcove settings and had a relatively substantial population overall. With the onset of climatic change involving increased temperatures and

decreased precipitation, settlement patterns and land use shifted to increased mobility and larger territories incorporating upland resources and well-watered lowland locations. This shift gives the appearance of hiatus in the radiocarbon and archeological record. Some Middle Archaic people may have emigrated out of the Glen Canyon region; however, select sites indicate a continuous low population within Glen Canyon. In the Late Archaic, population again increased, with perhaps more than one group identity present in Glen Canyon, and by the end of this period, it appears Basketmaker II people moved into the southern portion of Glen Canyon, bringing with them squash and maize, which was later adopted by the continuing “Terminal Archaic” populations to the north (Vance 2013:16–17).

Within the GLCA portion of the area of potential effects (APE) petroglyph sites containing Style 5 (Turner 1963, 1971), also called Glen Canyon Linear Petroglyph Style (Schaafsma 1987), elements are the most visible manifestation of Archaic occupation. Archaic-period radiocarbon dates have been obtained from a handful of charcoal lenses and features in alluvial terraces (Anderson 2006), and several lithic scatters lacking diagnostic artifacts may date to the Archaic Period (Spurr and Collette 2007).

Preformative or Early Agricultural Period (1,000 B.C.–A.D. 500) and Basketmaker Period (A.D. 500–800)

These periods encompass the transition from the Archaic hunting and gathering economy to agriculture, followed by the initial establishment of permanent settlements and development of a fully agricultural lifestyle. These periods are distinguished by the extensive production of baskets, sandals, textiles, and distinctive stone artifacts, as well as by technological advancements such as the development of the bow and arrow. There is evidence of increased reliance on cultivated plants, primarily corn and squash, later supplemented with beans and cotton. This interval has the dubious honor of being among the least well-known cultural periods in the Grand Canyon. Even the timing of the Early Agricultural period is not fully understood. The earliest use of maize on the southern Colorado Plateau is now believed to date to at least 1000 B.C. (Geib 2011; Gilpin 1994; Smiley 2002), but sites on the northern part of the Plateau tend to lag in the introduction of corn by several hundred years. Davis et al. (2000) claimed evidence for corn agriculture in the Grand Canyon before 1000 B.C. on the basis of maize pollen bracketed by two radiocarbon dates of 3160 ± 60 B.P. and 4460 ± 50 B.P., although Fairley (2003:84–85) discusses several problematic issues with these results. The interval between 1000 B.C. and A.D. 800 is gradually being filled by additional reliable radiocarbon dates (see, for example, Geib 2011), but we lack a solid understanding of human use of the Grand Canyon, and the entire southern Colorado Plateau, during this period.

Most of the dates derive from wood charcoal samples and may be susceptible to the “old wood” problem, in which the dated sample can be several hundred years older than the target event (Smiley and Ahlstrom 1998). We still have little idea what Early Agricultural/Basketmaker people were doing in the canyon because the current sample is skewed toward tested thermal features in fluvial, river-level contexts (Fairley 2003:88–90). Long-term

habitations with pit houses and large bell-shaped pits for storage occur in adjacent regions (Geib 2011), but such large sites have not been documented within the canyon.

Geib (1996c) provides substantial evidence for the argument of two contemporary cultures in Glen Canyon during this period, with Dirty Devil phase people practicing a continuing archaic lifestyle north of the Colorado River, and Western Basketmaker people present south of the Colorado and along the San Juan River. Dating of maize within Glen Canyon indicates Western Basketmakers brought farming into the southern portion of Glen Canyon perhaps as early as [300 B.C.], but that maize and squash agriculture was not in practice to the north until perhaps A.D. 100–300 (Geib 1996c:75). Boundaries between these two groups appear quite clearly in the archaeological record of the region, and seem to have continued even after adoption of agriculture in the north. Following this line, Dirty Devil phase cultural material indicates cultural continuity from the preceding Archaic periods through ancestral Fremont to Fremont Formative periods in the north, with the Western Basketmaker II people intrusive from the south, and ultimately giving rise to Basketmaker III (ancestral Pueblo) and the Formative Pueblo populations of later periods (Vance 2013:19–20).

Evidence of Preformative/Basketmaker use of the GLCA portion of the APE is extremely limited, although several charcoal lenses and features in alluvial terraces have produced radiocarbon results dating to this period (Anderson 2006).

Formative/Pueblo Period (A.D. 800–1250)

The Pueblo period lasted less than 500 years in the Grand Canyon region but generated the greatest amount of cultural change in the shortest amount of time in terms of settlement and subsistence practices, material goods, and perhaps even cultural identity. Modern American Indian groups in the region are descendants of these ancestral people. This period is most often divided into three temporal periods: Pueblo I (A.D. 800–1000), Pueblo II (A.D. 1000–1150), and Pueblo III (A.D. 1150–1250), with the latter continuing to about A.D. 1300 in the Kayenta heartland east of the canyon. Each period is defined by changes in ceramic styles, architecture, and social patterns. The time ranges of these periods are based primarily on cross-dated ceramic types from east of the Colorado River; ceramic types north and west of the Colorado River are not as well dated and may begin or end earlier or later than their eastern counterparts. The Pueblo period is generally described as a time when populations became increasingly sedentary and dependent on agricultural crops such as corn, beans, squash, and occasionally cotton. It is the most visible period on the ground as sites became larger and were occupied longer, allowing accumulation of more artifacts and other cultural material. The sites also became more architecturally complex, with above-ground masonry rooms, below-ground kivas, and site layouts that integrated storage, habitation, and ceremonial functions.

By A.D. 900, at least three archeological cultures bounded the Grand Canyon: the Kayenta Branch to the east (Geib 2011; Powell and Smiley 2002), the Virgin Branch to the north (Aikens 1966; Lyneis 1996), and the Cohonina to the south (Cartledge 1979; Euler 1981; McGregor 1951, 1967; Samples 1992; Sullivan 1986). As elsewhere on the Colorado Plateau, the

Puebloan occupation in the Grand Canyon peaked during late Pueblo II and came to an end by the middle of the A.D. 1200s. Fairley (2003), Moffitt and Moffitt (2004), and Smiley et al. (2017) provide current overviews of the Pueblo period in the Grand Canyon.

Ceramics from Pueblo I are dominated by San Francisco Mountain Gray Ware with some intrusive red ware types, such as Deadmans Black-on-red. Schwartz et al. (1980) argued that the Pueblo I occupation of the Grand Canyon was by the Cohonina, rather than the Kayenta, a model reinforced by Sullivan (1986) and Pederson et al. (2011). Whoever was in the Grand Canyon by A.D. 900–1000, they were evidently operating at a less intense or permanent level than later inhabitants. In contrast to Pueblo II–III masonry room blocks, Pueblo I–II features within the inner canyon comprise possible pit structures at UN-8 (Schwartz et al. 1980), a roasting pit at Deer Creek (Jones 1986), buried ceramics at Furnace Flats (Hereford et al. 1991), and a dated hearth in the same general area (Balsom and Larralde 1996). It appears that Pueblo I peoples were using the inner canyon for logistical forays and short-term habitation as part of a subsistence round that included the South Rim, interior benches, and river-level lowlands.

By at least A.D. 1050, the canyon experienced an intrusion of Kayenta peoples from the east — possibly the first generation that would call the interior of the Grand Canyon home. Cohonina and Kayenta ceramics often co-occur at sites from this period, but the nature of the interaction between these two groups is unknown. Between A.D. 1000 and 1100, ceramic assemblages are increasingly dominated by Tusayan White and Gray Wares and Tsegi Orange Ware. Cohonina ceramics dwindle in numbers, proportionally, and essentially disappear by A.D. 1100 to 1150. Middle Pueblo II, between A.D. 1050 and 1100, was marked by a surge in habitation sites along the Colorado River in the eastern Grand Canyon. This period coincided with an influx of material and architectural traits strongly suggestive of the Kayenta region.

During the A.D. 1100s, the number of sites and, likely, households reached its maximum in the inner Grand Canyon, particularly in areas such as Nankoweap Canyon and the Furnace Flats Reach. The best-known sites from this period are the Pueblo II–III settlements at Unkar Delta along the Colorado River (Schwartz et al. 1980). Long-term habitations took advantage of the expanse of relatively flat land in these areas, which would have been necessary to raise crops to support the increased population. In addition to the typical suite of maize, beans, and squash, the GCNRP River Corridor Archaeology Project (GCRCAP) excavations confirmed previous evidence (e.g., Schwartz et al. 1980; Altschul and Fairley 1989, Fairley 2003) that cotton was commonly grown during the Pueblo II–III interval, probably for use both as a food and for fibers. Sites of this era occur in canyon reaches boasting good cross-canyon travel routes, which would have facilitated seasonal movement of population, as well as interaction with groups to the north and southeast.

The end of the Puebloan occupation of the Canyons occurred earlier than in the so-called Kayenta heartland, where it persisted until nearly A.D. 1300 (Lindsay 1969; Geib 2011). Following conventional wisdom, Fairley (2003:95) judged that “by A.D. 1150 the majority of the Puebloan sites had been abandoned, and by A.D. 1200 ... the Puebloan occupation of the Grand Canyon had ended,” although she cited Jones (1986:324) as suggesting that use may have continued as late as A.D. 1220. The GCRCAP (and earlier National Park Service [NPS] projects) affirmed a late Puebloan presence that likely continued after the beginning of the 13th century.

The dearth of reliable tree-ring dates and the uncertain terminal date ranges of locally produced ceramics, however, make the date of the Puebloan exodus from the inner canyon open to question. Few would disagree that by A.D. 1250, the terraces and deltas of the eastern Grand Canyon were generally quiet. It is important to acknowledge that leaving specific structures and sites was not abandonment of the landscape by ancestors of modern Tribes. Indeed, the Grand Canyon remains a cultural homeland where ancestors are still present in the landscape and the sites where they lived.

At least four archeological cultures occupied GLCA during the Formative Period: the Virgin Branch to the west and southwest, the Fremont to the north, the Kayenta Branch to the southeast, and the Mesa Verde Branch to the northeast. The origins, temporal and spatial extent, and interactions of these archeological cultures has been of a great long and continuing interest to regional scholars (e.g., Geib 1996d; Jennings 1966). The following three paragraphs summarizing the Formative period in GLCA are excerpted with minor edits from Vance (2013:20-22):

Glen Canyon Project investigators (summarized by Jennings 1966) found little evidence of Early Formative cultural traditions and inferred an occupational hiatus during this period (A.D. 500 to 1000). Although there does seem to have been a hiatus of *Puebloan* occupation in the southern Glen Canyon region during this time, Geib (1996e) and Baker (2009) demonstrate the presence of Early Formative Fremont people in the Escalante River basin and the northern portions of Glen Canyon. Locations of the Early Formative Fremont sites in the Escalante region suggest seasonal use of both well-watered lowlands and Kaiparowits Plateau uplands (Geib 1996e:89, 94). Site types consist of residences, field locations related to farming, and storage structures.

Little is currently known about the Late Formative Fremont occupations within Glen Canyon, and evidence to date is scant. In contrast, considerable data exists about the Kayenta, Virgin, and Mesa Verde occupations dating to this period. In Glen Canyon, Pueblo II sites appear to have been seasonal settlements in the lowlands (Geib 1994). Important lowland resources during Pueblo II, aside from domestic plants, were mountain sheep and cotton (Geib 1994). Cotton, although present before A.D. 1050 in textiles, increases in frequency and appears as seeds, stored bolls, and fibers after this date (e.g., Fairley 2003:95). Use of the lowlands during this period was apparently logistic, however, with only temporary residences established during the year.

The Pueblo II–Pueblo III transition, ca. A.D. 1150, was marked by dramatic changes in settlement and subsistence patterns. Pueblo III sites become more substantial, with architecture, trash middens, and ceremonial structures indicating year-round occupation (Geib 1994). Although alcoves and rock shelters were used frequently during this period, extensive cliff dwellings such as those seen at Tsegi Canyon and Mesa Verde were not adopted within Glen Canyon. The Pueblo III occupation, rather, included the establishment of small permanent habitations in the lowlands after about A.D. 1200 (Geib 1996f:199). Habitation sites typically contain pithouses, and later, above-ground single masonry structures or small roomblocks (Gunnerson 1959). Granaries, dams, terraces, stone-lined ditches, and other water control features attest the degree of

agricultural reliance during this period within the region (Jennings 1966:44–45, 56). By approximately A.D. 1250, however, long-term habitation of Glen Canyon by all four cultural groups appears to have ended.

Within the GLCA portion of the APE, Formative period sites consist primarily of Pueblo II and a few Pueblo II/III camps and petroglyphs. Camps are characterized by small artifacts scatters around overhangs or large boulders; occasionally, remnants of small masonry walls are also present. Artifact densities at a few sites are high enough to suggest short-term habitation or episodes of multiple use at these locations.

Late Prehistoric Period to Spanish Entrada (A.D. 1250–1537)

For interpretation of this period, Western approaches start employing both archeological and ethnohistoric (i.e., Native American oral histories recorded in written documents) research methodologies. The following summary from Neff et al. (2016:1.28–1.31) draws on both of these approaches and also highlights the limited attention that this period has received from researchers (their definition of this time period does not show a one-to-one correlation with the one in this document).

Current archeological research suggests that as Puebloan populations were moving out of the Canyons, people from the west began to incorporate the Canyons into their seasonal hunting and gathering territory. There is an unknown interval of time between the migration out of the Canyons by the Puebloans and the arrival of ancestral Pai and Southern Paiute from the west. It may have been as little as a moment, if the cultures overlapped in space and time (Simonis 2001), or as much as one to two hundred years, if the newcomers arrived between A.D. 1150 and 1300, as Euler (1974) has suggested. Hualapai oral history tells of interaction with early Puebloan peoples, continuing into the Historic period as strong trade relations existed with the Hopi. Huffman (1993) has argued that, with the end of the Puebloan occupation in the Canyons being pushed forward, and the beginning of the Protohistoric being pushed backward, any gap may have been exceedingly short. Excavations by Jones (1986) at Whitmore Wash and Tuna Creek indicate a “relatively brief” (Fairley 2003:98) temporal interval between possible Paiute and Puebloan strata. Roasting pits in Tuckup Canyon returned radiocarbon dates as early as the A.D. 1300s and 1400s (Huffman 1993), although these have the potential for “old wood” issues.

The incoming groups had much different ways of life as compared to the previous occupants; and because they were not sedentary or heavily reliant on agriculture, they were able to sustain themselves under the drier and cooler post-13th Century environmental conditions. These groups lived in smaller camps, built brush structures, and utilized large roasting features and clusters of small fire pits. Many roasting pits in the western reaches of the canyon date to this interval. Archeologists assign diagnostic pottery types to this period that represent both local and imported varieties and characterize the cultural transitions and interactions taking place during this time.

B.2 SPANISH ENTRADA AND COLONIZATION (CA. AD 1538–1848)

Previous researchers (e.g., Altschul and Fairley 1989; Fairley 2003) divide this time period into two segments: a protohistoric period (1538–1776), which followed the arrival of Europeans in the American Southwest but from which time very little written documentation exists concerning the Grand Canyon area and when European influences in the American Southwest were still minimal; and the historic period (1776 onward) when European influence and written documentation become more pronounced in the region. The end of the Protohistoric period is typically cited as A.D. 1776, the year of the Dominguez–Escalante expedition through southern Utah and northern Arizona. The latter part of this period and the subsequent century resulted in major upheavals for indigenous groups in the canyon and throughout the Southwest. By the early 18th Century, and probably for centuries before, the Havasupai Indians lived at Indian Garden along the Bright Angel Trail and in a permanent settlement within the South Rim village area. The Southern Paiute bands utilized large areas across the Toroweap Valley for habitation and resource procurement. The Navajo lived seasonally along the South Rim during this time, and the Hopi made regular visits to gather resources from the Canyons' depths.

Fundamental changes occurred in the indigenous populations during this period, whether they were in an area colonized by Spanish settlements or in areas farther removed. Knowledge systems that had evolved specific to the surrounding landscapes and other known inhabitants suddenly had to accommodate new people who did not behave according to previously understood cultural precepts. They possessed materials, technologies, and animals not known at the time in the Southwest. Some of these, such as sheep, horses, melons, fruit trees, grapes, and metal tools, became welcome or even central players in the indigenous cultures and economies. Other “gifts” such as the enforced practice of an alien religious belief system, which had little applicability to the traditional social structures, served to sever traditions and ties to the land, which had been in place for millennia. New diseases, which likely even predated the initial contact with the Spanish, had a devastating impact on populations, the degree to which is still unknown. Over 300 years of subjugation and resistance undoubtedly left a mark on the traditions of the tribal groups. Some consequences of this period may still be felt in current tribal relationships with the Grand Canyon. What follows are some of the events that have shaped the relationships of the Tribes to the Grand Canyon during the period AD 1539–1848.

1540–1542

Francisco Vázquez de Coronado visits the Zuni, the Hopi, the South Rim, and the Tanner area, returning to Hopi, Zuni, and on to Mexico, setting the stage for subsequent Rio Grande Pueblo and Zuni expeditions and missions.

On July 7, 1540, the Coronado entrada arrive at Hawikku and meet the Zuni. The first meeting does not go well and a battle ensues, and Coronado is hit in the head with a rock and falls from his horse. Hawikku is captured by Coronado in 1540 and remains Coronado's headquarters for months. The violent siege and treatment of Zuni by Coronado sets a pattern for Spanish–Indian conflict in the Southwest.

Pedro de Tovar, Juan Padilla, and García López de Cárdenas travel from Zuni to Hopi (first contact by Spanish with Hopi) and on to the south rim of the Grand Canyon.

1582

Espejo's party prospect within the Hopi lands and Arizona's Verde Valley. Esteban's arrival at Hawikuh violates cultural norms and he is killed after three days, after informing Zunis that more Spanish were to follow (Knaut 1995:27–28).

1598

Permanent Spanish settlement in Rio Grande Pueblos by Juan de Onate.

Cristóbal de Oñate obtains loyalty oaths from groups, including Zuni and Hopi (Knaut 1995:35). The beginning of Spanish settlement and some conversion to Christianity occurs, but in numerically small numbers, so initially, there is no large-scale shift from traditional beliefs and practices (though they increasingly had to be conducted in secret) (Knaut 1995:53–54).

1629–1680

Initial Spanish occupation at Hopi. During this time, Spanish priests force Hopi men to travel to the Colorado River and springs in the Grand Canyon to obtain water for use in churches. While they are away, the Spanish take “liberties” with Hopi women.

1680

Pueblo groups unite to drive the Spaniards back to Mexico in what is known as the Pueblo Revolt.

Post-1680s

Pueblo groups from New Mexico move to Hopi settlements to avoid Spanish reoccupation of the Rio Grande Valley.

1775–1776

The Spanish settle in what is now California. Father Garces from the lower Colorado River travels northeast to the Hopi, a journey aided by Hopi, Hualapai, and Havasupai guides.

By this time, missionaries were traveling south of the Grand Canyon from the Mojave Villages to the Rio Grande Pueblos, and north of the canyon from the Rio Grande pueblos to the Pacific coast. On October 26, 1776, Spanish priests Francisco Atanasio Dominguez and Silvestre Velez de Escalante camped on the north bank of the Colorado River, just upstream from the mouth of the Paria. The priests and their small entourage had been in search of a northern trail between Santa Fe, New Mexico, and the Monterey Mission in California when they encountered early snow near present-day Cedar City in southern Utah. Deterred, the priests turned eastward, hoping to return to Santa Fe by a direct but unexplored route. From the native Paiutes, Dominguez and Escalante learned of a shallow Colorado ford. Inadvertently traveling south of the rumored crossing, the priests reached what is now known as Lees Ferry. Here the river proved too deep to ford on horseback, too deep to pole across on crude willow rafts, and too swift and wide to swim. Rusho and Crampton (1981) report that the priests “named their camp ‘San Benito’ — a monk’s robe of penance — then added ‘Salsipuedes,’ which means ‘get out if you can.’” They gratefully escaped the canyon confines along the Paria River, which they christened Rio Santa Teresa. After their unsuccessful crossing attempt, the whole company traveled north approximately 40 miles and found an easier place (the Crossing of the Fathers) to cross in order to continue their journey back to Santa Fe.

1821

The end of Spanish rule and reduced oversight of the territory by Mexico results in new access to the area for trappers, prospectors, and guides.

1842

Trapper and traveler Warren Augustus Ferris writes about the inaccessibility of the canyon downstream of the confluence of the Green and Colorado rivers:

...which is a canal in many places more than a thousand feet deep, and bounded on either side by perpendicular walls of rock....From the summit of the walls, a succession of rocky cedar-covered hills, and sandy plains, appear losing themselves in the distance. This chanion [sic] confines the river between two and three hundred miles; and even to those, who have seen and for years been familiar with the mightiest productions of nature, presents a scene from which they recoil with terror (Ferris 1842).

1848

Signing of the Treaty of Hidalgo ends the Mexican War, drawing a boundary between the United States and Mexico to include territory that becomes the states of Arizona, California, western Colorado, Nevada, New Mexico, and Texas, completing the continental expansion of the United States. This expansion, combined with the discovery of gold in California, results in a rush west.

B.3 EURO-AMERICAN ENTRADA AND COLONIZATION (1848–PRESENT)

The area officially entered into the U.S. land base with the ratification of the Treaty of Guadalupe Hidalgo. For the indigenous inhabitants, the erosion of rights, sovereignty, and land base; restrictions on the practice of traditional lifeways; and other injustices continued unabated from the previous period. In fact, the Manifest Destiny philosophy may have been more detrimental in the end to traditional lifeways than had been the quasi-vassalage lifestyle the Tribes were subjected to under Spanish rule. During this period, exploration and exploitation, development, and government control quickly led to restriction or outright removal of the indigenous groups from their traditional homelands and confinement on reservations. A large part of that landscape that had sustained them since the beginning of time was made the legal property of others. In a very real sense, this period in the Grand Canyon becomes the story of everyone but the indigenous groups. What follows are some of the events that have shaped the relationships of Euro-Americans and the Tribes to the Grand Canyon during the period from A.D. 1851 to the present (Anderson 1998, 2000, and 2008; Billingsley et al. 1997; Schwartz 1989; Ferris 1842).

1848

Arrival of the Mormon settlers to southwestern Utah and the “colonization” consistent with church doctrine and explorations take place (Altschul and Fairley 1989).

1851

The Sitgreaves survey trip sets out from Zuni, New Mexico, to chart a shortcut to a possibly navigable river between New Mexico and the Gulf of California. Upon reaching Grand Falls on the Little Colorado River, the party is advised not to descend into the deep canyon. Traveling west, the party arrives at the Colorado River near Bullhead City, Arizona. Following the river course, it arrives at Camp Yuma three months after leaving Zuni.

1857–1858

Lieutenant Joseph Christmas Ives and Army corps travel upriver from Yuma to Black Canyon, then overland to Diamond Creek in the first exploration expedition in the western Grand Canyon.

E.F. Beale travels west from Fort Defiance to California along what is now known as the Beale Wagon Road. In his report to Congress and the War Department, Beale notes the Indians living along the way to be “very numerous.” Beale requests funding for bridges, dams, and a military fort on the Colorado River.

Jacob Hamblin leads exploring expeditions into the area around Grand Canyon, locates places to cross the Colorado River, and visits the Hopi Mesas.

1861–1865

The Civil War halts further development for a time, then results in an influx of military and other government agents westward. Encroachment on traditional lands and maltreatment of the native populations due to the arrival of cattle ranching in Hualapai, Havasupai, and Southern Paiute territories tie up land and water sources. The staking of mining claims and associated activities result in the Walapai War (1865–1870) between the Hualapai Tribe and the U.S. population in the Arizona territory.

1865–1950

Mining claims are recorded within the boundaries of present-day GCNP by prospectors for copper, silver, uranium, asbestos, gold, molybdenum, zinc, iron, magnesium, and nickel.

1867–1872

John Wesley Powell leads geology expeditions in the Rocky Mountains, meeting plenty of trappers and prospectors before hatching his plan to navigate the last undocumented territories left in the United States.

By the time of Powell's 1869 journey, although not mapped or documented, the area had been explored by a variety of inhabitants, trespassers, fortune seekers, and runaways. Powell's second exploratory trip occurred in 1872. Powell's romanticized account summarizing both trips paved the way for further exploration and documentation. There was limited observation and documentation of prehistoric use of the river corridor. Powell documented "ruins" in Glen Canyon that he associated with the ancestors of the Hopi Indians, whom he knew lived south of the canyon. At the confluence of the Little Colorado River, he noted a worn path with stone steps while his crew identified pottery, ruins, and "etching and hieroglyphics on rocks." At Bright Angel Creek, Powell noted two or three masonry homes, trails, pottery, and a metate. Again, he speculated that these were left by Hopi farmers escaping the Spanish. Powell described additional prehistoric remains farther downstream, as well as those belonging to Paiute farmers. Powell's expedition included what Schwartz (1989) called "the first chapter of archeological research in the Grand Canyon."

1868

Treaty of 1868 grants the Navajo Tribe its first reservation.

1870s to 1880s

The Glen Canyon region begins to be used for cattle grazing. At the same time, scattered gold mining operations and oil prospecting begin in Glen Canyon.

1870

Silver is discovered in Cataract Creek.

1871

The Wheeler expedition sets out to make topographic maps of the southwestern United States. The expedition moves upstream from Needles, California, to Diamond Creek following established trails to the canyon rim.

John D. Lee establishes a ranch at the mouth of the Paria River and a ferry crossing a short distance upstream on the Colorado River.

1872

The Kanab Creek Gold Rush lasts four months.

1874

Mining activities occurred in the 1870s and 1880s in the canyons south of Whitmore Canyon by William B. Ridenour and Sam Crozier. Both were driven off by the Hualapai in 1874 only to return with additional partners to establish the “Grand Canyon” copper and silver mine on March 6, 1880.

1880

Havasupai Indians request assistance from the U.S. Government to protect them from the intrusion of prospectors. The Havasupai Reservation is established by President Hayes but does not include the mining areas along the creek.

1882

The Havasupai reservation boundary is reduced in size by President Arthur, turning all plateau lands traditionally used for winter homes into public property.

Dutton publishes *A Tertiary History of the Grand Canon District*, including topographic drawings; journals note trails and prehistoric sites in Surprise Valley.

Then-Senator Benjamin Harrison sponsors the first bill to establish GCNP as the second National Park in the United States, after Yellowstone. He goes on to sponsor the bill again in 1883 and 1886.

1882–1883

The Walcott survey renovated an existing Native American trail leading to Nankoweap Canyon. The survey team travels by mule to Kwagunt, Chuar, and Unkar Canyons, traveling west of Hance Rapid. The U.S. Geological Survey (USGS) publishes topographic maps of the Saddle Mountain and Nankoweap quadrangles.

1883

The Atlantic and Pacific Railroad crosses through traditional homelands of local Tribes and connects the East and West coasts. Overnight, the cost of freight delivery is reduced, and the speed is increased. The value of property along the railroad doubles, and worker camps become permanent stations and settlements. The jumping-off points for access to the Grand Canyon include Holbrook, Winslow, Flagstaff, Williams, Seligman, and Kingman.

W.W. Bass works with Havasupai Indians to turn an existing indigenous trail into one that is passable by stock animals; this is what is now called the South Bass Trail. Tourism and prospecting by Bass continue into the canyon, across the river, and up to the north rim from 1883 to 1923. In 1890, Bass is the first to provide a rim-to-rim route for tourism across the Grand Canyon. In 1902, he convinces railroad operators to stop at “Bass Station.” In 1906, he erects the first tram crossing connecting the South Bass and North Bass trail networks. Overall, Bass spends 35 years in the canyon, both prospecting and as a rim and inner canyon tour operator, building over 50 miles of trails.

Settlements, cattle, and then hotels begin to arrive along the east rim of the Grand Canyon.

1884

The area of southern Utah bounded by the San Juan River on the north and the Arizona border on the south, referred to as the “Paiute Strip,” was dedicated for the use of San Juan Southern Paiutes who had occupied the area historically (Madsen and Rhode 1994:30; Bunte and Franklin 1987:185).

The Farlee Hotel is built at the bottom of Diamond Creek, adjacent to the Colorado River.

1888–1918

The costs associated with transporting ore to town and the requirements for recording improvements to claims with the county outweigh the gains associated with the work, and prospectors realize greater monetary gains from tourism than mining. Prospectors-turned-tourism guides maintain camps, tours, and trails (e.g., Seth Tanner, Hance, Boucher, Bass, Rust)

throughout the canyon. Historic-era archeological remains include mining activities, tools, habitation, tourist camps, trails, and other infrastructure-type improvements.

1890s

The Glen Canyon region begins to be used for sheep grazing.

1889–1890

The Stanton expedition surveys a water-level train route from Colorado to the desert west of the Grand Canyon in search of a viable means of transporting coal mined in Colorado to the resource-starved California settlements. Photographs from the survey show prehistoric structures.

Louis Boucher sets up an encampment at Dripping Springs and builds a trail that is suitable for pack stock use into the Hermit Basin, the first tourist camp on Tonto Creek. Like many other historic trails in the Canyons, this trail was modified from an existing Native American trail.

1893

President Harrison establishes the Grand Canyon Forest Reserve in the eastern Grand Canyon, exempting the area from homesteading and public land laws, and still allowing for mining claims.

1896

Development of the present-day NPS South Rim Village begins.

On a river trip from Green River, Utah, to Yuma, Arizona, George Flavell notes seeing Hance with a tourist party at Red Canyon, above the rapid.

1897

Nathanial Galloway and a fellow trapper run the entire Grand Canyon. Galloway's boat design and rowing technique revolutionize whitewater boating.

1901

Railroad service arrives at the South Rim Village.

1902

The first automobile arrives on the South Rim.

1906

President Roosevelt establishes the Grand Canyon Game Preserve, closing the area to all private entry. In 1908, he establishes the Grand Canyon National Monument, closing the area to prospecting and mining.

Francois Mattes publishes the first topographic maps of the North Rim area.

David Rust builds a trail from the North Rim (Bright Angel Point) to Bright Angel Creek; within two weeks of its completion, tourists arrive. Rust Camp consists of tent cabins and trails along Bright Angel Creek.

1907

This Paiute Strip Reservation was placed under the jurisdiction of the Western Navajo Agency in 1907 and was completely integrated into Navajo lands in 1922 (RDI Native Peoples Technical Assistance Office nd).

Rust erects a cable car crossing to connect the North and South Rims, with a trail along the river downstream to Pipe Creek and up the Bright Angel Trail to the South Rim Village. He develops a relationship with Ralph Cameron to avoid toll costs levied for use of the trail by Cameron for use from the South Rim into the canyon.

1908

Stanton publishes a regional map summarizing the history of exploration and navigation of the Colorado River between 1540 and 1908.

The Grand Canyon Forest Reserve is rebranded as the Grand Canyon National Monument.

1909

Julius Stone, interested in repeating Powell's journey, hires Than Galloway to build boats for a river trip, launching from Green River, Wyoming, on September 12, 1909, and arriving in Needles, California, on November 19. This is the fastest recorded journey through the rivers and canyons. Julius Stone had no motive other than to experience the canyon for himself, making him the first paying tourist to travel through the canyon by river.

The first automobile arrives on the North Rim.

1911

The Kolb Brothers use a movie camera to document their river trip, marking the beginning of 61 years of showing their motion picture of a Colorado River trip from their South Rim studio.

1912

Charles Spencer's gold mining operation at Lees Ferry ceases.

1914

USGS establishes a presence at Lees Ferry with a focus on measuring river flows and exploring possible dam sites for water storage, flood control, and hydropower development.

1915

Charlie Russell abandons the *Ross Wheeler* (a galvanized steel boat built by Bert Loper) at the foot of the South Bass Trail. John Waltenberg, a miner working in the area, finds the boat and winches it high on the slope, near where it still lies today.

1919

President Woodrow Wilson signs the Grand Canyon National Park Act. Subsequent enlargements and boundary changes occur in 1927, 1932, and 1975. Agencies, ranchers, and miners object to Tribes (Havasupai) using traditional lands outside reservation boundaries and enact policies such as hunting regulations.

1920s

A second round of oil prospecting begins in the Glen Canyon region.

1921

The 7 States Water Commission (subsequently the Colorado River Commission) convenes to determine how to allocate the Colorado River waters between the Upper and Lower States (Basins).

1922

The Colorado River Compact officially describes the division of Colorado River water, and the dividing line between the Upper and Lower Basin states is established a short distance below the mouth of the Paria River.

1923

The Birdseye Expedition on the Colorado River through Grand Canyon, sponsored by the USGS, results in the first topographic maps of the river corridor. The canyon is surveyed for potential dam locations.

In 1923, a party with the Milwaukee Public Museum recorded archeological sites, made collections, and conducted limited archeological excavations (West 1925 in Smiley et al. 2017:7).

1927–1929

Construction of Navajo Bridge (originally called the Grand Canyon Bridge), located approximately 4 miles (6.4 km) southwest of Lees Ferry, begins in 1927 and is completed in 1929. Ferry operations at Lees Ferry end in 1928 and are never resumed.

1934

Bus Hatch (first boatman to become a Grand Canyon river outfitter — Hatch River Expeditions) finds “toy horses or sheep” in the cave where the Stanton expedition cached its gear. These “split twig figurines” were later dated to be more than 4,000 years old.

1936

Construction of the Hoover Dam is completed.

1937

During a Carnegie Institution of Washington/CalTech river trip, Edwin McKee identifies caches of mining equipment along the river corridor.

On an expedition with Norm Nevills, Lois Jotter and Dr. Elzada Clover become the first women and biologists to study the river corridor vegetation and run the Colorado River.

Buzz Holmstrom completes the first solo trip through the canyon.

1938

Norm Nevills forms the first commercial river running company and seeks vacationing clients for river trips.

The first inflatable down the Colorado is Amos Burg's 1938 *Charlie*, a custom-made 83-pound raft.

1939

Bert Loper and Don Harris launch in July and become one of the first parties to run every rapid.

1949

Just shy of his 80th birthday, Bert Loper dies while on a river trip in Grand Canyon, and his boat was dragged high on the shore near Mile 41. The remains of the boat were left *in situ* and can still be seen today.

1950s

Uranium prospecting and mining begin in the Glen Canyon region.

1952

Georgie White is the first woman to row the full length of Marble and Glen Canyons. By the mid-1950s, she had brought huge bridge pontoons to Grand Canyon, powering them with outboard motors. She attracted passengers with her affordable "share-the-expense" trips and opened Grand Canyon to large-scale river tourism.

1953

At the request of the NPS, archeologist Walter Taylor, who initiated the era of systematic documentation of archeological sites in the river corridor, accompanies a group of scientists from the University of Arizona on a river trip into the canyon and produces the first professional publication about archeological sites along the river in Grand Canyon. The trip was to provide an assessment of the archeological resources that might be lost due to the proposed construction of Bride Canyon Dam.

1955

Reclamation deems construction of dams necessary because of increased demand from Basin states. Opposition by the growing environmental movement leads to a compromise: plans for the Echo Park Dam in Dinosaur National Monument are dropped in exchange for construction of the Glen Canyon Dam.

Environmental icon Martin Litton and his wife Esther were introduced to Grand Canyon through a Colorado River trip guided by Plez Talmadge “PT” Reilly.

1956–1966

The 1956 Colorado River Storage Project Act authorized construction of the Colorado River Storage Project (CRSP), which allowed for comprehensive development of the water resources of the Upper Basin states (Colorado, New Mexico, Utah, and Wyoming) by providing for long-term regulatory storage of water for purposes, including regulating the Colorado River; storing water for beneficial use; allowing Upper Basin States to utilize their Colorado River Compact apportionments; and providing for the reclamation of arid lands, control of floods, and generation of hydroelectric power. The Colorado River Storage Project is one of the most complex and extensive river resource developments in the world (<https://www.usbr.gov/uc/rm/crsp/index.html>). One of the four initial storage units built as part of the CRSP is the GCD.

On October 15, 1956, the beginning of construction of the GCD occurred when President Dwight D. Eisenhower pressed a telegraph key from Washington, D.C. setting off the first dynamite blast in Glen Canyon (<https://www.usbr.gov/uc/rm/crsp/gc/index.html>):

Because there were no rail facilities near the construction site, a bridge was built to allow trucks to deliver material and equipment across the canyon. Construction of the 1,271-foot-long steel-arch bridge 700 feet above the river was completed in January 1959, reducing a 200-mile trip to cross the river to less than a quarter mile. State highways were extended to the remote construction site and the Glen Canyon Bridge was constructed across the Colorado River to join the highways.

The construction of the GCD began with the building of a coffer dam upstream to channel the Colorado River around the construction site and the excavation of two diversion tunnels dug into the walls on each side of the canyon. Material excavated from the tunnels was used to make the coffer dam. The first concrete placement began on June 17, 1960. Construction continued 24 hours a day until September 13, 1963, when the last concrete was placed. On September 22, 1966, First Lady Claudia “Lady Bird” Johnson dedicated the GCD and Powerplant (<https://www.usbr.gov/uc/rm/crsp/gc/index.html>).

The Glen Canyon (archeological) Project (1957–1963) was established as a joint effort by the University of Utah and the Museum of Northern Arizona (MNA) to undertake rapid and extensive “salvage archeology” prior to the flooding of the area by Glen Canyon Dam. The

MNA was responsible for the southern banks of the lower San Juan River and the southern bank of the main Colorado River from the mouth of the San Juan to Lees Ferry. The archeological work completed by the MNA in the lower San Juan and left bank of the Colorado River below the San Juan, as well as interpretations of the significance of those sites, has been summarized in numerous publications (Danson 1958; Adams and Adams 1959; Adams and Danson 1960; Adams et al. 1961, to name a few). The materials, notes, and publications from these efforts are maintained at the MNA in Flagstaff. The University of Utah was responsible for the remaining areas of the reservoir area. The materials, notes, and publications from the University of Utah efforts are maintained at the Museum of Natural History of Utah in Salt Lake City.

Robert Euler completes an ethnohistorical study of the Southern Paiutes (Euler 1966).

1960

Robert Euler and the Sanderson family make a river trip for the Arizona Power Authority to document archeological resources along the river in preparation for construction of several dam projects.

1960s-1972

NPS begins management and development in the area that will eventually become Glen Canyon National Recreation Area.

In the late 1960s and early 1970s, river running grows in popularity and use levels increase.

1972

Public Law 92-593 creates Glen Canyon National Recreation Area.

1975

Public Law 93-620 creates the Grand Canyon National Park Enlargement Act.

1978

NPS archeologists initiate site monitoring along the Colorado River in GRCA. The primary purpose is to evaluate whether and to what degree hikers and boaters were affecting archeological resources. Impacts from natural processes such as rainfall-induced erosion were of secondary concern.

1979

UNESCO designates Grand Canyon as a World Heritage Site.

1982

Reclamation initiates the Glen Canyon Environmental Studies Program to address perceived effects of GCD on beaches and native fish habitat in GRCA.

1989

Beginning in 1989, Reclamation contracts with USGS to research the causes for archeological site erosion and its relationship to the GCD operations. Detailed topographic maps were produced during this project.

1990

The San Juan Southern Paiute people are officially recognized by the U.S. federal government in 1990 but were not granted reservation lands. A little more than a decade later, Navajo Nation President Kelsey Begaye signs a treaty with San Juan Paiute President Johnny M. Lehi, Sr., granting the San Juan Southern Paiute Tribe approximately 5,400 acres of land at Hidden Springs, Arizona (Allen 2013).

1990–1991

The Grand Canyon River Corridor Archeological Survey Project inventories archeological sites along a 255-mile stretch of the river corridor from Glen Canyon Dam to Separation Canyon (Fairley et al. 1994). Approximately 10,600 acres were surveyed, and 475 sites and 489 isolated occurrences were documented.

Under order from Interior Secretary Manuel Lujan, the Glen Canyon Dam Environmental Impact Study and Phase II of the Glen Canyon Environmental Studies program commence. This effort includes tribal partners and provided access to the river corridor and produced ethnographies, sedimentological observations, and standard geomorphic mapping techniques.

1992

July 10, 1992, judicial ruling regarding the San Juan Southern Paiute land claims within the 1934 Navajo Reservation recognized that San Juan Southern Paiute access and use of religious areas in traditional lands, even if they are part of another Indian reservation, is guaranteed by the 1974 Act (25 USC § 64Od-20; Judge Earl H. Carroll 1992:63).

The Grand Canyon Protection Act is passed by Congress.

1994

The 1994 Programmatic Agreement (PA) is executed.

1995

The GCD Environmental Impact Statement (EIS) is completed. Five Native American Tribes actively participated in the development of the EIS.

1996

The Record of Decision (1996 ROD) for the Operation of GCD, Final Impact Statement is signed by Bruce Babbitt, Secretary of the Interior, on October 9, 1996.

1997

GCDAMP is officially launched. The purpose of the program was and still is to engage a group of stakeholders to advise the Secretary of the Interior on how best to operate GCD to achieve the stated intents of the Grand Canyon Protection Act of 1992 (GCPA).

The Grand Canyon Monitoring and Research Center (GCMRC) is formally established as an independent science organization to carry out research and monitoring projects to inform policy decisions.

Stakeholders participating as policy advisors within the Adaptive Management Work Group (AMWG) and as technical advisors in the Technical Work Group (TWG) begin developing their own guidance documents, including a vision statement, programmatic goals, and monitoring objectives.

1999–2003

The AMP Strategic Plan is drafted by the TWG. This document was intended to provide guidance to the future research and monitoring program by articulating the goals, objectives, and highest priorities for future research and monitoring. The AMP Strategic Plan was declared “completed” in 2009 by Anne Castle, Assistant Secretary, Water and Science.

2005

Reclamation develops a cooperative agreement with the Navajo Nation Archeology Department (NNAD) for the re-evaluating of all 53 archeological sites in the Glen Canyon reach and makes new National Register eligibility recommendations.

2011

Development and Implementation of a Protocol for High-Flow Experimental Releases from GCD Environmental Assessment is completed.

2012

A Memorandum of Agreement (MOA) for Non-Native Fish Control in the Colorado River below GCD is executed. Reclamation determines that lethal removal of non-native fish is an adverse effect on the historic and cultural character and use of the Canyons. Stipulations include live removal on non-native fish to the maximum extent practical.

2016

Record of Decision (2016 ROD) for the GCD Long-Term Experimental and Management Plan (LTEMP) Final EIS is signed by Sally Jewell, Secretary of the Interior, on December 15, 2016.

2017

On September 6, 2017, with the signature and filing by the Advisory Council on Historic Preservation (ACHP), the 2017 Programmatic Agreement is executed.

B.3.1 Archeological Context of the Euro-American Entrada and Colonization Period (A.D. 1776–1950)

Historic-period sites represent activities by a wide range of cultural groups, including American Indian habitation and activity locales, Euro-American mining and exploration, ranching, tourism, and NPS and Civilian Conservation Corps facilities. Evidence for these activities can be found throughout the park. John Wesley Powell's journal documented his impressions of the use of an Indian garden, which later historians believe was located near the mouth of Spring Canyon during his trip of 1869 (Fairley 2003). Temporary camps related to collection of pine nuts and other resources by Native American groups exhibit wood structures and hearths. Shrines occur at various significant locations and continue to be used by these groups. By the mid-1800s, however, the end was nigh for traditional Native American use of the Grand Canyon. Incursion by Euro-American settlers, miners, and tourists constrained indigenous

groups to smaller and smaller territories. Trappers, miners, explorers, missionaries, scientists, and, ultimately, tourists first displaced the native lifestyle, then commercialized it as a commodity (Coder 1994). Sites from the Historic period are characterized by a blending of the old and traditional with the new and innovative. Tools made of stone, bone, and pottery are found, along with metal and glass used to fashion projectile points. Metal buckets, kitchen cutlery, and canned foods and beverages are found at such sites, representing everyday household activities. Historic campsites, corrals, and inscriptions found on the canyon rims and within the canyon are evidence of historic ranching, mining, and shepherding activities within the park.

B.3.2 Lees Ferry Historic Context

Both before and after the historic developments at Lees Ferry, the area was visited, inhabited, and used as a river crossing by Native Americans; this place retains cultural importance to the Hopi Tribe, the Kaibab Band of Paiute Indians, the Navajo Nation, the Paiute Indian Tribe of Utah, the San Juan Southern Paiute Tribe, and potentially other Tribes as well (e.g., Geib 1990; Hopkins 2013:34, 73–74, 109–110).

Although what is now Lees Ferry was briefly visited by Europeans in 1776 during the Dominguez and Escalante expedition (see Section B.2), there are no subsequent records of Europeans or Euro-Americans visiting the area until 1858. At that time, a party of Mormons led by Jacob Hamblin and guided by a Southern Paiute named Naraguts passed through the area. Over the next decade, Hamblin and other Mormons occasionally traveled through Lees Ferry or crossed the Colorado River at that point on trips between southern Utah and northern Arizona (Reilly 1999:3–10).

On August 4, 1869, during the first Powell Colorado River expedition, John Wesley Powell and his crew spent the night at what would soon be Lees Ferry; while there, they noted indications of Native American and Mormon use, including fire pits. Powell returned on September 30, 1870, in preparation for his second trip, and while there, he and his men constructed the *Cañon Maid*, a flatboat that was used as a ferry boat. In 1871, Powell's party left Green River, Wyoming, in May and arrived at Lees Ferry in October, where they halted for the winter and hiked out.

The expedition members returned to Lees Ferry in 1872, where they were glad to find John D. and Emma B. Lee and their family operating a new ferryboat. The Lees had moved to the crossing in 1873 to secure the location for the Church of Jesus Christ of Latter-day Saints (LDS Church) and to operate a river-crossing ferry. The Lees also established the ranch called the “Lonely Dell” and began irrigating and farming the land to provide for their family and the many people and animals traveling the Old Arizona Road and crossing the river.

From 1872 until 1928, the Old Arizona Road was a significant travel route between Arizona and Utah. The trail went from Kanab, Utah, to Lees Ferry on the Colorado River, then south to Tuba City, Arizona. From there it continued upstream along the Little Colorado River to several primarily Mormon settlements that were founded in the 1870s and 1880s. Several other

historic roads and trails from southern Arizona joined the Old Arizona Road at various points. Lees Ferry was a vital part of this road as the most utilized Colorado River crossing. In later years, the road was dubbed the “Honeymoon Trail” for the large numbers of Mormon couples who traveled its route north to St. George to have their marriage sealed in the temple there. In addition, the Old Arizona Road served as a major travel route for pioneers and settlers, large herds, and bands of livestock, and for commercial transportation until the Navajo Bridge was finished just downstream of Lees Ferry near Marble Canyon, Arizona.

The Lees lived at Lees Ferry and Lonely Dell for only a short time. In 1879–80, the ferry and farmstead changed hands and a new ferry boat was constructed. Thereafter, the operation was directed for many years by Warren Johnson and his family under the guidance of the LDS Church leadership. They also applied for and were granted the right to operate a post office at Lees Ferry, with Warren Johnson sworn in as the postmaster. LDS Church control of the ferry and the ranch was relinquished in 1909 with the acquisition of both by the Grand Canyon Cattle Company. The cattle company sold the ferry to Coconino County in 1910.

In 1925, Lonely Dell was purchased by Jeremiah Johnson. Johnson built and renovated several structures on the property and in 1930 was able to file for a homestead at the ranch (Graham and Kupel 2000). In 1934, the property was acquired by Leo Weaver, who operated it as a dude ranch with several partners from 1934 to 1940. The property was acquired by Gus Griffin in 1940. He operated the ranch until a consortium bought it in 1964. It was eventually acquired by the NPS in 1974.

In addition to ferry operations, farming, ranching, and tourism, other activities occurred at Lees Ferry. From 1889 to 1900, John R. Nielson, followed by Robert Brewster Stanton, prospected along the Glen Canyon Reach for gold. From 1909 to 1912, Charles H. Spencer did the same. Spencer used a steamboat, bearing his name, to transport men, supplies, and materials to and from several sites along the left and right banks above Lees Ferry. Spencer built several structures in what is now the historic district to support his mining operations but, ultimately, was unsuccessful and gave up his pursuits.

Work by the USGS at Lees Ferry commenced in 1914 and focused on measuring flows and exploring potential dam sites for flood prevention, water storage, and hydropower development. The first permanent stream gauge was constructed near the mouth of the Paria River in 1921 by the Southern California Edison Company and the USGS cooperatively. Several improvements and support buildings resulted from this endeavor. In fact, from 1933 to 1945, the USGS undertook several construction and improvement projects in the area of the Ferry to support its objectives in the area. USGS continued to be active from 1946 to 1962, and employees at the site were very involved in the construction of GCD. In 1962, the property in the vicinity of Lees Ferry was acquired by the NPS in preparation for the new GLCA.

The USGS also installed a gauge on the Paria River. Installed in 1925, this gauging site, which is located inside the boundary of the Lees Ferry Lonely Dell Historic District, is the oldest gauging station on any tributary of the Colorado River.

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APPENDIX C: CULTURAL RESOURCE MONITORING

Monitoring is a critical part of the Bureau of reclamation's (Reclamation's) historic preservation program. In addition, cultural resource monitoring within the Canyons is a component of the Grand Canyon Protection Act of 1992 (GCPA) and is identified in Section 1805 of that Act as "Long-Term Monitoring." Section 1805 identifies three functions: (1) establish and implement long-term monitoring programs and activities to ensure that Glen Canyon Dam (GCD) is operated in a manner consistent with Section 1802 of the Act; (2) include any necessary research and studies to determine the effect on the natural, recreational, and cultural resources within the Canyons; and (3) ensure that the monitoring programs and activities are established and implemented in consultation with various entities, including Indian Tribes and the general public. Monitoring programs under this Act have been established with Grand Canyon National Park (GCNP), Glen Canyon National Recreation Area (GLCA), Grand Canyon Monitoring and research Center (GCMRC), Hopi Tribe, Hualapai Indian Tribe, Southern Paiute Consortium (SPC), Navajo Nation, and the Zuni Tribe.

Archeological resources are nonrenewable, tangible evidence of past lifeways. Archeological data are collected through systematic recovery of artifacts within their context, and when artifacts are moved, damaged, or taken from the site, original context is lost. Looting, vandalism, destruction, and damage (whether intentional or unintentional) of an archeological resource can diminish the integrity of the site.

Properties of traditional religious and cultural properties, cultural landscapes, traditional use areas, and sacred sites often overlap with archeological sites and other areas of Native American concern. These resources are rooted in tribal histories, spiritual narratives and sacred relationships which are part of a larger setting for tribal histories and spiritual narratives that are important to contemporary lifeways. There is a relationship between Tribes and the ecological, physical and spiritual health of the landscape, and impacts to these resources may be of a spiritual and emotional nature that is impossible to capture through the National Park Service (NPS) archeological site monitoring program.

The Glen Canyon Dam Adaptive Management Program (GCDAMP) collaborates with five Tribes in monitoring the Canyons as properties of traditional religious and cultural importance as well as in monitoring additional important cultural and sacred sites within the larger traditional cultural properties (TCP) landscape. Each Tribe has its own monitoring program that conducts yearly site visits to assess changes in the condition and the physical and spiritual integrity of important cultural sites, such as traditional collection areas and sacred springs, as well as the canyon as a whole. Sites are monitored for a number of variables, including increased recreational use by visitors, vandalism, looting, and erosion (Yeatts and Huisinga 2013; Jackson-Kelly et al. 2013; Bullett et al. 2008, 2012; Dongoske 2011). The tribal monitoring programs have shown that damage from visitor use, such as vandalism, trailing, trampling, littering, removal of vegetation, removal of artifacts, and disturbance to archeological sites, cultural landscapes and other areas of concern affect the significance of and feelings associated with these areas and deter further use of some sacred spaces (Yeatts and Huisinga 2013, Jackson-Kelly et al. 2013, Bullett et al. 2012 and 2008, Dongoske 2011). Yearly reports

are delivered to Reclamation and presented at regular meetings of the GCDAMP. These programs have proven useful in helping Reclamation and the NPS adaptively manage the river corridor (Reclamation 2015, NPS 2015). A summary of NPS and tribal monitoring protocols are described below.

C.1 GLEN CANYON MONITORING PROTOCOL

Since 2012, the Glen Canyon National Recreation Area (GLCA) reinstated archeological monitoring in the Glen Canyon reach. In 2015, a new monitoring plan was developed that identifies the most severe past and ongoing threats to archeological resources, defines monitoring priorities, and advances new monitoring techniques such as land-based photogrammetry (Harmon and Washam 2018). The monitoring plan:

- Identifies the most severe past and ongoing disturbances and threats to archeological resources as terrace bank retreat and terrace stream downcutting and expansion.
- Incorporates the park-wide archeological site monitoring form developed in cooperation with the Museum of Northern Arizona. The monitoring form incorporates Archeological Sites Management Information System (ASMIS) data fields and includes prompts for detailed and narrative recording of grazing, visitor, and natural impacts.
- Lays the foundation for establishing in-park photogrammetry capabilities. As periodic visual inspection and two-dimensional photography identify changes in bank and stream morphology at only the grossest level, Glen Canyon will use three-dimensional recording to more accurately identify and quantify topographic change detection through time.
- Identifies digital data for future planning. Many aerial photographs and high-resolution topographic data exist for the Glen Canyon reach; incorporating these into analysis and decision-making will inform an understanding of past changes at archeological sites and assessment of monitoring priorities.
- Defines site monitoring priorities and identifies sites as high, medium or low priority. The monitoring schedule will vary on the basis of site priority.

C.2 GRAND CANYON MONITORING PROTOCOL

The management of GCNP cultural resources is based on preservation and maintenance of resources in a stable condition. Archeological site condition is documented at the time of discovery and monitored for changes relative to the initial baseline condition. The monitoring program at GCNP aims to protect the aspects of integrity of historic properties, preserve cultural resources in place, and implement appropriate mitigations when integrity is threatened. Site

condition monitoring protocols are designed specifically to focus on the identification of processes affecting site integrity.

Monitoring begins with a review of the previous site forms and photographs. Comparing the current condition with previous documentation enables field monitors to identify specific changes to features and changes across site boundaries. When a disturbance is noted, monitors assess the specific effect(s) the disturbance has on the property's integrity. Monitors note which of the seven aspects of integrity are affected and the level of disturbance observed. Mitigation strategies to address disturbances are grounded in understanding the mechanism of change and treatment methods designed to preserve integrity. Small-scale treatment, implemented after deliberate planning, results in less impact to the surrounding landscape. All treatments are monitored to evaluate the outcome.

C.3 HOPI MONITORING PROTOCOL

The Hopi Monitoring program arose with the GCMRC Integrated Terrestrial Ecosystem Monitoring (TEM) program in 2001. While the original TEM program is no longer funded, the Hopi Long-term Monitoring Program continues to operate and forms the core of Hopi cultural resources assessment activities (see Yeatts and Huisinga 2007 for detailed methodology).

The overall goal of Hopi long-term monitoring is to document the health of *Öngtupqa*, and the culturally important resources within it, from the Hopi perspective. The Hopi program relies on Hopi individuals to assess the health of important resources in *Öngtupqa* from both formal presentations regarding the physical state of resources, as reported in scientific studies, and from direct observation by Hopi advisors venturing into *Öngtupqa*. These assessments are used to guide research, management, and policy recommendations by the Hopi Tribe in the GCDAMP and by management agencies. It is important to note that the Hopi Long-term Monitoring Program was developed to broadly assess system health, not specifically as a Section 106 monitoring effort. So, while it does in part obtain information relevant to assessing the status of *Öngtupqa* as a Hopi TCP, its original goal was much broader (GCPA compliance), and therefore it may not be currently to systematically identify potential adverse effects to all resources that comprise the TCP.

In the development of the Hopi Long-term Monitoring Program, a number of guiding principles, many informed by Hopi cultural proscriptions, were considered and accounted for in the methodology. The program recognizes the following:

- Integration of Hopi traditional values and knowledge into a Western science program would need to occur primarily at the level of data analysis, not at data collection.
- Data collection and data analysis do not necessarily need to be conducted by the same entity once appropriate procedures are developed.
- Duplication of efforts should be avoided.

- Some data can only be collected by knowledgeable Hopi people.
- Components of the ecosystem are interconnected and cannot be viewed in isolation.
- Hopi cultural mandates greatly restrict who can or should enter *Öngtupqa*.
- Hopi traditional knowledge is not uniformly distributed among the Hopi people.
- Methodologies that can evaluate the resources of *Öngtupqa* from a remote location would be the only approach that could adequately sample and provide representative data on the health of the resources from a broad Hopi perspective.
- Traditional scientific presentations of data are generally not the best mechanism for conveying information, particularly to a different culture.

Guided by the above stated principles, the Hopi Long-term Monitoring Program developed a survey-based assessment protocol that minimizes the need for Hopi people to enter *Öngtupqa*, thereby reducing the spiritual danger they are subjected to. Underpinning the monitoring approach is the recognition that the physical state of a resource and the health of that resource are two different measures; the first measure can be largely devoid of cultural values and can be assessed by anyone suitably trained and with the appropriate sampling methodology. The number of tons of sand in a given area, or the number of fish of a certain size, are examples of this type of measurement. The second measure can only be assessed within a cultural context because it incorporates culturally-derived values into the assessment (i.e., Desired Future Conditions as articulated within the AMP). For the Hopi monitoring work, a Hopi cultural perspective is the focus of the work.

The scope of the Hopi Long-term Monitoring Program is comprehensive and incorporates a wide range of culturally important Hopi resources, including archeological sites, ancestral Hopi places, springs, mineral deposits, animal and plant abundances, and water quality. The goal is not to conduct fieldwork with Hopi advisors that duplicates the data collection and experiments already being conducted by Center science programs, but instead to utilize this scientifically-collected information as the starting point. Hopi people can employ their own methods of observation, analysis, and interpretation of the data to assess the resources that are important to them. Hopi advisors provide a unique look into the ecology of a landscape based on place-specific understanding that has evolved and been recorded in traditional knowledge over centuries.

The way the program works is that data concerning the state of resources significant to the Hopi are summarized into standardized presentations that are provided to Hopi tribal members. While the presentation format and the categories of information are standardized, the specific information about the state of the resources is updated annually to reflect the current status of the ecosystem. Following the presentations, Hopi advisors are asked to provide

feedback (in the form of surveys and interviews), which draws on their traditional knowledge and teachings to assess the new information about specific resources and the state of the landscape in *Öngtupqa*. In addition, a limited number of Hopi advisors view the resources first-hand on monitoring trips. This approach allows comparison between survey responses by Hopis who have witnessed *Öngtupqa* directly and those who are only responding to information provided about it in the standardized presentations. The overall approach is a social-science-based, survey-based methodology.

This survey-based approach is a way to limit the need for many Hopi to enter the canyon and examine the resources directly, but it does require that the data being collected by GCMRC, NPS, and other scientists working in *Öngtupqa* be relevant. That is, it needs to not only address resources that are culturally important, but also consider relevant aspects of those resources. In the early stages of development of the Hopi Long-term Monitoring Program, great effort was made to coordinate with the developing TEM program to ensure that suitable, relevant information was being collected by the scientists. Unfortunately, with the decline of the TEM, some culturally important information that was being fed into the Hopi monitoring work (for example, bird and reptile monitoring) is no longer available. Greater emphasis is then placed on the informal observations made by Hopi advisors during the monitoring trips.

Hopi criteria for ecosystem health are defined not only by ecological values, but also by the spiritual significance of organisms and components. The resources that are the focus of Hopi assessments are those that play a role in Hopi social, economic, ritual, and cultural practices. Presence, abundance, and “good” appearance of living things can be considered general measures of a healthy ecosystem. There are many other more specific criteria. For example, while the number, size, or density of willow along the river corridor can be indications of overall ecosystem health, because willow also has specific culturally defined uses, a better measure of health from a Hopi perspective may include such characteristics as the ease with which branches may be harvested and woven (more a function of age structure and management tactics than sheer numbers and size).

Hopi perspectives provide an alternative method of assessing ecosystem health and offer a distinctive historical reference point. “Health” is broadly and variously defined because different people and cultures have unique ideas of what a healthy ecosystem looks like. Although the same site may be observed and the same metrics recorded, the resulting interpretation is defined by cultural values, training, experience, and background, among other things. Because of their long, entwined history with *Öngtupqa* and the use of its natural resources, the Hopi people offer an inherently holistic perspective of the environment and its management. The Hopi Long-term Monitoring Program allows the integration and tracking of Hopi cultural measures of health for *Öngtupqa*.

C.4 ZUNI MONITORING PROTOCOL

The Zuni Cultural Resource Enterprise facilitates, manages, and implements the Pueblo of Zuni’s long-term monitoring of places and resources of traditional Zuni concern located within the Colorado River Ecosystem (CRE) through the Glen and Grand Canyons as part of the

GCDAMP. As a result of the traditional cultural significance that the Grand Canyon holds for the Zuni people, the Pueblo of Zuni is a tribal stakeholder in the GCD Long-term Experimental Management Program (LTEMP) AMP. Several management objectives (MOs 11 and 12) of the GCDAMP are especially pertinent to the development of a Zuni monitoring protocol.

Management Objective (MO) Goal 11 seeks to “preserve, protect, manage, and treat cultural resources for the inspiration and benefit of past, present, and future generations.” MO 11.1 is specifically designed to preserve *National Register-eligible* historic properties including archeological sites, historic places, and TCPs within the Colorado River corridor. MO 11.2 seeks to manage resources that possess traditional cultural significance, but that are not necessarily tied to a specific location within the river corridor. For example, Zuni traditional, culturally significant plants and animals may be grouped into this category. MO 11.3 seeks to maintain and improve access to the river corridor for traditional Native American religious practitioners.

Management Objective Goal 12 is concerned with the maintenance of “a high quality monitoring, research, and adaptive management program.” MO 12.1 seeks to attain and maintain adequate socioeconomic data pertaining to tribal and spiritual values for generating recommendations to the Secretary of the Interior. MO 12.2 endeavors to integrate and synthesize cultural and environmental data, which could be accessed through use of a geographic information system (GIS), for making recommendations to the Secretary of the Interior. MO 12.5 seeks to attain and maintain effective tribal consultation in all adaptive management activities including research and long-term monitoring activities; MO 12.6 seeks to attain and maintain effective and meaningful tribal participation in these activities.

The principal purpose of the Zuni monitoring river trip is to provide the Zuni Cultural Resource Advisory Team (ZCRAT), other Zuni religious leaders, and cultural advisors an opportunity to inspect ancestral archeological sites and Zuni traditional cultural properties that may be experiencing impacts from erosion, presence of humans, other natural forces, and/or flows released from operations of GCD. The Zuni monitoring program is designed to collect data that is utilized in identifying adverse impacts resulting from these forces on Zuni traditional cultural properties situated along the Colorado River corridor through Grand Canyon. The Zuni monitoring data is employed to guide measures taken to preserve Zuni traditional cultural properties in place for their continued use by ancestral and contemporary Zunis, and future generations of Zuni. The annual Zuni monitoring river trip provides the Zuni representatives with an opportunity to identify and ascertain the overall health and abundance of certain plant and animal communities of traditional cultural importance. It also provides an opportunity for the Zuni representatives to collect certain culturally important plants, minerals and water from springs and other areas for religious and ceremonial purposes.

Moreover, and perhaps more importantly, the annual monitoring river trips provides the Zuni religious leaders, Rain priests, Bow priests, Kiva members and members of medicine societies an opportunity to directly experience the place where the A:shiwi emerged (Ribbon Falls) from the fourth world and ascended out of the Grand Canyon in search of the Middle Place. The cultural, biological, and physical resources located within the Grand Canyon are held most sacred by the Zuni as a result of their association with the Zuni emergence, migrations, and

enduring ceremonies. Zuni *weltanschauung* is a relational one that presumes a personal responsible relationship with all life forms (i.e., animal and plant) that exist within the natural world. Embedded within this perspective is a Zuni mindfulness of honoring the primacy and validity of direct personal interaction with the ecosystem. This spirit of deliberate care is one of the hallmarks of the Zuni ethic of environmental stewardship. It is through this direct personal interaction with the Colorado River ecosystem through Grand Canyon that provides the Zuni monitoring team with its foundation for understanding the health and well-being of the Colorado River ecosystem through Grand Canyon.

In addition to visiting and making observations regarding the wellbeing of natural and cultural resources of traditional Zuni importance within the Grand Canyon, the annual Zuni monitoring river trip provides the Zuni Cultural Resource Enterprise with vital information regarding the condition of ancestral archeological sites and National Register of Historic Places (NRHP)-eligible Zuni traditional cultural properties located along the Colorado River corridor within Glen and Grand Canyons. This information is essential to the Pueblo of Zuni's participation, as a consulting signatory, in the 2017 Programmatic Agreement (2017 PA) on the operations of the GCD pursuant to the NHPA and Reclamation's compliance responsibilities and as a stakeholder in the GCDAMP.

In the past, the Zuni monitoring program has annually identified archeological sites to be assessed as Zuni traditional cultural properties and which Zuni TCPs were to be monitored. Listing of proposed Zuni TCPs, archeological sites, and sampling locations proposed for visitation during a river trip are normally provided to the GRCA as part of the permitting process.

The implementation of a Pueblo of Zuni monitoring program contributes to the GCD LTEMP AMP's success in meeting the MOs described above. Zuni Cultural Resources Enterprises (ZCRE) and ZCRAT monitors visit and provide a Zuni TCP assessment for a judgmentally based sample of NRHP-eligible historic properties on an annual basis. Zuni monitors identify all traditional culturally significant resources that are potentially affected by dam operations and continue to monitor their status with repeat visits during the duration of this long-term monitoring effort.

Zuni monitors affect the promotion of effective tribal consultation through informing the Zuni representatives of Zuni cultural resource status prior to their participation in the Technical Work Group (TWG) and/or the Adaptive Management Work Group (AMWG) meetings or through other meetings organized by the GCMRC, Reclamation, and/or GCNP. The Zuni monitoring program contributes to effective Zuni participation in management, research, and monitoring activities of Zuni traditionally important resources within the CRE. Finally, the Zuni monitoring program provides a much-needed assessment of the overall health of the CRE from a Zuni traditional perspective that will contribute important information to the LTEMP adaptive management program and the decision matrix for future management actions.

The primary purpose of the Zuni monitoring program is the collection of data that are used to identify adverse impacts that are the results of dam operations, research and monitoring program activities, or other sources (i.e., visitor impacts, non-dam induced erosion) on Zuni

TCPs situated along the Colorado River Corridor below the pre-dam flood zone at approximately the 300,000 cfs level. Zuni monitoring data is used to guide measures taken to preserve Zuni TCPs in place for their continued use by ancestral and contemporary Zunis, and for their use by future Zuni generations. Currently, the Zuni monitoring program continues fieldwork that is focused on the identification of additional Zuni TCPs and resources of traditional importance. Data are routinely collected to assess the condition of Zuni TCPs, generate recommendations concerning treatment options, and schedule future monitoring fieldwork.

The Zuni monitoring program implements one annual river trip to conduct fieldwork. If determined necessary, Zuni monitors may also request involvement in NPS monitoring fieldwork. Zuni monitoring trips usually last 10 days. The Zuni monitoring program collects photographic or video documentation of Zuni TCPs and any associated physical or visitor-related adverse impacts. In most instances a digital camera or digital video recorder is used for these purposes.

On an annual basis, the Zuni monitoring program prepares a report detailing its activities on each river trip which includes information concerning each Zuni TCP and an impact assessment. The Zuni monitoring program retains all sensitive information regarding Zuni TCPs. The Zuni monitoring report enumerates the proposed sites requiring Zuni monitoring during future river trips. The report also addresses any proposed refinements or other changes to the Zuni monitoring program methodology. The annual Zuni monitoring program report is submitted to Reclamation with recommendations based on the result of the monitoring trip. This report endeavors to be an effective means of transmitting the results of the Zuni monitoring program to the GCMRC for incorporation in the overall status assessment of the health of the river corridor ecosystem presented in the *State of the Colorado River Ecosystem in the Grand Canyon* report.

C.5 HUALAPAI MONITORING PROTOCOL

The Hualapai Department of Cultural Resources (HDCR) Cultural Resource Monitoring Protocols were last revised and distributed to the GCDAMP in 2007 (Jackson-Kelly et al. 2007). Provided below is a brief summary of the monitoring protocols, including (1) HDCR's monitoring philosophy, (2) cultural resource monitoring methods, and (3) ethnobotanical monitoring activities. The objective of the Hualapai monitoring program is to understand the effects of the operation of GCD, human visitation, and natural processes on the integrity of TCPs, archeological sites, sacred sites, and the Grand Canyon and the CRE as a whole.

C.5.1 HDCR Monitoring Philosophy

The following section reiterates the position articulated in a document prepared in 2007 that details HDCR's approach to monitoring along the Colorado River as part of the GCDAMP (Jackson-Kelly et al. 2007).

The Indigenous perspective is to simply care for the land and practice spirituality and respect for sacred sites (tangible or intangible) within the indigenous landscape. For example, the

Hualapai belief system encompasses traditional thought that makes the Colorado River and Grand Canyon significant and integral to their cultural identity. This includes landforms and sites and areas of creation of both humans and non-humans. The significance also involves TEK and belief systems that take into consideration the entire landscape and its elements (land, minerals, rocks, water, springs, air, climate, seasons, plants, and wildlife) as an integrated whole.

This belief system is oriented around five general thematic categories regarding the Colorado River Corridor. Additionally, these categories inform interview questionnaires that are used in the monitoring program during river research trips:

1. Culturally Sensitive Areas
2. Perspectives on Ethnobotany: Native and Introduced Species
3. Cultural Significance of Fauna
4. Perspective on Uses of Hualapai Land and Human Impacts
5. Hualapai Restricted and Esoteric Perspectives

As these five categories demonstrate, Hualapai perspectives on cultural and ecological knowledge contain information on specific representations about relationships, in particular about places through a perceived way of “knowing,” which reflect cultural values. These values can also encompass esoteric or restricted information that needs to be respected and protected. Esoteric knowledge is a means of caring for culture and contains a bridge linking guardianship and service for the Hualapai way of life. For example, when there are intrusions and negative impacts upon Hualapai areas of concern, there are cultural protocols to address such situations. When exploitation or harm occurs (cause), an impact (effect) results that must be addressed. Consequently, a remedy (specific knowledge) must be applied in order to balance the bridge between the cause and effect through healing processes.

Through the Hualapai Cultural Resource Monitoring Program, the Tribe is able to maintain a philosophy of stewardship by continuing to interact with the river corridor and all of its varied resources on multiple levels. These include the practical activity of monitoring places of cultural significance; the reinforcement of Hualapai history and culture; the passing on of knowledge to current and future generations; and individual and collective acts of spirituality and ceremony, all of which contributes to the sense that the Grand Canyon and Colorado River continue to be a highly significant cultural landscape.

C.5.2 Cultural Resource Monitoring

Four monitoring forms are used by HDCR during the evaluation process for the Colorado River Corridor. These monitoring forms record characteristics and impacts related to dam operations, human visitation and natural processes. Each form is designed for the evaluation and monitoring of natural and human impacts on all sites. The impacts are quantified (ranked) and recorded in the field on a point scale system, ranging from 0 (absent) to 4 (severe). Quantitative data gathered during previous river trips establish a baseline and diachronic condition sequence for analysis of future natural and human impacts. The forms additionally include comment sections to record qualitative data used for multi-year impact comparisons. Qualitative

information frequently addresses topics related to TEK, historical associations, traditional stories, and individual responses about culturally significant places.

Diachronic photographic comparisons are a key element in identifying changing or stable conditions at sites, especially those with tangible and perhaps portable elements. Hualapai have used photo matching at numerous sites since the establishment of the monitoring program, but have expanded their scope in recent years to include comparisons with historic photos of riverine landscapes and environments taken in the late 19th and early to mid-20th centuries (especially pre-dam), as well as to document the effects of high-flow experiments (HFEs) at riverbank locales at places of interest (e.g., near TCPs).

River trip reports present the results of observations about natural and human impacts on sites, associated features and ethnobotanical resources located within the traditional Hualapai lands. The monitoring protocols established in 2007 provide guidelines that assist the Department of Cultural Resources in synthesizing information gathered on previous and current monitoring trips.

C.5.3 Ethnobotany

At a few specific locations (National Canyon, Mohawk Canyon, and Granite Park), the abundance of plant species is estimated using the line-intercept method (Mueller-Dombois and Ellenberg 1974, Bonham 1989). A 50-meter tape is laid from the edge of the river, perpendicular to the river, across the vegetation plot. Starting from the “0” end of the tape, each individual plant that hangs over the tape, or “breaks the plane,” is measured by reading the interval along the tape through which the plant intercepts the plane. The beginning and endpoint of each such intercept is recorded for each individual biennial and perennial plant. Annuals are not included.

The individual intervals recorded for each species are added, giving a total intercept for each species along a transect-line. The ratio of the intercept for a particular species and the sum of intercepts for all species gives a value known as “percent cover” for each species present on the transect. This is calculated as follows:

$$\text{Percent cover} = \text{Sum of intercepts for each species} \div \text{Sum of intercepts for all species}$$

C.6 NAVAJO MONITORING PROTOCOL

The Navajo Nation is currently developing a formal protocol for tribal monitoring. A formalized monitoring protocol will be a deliverable for a future GCDAMP project. Current monitoring trips have included stopping at properties of traditional religious and cultural importance. Education for the Navajo participants and their relationship with the Canyons is a key to the tribal presentations given during the monitoring trips.

C.7 SOUTHERN PAIUTE MONITORING PROTOCOL

In 1995, the SPC led the Southern Paiute response to the publication of the first environmental impact statement (EIS) on the operations of GCD and positioned Southern Paiutes to fully participate in the AMP that was mandated by the GCPA. Since this time, the SPC has developed protocols to participate in the GCDAMP, to preserve, protect, manage, and treat cultural resources. SPC protocols support the GCDAMP in its efforts to maintain resource integrity and cultural values of traditionally important resources within the Colorado River Corridor. The SPC coordinates annual Southern Paiute monitoring trips to protect traditional cultural resources and maintain physical access of Southern Paiute to their cultural resources. By promoting access to sites of cultural and spiritual importance, SPC monitoring protocols enable tribal participants to actively contribute to the GCDAMP's work. The SPC facilitates tribal participation in these monitoring activities, and the SPC Director's membership of and active involvement in the TWG and AMWG insures the inclusion of Southern Paiute perspectives in the GCDAMP.

Drawing on research conducted between 1992 and 1995, the SPC established the Colorado River Monitoring and Environmental Education program. The program evaluates both direct and indirect effects of the operation of GCD on cultural resources that have been identified by Southern Paiute consultants within the Colorado River Corridor. Indirect effects of dam operations on important cultural sites may extend well beyond the river's edge, and variations in river level may affect site access, frequency of visitor use, and plant and animal communities well beyond the shoreline of the river. Evaluating the effects of dam operation on the holistic integrity of river corridor cultural sites requires that some monitoring activities take place within portions of sites beyond the immediate influence of the Dam. The basis for the program and the results of its initial development and implementation are fully discussed in the report, *Itus, Auv, Te'ek (Past, Present, Future): Managing Southern Paiute Resources in the Colorado River Corridor* (Stoffle et al. 1995a).

Since the establishment of the program, Southern Paiute representatives have been involved with (1) monitoring cultural resources in the Colorado River corridor, (2) issuing reports summarizing monitoring activities and providing management recommendations, and (3) managing an education program for tribal participants (Stoffle et al. 1995a:7). The SPC's Colorado River Monitoring and Environmental Education program enables Southern Paiute representatives to monitor cultural resources in the Colorado River Corridor and to compile an archival database of information concerning the area and its resources. Annual monitoring makes it possible for tribal representatives to determine the type and extent of impacts occurring to their cultural resources (Stoffle et al. 1995a:64).

The SPC's Colorado River Monitoring and Environmental Education program conducts an annual river trip, during which time tribal participants monitor cultural sites within the Colorado River Corridor that are culturally important and impacted by Dam operations. Sixteen sites are regularly monitored on a four-year schedule, with sites visited on annual, biennial, or every four-year basis, depending on what is being monitored and the fragility of the site. Appropriate methods drawn from Cole's (1989) widely used sourcebook of monitoring methods for remote wilderness areas were developed at the program's outset (Stoffle et al. 1995a:66).

Clearly defined parameters were established to measure impacts on the sites, and compiled observations, data, and photos facilitate ongoing assessment of the extent to which change occurs along and within the Colorado River Corridor. The program includes the use of: (1) a composite cultural resource monitoring form; (2) site-specific monitoring checklists and data collection forms; (3) the SPC Monitoring Training Program; and (4) a SPC plant reference guide. In addition, every trip participant receives the Southern Paiute River Guide, a compiled notebook with ethnobotanical, archeological, geographic, cultural, and linguistic information.

Although the ultimate goal of the monitoring program is to define and monitor broadly-understood cultural sites, ethnographic studies have been conducted on specific culturally significant elements, such as archeological materials, plants, or rock writing panels. Therefore, these particular elements are monitored, even as Southern Paiutes emphasize the connections of individual sites, plants, and rock writing panels to other culturally-important resources (Stoffle et al. 1995a:68).

C.7.1 Archeology

The SPC monitors sites along the Colorado River Corridor that have been identified during archeological surveys, recording changes to artifacts and site area. Both the level and type of natural and human impacts occurring to these sites are monitored using photography and pre-defined condition classes measured by on-site observations. Condition classes measure changes that are perceptual in nature, and the SPC program utilizes a recording instrument based on the GCNP's archeological site monitoring form to register effects of natural processes and human activities on archeology sites in the Colorado River Corridor (Stoffle et al. 1995a).

C.7.2 Plants

Southern Paiutes relied upon plants for their survival, making ethnobotanical knowledge essential to their “transhumant adaptive strategy” (Stoffle and Evans 1990) for living in the desert. Early ethnographic fieldwork among Southern Paiute people included the recording of Southern Paiute use of plant resources in and around the Grand Canyon (Stoffle et al. 1994). The Colorado River Corridor provided important foodstuffs to Paiute people that were collected seasonally, processed and stored for year-round use. A wide variety of plants continue to be utilized by Paiute people for food, medicine, ceremonies, and economic activity, and Southern Paiute representatives on monitoring trips routinely share ethnobotanical knowledge with other trip participants. The SPC monitoring program documents changes occurring to plant communities (many species), plant stands (one species), and individual plants through the use of photography and written observations. In addition, impacts occurring to entire ecosystems are also monitored as a means of incorporating the holistic concerns that Southern Paiute people have about the Grand Canyon.

C.7.3 Rock Writing Panels

Still photography provides the easiest and most cost-effective technique for recording and monitoring change to rock writing, and is used to document change to panels and sites with rock writing. A reproducible and systematic protocol has been developed to guide photo monitoring at each site. These protocols establish photo points and compass readings to guide the photographic recording of changes to rock writing. Additionally, photographs are paired with written observations of noted changes. Rock writing is most profitably examined in relation to its locational setting (see Stoffle et al. 1995b). For this reason, tribal elders and consultants accompany monitors to each site, and share their insights as to how the monitored site connects with other local sites as well as the holistic cultural resources of the Colorado River Corridor.

Finally, education is a critical component of the Southern Paiute cultural resource monitoring program. The annual river trip integrates educational aims within the monitoring process. These components of the trip include (1) specialized training in monitoring skills and techniques; (2) direct information about Paiute culture provided by the Southern Paiute elders and cultural resource specialists; (3) learning through participation in Southern Paiute traditional practices and in monitoring activities; (4) information about policy and management related to Southern Paiute participation in the GCDAMP; (5) education about how cultural resources along the Colorado River are being protected, and what policies exist and requirements are needed for receiving protective designation of cultural resources; and (6) expert consultation about relevant political and scientific issues in the Grand Canyon. Tribal elders are an integral component of this education program, sharing information about past as well as present connections between Southern Paiutes and the Colorado River Corridor. The sharing of ethnobotanical knowledge, including information about traditional plant uses, is an important feature of the annual river trips.

Each year, the SPC director and tribal representatives work to prepare monitoring materials, participate in monitoring trips and data collection along the Colorado River Corridor, analyze the information collected, archive the photos taken, and prepare reports and presentations for the Southern Paiute Tribes and the agencies involved in the GCDAMP. The activities conducted by the program are submitted in annual reports to Reclamation.

The SPC continually evaluates the monitoring program in an effort to collect data in as straightforward and replicable a process as possible and to adjust the program as needed. Program assessment is particularly mindful of changing strategies executed by the GCDAMP, including experimental high flows, evaluating how best to monitor changing impacts of dam management.

C.8 GCMRC MONITORING PROTOCOL

GCMRC has designed a monitoring program that can provide a record of topographic change linked to dam operations at a site-specific scale, while also providing information that will have broader applicability for informing the AMP about how dam operations affect the river corridor landscape in general. In this monitoring program, site condition monitoring occurs at

two different scales: (1) at the level of the site population as a whole, and (2) at a stratified sample of sites. At the site population level, long-term changes in terms of both aeolian classification and drainage evolution status are tracked. For a sample of sites, high-resolution surface changes are monitored with repeat terrestrial light detection and ranging (LiDAR) surveys to quantify the type and amount of change occurring at different classes of sites.

In terms of the aeolian classification, the monitoring program tracks whether sites are shifting from one aeolian classification to another in response to changing availability and connectivity with fluvial sand sources. Site classifications are not static but have shifted over time in response to declining sediment source areas and increasing vegetation, with many fewer sites now able to receive and benefit from aeolian deposition compared to 40 years ago (East et al. 2016). In general, as sites shift from lower-numbered categories to high-numbers owing to sandbar loss, riparian vegetation growth, or both, their potential to receive aeolian sand diminishes. This presumably increases their vulnerability to future erosion by overland flow because less aeolian sand cover reduces the resilience of sites to future gully erosion (Sankey and Draut 2014).

The program also evaluates overland-flow drainage channels (rills, gullies, and arroyos, in order of increasing size) at each archeological site by noting whether such drainage systems are present at or immediately adjacent to each site and the downslope extent of each drainage. This is essentially the base level to which each drainage is graded, binned into four categories: (1) no drainages present, (2) terrace-based drainages, (3) side-canyon based drainages, or (4) Colorado-River-based drainages. This categorical classification is one means to assess the maturity of such drainage networks, as river-based and side-canyon-based drainages are graded to the lowest possible local base level and thus represent the endpoint of drainage development, while terrace-based drainages are an intermediary stage of development. In general, changes from lower- to higher-numbered drainage classes indicate a transition to a more degraded site condition, and the inverse indicates a transition to a less degraded site condition. The plan is to revisit both classifications at five-year intervals, because previous analyses (e.g., East et al. 2016) have shown that these site attributes change relatively slowly.

At a subset of sites ($n = \sim 30$), repeat ground-based LiDAR surveys are being used to monitor the amount of surface change that occurs at each archeological site due to the influx of windblown sand relative to changes that occur due to gullying and other (including aeolian) erosive processes. As in the preceding testing and pilot phases, digital elevation models derived from LiDAR scans are acquired during each individual site visit, but the scope of the digital elevation models (DEMs) have been expanded to cover not only the area within each archeological site, but also the area between the site and the river channel in order to include the upwind sand source and any topographic barrier(s). In addition, changes are mapped and analyzed in relation to individual archeological features and artifact concentrations within site boundaries.

A non-random stratified sample of sites representing a variety of aeolian classifications has been selected for long-term LiDAR monitoring. The sample was selected to capture as wide a range of geomorphic complexity as possible in terms of replicated aeolian, drainage, and nearby sandbar characteristics, while also operating within logistical and permitting constraints.

The site sample is stratified by aeolian classification categories, with approximately two thirds of the sites assigned to Types 1 and 2 (where the potential for dam operations to affect site condition is presumably greatest), and approximately one third assigned to Types 3 or 4.

The LiDAR geomorphic change detection approach provides the ability to not only accurately detect and measure changes, but to attribute the changes to specific geomorphic processes in a more quantitative manner, albeit at a smaller total number of sites compared to the classification system approach. Based on landscape morphometry at each site along with the shape and orientation of elevation changes observed in DEMs-of-difference (DODs), areas of change can be mechanistically segregated, or attributed, into one of four geomorphic transport mechanisms: fluvial, aeolian, colluvial, or alluvial (Kasprak et al. 2017). Until 2014, the mechanistic segregation was performed by the project LiDAR analyst and geomorphologist who used expert knowledge to attribute geomorphic process to individual areas of change in the DODs (Collins et al. 2016; East et al. 2016). Initially this attribution focused solely on either aeolian or alluvial processes. More recently, an automated methodology has been developed to compute the overall magnitude and direction (e.g., net deposition or erosion) of change at each site, and also quantify the relative contribution of individual sediment transport processes (fluvial, aeolian, colluvial, or alluvial) in driving topographic change at the site (Kasprak et al. 2017).

DODs are being acquired at a monitoring interval that is frequent enough to avoid overprinting of geomorphic processes, while taking into consideration the logistical and financial constraints of conducting field work in the Grand Canyon. Overprinting results when a geomorphic process produces topographic change that is altered or reworked by a subsequent geomorphic process. In general, we believe that a 3-year monitoring interval is reasonable for the reliable detection and mechanistic segregation of geomorphic changes and trends, while minimizing the possibility for mis-attribution of the changes as a result of process overprinting; however, monitoring intervals vary in accordance with the amount of geomorphic change occurring at a given location (i.e., Types 1 and 2 sites are monitored more frequently than Types 3 and 4). GCMRC plan is to continue to study and refine understanding of how overprinting affects LiDAR change detection as the monitoring work progresses.

In addition to measuring topographic changes with LiDAR surveys, some variables require other monitoring methods that can be applied concurrently with the LiDAR data acquisition. For example, 3600 photos of the site area are acquired coincident with the LiDAR surveys and are co-registered with the LiDAR data. These photos are inspected visually (qualitatively) to determine the type of vegetation that has changed at the association or species level, if possible. The photos are also inspected to identify locations within sites where biologic soil crust has changed from being present to absent, or vice versa. Biologic soil crusts are important to monitor because they can fundamentally alter geomorphic processes in and around sites and landscapes. Biologic crusts are also associated with reduced aeolian sand activity and so stabilize a site against dune migration or aeolian deflation, but also reduce a site's resilience to gully erosion by limiting aeolian sand activity that otherwise may fill in and anneal gullies. Biologic soil crusts can be negatively impacted by surface disturbances due to the erosion or deposition of sediment. The photographs also allow us to verify whether changes detected by LiDAR are visually detectable to the naked eye.

Weather data, specifically wind and rainfall measurements, are necessary to interpret surface changes detected with LiDAR and to attribute changes to specific geomorphic processes. GCMRC therefore will continue to maintain six weather stations throughout the river corridor that are co-located with six archeological sites, and these six sites are also part of the site sample subject to LiDAR monitoring. Remote cameras are located at several of these sites so that changes detected by LiDAR surveys can be linked to specific weather events and conditions. The weather monitoring and remote camera data are collected at high temporal frequency due to their autonomous nature and are manually downloaded during infrequent site visits.

C.9 MODIFICATIONS TO MONITORING PROTOCOLS

Monitoring protocols listed above are intentionally written to be “flexible”. It is acknowledged that the protocols will need to be changed as new experimental flows are developed or as new research questions are being asked. Flexibility is also key to identifying monitoring “gaps” that may be identified. Modifying the protocols to address these gaps is fundamental in adapting to new research.

Should modifications to existing monitoring protocols become necessary to maintain significance or relevance in assessing effects of the GCDAMP activities, Reclamation shall submit the draft monitoring protocols to consulting parties for a period of 30 calendar-days for review and comment. Written comments may be submitted to Reclamation via email, and Reclamation shall take into account all timely comments. Reclamation shall make a good faith effort to contact any non-responsive party by email and/or telephone.

Reclamation shall address any comments in a revised draft and submit the revised monitoring protocols to consulting parties for additional review. Consulting parties shall have 30 calendar-days to review the revised monitoring protocols. Reclamation shall make a good faith effort to contact any non-responsive party by email and/or telephone. If there are no further comments, the revised document shall be considered Final. Should consulting parties have additional comments, consultation shall continue for an additional 90 calendar-days. If consensus cannot be reached within the additional 90 calendar-days, Reclamation shall follow Stipulation XVI of the 2017 PA. The existing monitoring protocols will remain in effect until revised monitoring protocols are finalized. Reclamation will provide all consulting parties with a copy of the approved or final monitoring protocols.

C.10 COLLABORATIVE MONITORING EFFORTS

Within the GCDAMP activities and the adaptive nature of the LTEMP and the need for new experimental actions, there are many potential needs for collaborative monitoring efforts. As needed, or as requested, collaborative monitoring efforts will be coordinated. Current monitoring protocols are all flexible enough to address specific concerns which may involve more than one monitoring entities.

C.11 DATA SHARING

Data Sharing is a key to the cultural resources program under GCDAMP. All monitoring programs, whether they be NPS, tribal, or other monitoring, require monitoring reports to be submitted to Reclamation. These monitoring reports are not the conclusion to the research, but only a step in a much larger process. The following is a general outline of the steps to be followed in the monitoring process and the data sharing.

Monitoring. This is the first step in which each monitoring entity follows their monitoring protocols which may include research questions.

Monitoring Reports. Following the monitoring, each entity will complete a monitoring report to Reclamation. These monitoring reports, minimally contain a list of sites monitored, findings of the monitoring including condition of each site (site by site, component by component), recommendations for Reclamation, and recommendations for NPS. Once received, copies of the NPS and contractor monitoring reports will be sent to the parties of the 2017 PA for a 45-day review. Reclamation will compile all comments and responses received and send them and a cover letter to NPS. A 20-day revision time will be given NPS to produce and send a final report to Reclamation.

Review Process. The review process for tribal monitoring reports will follow the protocols established in 2012. Reports are submitted to Reclamation's Grant Officer's Technical Representative (GOTR). Copies are sent to a specified list of DOI agencies for a 45-day review. If needed, Reclamation will consult with specific DOI agencies concerning their comments. Reclamation compiles all comments and responses received and sends them and a cover letter to the individual Tribe. If a Tribe requests, DOI agencies will meet with tribal representatives to review specific tribal recommendations and follow-up with the Tribe about actions taken or proposed in response to their recommendations or concerns. DOI agencies and Tribes will meet at least annually to conduct a review of all monitoring information and any follow-up activities conducted in response to monitoring results. This meeting will be held in conjunction with the Annual Meeting discussed below.

Reclamation's Response. Following the receipt and review of each monitoring report, Reclamation will respond to the report with a letter acknowledging receipt and review of the report. Reclamation will request a face-to-face meeting with each Tribe. The face-to-face meeting will discuss the findings of the monitoring, the recommendations and the actions that will be taken to address the recommendations. If the recommendations are directed at NPS or GCMRC, Reclamation will pass this information to the NPS or USGS.

Annual Meeting. Stipulation XI of the 2017 PA calls for an Annual Review, Report and Meeting. This annual reporting meeting will be the primary venue for reports to be given on the Monitoring projects. These reports will consist of first-hand observations, dialogue on what is happening throughout the canyon, identifying recommendations, issues and seeking input from other participants and representatives. Details of the monitoring projects may also be shared at the annual TWG-GCMRC Annual Reporting Meeting.

Data Sharing. Following the annual meetings, data sharing of the monitoring results will take place with interested parties. Copies of the annual monitoring reports will be available and distributed as requested.

APPENDIX D: HISTORIC PROPERTIES AND DISTRICT DESIGNATION

The National Register of Historic Places (NRHP) is the federal government's official list of the nation's historic places (historic properties) worthy of preservation. Created under the National Historic Preservation Act of 1966 (NHPA), this list is part of the national program to coordinate efforts to identify, evaluate and protect the nation's historic and archeological resources. These historic properties include districts, sites, buildings, structures, objects, and landscapes. In addition, traditional cultural properties (TCPs) may be a historic property (National Register Bulletin 38). To be eligible for listing, the property must meet one or more of the NRHP's four criteria and retain historic integrity. There are many historic properties identified within the Canyons, some contained within each national park, and some extending beyond the boundaries of each park.

D.1 HISTORIC PROPERTIES OF GRAND CANYON NATIONAL PARK

Grand Canyon National Park (GCNP) contains within its boundaries at least 12,000 years of prehistory. The archeological resources within the park and therefore the river corridor are considered significant at the local, regional, and national levels, based on how the resources reflect the abilities of people to adapt to the varied environments representative of the canyon. Historic properties reveal the relationships between the canyon and those who interacted within it including exploitation of the natural and physical landscape while also adapting to climatic and cultural shifts. Adaptation through time, is represented by archeological evidence in all life zones and nearly every microenvironment documented in the river corridor.

Only a portion of the 1.2 million acres within the GCNP boundary has been surveyed for cultural resources. Modeling for site type densities within specific life zones guide current survey protocols and projects within the park. As staff continues to document archeological sites, those retaining NRHP integrity are potentially eligible for inclusion on the NRHP for the significance they exhibit in illustrating prehistoric and historic exploitation and adaptation to a rugged and diverse environment.

D.2 HISTORIC PROPERTIES OF GLEN CANYON NATIONAL PARK

Thirty-three archeological sites are identified in the Glen Canyon National Recreation Area (GLCA) portion of the APE. AZ C:2:11, Lees Ferry, was placed on the NRHP in 1977 (see below); most of the remaining sites were determined to be eligible to the NRHP in 1991 (NPS 1991). Subsequent recording, investigating, and monitoring of these sites have resulted in additional, and sometimes contradictory, eligibility recommendations; with a few exceptions (Reclamation 2011), none of these recommendations have resulted in formal eligibility determinations. At this time, GLCA treats all sites as eligible until such time as formal determinations of ineligibility are made. In addition, although some sites may not be eligible individually, they may be contributing elements to an eligible district.

D.2.1 Lees Ferry and Lonely Dell National Historic District

At Lees Ferry, the Colorado River briefly flows free of canyon walls, and was historically the only place in over 400 miles that could be accessed on both banks by wheeled vehicles. This natural attribute has influenced the site's history for 150 years. Today, historic buildings and a cemetery, shade trees, an orchard, fields, trails, and dugways carved into the river bluffs combine with more contemporary structures to illustrate the site's use as a farm and a vital ferry link between settlements in Utah and Arizona. U.S. Geological Survey (USGS) gauging stations used to fulfill terms of the Colorado River Compact, dude ranch buildings, and an access point for river runners are also present at Lees Ferry.

Lonely Dell Historic District was nominated to the NRHP in 1977 (Muhn 1977); 20 years later, the district was expanded to include Lees Ferry (Hubber 1997). Since then, Glen Canyon has updated the National Register nomination form (Mardorf 2010) and completed a historic structures report (Graham and Kupel 2000) and a cultural landscape inventory (NPS 2010) for the district.

The district contains 26 contributing elements, including historic structures, a cemetery, an irrigation ditch, and the remains of a steamboat. Also contained within the district are numerous modern non-contributing structures including maintenance buildings, a launch ramp and a comfort station. In addition, Lonely Dell Ranch has been identified by the Secretary of the Interior as a Historic Landscape. A list of contributing elements is provided in Appendix P.

The significance of the district is based on its association with early Mormon settlement, early ranching and agriculture, early mining, early USGS exploration, the exploration and development of the Colorado Plateau, and transportation across the Colorado River.

D.3 HISTORIC PROPERTIES OF TRADITIONAL RELIGIOUS AND CULTURAL IMPORTANCE

In 2011, Reclamation in consultation with the Arizona State Historic Preservation Officer (SHPO), concurred that the Canyons from Glen Canyon Dam (GCD) to River Mile 277, and the lower gorge of the Little Colorado River, are NRHP-eligible properties under Criteria A, B, C, and D. Currently, only the Hopi and Zuni TCPs have been documented with NRHP nomination forms. Other tribal nomination forms are pending. Descriptions of the TCPs follow.

D.3.1 Hopi TCP

Öngtupqa (Grand Canyon), *Palavayu* (Little Colorado River), and *Pisisvayu* (Colorado River), A Hopi TCP Traditional Cultural Property

The Grand Canyon is a Hopi TCP. Known as *Öngtupqa* in Hopi, it holds a uniquely prominent place in the history of the Hopi People and continues to maintain its significance

today. Broadly, it is an origin location, a place where Hopi ancestors resided, a source for ceremonial and cultural items, and the final destination for Hopis in the afterlife.

Within the framework of National Register eligibility criteria, the significance of *Öngtupqa* is found under all four of the eligibility criteria. Numerous events that are described in Hopi traditional history occur in part or in whole in *Öngtupqa*. Personages associated with these events likewise are memorialized by locations within *Öngtupqa*. *Öngtupqa* served as a home and provided the means for survival of the *Hisatsinom* (Hopi ancestors) and still provides resources for traditional use by the Hopi people. Finally, the historic record contained at ancestral Hopi sites and other locations confirms Hopis' stewardship covenant and provides the opportunity for Hopis to understand their history through traditional and modern approaches.

Below is a listing of the components that contribute to the significance of *Öngtupqa*, arranged by criteria. It should be recognized that many of the components are likely eligible for the NRHP on their own and that in a number of cases, their boundaries extend well outside of the geographic boundaries of *Öngtupqa*.

Criterion A: Association with events that have made a significant contribution to the broad patterns of [Hopi] history.

(1) Emergence and Clan Migrations

The emergence into the Fourth World and subsequent clan migrations are central to the Hopi as a people and as a cultural entity. It is through these events that Hopi identity is constructed, and aspects of these events are continually reaffirmed in the ceremonies and the traditional daily practices of the Hopi people. All of the following locations within or incorporating portions of *Öngtupqa* are integral to the history of Emergence and clan migrations and contribute to the significance of *Öngtupqa*:

- *Sipapuni* (Origin location)
- *Pisisvayu* (Colorado River)
- *Palavayu* (Little Colorado River)
- *Öngtupqa* (Grand Canyon)
- *Neneqpi Wunasivu* (Lees Ferry)
- Archeological Sites
- Shrines (Village shrines and separate shrine locations)

(2) Introduction of the Snake Ceremony

Öngtupqa plays a central role in Snake Clan history and the introduction of the Snake Ceremony to Hopi. Tiyo, the protagonist in the story, travels through *Öngtupqa* on his journey to and from the ocean, where he receives the tenants of the Snake Ceremony. The following locations figure prominently into the narrative:

- *Pisisvayu* (Colorado River)

- *Palavayu* (Little Colorado River)
- *Öngtupqa* (Grand Canyon)

(3) Creation of the Hopi Salt Trail/Initiation Ceremony

All aspects of the Hopi Salt Trail, the Salt pilgrimage, and portions of the *Wuwut'sim* (initiation ceremony) are closely tied to *Öngtupqa*. The Hopi Salt Trail route runs from Hopi into the heart of *Öngtupqa*, passing numerous shrines and significant locations that were established by *Pökanghoya* and *Palöngawhoya*, many of which are within *Öngtupqa*:

- *Palavayu* (Little Colorado River)
- *Pisisvayu* (Colorado River)
- *Sipapuni* (Origin location)
- *Homvi'kya* (Hopi Salt Trail and associated shrine locations)
- *Sa'lako*
- *Öönga* (Hopi Salt Mine)

(4) Water gathering

Water is life to Hopi. Locations where it occurs are revered and serve a vital role in the continuation of Hopi culture. Traditionally, water collected from *Öngtupqa* is of particular cultural significance precisely because of its association with the location and the events that have occurred there. Traditional water source locations include the following:

- *Sakwavayu* (Blue Springs)
- *Yam'taqa* (Vasey's Paradise)
- *Sipapuni* (Origin location)
- Other spring locations

Though not a water source, *Hopisinom Pöhu* (trails and trail markers) are an integral part of accessing the water sources.

(5) Mineral gathering

Öngtupqa has served as a location where the Hopi have traditionally gathered a number of minerals. Because many minerals do not occur widely, locations where they do occur have a long record of traditional usage. All of the following minerals have been traditionally gathered at locations in *Öngtupqa* (this is only a partial list; others are known to occur in *Öngtupqa*):

- *Öönga* (Salt)
- *Suta* (Hematite)
- *Pavisa* (Yellow ocher)
- *Sakwa* (Copper minerals)
- *Tuuwa* (Sand)

While not a mineral, *Hopisinom Pöhu* (trails and trail markers) play an integral part in the collection of minerals, as they are followed during collecting pilgrimages.

(6) Afterlife and Journey to the Underworld

When Hopis pass from this life into the next, they travel to and reside in *Öngtupqa*. The interface between this world and the next makes *Öngtupqa* an especially sacred and spiritually dangerous place to visit. The journey to the next world cannot be undertaken without the appropriate traditional preparation. Improper behavior risks repercussions and disturbs the sanctity of place. Places central to the transition into the afterlife include the following:

- *Öngtupqa* (Grand Canyon)
- *Palavayu* (Little Colorado River)
- *Pisisvayu* (Colorado River)
- *Hopisinom Pöhu* (trails and trail markers)
- *Homvi'kya* (Hopi Salt Trail and associated shrine locations)

Criterion B: Association with the lives of persons significant in [Hopi] past.

(1) *Ma'saw*

Ma'saw is the guardian of the Fourth World. On entering the Fourth World, Hopi ancestors entered into a spiritual covenant with *Ma'saw* to undertake migrations around the world and to serve as caretakers of the earth. One of his residences is within *Öngtupqa* and his spiritual presence imbues the Grand Canyon with a great sacredness. Improper behavior or lack of appropriate stewardship risks jeopardizing the spiritual covenant. *Ma'saw* is associated with the following locations:

- *Öngtupqa* (Grand Canyon)
- *Palavayu* (Little Colorado River)
- *Homvi'kya* (Hopi Salt Trail and associated shrine locations)

(2) *Kwanitaqa*

Kwanitaqa (one-horn deity) mediates between this and the next world. He played a role in the emergence into the Fourth World and arbitrates as people travel into the afterlife. He is associated with the following locations:

- *Öngtupqa* (Grand Canyon)
- *Palavayu* (Little Colorado River)
- *Sipapuni* (Origin location)

(3) Muyendo

Muyendo is associated with the underworld and germination. He plays a role in the *Wuwutsim* ceremony. He is associated with the following locations:

- *Öngtupqa* (Grand Canyon)
- *Palavayu* (Little Colorado River)
- *Sipapuni* (Origin location)

(4) *Huruingwu'ti*

Huruingwu'ti is involved in the creation of the world. She plays a significant role in Tiyo's journey and the origin of the Snake ceremony. She is associated with the following locations:

- *Öngtupqa* (Grand Canyon)
- *Pisisvayu* (Colorado River)
- *Öönga* (Hopi Salt Mine)

(5) *Tiyo*

Tiyo is the first person to have navigated the Colorado River through the Grand Canyon. His travels to the ocean and brought back the Snake ceremony and Snake clans to Hopi. He is associated with the following locations:

- *Pisisvayu* (Colorado River)
- *Öngtupqa* (Grand Canyon)

(6) *Pökanghoya and Palöngawhoya*

Pökanghoya and Palöngawhoya led the Hopis to the Hopi Salt Mines after the salt was relocated from near the Hopi Mesas. They established the Hopi Salt Trail and all of the associated shrines and ceremonial activities that must be performed along the route. They live in *Öngtupqa* and their presence is enshrined in rock formations. *Pökanghoya* is the protector of *Öngtupqa*. They are associated with the following locations:

- *Öönga Pöhu* (Hopi Salt Trail and associated shrine locations)
- *Palavayu* (Little Colorado River)
- *Pisisvayu* (Colorado River)
- *Homvi'kya* (Hopi Salt Trail and associated shrine locations)
- *Öönga* (Hopi Salt Mine)
- *Öngtupqa* (Grand Canyon)

(7) *Öngwu'ti*

The spirit of *Öngwu'ti* (Salt Woman) resides at the Hopi Salt Mine and tends to the salt, replenishing it as appropriate. She is specifically associated with the following locations:

- *Öönga* (Hopi Salt Mine)
- *Homvi'kya* (Hopi Salt Trail and associated shrine locations)

(8) *Kokyangsowu'ti*

Kokyangsowu'ti (Spider Old Woman or Spider Grandmother) is a “goddess” of wisdom. She has a shrine dedicated to her in *Öngtupqa*. She is broadly associated with the following locations:

- *Öngtupqa* (Grand Canyon)
- *Pisivayu* (Colorado River)

(9) *Sa'lako*

Sa'lako is a deity that originated in *Öngtupqa* and ultimately traveled to Zuni by way of *Nuvatukay'ovi* (San Francisco Peaks). There are several rock formations representing *Sa'lako* in *Öngtupqa*. This deity is associated with a number of locations, including the following:

- *Öngtupqa* (Grand Canyon)
- *Homvi'kya* (Hopi Salt Trail and associated shrine locations)
- *Palavayu* (Little Colorado River)

(10) *Kooyemsi*

The *Kooyemsi* live in *Öngtupqa* at a place called *Tatatsiqwtömuy kiiam* (Mudhead kiva). They are often present at ceremonial dances that occur at Hopi. In *Öngtupqa*, they are associated with the following locations:

- *Palavayu* (Little Colorado River)
- *Homvi'kya* (Hopi Salt Trail and associated shrine locations)
- *Sipapuni* (Origin location)

Criterion C(4): Representative of a significant and distinguishable entity whose components may lack individual distinction.

The native plants, animals, landscapes, and even the “feeling” and natural processes that occur within *Öngtupqa* contribute to the significance of the place. Plants associated with riparian zones are particularly significant in Hopi culture, being used within both domestic and ceremonial settings. Animals similarly have traditional uses, but more importantly, their presence in *Öngtupqa* is equated with health and life. Because these aspects of *Öngtupqa* are not necessarily “place-specific,” they are not eligible properties on their own, but they are integral to the overall significance of *Öngtupqa*.

Criterion D: History of yielding, or potential to yield, information important in [Hopi] history or prehistory.

Öngtupqa, and its contributing elements, have provided information to the Hopis about their history through traditional knowledge transmission by Hopi societies and clans. This is accomplished in ceremonial contexts, clan histories, traditional story-telling, and growing up in a Hopi family. In recent times, traditional methods of learning Hopi history have been augmented by approaches incorporating Western scientific methodologies. This is particularly the case for the study of ancestral archeological sites where traditional methods of knowing history and archeological methodology can provide separate, complementary types of information. In particular, archeological methods can inform about day-to-day domestic activities at a temporal resolution that traditional historical knowledge generally doesn't retain.

D.3.2 Zuni TCP

“Chimik'yana'kya dey'a (Place of Emergence), K'yanan' A:honanne (Colorado River), and Ku'nin A'l'akkwe'a (Grand Canyon), a Zuni Traditional Cultural Property”

The Zuni people emerged onto this world at a place within Grand Canyon called *Chimik'yana'kya dey'a*, near Ribbon Falls in Bright Angel Canyon within Grand Canyon National Park. The natural environment that Zuni people saw at Emergence became central to traditional Zuni culture. All of the plants that grow along the stream from Ribbon Falls to the Colorado River, and all the birds and other animals, springs, minerals, and natural resources located in the Grand Canyon and its tributaries have a central place in Zuni traditional cultural practices and ceremonial activities (Hart 1995).

After Emergence, the ancestors of today's Zuni people began a long journey along the Colorado River searching for *Idiwana'a* or the Middle Place, which is known as modern day Zuni Pueblo. While this particular determination of eligibility is for the direct migration line from *Chimik'yana'kya dey'a*, along the Colorado River to the confluence with the Little Colorado River, eastward up the Little Colorado River to its confluence with the Zuni River, and then up the Zuni River to what is the present day Zuni Indian Reservation, there are multiple indirect migration paths and localities that could be added as contributing elements to the significance of the overall traditional cultural property. Given that the search for the Middle Place took many centuries to complete, there are numerous loci or places of significance along the multiple migration routes to the north and south of the direct migration trail that could be added as contributing elements to the property.

The site is eligible for the NRHP for its traditional cultural value to the Zuni people. The site is considered eligible for the NRHP under all of the Criteria for Evaluation. The property has been significant since time immemorial when Zuni ancestors first emerged from *Chimik'yana'kya dey'a* and began their migration to the Middle Place, or the present-day Zuni village. Bright Angel Creek, the Colorado, Little Colorado, and Zuni rivers and the canyons encompassing the rivers, as well as uplands and all features related to the Zuni migration from the place of Emergence to the settling of the Middle Place constitute the NRHP eligible property.

D.3.3 Paiute TCP

Native peoples have worked with anthropologists and cultural resource managers to promote the understanding and documentation of their conceptions of land and the plants, animals, and minerals found upon and within it. According to Stoffle et al. (1997:230–231), “Southern Paiute perceptions of land and its resources can be represented as cultural landscapes that are culturally and geographically unique areas... Southern Paiute people tend to view cultural resources as being bound together in broad categories based on functional interdependency and proximity rather than being defined by inherent characteristics. Most places where Indian people lived and visited contained the diverse necessities of life: plants and animals for food, medicinal plants for continued health, paintings and peckings on rock walls telling about historic events and blessing the area where the people gathered, and water to drink and use in ceremonies of all kinds.”

Southern Paiutes recognize the Colorado River, its tributaries, and the canyons within which these flow, to be part of a broader cultural landscape or TCP. This landscape is connected by cultural beliefs, songs, and memories which Southern Paiutes seek to protect and preserve. Sites within this landscape or TCP continue to be a central foundation of Southern Paiute life, and a source of their continuing authority in the Colorado River corridor. Though recent arrivals have perceived much of this area to be largely inaccessible to humans (e.g., Powell 1961), Southern Paiutes and their ancestors lived, hunted, gathered, farmed, and traveled throughout the region until restricted by the actions and policies of Europeans and Euroamericans (see Stoffle et al. 1994). Indeed, the Southern Paiutes recognize *Pia-Paxa’a* (the Colorado River), with its tributaries and canyons, as a culturally unique, geographically integrated system includes those watersheds that drain into the river along more than 600 miles from the Kaiparowits Plateau in the north, to Blythe, California in the south. In the east, this area extends to Kaivyaxaruru (Navajo Mountain) and the Kaibito Plateau; north to the Paunsaugunt Plateau and the Markagunt Plateau, west to the Beaver Dam Mountains, and is defined to the south by the center of the Colorado River (Stoffle et al. 1995b; 1997).

Despite local variations in the identification of a band’s place of origin, Southern Paiutes consider all portions of their traditional territory sacred (Stoffle and Dobyns 1982). Referring to San Juan Paiute territory, one published account notes that, “This traditional territory as a whole is made sacred by myth-time events that are said to have taken place there, recounted in the cycle of mythic stories known as ‘Coyote tales’ or ‘winter stories’” (Franklin and Bunte 1994:249–251). Southern Paiutes recognize their lands as animate and sentient; rocks, springs, plants and animals are alive (Stoffle et al. 1994). They also recognize the sites of former dwellings and the area surrounding them to be sacred, as demonstrated by the many rituals that typically take place in and around homes, and the many powerful ritual substances and objects that remain behind when people leave a dwelling to live elsewhere (Franklin and Bunte 1994). Therefore, Southern Paiutes distinguish places within their homeland as having special meaning because they serve as reminders of events that occurred there and/or are places where rituals and ceremonies continue to be conducted. Nevertheless, those places acquire their full value as features within and connected to the entire Colorado River system. As published report notes, “Throughout Paiute history, the canyon and its surrounding areas have been a place of prayer, of everyday living and, in the end, a final refuge for a people who were being squeezed out of their traditional lands by

newcomers” (Angelita S. Bullets, “Our Homeland” in Stoffle et al. 1995b:11). Southern Paiutes consider physical evidence of past occupation to consist of more than just archeological materials and other remains (Stoffle et al. 1994). As such, areas defined as sacred include round dance sites, funerary sites, agave-roasting pits, buckskin-processing sites, and sites and areas where Paiutes gather medicinal plants, animals, and mineral pigments (Franklin and Bunte 1994). Within their cultural landscape, humans, non-humans, and the supernatural are all integrated into a single whole (Stoffle et al. 1995a).

Even though Paiute sovereignty over their traditional lands has been lost because of expansion of Navajos into the region, encroachment by Euroamericans, and U.S. federal government legislation, Southern Paiutes remain connected to these lands. As they always have, they continue to perform traditional ceremonies there, and strive to carry out their sacred responsibilities as given to them by the Creator (Stoffle et al. 1994, 2004).

In 1995, the Southern Paiute Consortium, on behalf of its member Tribes (the Kaibab Band of Paiute Indians and the Paiute Indian Tribe of Utah, representing the Shivwits Band of Paiute Indians), submitted a statement to Reclamation that, due to the significance of the Colorado River and its canyons in Southern Paiute culture, the entire region was considered a TCP (Austin et al. 2007:15). This status of the Colorado River and its canyons as an integrated TCP is fundamental to ongoing Southern Paiute Consortium (SPC) work to document and manage Southern Paiute interests in the Colorado River.

D.3.4 Hualapai TCPs

The Hualapai consider the area from the Little Colorado River downstream from the middle of the river to the south as part of their ancestral territory. Cultural resources, including archeological sites, springs, landforms, and associated plants and animals may be subsumed under the concept of a TCP.

As part of their participation in the Glen Canyon Environmental Studies (GCES), the Hualapai Tribe initiated studies concerning cultural and historical connections with the Colorado River in Grand Canyon starting in 1991, under a contract with the Bureau of Reclamation (HDCR 1993). A major part of this effort included fieldwork along the river supported by multi-day raft trips and interviews with tribal elders and other knowledgeable individuals. Initial research topics included:

- (1) Hualapai territorial affiliation with the Grand Canyon and Colorado River
- (2) Ethnobotany
- (3) Wildlife
- (4) Cultural geography
- (5) Archeology
- (6) The possible presence and treatment of human remains along the river
- (7) Recreation and tourism
- (8) The effects of operations of Glen Canyon Dam

As the Hualapai Tribe continued their involvement and as their research focus evolved, information about specific places and events came to light, as well as aspects of the natural world, such as plants and animals and how they were used or regarded, springs and other water sources, tributary canyons and other landforms, and trails and trade routes. Over the next ten years, over 80 TCPs were identified (spreadsheet dated 2003 on file at the Hualapai Department of Cultural Resources). Approximately half were chosen for periodic monitoring. This number does not include many archeological sites identified as possibly affiliated with Pai, however. These are often low-visibility manifestations in secluded locations. Their seclusion, in fact, is one of the best protections contributing to their long-term preservation.

One of the challenges in documenting the breadth and significance of TCPs along the river is simply the difficulty of access, which almost exclusively entails raft support. Nonetheless, 25 years of participation by elders and other knowledgeable individuals on Hualapai monitoring river trips has resulted in a wealth of knowledge about the significance of the canyon and historic Hualapai connections. This significance, in one way or another, covers every NRHP criteria, but mainly Criteria A (events and patterns of events) and D (information potential). Since the people's very identity is tied to the Colorado River and Grand Canyon, it is important to maintain this cultural connection, which pertains to Criterion A, and to continue to learn and pass on knowledge to present and future generations, which pertains to Criterion D.

The scale of significance of TCPs along the river corridor is both local at specific sites and broader at the landscape level. To say that, standing along the river, the entire canyon from rim to rim is a TCP would not be an overstatement. At the same time, the spine of the river itself, known as Ha'yidaa, the backbone, is the entity that binds it all together.

D.3.5 Navajo TCPs

While the Navajo Nation considers the Canyons to be significant and to meet the NRHP criteria, no formal NRHP nomination form has been completed. The completion of the nomination form and the documentation of the Navajo TCP(s) within the Canyons will be the focus of future Glen Canyon Dam Adaptive Management Program (GCDAMP) activities.

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APPENDIX E: SITE TYPES

Within the Canyons (only a partial list)
Based largely on the Intermountain Region of the
Archeological Sites Management Information System (ASMIS),
National Park Service

Structural Habitation Sites is a site type that is represented by the presence of evidence of habitation structures. This site type has multiple subcategories which further divide the type based on identified features.

1. **Residential / Community Complex** is a subcategory of Structural Habitation sites and contains archeological sites reflecting larger settlements like Nankoweap and Unkar Delta.
2. **Habitation, Multiple Units** is a subcategory of Structural Habitation sites and contains more than one structure or building for living in. May be masonry, brush, other structure types.
3. **Habitation, Single Units** is a subcategory of Structural Habitation sites and contains a single structure or building for living in. May be masonry, brush, other structure types.

Structural Non-Habitation Sites is a site type that is represented by the absence of evidence of habitation structures. This site type has multiple subcategories which further divide the type based on identified features:

1. **Agricultural Structures** is a subcategory of Non-Habitation Structures containing a grouping or groupings of agricultural features such as terraces and garden plots.
2. **Ranching Structures** is a subcategory of Non-Habitation Structures containing features associated with historic ranching activities such as barns, corrals, fences, salt cabins, and water troughs.
3. **Storage Structures** is a subcategory of Non-Habitation Structures containing features like granaries or cists, but may include caches, used for storage of food and/or supplies as evidenced by the number of storage features present.
4. **Transportation/Communication Structures** is a subcategory of Non-Habitation Structures containing features associated with transportation (e.g., bridges) and communication (e.g., telephone/telegraph lines).
5. **Special Use Structures** is a subcategory of Non-Habitation Structures containing structures designed for special use, such as religious or cosmological functions.

6. **Hunting/Fishing/Gathering Features** is a subcategory of Non-Habitation Structures containing structures and/or features related to hunting, fishing or gathering of plants.
7. **Other Structures** is a subcategory of Non-Habitation Structures containing structures not covered by other categories.

Non-Structural Habitation is a site type that is represented by the absence of evidence of habitation structures. This site type has multiple subcategories which further divide the type based on identified features.

1. **Open Air (Non-structural)** is a subcategory of non-structural habitation sites and consisting of a prehistoric or historic artifact scatter with one or more features but without an associated habitation structure.
 - a. **Camp** is a site type consisting of prehistoric or historic artifact scatter with one or more features but without an associated habitation structure. Camp sites were designed to be temporary or short-termed occupation.
2. **Protected (non-structural)** is a subcategory of non-structural habitation sites and contains evidence of human occupation that lacks architectural materials but has natural protection such as a large overhanging boulder or alcove space in a cliff.

Non-Structural Non-Habitation is a site type that is represented by the absence of evidence of any structures. This site type has multiple subcategories which further divide the type based on features or the lack of features.

1. **Artifact Scatter** is the site type that is represented only by concentrations of artifacts, ceramic and lithic debris and/or flaked or groundstone tools for prehistoric artifact scatters. Historic artifact scatters consist of only historic materials/artifacts. This site type does not contain formal structures or features such as roomblocks, hearths, or roasting pits.
 - a. **Lithic Scatter** is a subcategory of Artifact Scatter, but only contains lithics and lithic material with or without groundstone but lacking associated ceramics or features.
 - b. **Ceramic Scatter** is a subcategory of Artifact Scatter, but only contains a ceramic scatter or concentration without associated tools or features.
 - c. **Cache** is a subcategory of Artifact Scatter, but only contains artifacts deposited in one location during one event. An example of a cache in the Canyons is the location containing split-twig figures.
2. **Burial** is a site type containing the interred human remains or evidence of the presence of a human burial. Burials may include primary, secondary inhumations, etc.

3. **Extractive Site** is a site type containing evidence of mineral or other material extraction. This site type is associated with quarrying or mining.
4. **Petroglyph/Pictograph/Inscription Sites** is a category of site types often referred to as “Rock Art.” Because the archeological term “Rock Art” is sometimes interpreted as offensive to Native Americans, the term Petroglyph/Pictograph/Inscription Sites will be used in this HPP. Petroglyph/Pictograph/Inscription Sites may be very important to Native Americans. These sites contain only petroglyphs/pictographs/inscriptions: isolated pecked, incised, scratched or painted designs, symbols, figures, or text on rock.
 - a. **Historic Inscription** is a subcategory of Petroglyph/Pictograph sites but only contain historic inscriptions carved onto the rocks of the Canyons. This category consists generally of only names or dates of historic origin inscribed or painted on rock or other surfaces.
5. **Shrine** is a site type consisting of architectural or archeological features of a ritual purpose. May require ethnographic data to identify.
6. **Submerged Resource** is a site type consisting of archeological material generally inundated. The *Charles H. Spencer* steamboat is an example of a submerged resource.
7. **Thermal Features Complex** is a site type consisting of hearths or roasting features.
 - a. **Roaster Complex** is a subcategory of Thermal Features site type containing two or more well-defined circular burned rock middens with or without associated discard pile. These sites are often, but not necessarily associated with artifact scatters.
 - b. **Isolated Thermal Feature** is a subcategory of Thermal Features site type consisting of a hearth or scatter of firecracked rock or a single roaster without associated artifacts.
8. **Traditional Cultural Property** is a site type consisting of traditional religious and cultural significant properties. These sites are National Register eligible and are considered historic properties under the National Historic Preservation Act of 1966 (NHPA).
9. **Trails** is a site type of a narrow linear foot path marked by a clearing of stone. Features identified with trails may include linear sherd scatters, cairns, wood or masonry retaining walls, ladders, steps, or hand and toe holds. Historic trails may contain walls, blast marks, barrow areas, etc.
10. **Tourism** is a site type consisting of structures or other features associated with historic tourism facilities or features.

11. ***Other*** is a site type consisting of features not readily assigned to another type. This may include enigmatic features consisting of surface or subsurface features of unknown type or function.

APPENDIX F: PAST GCDAMP RESEARCH AND TREATMENT ACTIVITIES

Cultural resources research has been ongoing in the Canyons for nearly 90 years. The majority of this research has focused on archeological investigations to identify, evaluate and protect historic properties. These past investigations have included some treatment and/or mitigation activities, but with essentially little to no tribal participation. More recent research has incorporated tribal participation, including ethnographic studies and traditional knowledge. While this Historic Preservation Plan (HPP) focuses on future research and compliance with current historic preservation legislation, a review of the past research and treatment activities is invaluable and summarized here. A more detailed synthesis can be found in Neal and Gilpin (2000), Leap et al. (2000), and Fairley (2003).

Professional archeological investigations in Grand Canyon have occurred since the 1920s, but the first comprehensive archeological survey of the river corridor was conducted as part of the Glen Canyon Environmental Studies (GCES) in 1990–1991 (Fairley et al. 1994). The survey, a cooperative venture between Grand Canyon National Park (GCNP) and the Department of Anthropology at Northern Arizona University, encompassed a 225-mile stretch of river corridor, extending from Glen Canyon Dam (GCD) to Separation Canyon. It incorporated all terrestrial river-derived sediments below the estimated 300,000-cfs level, as well as a few areas of aeolian sand dunes lying slightly above this level (Fairley et al. 1994).

This survey documented the baseline condition of cultural resources not only for presence or absence of archeological material but also for geomorphic settings, site sediments and erosional factors. The survey laid the foundation for the assessment of ongoing changes to archeological sites in both Glen and Grand Canyons from GCD operations, as well as future collaborative studies between National Park Service (NPS), U.S. Geological Survey (USGS), Glen Canyon National Recreation Area (GLCA), and Grand Canyon Monitoring and Research Center (GCMRC) (Leap et al. 2000). More information on this survey and its outcomes can be found in *The Grand Canyon River Corridor Survey Project: Archeological Survey along the Colorado River between Glen Canyon Dam and Separation Canyon* (Fairley et al. 1994).

F.1 IDENTIFIED ARCHEOLOGICAL PROPERTY/SITE TYPES

The following archeological property site types are derived from the survey work mentioned above (Fairley et al. 1994, Damp et al. 2007, and others). Standardized definitions for each site type currently used by NPS staff are included in Appendix E. Archeological site types identified in the Canyons include the following:

- Structural Habitation
 - Residential/Community Complex
 - Habitation – Multiple Units
 - Habitation –Single Units
- Structural Non-Habitation
 - Agricultural Structures

- Ranching Structures
- Storage Structure
- Transportation/Communication Structure
- Special Use Structure
- Hunting/Fishing/Gathering Features
- Other Structures
- Non-structural Habitations
 - Open Air
 - Camp
 - Protected
- Non-Structural Non-Habitation
 - Artifact Scatter
 - Lithic Scatter
 - Ceramic Scatter
 - Cache
 - Burial
 - Extractive Site
 - Petroglyph/Pictograph/Inscription
 - Historic Inscription
 - Submerged Resource
 - Thermal Feature Complex
 - Roaster Complex
 - Isolated Thermal Feature
 - Traditional Cultural Properties
 - Trails
 - Tourism
 - Others

F.2 PAST RESEARCH IN THE NPS MANAGED CANYONS

Because past research in the Canyons covers two NPS park units, and because many of the tribal and GCMRC monitoring projects cross-cut the two park units, information from both Grand Canyon National Park (GRCA) and GLCA is combined here into NPS managed lands.

Since 1991, treatments included construction of erosion control structures; planting vegetation to stabilize active dune areas; removing graffiti; trail work including trail obliteration, redirection and revegetating; and “documentation as preservation” actions such as medium-format photography and mapping sites with a total station or light detection and ranging (LiDAR) instrument. In some cases, mitigation of adverse effects through preservation *in situ* was not possible and partial or complete data recovery was employed, depending on the condition of features within the site (Leap et al. 2000). A detailed summary of the River Corridor Monitoring Project (RCMP) between 1992 and 1999 is presented in *Grand Canyon Monitoring Project 1992–1999: Synthesis and Annual Report* (Leap et al. 2000). Below is a summary of past research and preservation activities conducted on NPS-managed lands.

F.2.1 Intensive Archeological Survey

As previously stated, the first intense archeological survey of the river corridor was conducted as part of the Glen Canyon Dam Environmental Impact Statement (GCDEIS) in 1990–1991. The Grand Canyon River Corridor Survey Project covers 255-mile stretch from Glen Canyon Dam to Separation Canyon (Fairley et al. 1994). Approximately 10,600 acres were surveyed, and 475 sites and 489 isolated occurrences were documented.

F.2.2 Monitoring under NHPA and GCPA

Following the initial inventory of the Canyons, compliance with the National Historic Preservation Act of 1966 (NHPA) and the Grand Canyon Protection Act of 1992 (GCPA) shifted to various monitoring programs. Tribal monitoring programs began in the early 1990s. Tribal monitoring programs, as discussed in more detail below, cross-cut NPS and tribal managed lands. Tribal monitoring programs as well as NPS monitoring programs, monitor archeological sites as well as other properties of traditional religious and cultural importance to identify potential adverse effects cause by Glen Canyon Dam Adaptive Management Program (GCDAMP) activities.

Under nearly all monitoring programs, historic properties are monitored on a rotating cycle dependent upon a number of factors including accessibility, condition and number and type of impacts. The goal of these monitoring programs is preservation *in situ*. Monitors focused on recognizing and recording change and the causes of change to historic properties from natural processes, dam-regulated flows, GCDAMP activities, and visitor-related impacts and applying the best treatment option to reduce damage or the loss of integrity while trying to preserve the sites *in situ*.

From 1992 to 1999, archeological sites in the Glen Canyon river corridor were monitored annually by the NPS (Burchett 1994, 1995a and b, 1996, 1997; Leap et al. 1998, 2000), and additional NPS monitoring in Grand Canyon occurred in 1999–2004 and 2010–2015 (Dierker 2012, 2013, 2014, Dierker et al. 2001, 2002, Dierker and Leap 2002, 2003, 2004, 2005, 2006, Leap et al. 2003, Pitroff 2015; Wulf and Moss 2004, to name a few). In 2005, the Navajo Nation Archeological Department completed condition assessments and significance evaluations of river corridor sites under contract with Reclamation (Spurr and Collette 2007). In addition to professional archeological monitoring, the Arizona Site Steward Program, in cooperation with Glen Canyon NRA, has periodically monitored select river corridor sites in the Glen Canyon reach since 2012.

Monitoring and assessment work across all years consisted primarily of completing monitoring forms and performing photography (Leap et al. 2000). To a lesser extent, total station mapping, collection of global positioning system (GPS) data, erosion monitoring, and the installation of survey control points was conducted. Pitroff (2015) provides a detailed summary of data captured on monitoring forms and a brief discussion of geographic information system (GIS) site data. Spurr and Collette's (2007) report is the most comprehensive corridor-wide site condition assessment and overview for Glen Canyon.

Photography as a monitoring tool predates the 1994 PA (H. Fairley, per comm., in unpublished report submitted to Reclamation, 2018). In 1990–1991, the intensive archeological survey project photographed all archeological sites (Fairley et al. 1994). As a means of monitoring erosion or other effects to historic properties, comparative photographs were taken on nearly all monitoring projects since. Between 1995 and 1997, a new baseline record of high-quality photographs for all sites being actively monitored was implemented and accomplished (Leap et al. 2000). Following acquisition of high-quality photographs from all sites that were still being actively monitored, photography was limited to only documenting new impacts (Leap et al. 2000).

GLCA and others have conducted considerable amounts of monitoring, research, and structure stabilization in the Lees Ferry and Lonely Dell Historic Districts (AZ C:2:11 and AZ C:2:42, respectively), including a National Register of Historic Places (NRHP) nomination (Muhn 1977) and updates (Hubbard 1997; Mardorf 2010), a historic structures report (Graham and Kupel 2000), and a cultural landscape inventory (NPS 2010). A summary of stabilization work and similar projects will be part of a forthcoming updated historic structures report.

The 1992–2005 Grand Canyon RCMP was an outgrowth of the 1991 Grand Canyon River Corridor Archeological Inventory. It was shaped by the wealth of data collected and organized by this effort as well as a variety of legal requirements, policies, and directives regarding the preservation and management of cultural resources including the passage of the GCPA, the 1996 Record of Decision (ROD) for the 1995 GCDEIS, and the 1994 Programmatic Agreement (PA). In 2006, the monitoring program continued under the auspices of the Grand Canyon National Park’s Colorado River Management Plan Research, Monitoring and Mitigation Program.

F.2.3 Submerged Resource Monitoring

In 2014, the NPS Submerged Resource Center conducted a conditions assessment of, and established monitoring protocols for the *Charles H. Spencer* steamboat (AZ C:2:11 [Feature 12] (Pershern et al. 2015). The Center revisited the steamboat in 2015 and 2016 for additional monitoring (Pershern 2016). For further discussion of this Historic District, see Section 4.2.

F.2.4 GCMRC Research and Monitoring

Building on geomorphic studies that began in the early 1990s, Hereford et al. (1993) observed the important role of windblown sand in shaping the surface topography, impeding gully incision, and influencing other aspects of the pre-dam terrestrial ecosystem. In 2003, GCMRC initiated a new research effort to focus specifically on the role aeolian sediments play in the stabilization and preservation of archeological sites within the Canyons (Draut and Rubin 2008). Sankey and Draut (2014) and East et al. (2016) expanded on this earlier work by identifying conditions under which aeolian sediment reached upland sites.

Concurrently, Fairley and others (2007) initiated a research program to identify, test and refine appropriate tools and methods for monitoring dam-effects on ecosystem processes that in turn, affect cultural site conditions. This project specifically explored the use of light detection and ranging (LiDAR) surveys in combination with meteorological monitoring for monitoring changes in site topography. As part of this research and development effort, Collins and others (2008, 2009, 2012) documented the utility and limitations of LiDAR surveys as a monitoring tool to track rates and amounts of deposition and erosion occurring at archeological sites. Collins et al. (2016) incorporates some of the resulting data into a model to demonstrate how erosion of archeological sites is linked to local weather and geomorphic conditions, in addition to the influence of regulated flows on sediment supply. The results of all this research was subsequently incorporated into a monitoring protocol for tracking rates and amounts of deposition and erosion, and effects of high-flow experiment (HFE) sand bar replenishment, at a sample of archeological sites in the CRE.

F.2.5 Trailwork

The NPS manages a series of established trails in both GCNRA and GCNP, many of which predate the GCDAMP program. Trail maintenance and obliteration of social trailing occurs at campsites, adjacent to archeological sites, and in areas of other sensitive resources. In almost all cases, based on subsequent monitoring, trail work such as trail obliteration, redirection and revegetation has proved successful except in areas that are close to defined, well-established trails or popular rapid-scouting or camping areas. In these areas, regular trail maintenance and outreach is necessary to continue to reroute unwanted traffic. The effectiveness of trail work is monitored regularly, and maintenance is conducted when necessary.

F.2.6 Vegetation Management

Vegetation management involves the removal of vegetation to allow easier passage along a preferred route, or the planting of vegetation to slow run-off or to deter visitors from walking in sensitive areas. Vegetation management may also include the removal of non-native species or to encourage growth of specific plants. For example, vegetation management has occurred at Granite Park to reroute trails and to obtain tree cuttings.

F.2.7 Geophysical Surveys

In 2012, a team of archeologists from the Kentucky Archeological Survey and GCNP initiated a study to investigate the usefulness of ground-penetrating radar (GPR) at five sites within the Colorado River Corridor. The study was successful in identifying buried archeological deposits and generated a useful dataset that can contribute to the management of archeological sites within the Colorado River Corridor. Previous monitoring data were instrumental in aiding in the interpretation of identified anomalies (Mink 2013).

In 2015, a team of archeologists with the NPS proposed conducting geophysical surveys at one archeological site (AZ C:02:032). Due to the vegetation and depth of deposition of the site, the geophysical surveys were not completed in a successful manner (De Vore et al. 2016a).

F.2.8 Erosion Control Structures

Erosion control structures have been an important treatment option for archeological sites in the Grand Canyon and require a more detailed description. Geologists, soil scientists, and geomorphologists studying the Canyons note a dramatic increase in erosion along the river corridor between 1973 and 1984, evidenced by the development of new gullies and the expansion of existing drainages visible in aerial photographs obtained as early as 1965 (see Hereford et al. 1991, 1993; Grams and Schmidt 1999; Thompson and Potochnik 2000; and Pederson et al. 2006). However, Hereford et al. (1993) attributed the increase in erosion during this period to wetter than average conditions during these years (see also Hereford et al. 2014). Archeological site monitoring determined that the erosion caused by both precipitation runoff and aeolian deflation resulted in the exposure of previously unidentified archeological features (Coder and Andrews 1993; Coder et al. 1994, 1995, 1996).

By 1995, NPS archeologists had decided that some form of mitigation would be necessary to slow the erosion at archeological sites. As a result, Reclamation and NPS sponsored a three-day stabilization workshop. The NPS staff presented the impacts identified through monitoring to 1994 PA signatories, and options for treatment of these sites were discussed. Additional erosion treatment options were presented by geologists, geomorphologists, engineers, archeologists, and trail crew personnel representing federal agencies, Tribes, and private consultants in an effort to identify the most appropriate mitigations. Upon completion of the stabilization workshop, there was consensus that traditional Zuni-style checkdams (erosion control structures) would be constructed at sites with gully erosion under the guidance of members of the Zuni Conservation Program staff.

Use of checkdams began with an experimental program at Palisades Delta, where an extensive drainage network actively impacted two large habitation sites. The initial pilot program (Leap and Coder 1995) and subsequent evaluation resulted in the identification of structure designs appropriate to Colorado River environmental conditions, including understanding the appropriate style of structures, soil types and depositional contexts benefiting from the installation of such structures. Common structure styles include rock checkdams, rock linings, bank protection, brush lining, and water diversion bars.

Erosion control structures in GCNP are used as preservation methods for slowing erosion at historic properties. The goal of erosion control structures associated with the GCDAMP is to slow the velocity of runoff, providing a mechanism for sediment deposition and vegetation growth above these structures and preventing further exposure of cultural resources located adjacent to gullies. Checkdams are not used to divert channelized runoff onto stable terraces, as this approach could expose adjacent and stable cultural resources. The checkdams are used to stabilize existing drainages, prevent enlargement of rills and gullies, and slow downstream erosion of sediment.

At present, it is estimated that 189 unique checkdams exist at 25 historic properties. The fluctuation in the total number of structures through time is due to maintenance activities that combined two or more checkdams into a single structure, or the determination not to rebuild checkdams that were covered by aeolian deposition or removed by erosion. Most sites containing checkdams are concentrated between river miles 60 and 75, and from river mile 200 to 223; this distribution likely corresponds to the fact that Reaches 5 and 10 are the widest in the Canyon, with the greatest extent of alluvial deposits and consequently, also some of the highest site densities in the river corridor (Fairley et al. 1994), all of which make these areas more susceptible to site gullying (Pederson and O'Brien 2014). Each site was mapped in detail using a total station instrument with the intention of measuring deposition and erosion through decadal repeat mapping episodes (Leap et al. 2000).

Research contracted by the GCMRC using Reclamation funds has shown that erosion control structures along the Colorado river can and do slow erosion and may result in the deposition of sediment behind such structures, provided they are appropriately placed, that the drainage catchments and gradients are modest, and they are regularly maintained (Pederson et al. 2003, 2006), and encourage vegetation growth. Results from a review of the use of brush linings within a single gully show that the technique slows runoff, allowing for water passing over the structures to deposit sediments, resulting in aggradation within the drainage. Pederson et al. (2006) noted the importance of regular maintenance to prevent breaching and increased erosion. Overall, attempts to control or reduce erosion in drainages by constructing erosion control structures along the Colorado River have been successful.

Preliminary observations by NPS archeologists indicate that depositional context and checkdam type are important factors in predicting success rates of structures. Checkdams constructed in soils consisting of a combination of silt and sand, rather than just sand, tend to be breached less often. Checkdams constructed in soils capped by a cryptogamic crust are even less vulnerable to structural failure. Preliminary results also indicate that salt in sediments may also influence runoff in drainages with checkdams (Lindsey and Fisher 1999). Continued monitoring and maintenance helps to identify if the proper construction type was used, and may prevent future structure failures (Gellis et al. 1995, Pederson et al. 2006).

F.2.9 Ethnographic Research

There are a number of ethnographic reports discussing tribal values associated with the Canyons and the river corridor. Several of these reports deal specifically with the river corridor below GCD, but others touch on the broader context of the Colorado River within GLCA and GCNP (Austin et al. 2018; Begay and Roberts 1996; Ferguson 1998; Hart 1995; Hopkins et al. 2013; Hopkins and Hedquist 2018; Hubbs 2017; Piper et al. 2018; Roberts et al. 1995; Spurr and Collette 2007:33–36; Stoffle et al. 1994, 1995a and b; Two Bears 2007; Yeatts 2018a and Yeatts 2018b).

Hopkins et al. (2013) provides ethnographic overviews for the relationships between the Hopi Tribe, the Navajo Nation, the Pueblo of Zuni, and the Southern Paiute Tribes (Kaibab

Paiute, Paiute Indian Tribe of Utah, and San Juan Southern Paiute) specifically to all of GLCA and Rainbow Bridge National Monument.

F.2.10 TCP Documentation Research

In addition to the ethnographic reports and research mentioned above, two additional projects concerning the documentation of TCPs are ongoing. The first concerns the GCDAMP and Long-Term Experimental and Management Plan (LTEMP). This is the documentation of the known TCPs for each of the Tribes participating in this HPP. The project, which began a number of years ago, involves the documentation of individual Tribe's TCP as a standalone document which identifies the TCP as a historic property. Currently, TCP documentation for the GCDAMP exists for the Hopi and Zuni Tribes. The other Tribes are in various stages to drafting these documents.

The second TCP project is being led by the NPS and is unrelated to this HPP. This project is the completion of a multiple property documentation form (MPDF) for the Grand Canyon as a whole according the park's 11 traditionally associated Tribe's (Hopi Tribe, Havasupai Tribe, Hualapai Tribe, the Kaibab Band of the Paiute Indians, the Navajo Nation, the Hualapai Tribe, the San Juan Southern Paiute Tribe, the Pueblo of Zuni, the Paiute Indian Tribe of Utah, Las Vegas Paiute Tribe of Paiute Indians, and the Moapa Band of Paiute Indians) individual histories and connections to the land. If the Tribes determine it is appropriate to do so, the documentation may go to the Arizona SHPO and the Keeper of the NRHP for listing. The MPDF serves as the umbrella document for any individual nominations prepared by the Tribes through the GCDAMP or any other nominations prepared by the 11 Tribes now or into the future.

F.2.11 Non-Native Fish Control MOA and Non-Native Aquatics Environmental Assessment (EA)

As a mitigation measure under Section 106 of the NHPA, for the potential adverse effect identified by the operation of the GCD, Reclamation entered into a 2012 Memorandum of Agreement (MOA) with a number of the 2017 PA signatories. In 2011, Reclamation began consultation with the U.S. Fish and Wildlife Service (FWS) under Section 7 of the Endangered Species Act of 1973, as amended, on the effect of fluctuating flows from dam operations and its effect on non-native fish control. Reclamation committed to a FWS issued biological opinion that described various actions and conservation measures, including non-native fish control. Reclamation was advised that the lethal removal of fish is offensive to Hopi and Zuni cultural and spiritual values, therefore, an adverse effect. Fish, whether native or non-native, are considered contributing elements to the Zuni TCP "Chimik'yana'kya dey'a (Place of Emergence), K'yawan' A'honanne (Colorado River), and Ku'nin A'l'akkwe'a (Grand Canyon), a Zuni Traditional Cultural Property." In an effort to avoid, minimize, or mitigate adverse effects to the Zuni TCP, Reclamation, through consultation, developed the 2012 MOA. Stipulations contained within this 2012 MOA identified ways to mitigate the adverse effects.

As stipulated by the 2017 PA, Reclamation shall amend or replace the 2012 MOA for non-native fish control.

Concurrently with the Non-Native Fish Control MOA, the NPS prepared an Expanded Non-Native Aquatic Species Management Plan EA under the provisions of the National Environmental Policy Act of 1969 (NEPA). The expanded non-native aquatic plan is for both GCNP and GLCA below the GCD. The purpose for this EA is to provide additional tools beyond what is available under the 2013 Comprehensive Fish Management Plan (CFMP) and LTEMP, in order to allow the NPS to prevent, control, minimize or eradicate potentially harmful non-native aquatic species, or the risk associated with their presence or expansion. The need for this action is due to the increase of green sunfish, brown trout and potential expansion or invasion of other harmful non-native aquatic species that threaten downstream native aquatic species including listed species, and the Lees Ferry recreational rainbow trout fishery. These non-native species have become an increasing threat due to changing conditions since the completion of the 2013 NPS CFMP and the 2016 LTEMP. Existing measures may be inadequate to address potentially harmful non-native aquatic species (see <https://parkplanning.nps.gov/projectHome.cfm?projectId=74515>).

Both the MOA and the EA will be addressing similar potential adverse effects to contributing elements of the Zuni TCP.

F.2.12 NRHP Eligibility Assessment

Seven archeological sites within the Area of Potential Effects (APE) received test excavations to assess their eligibility for inclusion in the NRHP (Burchett 1994; Burchett et al. 1995; Damp et al. 2009; Leap and Neal 1992; Neff and Corey 2004; Neff and Wilson 2002; also see Martinez 2017 for a summary of investigations at Ninemile Terrace). Testing will include a research design for understanding the site's significance. Occasional surface collections occurred.

In 2005, the Navajo Nation Archeology Department (NNAD) entered into a cooperative agreement with Reclamation to re-evaluate and make recommendations on NRHP eligibility for all 53 archeological sites located in the Glen Canyon reach (Spurr and Collette 2007). This study recommended 34 sites as eligible for NRHP listing, 14 sites were not eligible, and five sites were undetermined and required additional testing. Of the 14 not eligible sites, eight were later identified as contributing elements of historic districts.

F.2.13 Archeological Excavation

Various projects to mitigate effects through data recovery were conducted within the Canyons. Between 2007 and 2009, excavations were conducted at 18 archeological sites (C:02:032, C:02:096, C:02:098, C:13:010, C:13:069, C:13:070, C:13:099, C:13:291, C:13:323, C:13:327, C:13:347, C:13:371, C:13:385, C:13:387, B:15:138, A:15:039, G:03:020, G:03:064). Damp's 2007 work evaluated 151 archeological sites for potential treatment, including the need

for data recovery (this project was not completed). Neff et al. (2016) reports on the excavation of nine archeological sites. Pederson et al. (2011) reports on the excavation of nine additional sites.

F.2.14 Geomorphic Investigations and Assessments in Glen Canyon

Numerous geomorphic projects in the Glen Canyon corridor were conducted to address topics relevant to cultural resource management, such as the age of river terraces; post-dam changes in riverbed, bank, and terrace morphology; rates and causes of terrace erosion; and corridor geoarchaeology (e.g., Anderson 2006; East et al. 2016, 2017; Grams et al. 2004, 2007; Hereford and Webb 2003; Tainer 2010). The feasibility of using geophysical investigations to detect buried archeological deposits at Ninemile Terrace has been explored; however, terrace vegetation and potential deposit depth represent significant obstacles to successful geophysical survey (De Vore et al. 2016a). For detailed summaries of Glen Canyon geomorphic investigations, see Anderson 2006, East et al. (2016, 2017) and Fairley (2003:28–35, 57–63).

F.3 PAST RESEARCH AND TREATMENT ON NAVAJO LANDS

Since June 1993 the Navajo Nation has participated as a cooperating agency in the development of NEPA documents concerned with environmental impacts on the Canyon resources downstream of GCD. The Navajo have participated in in-depth cultural studies, which identified important archeological, geological, botanical, and biological resources and TCPs within the Colorado River Corridor and provided monitoring and mitigation recommendations for culturally important resources that are affiliated with the Navajo Nation. Important cultural places include trails, subsistence areas, clan origin sites, migration places, spiritual landscapes, and archeological sites that lie within and adjacent to GLCA and GCNP (Neal and Gilpin 2000; NPS 2005a; Roberts et al. 1995; Thomas 1993). Currently, the Navajo are active members of the AMWG and the Technical Work Group (Reclamation 2012b).

F.4 PAST RESEARCH AND TREATMENT ON HUALAPAI LANDS

The Hualapai Department of Cultural Resources (HDCR) research studies focus on key resources that are of spiritual and cultural significance to the Hualapai people. The following presents a synthesis of past research on Hualapai Lands within the Colorado River Environmental Corridor. The Hualapai synthesis covers three broad interest areas documenting Hualapai cultural values and associations with the Colorado River Environmental Corridor. Particular attention is given between river miles 165 and 273. This range covers 108 miles on river left on lands belonging to the Hualapai Tribe. The three areas are as follows:

1. Hualapai Cultural Resources Monitoring River Trips
2. Ethnographic Research
3. Hualapai Cultural Atlas and Archeology

For the Hualapai people, the cultural link to the Grand Canyon and the Colorado River Corridor is both ancestral and contemporary. The river is integral to Hualapai creation and migration traditions, as well as defining the extents of ancestral territory and the modern reservation boundary. The Hualapai Tribe has a special interest in the Grand Canyon and the Colorado River because Hualapai traditional lands begin at the Little Colorado River and continue downstream through the entire Grand Canyon and beyond, to the confluence with the Bill Williams River. Today, the reservation boundary, along the Colorado River, begins at approximately River Mile 164.5 Left across from Tuckup Canyon and continues to about River Mile 273. Table F.1 provides a list of the relevant literature associated with HDCR investigations and monitoring reports.

F.4.1 Hualapai Cultural Monitoring River Trips

The Hualapai Tribe, through the Hualapai Department of Natural Resources (prior to 2006) and the HDCR (since 2006), has participated in the monitoring of natural and cultural resources of the Canyons since 1989. Current monitoring efforts began “assessing the effects of the operations of Glen Canyon Dam on terrestrial and cultural resources in lower Grand Canyon” in 2006 (Christensen et al. 2006:2). Since 2006, the HDCR monitoring program has coordinated research efforts through the GCDAMP.

TABLE F.1 Hualapai Cultural Monitoring River Trips/Assessment Reports: 1993–2017.

Fiscal Year	Reference
1993	Jackson, L., 1994, <i>Hualapai Tribe Cultural Resources Program River Trip Report GCES – 1993, July 30–August 6, 1993, Revised Report: 1994</i>
1994– 1995	Phillips, A.M., III, 1995, <i>Hualapai Ethnobotanical Native Species Plant Study, National Canyon to Pearce Ferry Trip Report, April 10–18, 1995</i> (also reporting on June 12–15, 1994, and September 10–14, 1994).
1996	Phillips, A.M., III, and Loretta Jackson, 1996, <i>Evaluation and Mitigation Efforts for March 1996 Colorado River Test Flow Experiment, December 1996</i>
1997	Phillips, A.M., III, and Loretta Jackson, 1997, <i>Monitoring Hualapai Ethnobotanical Resources along the Colorado River Annual Report 1997</i>

TABLE F.1 (Cont.)

Fiscal Year	Reference
1997	Jackson, L., C. Mayo, and A.M. Phillips, III, 1997, <i>Effects of 1997 Glen Canyon Dam Water Releases on Historic Goodding Willow at Granite Park, Colorado River Mile 209L</i>
1998	Stevens, R.H., J. A. Mercer, and Hualapai Tribe's Office of Cultural Resources, 1998, <i>Hualapai Tribe's Traditional Cultural Properties in Relation to the Colorado River, Grand Canyon, Arizona Final Report: 1998</i>
1998–1999	Phillips, A.M., III, and Loretta Jackson, 1999, <i>Monitoring Hualapai Ethnobotanical Resources along the Colorado River Final Report: 1998-1999</i>
2000	Jackson, L., A.M. Phillips, III, and K. Christensen, 2000, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2000 Report</i>
2001–2005	Christensen, K., L. Jackson, A.M. Phillips, III, and D. Kennedy, 2006, <i>Hualapai Tribe Terrestrial Monitoring Synthesis 2001–2005</i>
2001	Jackson, L., D.J. Kennedy, and A.M. Phillips, III, 2001, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2001 Report</i>
2002	Jackson, L., D.J. Kennedy, and A.M. Phillips, III, 2004, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2002 Report</i>
2005	Jackson, L., J. Tschopp, S. Wilder, D.J. Kennedy, and A.M. Phillips, III, 2006, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2005 Report</i>
2003–2004	Jackson, L., D.J. Kennedy, and A.M. Phillips, III, 2004, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2003–2004 Report</i>
2007	Jackson-Kelly, L., D.J. Kennedy, A.M. Phillips, III, K. Christensen, and D. Hubbs, 2007, <i>Monitoring Protocols, Traditional Hualapai Ecological Knowledge and the Monitoring Program for the Ecosystem in the Colorado River Corridor, 2007</i>
2007	Jackson-Kelly, L., and K. Christensen, 2007, <i>Terrestrial Monitoring Protocols Developed for Cultural Resources, Ethnobotany, and Wildlife Monitoring in Grand Canyon by the Hualapai Tribe, 2007</i>
2008	Jackson-Kelly, L., 2008, "Hualapai Tribe's Participation in the Adaptive Management Program: A Stakeholder's Perspective," presented at the Glen Canyon Dam Adaptive Management Work Group Meeting, Sept. 9–10
1996–2008	Christensen, K., L. Jackson, and A.M. Phillips, III, 2008, <i>Hualapai Tribe Terrestrial Monitoring Synthesis 1996–2008</i>
2009	Jackson-Kelly, L., D. Hubbs, C. Cannon, and A.M. Phillips, III, 2009, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2009 Report</i>
2010	Jackson-Kelly, L., D. Hubbs, C. Cannon, and A.M. Phillips, III, 2010, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2010 Report</i>

TABLE F.1 (Cont.)

Fiscal Year	Reference
2011	Jackson-Kelly, L., D. Hubbs, C. Cannon, A.M. Phillips, III, and W.G. Wright, 2011, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2011 Report</i>
2012	Jackson-Kelly, L., D. Hubbs, C. Cannon, and A.M. Phillips, III, 2013, <i>Evaluating Hualapai Cultural Resources along the Colorado River: May and August 2012</i>
2013	Jackson-Kelly, L., D. Hubbs, and C. Cannon, 2014, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2013 Report</i>
2014	Bungart, P., L. Jackson-Kelly, D. Hubbs, and C. Cannon, 2015, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2014 Report</i>
2015	L. Jackson-Kelly, P. Bungart, D. Hubbs, C. Cannon, and B. Wakayuta, 2016, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2015 Report</i>
2016	Hubbs, D., C. Cannon, and B. Wakayuta, 2017, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2016 Report</i>
2017	Hubbs, D., C. Cannon, B. Wakayuta, and S. Ka-Voka Jackson, 2017, <i>Evaluating Hualapai Cultural Resources along the Colorado River: FY2017 Report</i>

In 2001, HDCR, in consultation with Reclamation and NPS, expanded the evaluation and monitoring protocol for Hualapai archeology, ethnobotany and TCPs in the Colorado River Corridor. As a result, the Hualapai Colorado River Corridor TCP Evaluation Database and the Hualapai Cultural Atlas were developed to further incorporate Hualapai TCP and archeological analysis in evaluation and monitoring procedures. The database was created in conjunction with revised in-field evaluation forms used by HDCR during the evaluation and monitoring process for river corridor TCPs and archeological sites. Forms were designed for the evaluation and monitoring of natural and human impacts on all features (including archeological, ethnobotanical and other features) at each designated Hualapai TCP. The impacts were then quantified and recorded in the field on a 5-point scale, from 0 (absent) to 4 (severe). The forms and database also include comment sections to record qualitative data used for cross-year impact comparisons. Additionally, qualitative data are recorded through interviews with trip participants. The questionnaire includes topics regarding individual's knowledge and perspectives about TCPs and other resources in the area, through concepts of traditional ecological knowledge (TEK), relating to the following:

- Cultural Significance of Fauna
- Cultural Affiliation
- Ethnobotany
- Early Material Culture
- Ancestral Cremations and Burials
- Recreation and Tourism/Uses of Hualapai Lands

TCPs located within the traditional Hualapai lands of the Colorado River Corridor play a particularly significant role in the Tribe's cultural ties to the Grand Canyon area. According to the NPS Bulletin 38, a TCP is associated with "cultural practices or beliefs of a living community that are rooted in that community's history, and are important in maintaining the continual cultural identity of the community" (Parker and King 1990). Examples of Hualapai TCPs include plant and paint gathering areas, sacred sites, historic and prehistoric archeological sites, historic travel routes, and areas where rock images are present. All of these are believed by the Hualapai people to be inherently linked, and they regard their traditional lands in the Colorado River Corridor with the highest esteem and most profound respect (HDCR 1993).

The biological and cultural resources of the canyon have always been integral to the culture of the Hualapai people (Kroeber 1935; Mapatis 1982). Formal studies undertaken in the mid-1990s focused on the ethnobotanical resources of the canyon. During ethnobotanical river trips conducted in the lower Grand Canyon from 1993 to 1995, a total of 46 species of plants were recognized as having cultural significance to the Hualapai people (Phillips 1994a, 1994b, 1995a and b). Since then, intensive studies have been undertaken to document archeological resources and establish monitoring programs in portions of the Colorado River Corridor, with one goal being to inform and develop. Management strategies to maintain the integrity of Hualapai TCPs (HDCR 1998).

F.4.2 Ethnographic Research

In the early 20th Century, social scientists began studying Pai culture, attempting to understand social, economic, spiritual and political development amongst the Hualapai people and other peoples of the American Southwest. The Grand Canyon and the Colorado River region are home to Hualapai elders and scholars who participated in many ethnographic oral history projects.

In 1991, the Hualapai Tribal Council commissioned the then Hualapai Cultural Resources Division to conduct ethnographic and oral historical surveys among Hualapai Tribal cultural scholars and community members for developing a database regarding Hualapai TCPs in the Grand Canyon. With data drawn from the results of the survey, the Hualapai Tribal Council reviewed and evaluated the research findings and made recommendations to Reclamation regarding the operations of GCD.

The Hualapai Tribal Council at that time based its recommendations on the results of the above ethnographic study. The Tribal Council recommended that Reclamation select "an alternative for the operation of Glen Canyon Dam that will both protect and preserve the natural and cultural resources of Grand Canyon" (Hualapai Tribe Ethnographic and Oral Historical Survey for Glen Canyon Environmental Studies and the Glen Canyon Dam Environmental Impact Statement, Cooperative Agreement No. 1-FC-40-10930, January 11, 1993, p. 54).

An ethnographic study completed in 1997 (Jackson et al. 1997:i) monitored the effects of GCD water releases on the historic Goodding Willow tree (*Salix gooddingii*) located on the bank at Granite Park (River Mile 209 L). A study was completed by HDCR in collaboration with Mr.

Carlos Mayo of the SPC and botanist Dr. Arthur M. Phillips, III. The study resulted in a treatment plan to assist in reversing the declining condition of the historic tree. The study documented a mitigation effort that began as a stabilization treatment program to “prevent further erosion of sediment from around the base of the tree during experimental flood[s].”

Photography is an essential element of cultural documentation. The HDCR continues to inventory past photographic archival material and incorporates photography with ongoing monitoring and ethnographic research.

Oral interviews conducted over the past 30 years, resulted in over 300 audio-video files that were digitized and archived into HDCR’s Archive Program. Table F.2 lists pertinent ethnographic, photographic and audio research conducted through the Hualapai Cultural Division.

TABLE F.2 Ethnographic, Photographic, and Audio Research Conducted through HDCR

Fiscal Year	Reference
1991–1993	<i>Hualapai Tribe Ethnographic and Oral Historical Survey for Glen Canyon Environmental Studies and the Glen Canyon Dam Environmental Impact Statement</i> , Cooperative Agreement No. 1-FC-40-10930, January 11, 1993
1997	<i>Effects of 1997 Glen Canyon Dam Water Releases on Historic Goodding Willow at Granite Park, Colorado River Mile 209L</i> . Prepared by Loretta Jackson, Hualapai Tribe Office of Cultural Resources, December 19, 1997
1999	<i>Ethnographic Investigations of Impacts to Traditional Cultural Places and Resources by Proposed FAA Actions Over the Hualapai Indian Reservation, Arizona</i> . Prepared by the Hualapai Department of Cultural Resources, March 30, 1999
1980s–2017	Hualapai Audio Ethnographic-Research Files +82 Files [1.15 TB] <i>Library HDCR Peach Springs, AZ</i>
Late 1800s–2017	Hualapai Photographic Research Files +90 Files [365 GB] <i>Library HDCR Peach Springs, AZ</i>
Late 1990s–2017	Ethnographic and Cultural Reports Concerning Hualapai Reservation Lands with Management Recommendations [+1.15 TB]
2013–2015	Bungart, P., 2014, Photo Imagery-Repeat Photography HDCR File 2012-163, in conjunction with GRCA TEK Study

F.4.3 Hualapai Cultural Atlas and Archeology

HDCR initiated a heritage GIS database in 2003, incorporating archeological, ethnographic, photographic, and survey data. The database is known as the Hualapai Cultural Atlas, with a secondary database known as the Hualapai Tribal Historic Properties Registry.

Through a two-phased NPS Heritage Grant, HDCR developed the geodatabase, as well as identifying places of Hualapai cultural and historical significance through interviews, photography and oral histories. This compendium includes over 850 place names (both on and off the reservation) and over 1000 archeological sites (mostly within the Hualapai reservation). In addition, the Hualapai located and scanned an estimated 6000–8000 pages of documents and manuscripts used as research, management, and consultation resources (HDCR 2014).

One of the most productive sources of information was the collection of various materials produced as a result of the Indian Claims Commission (ICC), which was established by the U.S. Congress in 1946 and concluded its work in the early 1970s (e.g., Rosenthal 1990). HDCR continues to find documents in the ICC materials related to the Hualapai history in the Grand Canyon, including ethno-historic manuscripts, field notes, and letters; archeological site records from areas where historic Hualapai sites and settlements were known or were reported to exist; census records; and maps showing areas of Hualapai resource use.

Another important aspect of the Cultural Atlas project is the consultation with tribal elders and other knowledgeable individuals to gain insights about the traditional cultural landscape and general tribal concerns regarding cultural resources. As part of this effort, HDCR regularly conducts interviews to try to learn more about known place names as well as those not yet part of the Atlas. The Atlas is an invaluable tool for cultural resource management and Hualapai heritage preservation, including during Section 106 and other consultations on and off the reservation.

F.5 PAST GCMRC RESEARCH

Research by GCMRC cross-cuts both tribal and NPS-managed lands. Because of the variety and the amount of research conducted by GCMRC, a separate section in this HPP is presented.

In 1997, following the 1995 EIS and the 1996 ROD, the GCDAMP officially launched. The plan, as described in the 1995 EIS and 1996 ROD, was that the GCDAMP would be supported by an independent science organization called the Grand Canyon Monitoring and Research Center. GCMRC was to carry out research and monitoring requested by stakeholders of GCDAMP to inform AMWG policy recommendations and DOI decisions. In 1999–2003, the draft AMP Strategic Plan was developed, which identified two types of monitoring: “Core Monitoring” and “Effects Monitoring.” Core monitoring was defined as “consistent, long-term, repeated measurements using set protocols” (H. Fairley, per comm., in unpublished report submitted to Reclamation, 2018). Effects monitoring was the collection of data associated with an experiment performed under the 1996 ROD.

In 1997, following eight years of research and six years of monitoring prior to GCDAMP, the issue of whether and to what degree dam operations affected archeological sites located above the elevation of typical dam-controlled releases remained a source of controversy (H. Fairley, personal comm. in draft synthesis report, 2018). According to Fairley, “Prior to the mid-2000s, there was no means of demonstrating whether or how past or future dam-controlled

flow regimes actually affected archeological site condition” (Fairley 2003, 2005; Fairley and Sondossi 2010). The 1994 PA simply assumed “that dam-regulated flows were either directly or indirectly responsible for ongoing erosion at archeological sites, and that therefore, any evidence of erosion was evidence of dam effects” (H. Fairley, personal comm. in draft report to Reclamation, 2018).

In addition to research and monitoring undertaken by GCMRC in support of the 1994 PA and the general cultural resources program, in 1999, GCMRC contracted for a synthesis and evaluation of all data previously acquired by the cultural program, including Reclamation’s 106 program. This synthesis identified and documented all the monitoring, testing, and remediation activities that had been conducted at 264 archeological sites in GRCA between 1992 and 1999 (Neil and Gilpin 2000). GCMRC developed a Geomorphic Model to explain the relationship between dam operations and archeological site erosion and predict the vulnerability of archeological sites to future erosion. In 1998, GCMRC introduced the concept of Protocol Evaluation Panels (PEPs), and in 2000, GCMRC in collaboration with Reclamation undertook a PEP review of the cultural program (Doelle 2000). This PEP panel review focused on four topics, monitoring and compliance, archeology, Native American issues, and geomorphology — and offered numerous recommendations for improving the cultural program in each of these areas (Doelle 2000).

GCMRC adopted the recommendations from the PEP and beginning in 2006, building on previous geomorphic studies, GCMRC initiated a new research program to develop monitoring procedures that would focus on the role of dam-regulated flows and their influences on aeolian processes as they affected other ecosystem processes acting upon archeological resource condition. This multi-year phased research and development program involved five basic steps: (1) baseline geomorphic and meteorological research; (2) testing of methods to measure surface change; (3) development of conceptual models based on research results; (4) implementation of a pilot monitoring study; and (5) refinement and implementation of a long-term monitoring plan (Fairley et al. 2007) (H. Fairley, per comm., in unpublished report submitted to Reclamation, 2018). Findings and procedures from this study have been incorporated into a set of monitoring protocols that have been implemented as a formal monitoring program for cultural resources beginning in 2017.

F.6 UNRESOLVED TASKS FROM THE 1994 PA

A single stipulation from the 1994 PA remains unresolved. This stipulation will continue under the 2017 PA. Stipulations 1c, 1c1, and 1c2 were to identify and evaluate properties within the APE that retain traditional cultural values including TCPs and submit evaluations to the SHPO for determinations of eligibility. Reclamation has received nomination forms from Hopi and Zuni (which may now need revisions). Agreements for the development of nomination forms for the Navajo Nation, Kaibab Band of Paiute Indians, and the Hualapai Tribe have been awarded. Consultation with SHPO has not been completed.

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APPENDIX G: TRIBAL AND ARCHEOLOGICAL RESEARCH DOMAINS

One element to understand the past, archeologists typically try to answer questions about a specific site through the examination of cultural materials and their spatial context. Today, it is understood that a more comprehensive assessment of value and significance occurs when one considers both the tangible and intangible relationships of sites and places to other places and features in the landscape. With this in mind, Historic Property Treatment Plans (HPTs) developed under this Historic Preservation Plan (HPP) may build on past research by incorporating new topics and domains.

However, to enrich our understanding of the Canyons and use of the Canyons by past inhabitants, Reclamation supports and requires researchers to include tribal perspectives (referred to as multivocality) in their research to better our understanding of the Canyons.

Multivocality is an approach to archeological thought and practice that explicitly recognizes and highlights that narratives of the past which are intrinsically multilayered and dialogic—that is, always informing and informed by other works—and that different landscapes both define and express a multitude of meanings of place for the different peoples for whom they hold importance. Multivocality here is thus no simple plurality but rather an *engagement* of different voices that may represent traditional descendant communities arising together to tell a whole and complex story.

G.1 TRIBAL RESEARCH DOMAINS

Tribal Research domains for this HPP are for cultural resources projects beyond the scope of archeological resources. Tribal Research domains are for projects often described as ethnographic studies. It should be noted that Tribal Research Domains, also referred to as tribal perspectives, will also be developed and included with all Archeological Research Domains. These domains must present the very deep and personal association that Tribes have to the archeology of the Canyons and to their ancestors who still reside at these sites in a non-material form.

Tribes have long-term and customary affinity with the Canyons, as evidenced by ancestral and recent residence, occupancy, use, traditional cultural practices, ceremonial activities, religious beliefs, oral traditions, and social knowledge. The Canyons' landscapes and waters are locations of traditional and contemporary tribal activities and homeplaces of historical and cultural significance. The Colorado River system is subject to long-term, aboriginal use by Tribes; the Colorado River system, including its associated tributaries, seeps, springs, and washes, provides the life-giving waters sustaining various Tribes in their diverse ancestral and contemporary homelands. The land, waters, geographical features, plants, and wildlife are intimately related to—and in many cases are, in fact, themselves—traditional cultural properties (TCPs) and cultural resources.

The goals of the Tribes' research projects undertaken in collaboration with the U.S. Department of the Interior (DOI) are to record accurate accounts of traditional cultural knowledge to promote understanding about Tribes' cultural and natural resources. These accounts also convey tribal concerns regarding impacts of the operations of Glen Canyon Dam (GCD) upon the Tribes' culture, and resources.

The Tribes' survey research projects yield a database of documentary records of their cultural resources and practices. The Tribes' surveys are of further value for interactions with government agencies and public and private institutions in efforts to seek effective implementation of laws and policies, protection of cultural resources, and long-term sustainable uses of cultural and natural resources.

Research methodologies are designed and conducted in ways that adhere to traditional cultural customs and values, in compliance with protocols of tribal governance. Effective research methods acceptable to a Tribe (and preferred by tribal members) are used as cultural research is conducted within the context of the Tribes' population.

G.2 ARCHEOLOGICAL RESEARCH DOMAINS

The following research domains are identified as of interest to furthering our understanding of the function and use of the Canyons. It is understood that these research domains are often closely linked and that data requirements for specific properties reflect an overlap and include both the archeological perspective and the tribal perspective. In addition, it is expected that many more topics could be addressed, and research emphases and decisions may change as research and our understanding of human occupation and use of the river corridor evolves. Specific questions and data needs will be presented in each specific HPTP as they pertain to the resource(s). These themes include, but not limited to:

- Environment and Economy
- Population and Demography
- Social Organization
- Regional Relationships
- Religion and Cosmology
- Site Formation and Post-Depositional Processes

G.2.1 Fundamental Archeological Research

Damp et al. (2007) identified four areas of fundamental research requirements necessary for testing hypothesis explicit in the models, research domains and themes for historic context. These include Environment and Economy; Population and Demography; Social Organization; and Regional Relationships. This HPP adds two additional areas of research (Religion and Cosmology; and Site Formation and Post-Depositional Processes). These areas are briefly discussed below. Damp states:

Archaeological description refers to the documentation of observations on relevant archaeological phenomena. Determination of chronology identifies the temporal sequences of events. Together, descriptive and chronological information is used to construct cultural historical frameworks and form a basis for interpretations within a processual framework. Delineation of past environmental conditions is necessary for developing and testing explanatory models linking cultural processes with environmental conditions and/or change. Inferring past environments requires combining information on the modern environment with paleoenvironmental reconstruction. Paleoenvironmental reconstruction requires data on past climates, vegetation, wildlife, and depositional and erosional processes (Damp et al. 2007:457).

While the work of Damp and others address the archeological record for this fundamental research, ethnographic information must also be collected, analyzed and incorporated into any archeological research.

G.2.1.1 Archeological Description and Material Analysis

A thorough and consistent description of archeological and ethnographic information is a requirement for the identification of every historic property. This information will be collected for each feature and artifact classification. Damp et al. (2007) identifies that the descriptive information includes: “(1) description of field and analytical methods used, (2) description of findings, and (3) classificatory information on all archeological material classes including spatial, architectural/feature, additive technologies, reductive technologies, botanical, faunal, human, chronometrics, and historic documentation” (Damp et al. 2007:458). See Damp et al. (2007:458–463) for the basic descriptive information to be collected for each major artifact class.

In addition to the archeological description, a tribal perspective will be integrated into the description. The tribal descriptive information may include: (1) purpose/function of the property, and (2) affiliation of the property.

G.2.1.2 Chronology

Determination of the chronological sequence of events which occurred at a historic property is fundamental to all research issues. The relative dating techniques of the past continue to prove to be valuable tool today when used in combination with absolute dating techniques. Relative dating techniques may include seriation of ceramic types or attributes, projectile point typologies, architectural types, stratigraphic analysis of *in situ* deposits, and temporal placement of the property from a tribal perspective. Absolute dating techniques of today including accelerator mass spectrometry (AMS) dating of residue left on ceramics or AMS dating of annuals (plants) are a tremendous way to assign a very precise date to historic properties. While many of the Canyon’s early C-14 dates lack detailed descriptions of provenance, a renewed focus on C-14, utilizing AMS, will aid in the interpretation of historic events.

G.2.2 Environment and Economy

This research domain identifies the relationship between humans and the environment. This includes the mobility, sedentism and land use that define settlement-subsistence systems. Archeological and tribal perspectives will be integrated into the resulting interpretation.

G.2.3 Population and Demography

The focus of this research domain is on human populations and the characteristics of those populations. Age-sex ratio, life expectancy and temporal trends of population growth, decline, and expansion are some of the components of this research domain. As Damp et al. (2007:446) note:

Population growth refers to increases in total population size and density. Increases in population have been attributed to the presence of favorable environments, increased sedentism and dependence on agriculture, and the social, economic, and political draw of elites in some communities. The mechanisms of these increases include immigration, aggregation, and biological reproduction.

To assist with the identification and understanding of these mechanisms, tribal perspectives will be incorporated. Additional tribal interpretation of the population and demography may include: (1) population growth as a result of technical innovations, (2) why did the population decline, and (3) what are the traditional methods of site abandonment.

G.2.4 Social Organization

Damp et al. (2007) identify social organization as pertaining to intragroup relationships. This includes “the social, economic, political, and ideological mechanisms of both horizontal and hierarchical group formation and integration” (Damp et al. 2007:447). The focus of this research will be on community development, the mechanisms that play a role in that development, and how is this identified in the data being collected. GIS and GPS play a key role in this research when determining larger patterns of social organization. No study of social organization can be complete without the tribal perspective. Tribal perspective will include ethnographic information on each of the mentioned mechanisms. In addition, tribal perspectives may include additional information concerning: (1) social organization of the household unit, (2) resources available for community development, and (3) the economic, social, political and ideological mechanisms integrating the community.

G.2.5 Regional Relationships

Damp et al. (2007) describe regional relationships as follows: “Regional relationships pertain to intergroup relationships—the mechanisms of regional interaction and communication that tie individuals and groups into wider networks and delineate the nature and extent of

regional systems. The research issues within this domain include cultural affiliation and boundaries, and the processes on the peripheries of regional systems” (Damp et al. 2007:451). Damp et al.’s (2007) perspective focused more on the “interrelationships of all sites to one another and the formation of cultural boundaries and the expression of cultural affiliation (ethnogenesis) through time.” Socioeconomic systems and boundaries are defined by the examination of site type, function, style, and chronology: “For example, the demarcation between the location of roaster complexes and roomblocks is dramatic and has significance with regard to social boundaries” (Damp et al. 2007:452). An interesting comparison will be the integration of the tribal perspectives on the regional relationships. Nearly all Tribes have ethnographic information concerning regional relationships within the Canyons. Additional tribal perspectives may include: (1) changes in relationships within the Canyons, (2) how those changes are reflected in modern-day cultures, and (3) how are modern tribal identities are tied to landscapes?

G.2.6 Religion and Cosmology

The religion and cosmology information will be based largely on tribal perspectives. This topic tends to lack strong archeological evidence. Ethnographic information will be used to identify certain aspects of religion and cosmology. This information may then be used to interpret archeological findings and to further develop the archeological interpretation of certain findings.

G.2.7 Site Formation and Post-Depositional Process

Environmental and cultural contexts and processes determine the types of archeological materials that are deposited, if and how those materials are preserved, and they structure artifact, feature, and site provenience. Understanding site formation and post-depositional process is foundational to using archeological data for drawing inferences about the past. In addition, understanding how ongoing processes are affecting and may affect cultural resources is essential to developing preservation and mitigation actions. Assessing how the interplay of how fluvial, aeolian, and pluvial processes impact historic properties is of particular importance for protecting resources within the Area of Potential Effects (APE).

G.3 EURO-AMERICAN HISTORIC PERIOD RESEARCH DOMAINS

Euro-American historic properties are identified throughout the Canyons. This includes Lees Ferry and Lonely Dell Historic District, Spencer Steamboat, and properties related to mining, dam construction, and tourism, to name a few. The vast majority of this research will be restricted to surface finds and research based on past documentation. This may include:

1. Technology and Industry
2. Exchange and Commerce
3. Transportation and Communication

4. Government and Dam Construction
5. Formation and Preservation of the Archeological Record
6. Mining
7. River running
8. Tourism

APPENDIX H: GUIDE TO DEVELOP A HISTORIC PROPERTY TREATMENT PLAN FOR ARCHAEOLOGICAL SITES

Introduction and Statement of Authority

The Bureau of Reclamation (Reclamation) has determined that operation of the Glen Canyon Dam (GCD) and experimental and management actions according to the Long-term Experimental Management Program (LTEMP) Record of Decision (ROD) is an Undertaking subject to compliance with Section 106 of the National Historic Preservation Act of 1966 (NHPA) and has determined that the Undertaking has the potential to cause adverse effects to historic properties, and has developed the 2017 Programmatic Agreement (PA) pursuant to the requirements of Section 106 in order to take into account the effects of the Undertaking on historic properties. As a result of this Undertaking, the 2017 PA and the 2018 Historic Preservation Plan (HPP), Reclamation has identified a potential adverse effect to archeological sites. The sites are eligible for listing on the National Register of Historic Places (NRHP) under Criterion D, because the sites have a scientifically valuable assemblage with sufficient integrity to yield important information for prehistoric research. The sites are also eligible for listing on the NRHP under Criterion A, because the sites are associated with events that have made a significant contribution to the broad patterns of our history, and Criterion B, because the sites are associated with the lives of persons significant in our past. As such, the sites are historic properties under the Section 106 regulations (36 CFR Section 800.16[1][1]). The archeological sites may include organic materials that record prehistoric dietary, subsistence, and settlement patterns. While the archeological sites will no longer be inundated by the Colorado River, erosion has been documented by various monitoring programs on multiple occasions. The erosion has the potential to damage the data-bearing organic materials. In addition, this erosion at the sites could remove other portions of the cultural deposits that contain data such as lithic, faunal, and skeletal materials. These impacts would be an adverse effect under Section 106, because they would diminish the characteristics that make the sites eligible for inclusion in the NRHP (36 CFR Section 800.5[a][1]).

To resolve the potential adverse effects, Reclamation, after consultation with parties to the 2017 PA, executed a PA on September 6, 2017, per the Section 106 regulations (36 CFR Part 800.6). The 2017 PA stipulates that Reclamation will prepare a generic Historic Property Treatment Plans (HPTP) to resolve identified adverse effects or potential adverse effects (Stipulation IV A[3]). This HPTP provides the legal standards for identifying and resolving adverse effects. This HPTP offers a method of investigation to further identify the nature of the adverse effects as it relates to the archeological sites, and to obtain the data that contributes to the sites' eligibility.

The proposed treatment plans to achieve the goals identified in the HPP include analysis of existing collections from the archeological sites, geomorphological studies, archeological excavation and a literature review on the effects of erosion on archeological materials. With the utilization of fundamental archeological data recovery methods, this treatment plan will attempt to retrieve the perishable portion of the materials, including faunal remains and botanical material from the sediments. The analysis of existing collections will retrieve data and provide a

measure for characterizing the remaining materials. The geomorphological studies will provide an updated baseline to identify the effects of erosion. This work may also clarify how erosion has played a role in the degradation of the data potential to the archeological sites. Collectively, this treatment plan should characterize the nature of the site, allow the documentation of the erosion, and synthesize and capture data that may be lost to erosion. This plan may provide the elimination of future monitoring needs.

Regulatory Framework and Standard for Resolving Adverse Effects

Section 106 of the NHPA, as considered under the 2017 PA and further explored under this HPP, requires federal agencies to consider the effects of their undertakings on historic properties. Only adverse effects require resolution through Section 106 (36 CFR Section 800.6). The regulations indicate that an adverse effect is one that would:

... alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.

The criteria of adverse effects refer to the characteristics that make a property eligible for inclusion on the NRHP. The following applies to the sites:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and (a) that are associated with events that have made a significant contribution to the broad patterns of our history [Criterion A]; or (b) that are associated with the lives of persons significant in our past [Criterion B]; or (d) that have yielded, or may be likely to yield, information important in prehistory or history" [Criterion D].

As a result of the operations of the GCD and experimental and management actions according to the LTEMP ROD, Glen Canyon Dam Adaptive Management Activities (GCDAMP) activities, this undertaking has the potential to cause effect to the archeological sites and may expedite decay of the organic materials which contain information about the dietary, subsistence, and settlement patters, as well as the potential to cause soil sloughing or erosion of potential data-bearing sediments. Because these sediments contain data that make the sites eligible for listing on the NRHP under Criterion A, B, and D, the impacts are potentially adverse and must be resolved through consultation and planning.

Resolution of the adverse effects is a process that does not dictate substantive outcomes. Section 106 is characterized as a requirement that agency decision makers “shall take into account the effect of the undertaking on any historic property” (54 USC § 306108). The critical concern is that the federal agency identifies ways to “minimize or mitigate any adverse effects on historic properties” in consultation with the SHPO, Indian Tribes, and other consulting parties (36 CFR Part 800.1[a] et seq.), not that agencies completely mitigate the full extent of impacts.

Accordingly, this HPTP provides a range of treatment options to retrieve a sample of the data that contributes to the sites’ eligibility. This HPTP also provides a vehicle for the discussion and selection of the appropriate treatment and mitigation options. Following the review and incorporation of comments by the parties to the 2017 PA, this HPTP will be implemented to complete Reclamation’s responsibilities under Section 106 of the NHPA, and the 2017 PA for the treatment of these archeological sites. The following section documents the wishes of the consulting parties for the treatment of these historic properties.

Results of Consultation to Date on Treatment of Archeological Sites

Reclamation, National Park Service, Advisory Council on Historic Preservation (ACHP), the Arizona State Historic Preservation Officer (SHPO), Hualapai Indian Tribe of the Hualapai Indian Reservation, Navajo Nation, Hopi Tribe of Arizona, Kaibab Band of Paiute Indians, Paiute Indian Tribe of Utah, San Juan Southern Paiute Tribe of Arizona, Pueblo of Zuni, and Western Area Power Administration are parties to the 2017 PA, with Colorado River Energy Distributors Association, Inc., Bureau of Indian Affairs, Western Regional Office, National Parks Conservation Association, Grand Canyon River Guides, Inc., Grand Canyon Wildlands Council, Inc. being concurring parties. Reclamation’s role as lead federal agency assumes responsibility for completing the inventory and the HPTP under the 2017 PA. Further, Reclamation has identified that Native American Tribes attach cultural significance to the archeological sites and have standing to consult regarding treatment of the sites as consulting parties.

In meetings beginning on April 21, 2016, through October 4, 2018, the parties to the 2017 PA have indicated of primary importance is to preserve historic properties *in situ*. However, when avoidance or preservation *in situ* are not viable options, treatment or mitigation measures are required to address potential adverse effects on historic properties caused by GCDAMP activities and may include soil sloughing, erosion and indirect human disturbances.

Curation. All material remains, samples, and associated records, as defined in *Curation of Federally-Owned and Administered Archeological Collections* (36 CFR § 79.4), resulting from the surveys, monitoring, or treatments to resolve potential adverse effects associated with GCDAMP activities shall be curated as identified in Section 9.5.6 of this HPP.

Summary of Management Goals

To accommodate the combined goals of this HPP and HPTP for minimizing disturbances and resolving potential adverse effects on historic properties, Reclamation, in consultation with the parties to the 2017 PA, is proposing the following approach concerning archeological sites, consisting of:

1. **Data Recovery** – the systematic collection of site data and including a suite of techniques from excavation to documentation to geomorphological studies.
2. **Surface Collection** – as a form of data recovery. Collection may be made when there is a discovery of a significant artifact class or item not common to CRE cultural resources that requires further information gathering through detailed documentation or from appropriate tribal experts.
3. **Excavation** – is the systematic documentation and removal of subsurface cultural deposits carried out under an approved research design (e.g., Damp et al. 2007). Excavation will be site-based.
4. **Additional Site Documentation** – as a treatment includes collection of additional information to supplement the site record. This may include archeological documentation of newly identified site components such as tangible features or artifacts, or ethnographic documentation about intangibles identified by tribal experts. This additional documentation may be in the form of videos, podcasts, etc.
5. **Ethnographic Documentation** – may be used as a treatment measure to further our understanding of tribal past and present use of the Canyons. An example of an ethnographic documentation project is the Hualapai Archive Project.

Summary of HPTP Components

As identified in the SHPO Guidance Point No. 12, it is critical that the HPTP is thorough and at a minimum include the following components:

- The results of previous research relevant to the Undertaking and a research design that discusses the research questions to be addressed through eligibility testing, data recovery, archival research, analysis, and interpretation, with an explanation of their relevance and importance.
- The results of tribal consultation regarding the incorporation of tribal perspectives into the culture history, research design, and data recovery/methodology sections.
- The properties or portions of properties where eligibility testing or data recovery is to be carried out, and any property or portion of property that

would be affected by the Undertaking without treatment, and a rationale for untreated portions (e.g., discussion of the sampling strategy).

- If the data recovery is to be phased; a discussion of the transition between Phase I and Phase II including a review of preliminary reports and the field visits/consultations.
- The archival, field, and laboratory methods to be used, with an explanation of their relevance to the research questions.
- Specification of the level of effort (in text and on site maps) to be expended on the treatment of the sites, including treatment locations and methods of sampling, sample size, and procedures for selection of specific sample units.
- The methods to be used in the management and dissemination of the resultant data to the professional community and the public, including a proposed schedule for Undertaking tasks, and a schedule for the submittal of draft and final reports (Preliminary Data Recovery Reports and Data Recovery Reports) to consulting parties for review and comment.
- A discussion of permits, personnel qualifications, construction, personnel education and safety plan, coordination, and cultural sensitivity training.
- The proposed disposition and curation of recovered materials and records in accordance with relevant state and federal laws (cite the specific laws) and according to the HPP.
- Procedures for monitoring, evaluating, and treating discoveries of unexpected or newly identified cultural resources during the Undertaking, including the consultation process and timelines with appropriate consulting parties.
- A protocol for the treatment of human remains, in the event that such remains are discovered, describing methods and procedures for the recovery, inventory, treatment, and disposition of human remains, Associated/Unassociated Funerary Objects, and Objects of Cultural Patrimony (as per relevant state/federal laws) as identified in the HPP. The Native American Graves Protection and Repatriation Act (NAGPRA) will apply; a NAGPRA Plan of Action as identified in the HPP will be appended to the HPTP and should be discussed briefly in this section of the HPTP.
- A strategy for a public outreach program with the goal of disseminating information about the results of the cultural resources investigations to the general public. The public outreach should include a discussion on the public benefit of mitigation and recommendations for enhancing public education about, and interpretation of, the affected property. This discussion should address proposed means to involve the public during fieldwork and/or in the

future, and should include a strategy for a public outreach program with the goal of disseminating information about the results of the cultural resources investigations to the general public. This program will be implemented to inform and educate target audiences of the importance of archeological research and may include the following:

- Interpretive signage at the property, as appropriate.
- Print media (a short report written specifically for the public, an education brochure and/or pamphlet, short reports for public magazines and/or journals).
- Electronic media (websites and various social media venues and/or the production of a video of the fieldwork and analysis), as appropriate.
- Public outreach, such as, museum exhibits, traveling exhibits, presentations or lectures at local venues such as libraries, meetings of avocational organizations, conferences, special presentations given during Arizona Archaeology and Heritage Awareness Month, participant booths at the Arizona Archaeology Expo, laboratory and/or collections tours, and public tours during fieldwork, as appropriate.
- Ways to enhance local heritage education curriculum.

APPENDIX I: CONTACT INFORMATION

Bureau of Reclamation

Regional Archeologist
Upper Colorado Region
125 South State Street, Room 8100
Salt Lake City, UT 84138
(801) 524-3646 (office)
(801) 828-5119 (cell)
(801) 524-5499 (fax)

Glen Canyon National Recreation Area/Rainbow Bridge National Monument

Division Chief of Science and Resource Management
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Page, AZ 86040
(928) 608-6265 (office)
(928) 660-0118 (cell)

Grand Canyon National Park

Cultural Program Manager
PO Box 129 (Street Address 17 South Entrance Road)
Grand Canyon, AZ 86023
(928) 638-7742 (office)
(928) 638-7755 (fax)

River Corridor Archeologist

Grand Canyon National Park
1824 S. Thompson Street, Suite 200
Flagstaff, AZ 86001

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APPENDIX J: NAGPRA PLAN OF ACTION, GRAND CANYON NATIONAL PARK

Discovery of Native American Graves Protection and Repatriation Act (NAGPRA) Items (as defined in Appendix A) within the Grand Canyon National Park (GRCA) shall follow the established GRCA NAGPRA protocol, which is as follows:

- A. All human remains encountered on the project will be treated with dignity, care, and respect.
- B. When human remains and/or funerary objects (associated and unassociated) are found within GRCA in conjunction with a Glen Canyon Dam Adaptive Management Program (GCDAMP) activity, the person making the discovery shall immediately stop activities within a radius no less than 50 feet (15 meters) of the discovery and make a reasonable effort to respectfully secure and protect the human remains, funerary objects, sacred objects, or objects of cultural patrimony.
- C. The GCDAMP project director or designee will notify Reclamation's Regional Archeologist and the appropriate National Park Service (NPS) management representative(s) as identified in Appendix I. Verbal notification shall immediately be followed by written notification.
- D. Reclamation will notify the State Historic Preservation Officer (SHPO) of the discovery as soon as possible.
- E. All NAGPRA actions within GRCA will follow the 2007 "Memorandum of Agreement [MOA] Regarding Collections, Inadvertent Discovery, and Intentional Excavation of Native American Human Remains, Funerary Objects, Sacred Objects, and Objects of Cultural Patrimony at Grand Canyon National Park, Arizona Between The Grand Canyon National Park And The Havasupai Tribe, Hopi Tribe, Kaibab Band of Paiute Indians, Las Vegas Paiute Tribe, Moapa Band of Paiute Indians, Navajo Nation, Paiute Indian Tribe of Utah, Pueblo of Zuni, San Juan Southern Paiute Tribe of Arizona, and Yavapai-Apache Nation (hereafter collectively referred to as the TRIBES)," or its replacement; which includes the following.
 - 1. Inadvertent Discovery: Within three (3) working days after being notified of an inadvertent discovery, GRCA superintendent or the designated GRCA official will certify receipt of the notification; notify the Tribes by telephone, with written confirmation; and initiate plans to consult on the appropriate treatment and disposition of the NAGPRA items. If further action requires intentional excavation, this activity will be accomplished following the procedures detailed in the 2007 MOA.
 - a) At the request of the Tribes, GRCA is authorized to reposition human remains and funerary objects that were inadvertently discovered within their burial site and cover them with fill material. For this limited purpose, GRCA and the Tribes agree that a burial site is coterminous with the associated archeological site. Repositioning human remains and funerary objects in GRCA does not constitute intentional archeological excavation or removal for the purposes of NAGPRA.

- b) The custody and disposition of NAGPRA items removed or intentionally excavated from their original location as a result of inadvertent discoveries will be determined by a priority of custody specified in the 2007 MOA.
- 2. Intentional Excavation: For review, a written plan of action for intentional excavations will be submitted to GRCA and the Tribes per Section VIII of the 2007 MOA.
 - a) All intentional excavation of NAGPRA items in GRCA will follow the requirements of the Archeological Resources Protection Act and its implementing regulations and be undertaken in accordance with current professional standards for archeological data recovery.
 - b) The custody and disposition of NAGPRA items removed from their original location as a result of intentional excavation will be determined by a priority of custody specified in the 2007 MOA.
- F. Following the completion of the NAGPRA process, a written report will be sent to Reclamation's Regional Archeologist detailing the dates, actions and results of the actions for compliance with NAGPRA. This report will also contain a copy of the Notice of Intended Disposition as well as the location and dates of publication, results from any cultural affiliation studies and any other studies completed for this NAGPRA process. A summary of information from this report will be shared with the parties of the 2017 Programmatic Agreement (PA), as well as presented at the annual reporting meeting for cultural resources, as identified in Stipulation XI of the 2017 PA.

APPENDIX K: NAGPRA PLAN OF ACTION, GLEN CANYON NATIONAL RECREATION AREA

Discovery of Native American Graves Protection and Repatriation Act (NAGPRA) Items within the Glen Canyon National Recreation Area (GLCA) shall follow:

- A. All human remains encountered on the project will be treated with dignity, care, and respect.
- B. When human remains and/or funerary objects (associated and unassociated) are found within GLCA in conjunction with a Glen Canyon Dam Adaptive Management Program (GCDAMP) activity, the person making the discovery shall immediately stop activities within a radius no less than 50 feet (15 meters) of the discovery and make a reasonable effort to respectfully secure and protect the human remains, funerary objects, sacred objects, or objects of cultural patrimony.
- C. The GCDAMP project director or designee will notify Reclamation's Regional Archeologist and the appropriate National Park Service (NPS) management representative(s) as identified in Appendix I. Verbal notification shall immediately be followed by written notification.
- D. Reclamation will notify the State Historic Preservation Officer (SHPO) of the discovery as soon as possible.
- E. Pending development of a NAGPRA agreement specific to GLCA, all NAGPRA actions will follow NAGPRA (25 U.S.C. 3001-3013) and its implementing regulations (43 CFR § 10), which includes the following:
 - 1. Inadvertent Discovery: Within three (3) working days after being notified of an inadvertent discovery, GLCA superintendent or the designated GLCA official will certify receipt of the notification; notify the Tribes by telephone, with written confirmation; and initiate plans to consult on the appropriate treatment and disposition of the NAGPRA items. If further action requires intentional excavation, this activity will be accomplished following the procedures detailed in 43 CFR § 10.3 and includes the following.
 - a) Excavations will follow the requirements of the Archeological Resources Protection Act (ARPA) (16 U.S.C. 470aa et seq.) and its implementing regulations.
 - b) Excavations occur only after consultation with the appropriate Indian Tribe pursuant to § 10.5.
 - c) Custody and disposition of NAGPRA items removed or intentionally excavated from their original location as a result of inadvertent discoveries will be determined by a priority of custody specified in §10.6.
 - 2. Intentional Excavation: A written plan of action for intentional excavations will be submitted to GLCA and the Tribes per § 10.3.

- a) Excavations will follow the requirements of the Archeological Resources Protection Act (ARPA) (16 U.S.C. 470aa et seq.) and its implementing regulations.
 - b) Excavations occur only after consultation with the appropriate Indian Tribe pursuant to § 10.5.
 - c) Custody and disposition of NAGPRA items removed or intentionally excavated from their original location as a result of inadvertent discoveries, will be determined by a priority of custody specified in §10.6.
- F. Following the completion of the NAGPRA process, a written report will be sent to Reclamation's Regional Archeologist detailing the dates, actions and results of the actions for compliance with NAGPRA. This report will also contain a copy of the Notice of Intended Disposition as well as the location and dates of publication, results from any cultural affiliation studies and any other studies completed for this NAGPRA process. A summary of information from this report will be shared with the parties of the 2017 Programmatic Agreement (PA), as well as presented at the annual reporting meeting for cultural resources, as identified in Stipulation XI of the 2017 PA.

APPENDIX L: NAGPRA PLAN OF ACTION, HUALAPAI TRIBAL LANDS

Discovery of Native American Graves Protection and Repatriation Act (NAGPRA) Items within the Hualapai tribal lands shall follow:

- A. All human remains encountered on the project will be treated with dignity, care, and respect.
- B. When human remains and/or funerary objects (associated and unassociated) are found within Hualapai tribal lands in conjunction with a GCDAMP activity, the person making the discovery shall immediately stop activities within a radius no less than 50 feet (15 meters) of the discovery and make a reasonable effort to respectfully secure and protect the human remains, funerary objects, sacred objects, or objects of cultural patrimony.
- C. The GCDAMP project director or designee will notify Reclamation's Regional Archeologist as identified in Appendix I. Verbal notification shall immediately be followed by written notification.
- D. Reclamation will immediately notify Hualapai Tribal Historic Preservation Officer (THPO) of the discovery.
- E. Reclamation will notify the Bureau of Indian Affairs of the discovery as soon as possible.
- F. All NAGPRA actions on Hualapai tribal lands will follow Section 528 of the Hualapai Cultural Heritage Resources Ordinance, Resolution No. 13-98; or its replacement; which includes the following:
 - 1. Intentional Excavation. A class C permit may authorize the excavation and removal of human remains and/or cultural items (whether or not the cultural items are associated with human remains), but only if the permit includes a term expressly authorizing such excavation. Applicants who anticipate the need for such express authorization should request such a term in their applications. In the event of an inadvertent discovery associated with a permit that does not include express authorization to excavate human remains and/or cultural items, the Director is authorized to issue an amendment to the permit in an expeditious manner, taking into consideration of applicable requirements of the federal NAGPRA.
 - 2. Inadvertent Discoveries. In the event of an inadvertent discovery of Native human remains and/or cultural items, whether or not in conjunction with excavation authorized by a class C permit, legal requirements of NAGPRA become applicable. Any person who knows or has reason to know that he or she has inadvertently discovered human remains and/or cultural items as defined in NAGPRA must immediately provide notice by telephone to the Department, with written confirmation. If the inadvertent discovery occurred in connection with an on-going activity on tribal lands, the person who made the discovery and all other persons responsible for the on-going activity must stop the

activity in the area of the inadvertent discovery and make a reasonable effort to protect the human remains and/or cultural items.

3. **Determination of Proper Treatment.** After any inadvertent discovery of human remains and/or cultural items, the Director will consult with the parties involved in the discovery to determine an appropriate course of action, which may include reburial pursuant to subsection (e). The Director will also seek guidance from the Cultural Advisory Team. If the human remains do not appear to be Native American, or there appears to be evidence that the site may be a crime scene, tribal or federal law enforcement officers will be notified. If the Director decides to authorize excavation and removal, custody shall be determined in accordance with subsection (d).
 4. **Custody.** NAGPRA provides that the highest priority for the right to take custody of Native American human remains and associated funerary objects removed from tribal lands is vested in the lineal descendant(s), if any are known. The Department will make a good faith effort to determine whether there are any known lineal descendants, including consultation with the Cultural Advisory Team of Elders. If there are no known lineal descendant(s), then the right to take custody is vested in the Tribe. In the case of Hualapai tribal lands, an inadvertent discovery of Native American human remains may be culturally affiliated with a different Tribe, and the Department will make good faith efforts to consult with such other Tribes as may be warranted by a particular case. In response to a formal request from another Tribe, the Director may issue a decision transferring custody to such Tribe, provided that the Director posts notice of any such decision in the tribal office and provided further that any such decision shall be subject to judicial review in tribal court.
 5. **Reburial.** The Department will be responsible for managing the reburial process for any human remains and/or cultural items that are reburied.
- G. Following the completion of the NAGPRA process, a written report will be sent to Reclamation's Regional Archeologist detailing the dates, actions and results of the actions for compliance with NAGPRA. This report will also contain a copy of any notices of intended disposition, affiliation studies, etc. A summary of information from this report will be shared with the parties of the 2017 Programmatic Agreement (PA) as well as presented at the annual reporting meeting for cultural resources, as identified in Stipulation XI of the 2017 PA.

APPENDIX M: NAGPRA PLAN OF ACTION, NAVAJO NATION LANDS

Discovery of Native American Graves Protection and Repatriation Act (NAGPRA) Items within the Navajo Nation lands shall follow:

- A. All human remains encountered on the project will be treated with dignity, care, and respect.
- B. When human remains and/or funerary objects (associated and unassociated) are found within Navajo Nation lands in conjunction with a Glen Canyon Dam Adaptive Management Program (GCDAMP) activity, the person making the discovery shall immediately stop activities within a radius no less than 50 feet (15 meters) of the discovery and make a reasonable effort to respectfully secure and protect the human remains, funerary objects, sacred objects, or objects of cultural patrimony.
- C. The GCDAMP project director or designee will notify Reclamation's Regional Archeologist as identified in Appendix I. Verbal notification shall immediately be followed by written notification.
- D. Reclamation will immediately notify Navajo Tribal Historic Preservation Officer (THPO) of the discovery.
- E. Reclamation will notify the Bureau of India Affairs of the discovery as soon as possible.
- F. All NAGPRA actions on Navajo Nation lands will follow the 1988 Navajo Nation Cultural Resources Protection Act (CMY-19-88) and the Navajo Nation Policy for the Protection of Jischaá: Gravesites, Human Remains, and Funerary Items; or its replacement; which includes, but not limited to, the following:
 - 1. The Navajo Nation THPO shall determine the treatment of human remains without identified lineal descendants and/or funerary items in consultation with other Tribes, as appropriate.
 - 2. Inadvertent Discovery: Human remains and funerary items must be protected in place until treatment measures are implemented.
 - 3. Intentional Excavation: All trenching, hand excavation, sampling, photography, etc., shall cease within 10-feet (3-meters) radius of the discovery after the nature and extent of the buried remains have been determined.
 - 4. Ground-disturbing activities may resume only after a proposed treatment plan has been agreed upon and implemented by the Navajo THPO and the proper permits are obtained.
- G. Following the completion of the NAGPRA process, a written report will be sent to Reclamation's Regional Archeologist detailing the dates, actions and results of the actions for compliance with NAGPRA. This report will also contain a copy of any notices of

intended disposition, affiliation studies, etc. A summary of information from this report will be shared with the parties of the 2017 Programmatic Agreement (PA) as well as presented at the annual reporting meeting for cultural resources, as identified in Stipulation XI of the 2017 PA.

APPENDIX N: FUTURE PROJECT ACTIVITIES

A review of the program goals, historic context, synthesis of past research and treatment activities, current research design and questions, and results from resource monitoring and discoveries, as well as ongoing consultation, all play important roles in assessing the needs and focus for future activities and the direction for the historic preservation program in general.

N.1 CULTURAL SENSITIVITY TRAINING

Native American Tribes possess special expertise in religious and cultural significance. It is recognized that this expertise is the outcome of extensive traditional learning and training that certain Native individuals go through to receive tribal recognition as an initiated individual, a medicine person, or a spiritual leader. The Bureau of Reclamation (Reclamation) acknowledges and respects traditional knowledge and traditional education systems and recognizes that the inclusion of individuals with this knowledge is a vital component for the identification, evaluation, analysis, recording, treatment, monitoring or disposition of historic properties. Because not every researcher within the Glen Canyon Dam Adaptive Management Program (GCDAMP) is able to undergo the intense training that certain Native individuals complete, this project enables those experts to (1) assist the researchers to identify key aspects of religious and cultural significance; (2) develop training methods to pass this information on, and (3) to participate in the cultural sensitivity training.

This training will be developed and then revised on a recurring basis, as needed. Information from each of the five GCDAMP associated Tribes will be incorporated into this training; the training will be developed by tribal members and lead by a project coordinator. The project coordinator's role is to develop a written plan for the training, in coordination with representatives from each of the five GCDAMP associated Tribes, and then to facilitate the implementation of the training. Beginning in FY 2018, the project coordinator will develop a written plan for the cultural sensitivity training. In FY 2019 and FY 2020, the development and implementation of the cultural sensitivity training, including coordination with the development of a video version of the training will occur. Coordination with Reclamation for the development of the cultural sensitivity training and training video will be required. The project goals and objectives are:

1. Develop and implement a cultural sensitivity training program that will be used by all researchers working within the GCDAMP.
2. Produce a training video, podcast, etc. to be viewed by all personnel on GCDAMP projects.

Completion of this project allows for Reclamation's compliance with the 2017 Programmatic Agreement (PA) Stipulation IV A(9). The ultimate goal is to develop a training course for GCDAMP activity researchers and other interested GCDAMP participants. The training course will consist of one or more videos to be shared with all parties.

N.2 NRHP EVALUATIONS OF TCPs AND NRHP NOMINATIONS

Under previous contracts and financial assistance agreements, Reclamation initiated the traditional cultural property (TCP) documentation and nomination process with the five Adaptive Management Work Group (AMWG) member Tribes (Hopi, Hualapai, Navajo, Paiute, and Zuni), all of which have identified the Grand Canyon, from rim-to-rim, as a TCP. The documentation and nomination process, as identified in National Park Service (NPS) Bulletin 38, consist of the completion of National Register of Historic Places (NRHP) Registration Form followed minimally by consultation with the State Historic Preservation Officer/Tribal Historic Preservation Officer (SHPO/THPO). The documentation “should include a presentation of the results of interviews and observations that systematically describe the behavior, beliefs, and knowledge that are germane to understanding the property's cultural significance, and an organized analysis of these results” (NPS Bulletin 38:19).

Future projects including Associative Values studies (discussed below) and possible projects related to Traditional Ecological Knowledge are based on TCP documentation. Data from tribal monitoring reports will also support the documentation of TCPs. The project goals and objectives are:

1. Documentation of TCPs for Hualapai, Navajo, and Paiute Tribes.
2. Update documentation for Zuni and Hopi TCPs, as appropriate.
3. Reclamation will make a determination of eligibility to the NRHP in consultation with AZ SHPO/THPO.
4. Whether or not the nomination form goes beyond SHPO/THPO consultation in the nomination process, will be dependent on tribal approval.

Completion of this project allows for Reclamation’s compliance with the 2017 PA Stipulation I B(3) and IV A(7). The project product is the documentation of TCPs for the Hualapai, Navajo and Paiute Tribes and possible updates to the TCPs for the Hopi Tribe and the Pueblo of Zuni.

This TCP NRHP nomination project will be closely coordinated with NPS efforts to document a single multiple property “umbrella” TCP for the entire canyon for all traditionally associated Tribes. The NPS project is outside of the GCDAMP activities. It is anticipated that data from each Tribe’s documented TCP will be incorporated into the broader, canyon-wide multi-property TCP.

N.2.1 Associative Values Studies

Identified in the NPS Bulletin 15 (p. 11), the NRHP criteria recognize different types of values embodied in historic properties. These values fall into three categories:

1. Associative value (Criteria A and B): Properties significant for their association or linkage to events (Criterion A) or persons (Criterion B) important in the past.
2. Design or Construction value (Criterion C): Properties significant as representatives of the manmade expression of culture or technology.
3. Information value (Criterion D): Properties significant for their ability to yield important information about prehistory or history.

Reclamation has identified that Tribal Associative Values Studies are part of a three step process. The first step is to identify the Associative Values for each Tribe. This step will be completed as part of the TCP Documentation. Tribal Associative Values will be identified within the TCP documentation for future reference with respect to Historic Properties. The second step is to monitor and identify whether any Associative Values identified in the TCP documentation are being adversely affected by the GCDAMP activities. This monitoring will be completed as part of the Tribal Cultural Resources Monitoring, the documentation of which is submitted to Reclamation in annual monitoring reports. In accordance with the 2017 PA, Stipulation I, if adverse effects are determined by Reclamation, the third step is the mitigation of the adverse effects.

When historic properties are valued for their association with important historical events and important people, mitigation may be accomplished by documenting those associations. An example of a past GCDAMP Associative Value project is the 2015 Zuni Associative Values study which mitigates for losses of Associative Values through the production of a film that documents the Zuni relationship to Grand Canyon.

The implementation of Tribal Associative Values studies under the 2017 PA, Stipulation I B, can be a stand-alone mitigation measure. Alternatively, results of the Associative Value study may identify future mitigation strategies to address adverse effects to the character of historic properties as a result of the GCDAMP activity. Prior to beginning any tribal Associative Value study, it will be established whether the study itself is mitigation for the adverse effect or whether the study will identify future mitigation strategies. Associative Values Studies are based on TCP documentation and the results of monitoring. Beginning in FY 2019, Associative Values studies may be undertaken to mitigate or identify mitigation strategies for any Tribe with a documented TCP and identified adverse effects to the character of historic properties as a result of the GCDAMP activity. The steps associated with this project are:

1. Complete TCP documentation. Identify and document historic properties and their associative values.
2. Continue monitoring of the TCPs and aspects of the associative values as part of the Tribal Monitoring Program and under the Grand Canyon Protection Act of 1992 (GCPA). Document any effects as a result of the GCDAMP activity.
3. Complete Associative Values studies as a method of mitigation or to offer mitigation strategies for any adverse effects that may be identified.

Completion of this project allows for Reclamation's compliance with the 2017 PA Stipulation I B(4), IV and VI. The ultimate goal is the resolution of adverse effects to historic properties or to identify treatment measures for adverse effects.

N.3 CONTINUATION OF MONITORING PROGRAMS

A number of monitoring programs have been initiated and continue as part of GCDAMP activities. These include various monitoring programs being conducted by NPS, tribal groups, Grand Canyon Monitoring and Research Center (GCMRC), and others. A brief description of some of these monitoring projects follows.

N.3.1 NPS Resource Monitoring

The NPS conducts long-term monitoring, data review, and field work within the Colorado River Ecosystem (CRE), as well as data entry, analysis, and report preparation to support Reclamation's Section 106 compliance and implementation of the 2017 Long-term Experimental Management Program (LTEMP) PA, Stipulations IV and VI, as well as support NPS Section 106 and Section 110 responsibilities. Field staff may utilize the existing 2016 Cultural Resource Management protocol and associated standard operating procedures for all activities. Protocols are used to streamline field activities. Additional data collection related to geospatial references and condition of archeological sites may be gathered using a hardened field computer or hand-held unit and imported directly into the Cultural Resource geodatabase. The project goals and objectives are:

1. Support Reclamation's Section 106 compliance responsibilities under the 2017 PA, Stipulations IV and VI.
2. Conduct field assessments to update condition and effects using existing monitoring protocols and subsequent updates as defined in this HPP.
3. Provide Reclamation site data to support the development and implementation of treatment plans.
4. Review and update site information and associated treatment recommendations.
5. Coordinate with resource managers to design and implement appropriate management actions.
6. Streamline data collection and data management for cultural resources along the river corridor and report annually to Reclamation on activities and findings.

Completion of this project component allows for compliance with the 2017 PA Stipulation VI, and NHPA, Section 106. The ultimate goal of the long-term monitoring program is to collect data to support the evaluation of impacts to historic properties (as identified in 2017

PA Stipulation VI & VII); and, as appropriate, to help identify treatment measures to mitigate effects caused by GCDAMP activities.

N.3.2 Tribal Resource Monitoring

This project provides funds to identify and monitor TCPs and to implement Native American monitoring protocols that were developed in FY 2007 and recommended by the Technical Work Group as part of efforts to develop a core-monitoring program.

In addition, the five GCDAMP Tribes (Hopi Tribe, Hualapai Tribe, Kaibab-Paiute Tribe, Pueblo of Zuni, and Navajo Nation) work with Reclamation and the NPS to implement monitoring of historic properties in the Canyons.

The primary goal of this activity is to monitor and evaluate the effects of dam operations and other actions under the authority of the Secretary of the Interior on resources of value to Native American Tribes. A secondary goal is to conduct condition monitoring of historic properties to assist Reclamation in compliance with the 2017 PA Stipulation VI.

Annual reports will be prepared detailing activities, findings, and monitoring data that result from implementing core-monitoring protocols for historic properties. Condition monitoring data will be provided to Reclamation to assist in prioritization of historic properties for treatment in subsequent years. In addition, monitoring data will be used to update NPS databases.

N.3.3 GCMRC Resource Monitoring

GCMRC continues various other monitoring projects, some of which assist Reclamation in compliance issues related to Section 106 of the NRHP. These include the GCMRC cultural monitoring program described in Chapter 7, as well as other projects that (1) track the effects of individual HFEs on sandbars, (2) monitor the cumulative effect of successive high-flow experiments (HFEs) and intervening operations on sandbars and sand conservation, and (3) investigate the interactions between dam operations, sand transport, eddy sandbar dynamics, and vegetation. Additional projects seek to monitor riparian vegetation response to dam operations in order to (1) determine whether the LTEMP Resource Goals for riparian vegetation are being met, and (2) use the data created by riparian vegetation monitoring to address gaps related to predicting the responses of vegetation to dam operations, and support the implementation of experimental vegetation treatments directed by the LTEMP Record of Decision (ROD). Many additional projects are planned/conducted by GCMRC in support of Reclamation and GCDAMP activities.

Completion of these projects allow for compliance with the 2017 PA Stipulation VI, and NHPA, Section 106. The ultimate goal of the monitoring programs is to collect data to support the evaluation of impacts to historic properties (as identified in 2017 PA Stipulation VI & VII);

and, as appropriate, to help identify treatment measures to mitigate effects caused by GCDAMP activities.

N.4 ADDITIONAL PROJECTS

A number of additional projects have been identified through various meetings. Some, but not all, of these projects are briefly discussed below. Completion of these projects allow for compliance with the 2017 PA Stipulation VI, and NHPA, Section 106. These projects act as mitigation measures or provide mitigation options for potential adverse effects on historic properties caused by GCDAMP activities.

N.4.1 Impacts of Monitoring and Education Activities

Investigating the impacts of monitoring and education activities on intergenerational knowledge transmission, and its contributions to the preservation of the TCP.

N.4.2 Archive Projects

Provided the pilot program with the Hualapai is successful, additional Archives Studies with other Tribes may be expanded/developed as a mitigation measure.

The primary goals of the Hualapai archive project are to improve values and preserve stories and other knowledge by Hualapai tribal members in the Grand Canyon. For the past 30 years, the Hualapai Department of Cultural Resources has conducted interviews with tribal elders and other knowledgeable tribal members to gain information and insights about the varied resources and places along the river, as well as personal, qualitative assessments of resource condition and changes in resource health. Some of these interviews were captured in hand written notes, some were associated with photographs about certain resources, some were audio recorded and some interviews were videotaped. Hundreds of interviews were conducted, and the information had been stored in archival boxes at the Hualapai Department of Cultural Resources (HDCR).

This collection of information is currently in the process of being organized and preserved for future generations by archiving this information into a digital database. Many of the photographs and videos have been converted to digital formats to preserve them before they deteriorate. One goal in the creation of a database is that one will be able to query by resource or place and all of the interviews (in all formats) that pertain to that resource/place can be accessed. The database library will act as a data reference collection dedicated to preserving Hualapai heritage, language and culture.

Completion of this project allows for compliance with the 2017 PA Stipulation I B for mitigation of potential adverse effects.

N.4.3 Archeological Site Studies with Tribal Perspectives

While archeological research has been conducted at many archeological sites in the Canyons, few have included thorough tribal perspectives. Additional studies of archeological sites are recommended utilizing tribal perspectives. For example, two archeological sites contain information significant to Zuni and contain possible alignments of celestial bodies.

N.4.4 Traditional Ecological Knowledge

Several studies have included topics like Traditional Ecological Knowledge (TEK) and indigenous knowledge. However, a synthesis of the TEK studies needs to include all tribal perspectives on a canyon-wide basis.

N.4.5 Traditional Ceremony Documentation

Navajo Nation and other Tribes have identified numerous ceremonial activities that take place in the Canyons. While many aspects of these activities are considered sacred with information to be held in confidence, general information needs to be obtained to help protect the activities. For example, sacred plant gathering areas need to be identified through documentation to assist in the preservation of the activity and the location of the activity. This documentation will aid in the protection of the location and prevent inadvertent effects.

N.4.6 Historic Landscapes

As a method of mitigation, documentation of the cultural landscape, identified as Historic Landscapes, in the Canyons would be a valuable tool for Native American individuals as well as Tribes. NPS Bulletin 18 identifies the process to evaluate and to nominate designated historic landscapes. Once identified, these historic landscapes are protected under the NHPA.

N.4.7 Video River Guide

As a method of mitigation via public outreach, the documentation of locations of traditional cultural and religious significance utilizing short video clips to preserve cultural history of various locations along the course of the river through the Canyons may be useful education tool for tribal and non-tribal visitors. NPS Bulletins 18 and 38 specifically identify historic landscapes and traditional cultural properties which may be useful to identify locations of cultural significance and to educate visitors to the Canyons.

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APPENDIX O: PUBLIC OUTREACH

The historic preservation program under the Glen Canyon Dam Adaptive Management Program (GCDAMP) and Long-term Experimental Management program (LTEMP) has been, and continues to be, a unique and successful program of cooperation and information sharing. Many of the data that have been collected as part of this program are new and have been obtained using innovative and state-of-the-art techniques. As a result, much of our understanding of the cultural occupation and use of the Canyons has significantly changed and grown. It is critical to disseminate as much of this information as possible to the public so that they can learn about the unique cultural and historic value of this resource, and, perhaps more importantly, become sensitized to the preservation and protection of this valuable heritage.

O.1 Cultural Sensitivity

Consistent with 54 U.S.C. § 307103 (formerly Section 304 of the National Historic preservation Act of 1966 [NHPA]) and 36 CFR § 800.11(c), and in consultation with the Hualapai, Navajo, National Park Service (NPS), and the Advisory Council on Historic Preservation (ACHP), the Bureau of Reclamation (Reclamation) and the State Historic Preservation Officer (SHPO) shall withhold from disclosure to the public information about the location, character, or ownership of a historic property if it is determined that disclosure may (1) cause a significant invasion of privacy, (2) risk harm to a historic property, or (3) impede the use of a traditional religious site by practitioners.

Tribal Monitoring Reports and Tribal Ethnographic Studies submitted to Reclamation will be treated as confidential as described in Stipulation XII(A) and on a case-by-case basis with input from tribal representatives.

O.2 Annual Review, Report, and Meeting

As identified in Stipulation XI of the 2017 Programmatic Agreement (PA), annual reviews, reports, and meetings will take place. These processes shall evaluate the implementation and operation of the 2017 PA and this Historic Preservation Plan (HPP). Annual meetings shall occur, possibly in April, with the parties to the 2017 PA. Because this HPP is a dynamic process, it is expected that the content of the historic contexts, goals and priorities will be altered based on new information obtained during GCDAMP projects. The incorporation of this new information is essential to improving the content of this HPP and to keep it up-to-date and useful. The new information will be reviewed at the annual meetings, and the HPP revised accordingly.

Within 45 calendar-days prior to the annual meeting, Reclamation shall provide parties to the 2017 PA with an annual letter report (Annual Report) to review progress under the 2017 PA and this HPP. The annual report will include an update on project schedules, status, and any ongoing relevant cultural resources monitoring or mitigation activities, discovery situations,

proposed future actions, or outstanding tasks to be completed under this HPP or data recovery plans. Parties to the 2017 PA will have 30 calendar-days to review the Annual Report and provide comments to Reclamation, who will then use the comments to develop the agenda, in coordination with the Parties, for the annual meeting.

The Annual Report shall address issues and describe actions and accomplishments over the past year, as well as plans for the coming year, as appropriate, including but not limited to:

1. Budget and Research Development.
2. Additional inventory surveys and results.
3. Current status of monitoring and mitigation activities, including data recovery, treatment, etc.
4. Experimental flow or other activities triggering consultation meetings.
5. Ongoing and completed public education activities.
6. Any issues that affect or may affect the ability of Reclamation to continue to meet the terms of this Agreement.
7. Any disputes and objections received and how they were resolved.
8. Proposed plans for next year's activities.
9. List of activities determined to have no potential to cause effects on historic properties based on Stipulation I(A)(3)(a).
10. List of activities determined to have no historic properties affected based on Stipulation I(A)(3)(b).
11. List of activities determined to have no adverse effect on historic properties based on Stipulation I(A)(3)(c).
12. List of activities determined to potentially have an adverse effect on historic properties based on Stipulation I(A)(3)(d).
13. Presentation of tribal and NPS Monitoring Reports.
14. Review of existing monitoring protocols, (are changes needed, what works, what doesn't work, etc.).
15. Update Appendix J with updated information.

Within 30 calendar-days after the annual meeting, Reclamation will provide a written summary of the meeting, including any discussion on proposed actions and how they will be addressed. Parties to the 2017 PA will have 30 calendar-days to review and comment on the meeting notes.

O.3 General Public Outreach

As identified in Stipulation IV (A)(11) of the 2017 PA, a public outreach program will be developed. The outreach program will consist of three levels of outreach: (1) general public outreach; (2) traditional community outreach; and (3) professional outreach. The outreach program will be a dynamic process, it is expected that the content for public outreach will be along the lines of the findings addressed in the annual review and meetings mentioned above. For example, information pertaining to historic contexts, accomplishments and project priorities will be altered based on new information obtained during GCDAMP projects. The incorporation of this new information is essential to improving the content of outreach program and to keep it up-to-date and useful. The new information will be reviewed at the annual meetings prior to dissemination to the public.

As mentioned in Goals section above, fostering awareness through education is an important guiding principle for historic preservation. The culmination of over 20 years of cultural resources work within the Canyons has created a tremendous amount of information that needs to be shared with the public. Public benefit of mitigation and recommendations for enhancing public education includes the interpretation of historic properties. Programs should address proposed methods for involving the public during fieldwork and/or in the future and should include a strategy for a public outreach program with the goal of disseminating information about the results of the archeological and tribal (as appropriate) investigations to the general public. This program will be implemented to inform and educate target audiences about the importance of archeological and tribal research, and may include interpretative signage, print/electronic media, museum exhibits, presentations, and public tours (as appropriate). When disseminating information to the general public, consideration should be given to its sensitivity, including information on archeological site locations and information that is sensitive to Tribes. Public information should include tribal sensitivity messages and impart the stewardship ethic. The following are approaches that serve to enhance the appreciation and knowledge of historic properties and the Canyons.

1. General Public Outreach
 - a. Public meeting attendance/presentations
 - b. Encouraging community involvement
 - c. Foster public involvement in aspects of the GCDAMP program
2. Traditional Community Outreach
 - a. Council, Chapter etc. meeting attendance/presentations
 - b. Encouraging community involvement
3. Professional Outreach
 - a. Produce professional papers/publications
 - b. Attend professional conferences

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APPENDIX P: LIST OF HISTORIC PROPERTIES

APPENDIX P: LIST OF HISTORIC PROPERTIES

Table P.1 provides a list of historic properties, along with their National Register of Historic Places (NRHP) determinations of eligibility (DOEs) and criteria. Table P.2 is a list of contributing buildings, sites, and structures in the Lee’s Ferry and Lonely Dell National Historic District.

TABLE P.1 List of Historic Properties by Site Number and NRHP DOEs and Criteria

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
A:15:0003	Historic Prehistoric	Hunting/Fishing/Gathering Features	Thermal features, prehistoric artifact scatter, historic trash scatter	A,D	11/27/1991	3		4				
A:15:0004	Protohistoric	Hunting/Fishing/Gathering Features	A roasting feature and artifact scatter	A,D	11/27/1991	5		4				
A:15:0005	Prehistoric	Hunting/Fishing/Gathering Features	Rock art, rock walls, roasters, artifact scatter	A,D	11/27/1991	4		4				
A:15:0018	Protohistoric	Rock Art	Rock shelter with pictographs, artifact scatter, hearth	A,D	11/27/1991	4		3				
A:15:0019	Prehistoric	Hunting/Fishing/Gathering Features	Two (2) roasting features and lithic scatter with basket fragment	A,D	11/27/1991			1				

¹ NHRP Determinations of Eligibility are compiled from NPS (1991), Wulf and Moss (2004), Anderson (2006), Damp et al. (2007), Spurr and Collette (2007), and Reclamation (2011).
² Date of consultation, see SHPO letters to NPS (1991) and Reclamation (2011).
³ Sites were assigned a score based on the flow level at which they would be inundated with water. Scores are as follows: 25,000 cfs=1; 45,000 cfs=2; 97,000 cfs=3; 125,000 cfs=4; 170,000 cfs or greater = 5.
⁴ Aeolian Deposit Score: Type 1=5; Type 2a, b, and c=4; Type 3=3; Type 4=2; Type 5=1.
⁵ Site Condition Score: 1=poor; 2=fair; 3=good.

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
A:15:0020	Prehistoric Protohistoric	Hunting/Fishing/Gathering	Shelter with roasters, midden, and artifacts	A,D	11/27/1991	3		4				
A:15:0021	Historic Protohistoric	Hunting/Fishing/Gathering Features	Slab-lined thermal feature with lithics, sherds, cans	A,D	11/27/1991	5		3				
A:15:0022	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Three (3) roasting features with a sherd and lithic scatter	A,D	11/27/1991	5		3				
A:15:0023	Prehistoric	Artifact Scatter	Rockshelter with ceramic and groundstone	D	11/27/1991			1				
A:15:0024	Prehistoric Protohistoric	Artifact Scatter	Sheltered area with artifact scatter	D	11/27/1991			3				
A:15:0025	Protohistoric Prehistoric	Extractive Site	Hematite mine with sherds, lithics, charcoal	A,C, D	11/27/1991			1				
A:15:0026	Protohistoric	Hunting/Fishing/Gathering Features	Two (2) roasting features with a sherd and lithic scatter	D	11/27/1991	5		3				
A:15:0027	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Two (2) roasting features with an extensive lithic scatter and some ceramic sherds	A,D	11/27/1991	4		3				
A:15:0028	Protohistoric	Hunting/Fishing/Gathering Features	Multiple roasters with a ceramic and groundstone artifact scatter	A,D	11/27/1991			3				
A:15:0029	Protohistoric	Hunting/Fishing/Gathering Features	Thermal feature	A,D	11/27/1991			3				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
A:15:0030	Unknown	Hunting/Fishing/Gathering Features	Thermal feature	D	11/27/1991							
A:15:0031	Prehistoric	Hunting/Fishing/Gathering Features	Four (4) thermal features with an artifact scatter	D	11/27/1991	5		4				
A:15:0032	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Thermal feature with ceramic scatter	D	11/27/1991	4		4				
A:15:0033	Historic Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Four (4) thermal features, one (1) possible masonry structure outline, prehistoric sherd and lithic scatter, two (2) late historic cans	A,D	11/27/1991	5		3				
A:15:0034	Prehistoric Protohistoric	Artifact Scatter	Artifact scatter with small cleared area	D	11/27/1991			1				
A:15:0035	Unknown historic	Hunting/Fishing/Gathering Features	Roasting feature with no associated artifacts	D	11/27/1991			4				
A:15:0036	Prehistoric	Hunting/Fishing/Gathering Features	Two (2) fire-cracked rocks (FCR) concentrations and a sandstone mano	D	11/27/1991			3				
A:15:0037	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Several roasting features, artifact scatter, and a possible wickiup	D	11/27/1991			4				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
A:15:0038	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	FCR scatter with sherds and lithic scatter and possible steatite bead	D	11/27/1991			3				
A:15:0039	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Four (4) (?) roasting features and sparse artifact scatter	D	11/27/1991	4		3				
A:15:0040	Prehistoric	Hunting/Fishing/Gathering Features	Rockshelter with FCR scatter and groundstone	D	11/27/1991			3				
A:15:0042	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features		D	11/27/1991			4				
A:15:0043	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	One (1) to two (2) roasting features with a groundstone and lithic scatter	D	11/27/1991			4				
A:15:0044	Prehistoric	Hunting/Fishing/Gathering Features	Rockshelter and roasting feature with groundstone, sherds, and biface	D	11/27/1991			4				
A:15:0047	Prehistoric	Protected Habitation, Non-structural	Rockshelter with lithic and groundstone scatter and 17 bedrock mortars	D	11/27/1991	1		5				
A:15:0048	Prehistoric Historic	Hunting/Fishing/Gathering Features	Roasting features with a mano	D	11/27/1991	3		4				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
A:15:0051	Prehistoric	Hunting/Fishing/Gathering Features	Roasting feature with lithic tools, flakes, and sherds	D	11/27/1991			4				
A:15:0052	Prehistoric Protohistoric	Artifact Scatter	Rockshelters with artifact scatter	A,D	11/27/1991			1				
A:15:0055	Protohistoric	Habitation – Multiple Units	Room outlines, roaster, and activity area complex	D	11/27/1991			1				
A:15:0056	Protohistoric	Artifact Scatter	Scatter of sherds, lithics, and charcoal	A	11/27/1991			1				
A:16:0001	Prehistoric	Rock Art	Rockshelter with artifact scatter and pictographs	D	11/27/1991			3				
A:16:0003	Historic Prehistoric Protohistoric	Protected Habitation, Non-structural	Rockshelter with midden and artifact scatter, historic inscriptions	D	11/27/1991			4				
A:16:0004	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Rockshelters, roasting features, and artifact scatter	A,D	11/27/1991	5		4				
A:16:0148	Prehistoric	Hunting/Fishing/Gathering Features	Thermal features and artifact scatter	A,D	11/27/1991	3		3				
A:16:0149	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Five (5) roasting features with groundstone	D	11/27/1991			3				
A:16:0150	Unknown historic	Hunting/Fishing/Gathering Features	Single roasting pit	D	11/27/1991			3				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
A:16:0151	Protohistoric Historic	Hunting/Fishing/Gathering Features	Two (2) roasting features with protohistoric artifacts and historic trash	D	11/27/1991	3		4				
A:16:0152	Unknown		Three (3) ashy areas with FCR and sparse lithics	D	11/27/1991							
A:16:0153	Prehistoric Protohistoric	Habitation-Multiple Units	Five (5) to six (6) roasting features and structure outlines with an artifact scatter	D	11/27/1991			3				
A:16:0154	Protohistoric	Hunting/Fishing/Gathering	Rockshelter with a roaster complex, a habitation area, and artifact scatter	D	11/27/1991			4				
A:16:0155	Protohistoric	Artifact Scatter	Rockshelter with rock alignment, sherds, flakes	D	11/27/1991			3				
A:16:0156	Prehistoric	Habitation-Multiple Units	Ephemeral structures, shelter with walls and artifacts	D	11/27/1991							
A:16:0157	Prehistoric Protohistoric	Hunting/Fishing/Gathering	Rockshelter with two (2) roasters and artifact scatter	D	11/27/1991			2				
A:16:0158	Prehistoric	Protected Habitation, Non-structural	Rockshelter with flakes and grinding slab	D	11/27/1991	2		4				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
A:16:0159	Prehistoric	Rock Art	Rock overhang with sherds, lithics, and pictographs	A,C,D	11/27/1991	2		2				
A:16:0160	Prehistoric	Hunting/Fishing/Gathering Features	Several roasting features and artifact scatter	A,D	11/27/1991	5		3				
A:16:0161	Prehistoric	Habitation – Single Unit	Rock outlines, lithic scatter, and bedrock mortar	D	11/27/1991	2		4				
A:16:0162	Prehistoric	Protected Habitation, Non-structural	Rockshelter with three (3) possible activity areas, charcoal, and flaked stone tool	D	11/27/1991			3				
A:16:0163	Prehistoric Protohistoric	Habitation – Single Unit	Two (2) to three (3) structures, pictographs, artifact scatter	D	11/27/1991			4				
A:16:0164	Prehistoric	Open Air Habitation, Non-structural	Three (3) cleared spaces at cliff base, flakes, bone, corn	D	11/27/1991			4				
A:16:0165	Historic Prehistoric	Habitation – Single Unit	Rockshelters with walls, prehistoric and historic artifact scatters	D	11/27/1991			2				
A:16:0167	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Five (5) roasting features, one (1) rockshelter, and an artifact scatter	A,D	11/27/1991	5		3				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
A:16:0168	Protohistoric	Open Air Habitation, Non-structural	Four (4) cleared areas with ceramic, lithic, and botanical artifacts	D	11/27/1991			1				
A:16:0169	Prehistoric	Habitation – Single Unit	Two (2) possible masonry room outlines and lithic scatter	D	11/27/1991			4				
A:16:0170	Protohistoric	Habitation – Multiple Units	Two (2) roasting features and an artifact scatter	D	11/27/1991							
A:16:0171	Protohistoric	Hunting/Fishing/Gathering Features	Two (2) roasting features and an artifact scatter	A,D	11/27/1991	5		3				
A:16:0172	Historic Prehistoric	Rock Art	Rock art panel, historic inscriptions, and historic trash	A	11/27/1991							
A:16:0173	Prehistoric	Hunting/Fishing/Gathering Features	Two (2) thermal features in three (3) areas of FCR concentrations and flakes	D	11/27/1991			4				
A:16:0174	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Roasting features with artifact concentration	A,D	11/27/1991	3		3				
A:16:0175	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Three (3) shallow rockshelters, three (3) thermal features, midden, and artifact scatter	A,D	11/27/1991	3		3				

Site Information						Priority for Treatment					Total	Notes
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A:16:0176	Prehistoric	Hunting/Fishing/Gathering Features	Roasting pit with charcoal, bone, flakes	D	11/27/1991			4				
A:16:0177	Historic	Artifact Scatter	Rockshelter with historic artifacts including dynamite box and primer/fuse cord	D	11/27/1991			1				
A:16:0178	Prehistoric	Artifact Scatter	Artifact scatter of flakes and tools	D	11/27/1991							
A:16:0179	Prehistoric	Rock Art	Rock art	D	11/27/1991							
A:16:0180	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Two (2) roasting features, three (3) groundstone artifacts, and one (1) flake	D	11/27/1991	3		3				
A:16:0181	Prehistoric	Habitation-Single Unit	Ephemeral structure wall, slicks and charcoal stains	D	11/27/1991							
A:16:0182	Prehistoric	Habitation – Multiple Units	Ephemeral structures and cleared spaces with artifact scatter	D	11/27/1991							
A:16:0184	Historic	Other	Fire ring, cans, and jar with note	D				4				
A:16:0185	Prehistoric Protohistoric	Other	Possible burial with associated artifacts	D	11/27/1991	5		3				
A:16:0223	Prehistoric	Hunting/Fishing/Gathering Features	Possible slab-lined roaster eroding from a sand terrace	D				2				

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B:09:0192	Prehistoric	Habitation-Single Unit	Small structural room with ceramic and flake scatter	D	11/27/1991							
B:09:0314	Prehistoric	Habitation – Single Unit	Masonry structure outline with sparse lithic scatter	D	11/27/1991			2				
B:09:0316	Prehistoric	Habitation-Multiple Units	Five (5) rooms with associated artifacts	A,D	11/27/1991	3		5				
B:09:0317	Protohistoric	Hunting/Fishing/Gathering Features	Roaster with artifacts	A,D	11/27/1991	5		4				
B:10:0001	Prehistoric	Storage Structure	Seven (7) granaries and two (2) pieces of twine/cord	D	11/27/1991			2				
B:10:0004	Prehistoric	Habitation – Single Unit	Two (2) structures with scatter of sherd, flake, and ground stone artifacts.	D	11/27/1991			3				
B:10:0111	Prehistoric	Hunting/Fishing/Gathering Features	Three (3) roasting pits	A,D	11/27/1991			4				
B:10:0121	Prehistoric	Habitation – Single Unit	Masonry room outline with artifacts	D	11/27/1991			5				
B:10:0223	Prehistoric	Hunting/Fishing/Gathering Features	Roasting pit with artifacts; possible walls	D	11/27/1991			1				
B:10:0224	Prehistoric	Hunting/Fishing/Gathering Features	Slab hearth and FCR mound	A,D	11/27/1991	5		5				

Site Information						Priority for Treatment					Total	Notes
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B:10:0225	Prehistoric	Habitation – Single Unit	Masonry alignment and midden area	D	11/27/1991			5				
B:10:0226	Prehistoric	Protected Habitation, Non-structural	Rock shelters with charcoal and ceramic sherds	D	11/27/1991			4				
B:10:0227	Historic	Artifact Scatter	Trash from a 19th century mining camp. This site is historically documented and is attributed to the prospectors Riley and Stewart in 1872. They were packers for Major Powell in Kanab.	D	11/27/1991			1				
B:10:0228	Unknown	Habitation – Single Unit	Hearth and L-shaped masonry wall	D	11/27/1991			1				

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B:10:0229	Prehistoric	Agricultural Structures	Originally designated as a complex of agricultural rock alignment features, this site is now thought to be part of a historic trail visible on orthophoto and may be associated historic site B:10:0231.	D	11/27/1991			1				
B:10:0230	Prehistoric	Hunting/Fishing/Gathering Features	Shelter with possible wall and artifact scatter	D	11/27/1991							
B:10:0236	Prehistoric	Hunting/Fishing/Gathering Features	Artifact scatters with fire-cracked rock and ash concentrations	D	11/27/1991							
B:10:0237	Prehistoric	Hunting/Fishing/Gathering Features	Roaster complex and artifact scatter	A,D	11/27/1991	5		5				
B:10:0238	Prehistoric	Habitation – Single Unit	Masonry room beneath a detached boulder	D	11/27/1991			5				
B:10:0249	Historic	Habitation – Single Unit	Upright slabs in a rockshelter and historic trash	A,D	11/27/1991			3				
B:10:0250	Prehistoric	Habitation – Single Unit	Masonry room, no artifacts	D	11/27/1991			1				

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B:10:0252	Prehistoric	Hunting/Fishing/Gathering Features	Rock overhang with hearth, ash, lithic, bone scatter	D	11/27/1991			4				
B:10:0260	Prehistoric	Hunting/Fishing/Gathering Features	Hearth and lithic scatter	D	11/27/1991			4				
B:10:0261	Prehistoric	Hunting/Fishing/Gathering Features	Four (4) FCR/midden areas, many lithics	D	11/27/1991			5				
B:10:0263	Prehistoric	Habitation – Single Unit	Masonry room outline with few flakes	D	11/27/1991			5				
B:10:0264	Prehistoric	Other	Rock alignment and small artifact scatter	D	11/27/1991			5				
B:10:0266	Prehistoric	Habitation-Multiple Units	Two- (2-)room structure seen as rock-outlined cleared spaces	D	11/27/1991			1				
B:11:0002	Prehistoric	Habitation – Single Unit	Three (3) to five (5) habitation or storage rooms and a retaining wall	D	11/27/1991			1				
B:11:0271	Prehistoric	Hunting/Fishing/Gathering Features	Rockshelter with roaster and artifacts	D	11/27/1991			4				
B:11:0272	Prehistoric	Hunting/Fishing/Gathering Features	Roasting feature	A,D	11/27/1991	4		4				
B:11:0273	Prehistoric	Protected Habitation, Non-structural	Rockshelter with metate and corn cob	D	11/27/1991			1				

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B:11:0275	Prehistoric	Habitation – Single Unit	Two (2) walls defining a cleared space under a rockshelter. No artifacts visible.	A,D	11/27/1991			4				
B:11:0276	Prehistoric	Protected Habitation, Non-structural	Two (2) rockshelters with use areas, artifacts	D	11/27/1991			4				
B:11:0277	Prehistoric	Hunting/Fishing/Gathering Features	Roasting feature and a ceramic, lithic, and groundstone scatter	A,D	11/27/1991	4		4				
B:11:0278	Prehistoric	Habitation – Single Unit	Small structural wall in rockshelter with one (1) metate and no other artifacts	D				4				
B:11:0279	Prehistoric	Habitation – Single Unit	Three (3) masonry room outlines, one (1) granary, one (1) rock alignment, and sherd and lithic scatters	D	11/27/1991	2		4				
B:11:0280	Prehistoric	Habitation – Single Unit	Rockshelter with possible wall and few artifacts	D	11/27/1991			4				

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B:11:0281	Prehistoric	Artifact Scatter	Light- to moderate-density scatter of sherds, lithics, and groundstone fragments	A,D	11/27/1991	5		4				
B:11:0282	Protohistoric	Habitation – Single Unit	Rock outline and roasting feature with lithic scatter	D	11/27/1991			5				
B:11:0283	Prehistoric	Other Structures	Two (2) wall fragments and charcoal	D	11/27/1991			1				
B:11:0284	Prehistoric	Habitation – Single Unit	Masonry room outline and pictograph	A,D				1				
B:11:0359	Prehistoric	Habitation – Single Unit	Possible structure	D				1				
B:13:0001	Prehistoric Historic	Habitation-Multiple Units	Small structures; walls, hearth, RP, artifacts	D	11/27/1991			4				
B:13:0002	Prehistoric	Open Air Habitation, Non-structural	Roaster complex with midden, artifact scatter, and shallow rockshelter	D	11/27/1991			2				
B:14:0093	Prehistoric	Hunting/Fishing/Gathering Features	Two (2) roasting features	A,D	11/27/1991	3		5				
B:14:0094	Prehistoric	Hunting/Fishing/Gathering Features	Two (2) roasting features and flakes	D	11/27/1991			4				
B:14:0095	Prehistoric	Hunting/Fishing/Gathering Features	Roaster complex with artifacts	A,D	11/27/1991	5		5				

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B:14:0105	Prehistoric	Habitation – Single Unit	Rockshelter with room outline and four (4) roasting pits	A,D	11/27/1991	4		4				
B:14:0107	Prehistoric	Habitation – Single Unit	Rockshelter with masonry wall remnant and roasting feature	A,D	11/27/1991	5		4				
B:14:0108	Prehistoric	Artifact Scatter	Rockshelter with grinding tools	D	11/27/1991			5				
B:15:0001	Prehistoric	Habitation-Multiple Units	Many open masonry structures in three (3) loci. This site is thought to be the first site recorded by archeologists—most likely Robert C. Euler—working along the river.	D	11/27/1991			5				
B:15:0073	Prehistoric Protohistoric	Habitation-Multiple Units	Three (3) room outlines, granary, artifact scatter	D	11/27/1991			1				
B:15:0096	Historic	Other	Historic metal boat built by Bert Loper	D	11/27/1991	5		1				
B:15:0097	Historic	Other	Bass cable car system and associated artifacts	D	11/27/1991			1				
B:15:0118	Prehistoric Historic	Rock Art	Historic inscriptions and one (1) flake	D	11/27/1991	5		1				

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B:15:0119	Prehistoric	Artifact Scatter	Sparse scatter of ceramic and lithic artifacts	D	11/27/1991			1				
B:15:0121	Prehistoric	Hunting/Gathering/Fishing Features	Flake scatter and cluster of charcoal fragments	D	11/27/1991							
B:15:0123	Prehistoric	Other	Isolated pot; cached plainware jar, now in fragments	D	11/27/1991	5		1				
B:15:0124	Historic	Historic Inscription	Inscription; George Parkins 1903	A,D	11/27/1991 06/27/2011	1		1				
B:15:0125	Prehistoric	Artifact Scatter	Groundstone and flake scatter	D	11/27/1991			1				
B:15:0126	Prehistoric Protohistoric	Habitation – Single Unit	One- (1-)room structure, seven (7) granaries, and artifact scatter including a desert side-notched point	D	11/27/1991			3				
B:15:0127	Prehistoric	Hunting/Fishing/Gathering Features	Rock alignment (possible granary remnant), roasting pit, one (1) flake, three (3) to four (4) sherds	D	11/27/1991	3		4				
B:15:0128	Historic Prehistoric	Artifact Scatter	Lithic scatter and historic camp	D	11/27/1991			4				
B:15:0129	Prehistoric	Habitation – Multiple Units	Roomblock with two (2) rooms and granaries	D	11/27/1991							

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B:15:0132	Historic Prehistoric	Habitation – Single Unit	Several room outlines with recent historic trash can	D	11/27/1991			2				
B:15:0133	Prehistoric	Habitation – Single Unit	Masonry room outlines under two (2) boulder shelters, artifact scatter	D	11/27/1991			1				
B:15:0134	Unknown	Habitation – Single Unit	Wall alignment under rock overhang	D	11/27/1991			1				
B:15:0135	Prehistoric Protohistoric	Habitation – Single Unit	Upright slabs enclosing habitation area	D	11/27/1991			4				
B:15:0138	Protohistoric	Hunting/Fishing/Gathering Features	Roasting feature with an artifact scatter (ceramics and lithics)	D		3		5				
B:15:0139	Prehistoric Historic	Habitation – Single Unit	Two (2) rockshelter areas with prehistoric and historic artifacts	A,B,D	11/27/1991	5		3				
B:15:0143	Prehistoric	Hunting/Fishing/Gathering Features	Rockshelter with two (2) thermal features and a lithic artifact scatter	D	11/27/1991			1				
B:16:0001	Prehistoric	Habitation-Multiple Units	Roomblock with possible kiva; granary northeast of roomblock	D	11/27/1991			4				

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B:16:0003	Prehistoric Protohistoric	Habitation – Single Unit	Four (4) to five (5) masonry structures and an artifact scatter	D	11/27/1991			1				
B:16:0170	Historic	Artifact Scatter	Oar and pick cache left by Kolb Brothers (?)	A,D	11/27/1991	4		1				
B:16:0257	Prehistoric Historic	Habitation – Single Unit	Wall enclosing a rockshelter, rock wall, artifact scatter	D	11/27/1991			1				
B:16:0258	Historic	Special Use Structure	Rock alignments, cleared areas, historic trash	A	11/27/1991			1				
B:16:0259	Prehistoric	Hunting/Fishing/ Gathering Features	Four (4) to five (5) masonry structures and an artifact scatter; roasting pit with sherds and lithics	A,D	11/27/1991	5		3				
B:16:0261	Prehistoric	Habitation – Single Unit	Small masonry room with lithics and groundstone	D	11/27/1991			4				
B:16:0262	Historic	Gauging Station	Gauging Station	D	11/27/1991 06/27/2011				E			
B:16:0364	Prehistoric	Artifact Scatter	Six (6)+ chert flakes	D	11/27/1991			4				
B:16:0365	Historic	Other	Grave of Rees B. Griffiths; died Feb. 6, 1922	A	11/27/1991			1				
B:16:0911	Prehistoric	Hunting/Fishing/ Gathering Features	Room outline and four (4) roasting features	D				4				

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C:02:0011	Prehistoric Historic	Habitation Transportation Storage Structures Ranching Structures Submerged Resource	Multiple structures associated with Lees Ferry, mining operations, and USGS operations; hogans	A, B, C, D	11/27/1991 (This site was placed on the NRHP in 1977)			3	2			
C:02:0012	Historic	Historic Inscription	Historic road, inscriptions	A,B,C,D	11/27/1991							
C:02:0013	Prehistoric	Habitation	PII camp in shelter, petroglyphs, historic artifacts, and a wall	D	11/27/1991							
C:02:0032	Prehistoric	Non-Structural Non-Habitation	Charcoal features and lenses in terrace and associated artifacts	D	11/27/1991 06/27/2011			3	2			
C:02:0033	Prehistoric	Storage structure	PII granary in shelter with artifacts	D	11/27/1991			3	1			
C:02:0035	Prehistoric	Camp	PII structure with artifacts	D	11/27/1991 06/27/2011			3	3			
C:02:0036	Historic	Camp	Historic mining camp	A	11/27/1991			3	3			
C:02:0037	Prehistoric Historic	Petroglyph/ Inscription	Prehistoric and historic petroglyphs	A,B,D	11/27/1991			3	3			
C:02:0038	Prehistoric	Petroglyph	Prehistoric petroglyphs	D	11/27/1991			1	3			
C:02:0039	Prehistoric	Lithic Scatter	Lithic scatter, procurement area	D	11/27/1991			1	3			

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
C:02:0040	Prehistoric	Lithic Scatter	Lithic scatter, procurement area	D	11/27/1991			1	3			
C:02:0041	Prehistoric	Habitation	PII camp in shelter with structures, petroglyphs	D	11/27/1991							
C:02:0048	Historic	Transportation Historic Inscription	Wagon road, inscriptions	A,D	11/27/1991							
C:02:0050	Prehistoric Historic	Camp	PII–PIII camp; historic camp	D	11/27/1991			4	2			
C:02:0053	Prehistoric	Artifact Scatter	PII ceramic and lithic scatter	D	11/27/1991				1			
C:02:0056	Prehistoric	Petroglyph	Petroglyphs	A,D	11/27/1991			1	1			
C:02:0057	Historic	Habitation	Historic habitation	A,C	11/27/1991							
C:02:0058	Historic	Structural Non-Habitation	Cable and river gauges	A	11/27/1991 06/27/2011			3	2			
C:02:0059	Historic	Structural Non-Habitation	Gauging station and cableway	A	11/27/1991 06/27/2011				3			
C:02:0060	Historic	Transportation Historic Inscription	Historic road and inscriptions	A,B,C	11/27/1991							
C:02:0070	Prehistoric	Camp	PII–PIII camp at shelter	D	11/27/1991			3	2			
C:02:0071	Prehistoric	Camp Petroglyph	PII artifact scatter; archaic, petroglyph	D	11/27/1991			4	3			
C:02:0072	Prehistoric Historic	Habitation	PII camp; historic camp	A,D	11/27/1991							
C:02:0073	Prehistoric Historic	Petroglyph/ Instriction	Prehistoric and historic petroglyphs	D	11/27/1991			1	3			
C:02:0074	Prehistoric	Camp	Prehistoric camp	D	11/27/1991			3	3			

Site Information						Priority for Treatment					Total	Notes
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C:02:0075	Prehistoric	Camp	Prehistoric camp	D	11/27/1991 06/27/2011			3	2			
C:02:0076	Prehistoric	Habitation	Prehistoric camp	D	11/27/1991							
C:02:0077	Prehistoric	Camp	Prehistoric camp	D	11/27/1991 06/27/2011			4	3			
C:02:0078	Prehistoric	Artifact Scatter	Lithic scatter in shelter	D	11/27/1991							
C:02:0079	Prehistoric	Camp	PII camp in shelter	D	11/27/1991			1	3			
C:02:0080	Prehistoric	Artifact Scatter	Lithic scatter with a single PII sherd	D	11/27/1991			1	1			
C:02:0081	Prehistoric	Camp	Prehistoric camps	D	11/27/1991			3	3			
C:02:0082	Prehistoric	Habitation	PI–PIII camp in shelter	D	11/27/1991							
C:02:0083	Prehistoric	Habitation	PII–PIII open camp	D	11/27/1991							
C:02:0084	Prehistoric Protohistoric	Camp	PII camp in shelter, protohistoric camp in shelter	D	11/27/1991			3	3			
C:02:0086	Prehistoric	Habitation	Prehistoric camps near shelter	D	11/27/1991							
C:02:0087	Historic	Habitation	Historic camp	A	11/27/1991							
C:02:0088	Prehistoric	Camp	PII (?) artifacts in shelter	D	11/27/1991			1	1			
C:02:0090	Prehistoric	Habitation Rock Art	PII camp, petroglyphs	D	11/27/1991							
C:02:0091	Prehistoric	Hunting/Fishing/ Gathering Features	PII (?) charcoal lenses with sherd	D	11/27/1991							

Site Information						Priority for Treatment					Total	Notes
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C:02:0092	Prehistoric	Protected Habitation, Non-structural	Two (2) grinding slabs, two (2) manos, and a chopper	D	11/27/1991	3		3				
C:02:0094	Historic Prehistoric	Transportation/Communication Structure	Historic inscriptions mostly associated with Mormon immigrants on the Honeymoon Trail, 1890–1898; dugway associated with Lee’s Ferry Crossing (1873–1898), light prehistoric artifact scatter	A,B,CD	11/27/1991	2		3				
C:02:0095	Prehistoric Historic	Camp	Prehistoric and historic camps	D	11/27/1991			3	2			
C:02:0096	Prehistoric	Protected Habitation, Non-structural	Rockshelter with masonry (LA) and lithics and basin hearths (LB)	D	11/27/1991	3		3				
C:02:0097	Prehistoric	Habitation – Single Unit	Rockshelters with rock alignment/wall, light artifact scatter	D	11/27/1991			3				
C:02:0098	Prehistoric	Protected Habitation, Non-structural	Rockshelter with charcoal, ceramic sherds, and flakes	D	11/27/1991 06/27/2011	2		3	June 27, 2011			

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
C:02:0101	Prehistoric	Hunting/Fishing/Gathering Features	Probably roasting pit with no artifacts	D	11/27/1991			3				
C:02:0102	Historic	Inscription	Historic inscriptions	B	11/27/1991			1	3			
C:02:0103	Historic	Inscription	Historic inscriptions	B	11/27/1991			1	3			
C:02:0104	Prehistoric	Petroglyph/Inscription	Prehistoric petroglyphs and historic inscription	D	11/27/1991			1	3			
C:02:0105	Prehistoric Historic	Artifact Scatter Historic Inscriptions	Prehistoric artifacts, historic inscriptions	D	11/27/1991							
C:02:0106	Prehistoric?		Navajo sweat lodge	D	11/27/1991							
C:02:0108	Prehistoric	Rock Art	Prehistoric petroglyphs	D	11/27/1991							
C:02:0110			Thermal features	D								
C:03:0003	Historic	Transportation	Historic trail	D								
C:03:0004	Prehistoric	Petroglyph	Prehistoric petroglyphs	D	11/27/1991			1	2			
C:03:0006	Prehistoric Historic	Petroglyph/Inscription	Prehistoric petroglyphs; historic inscriptions	D	11/27/1991			1	2			
C:03:0010	Prehistoric	Camp	Prehistoric camp	D	11/27/1991			3	1			
C:05:0003	Prehistoric	Cave	Cave site associated with split-twigg figurines and other artifacts	D	11/27/1991							

Site Information						Priority for Treatment					Total	Notes
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C:05:0004	Historic	Cave	Cave shelter with artifacts from 1888 Fredrick Barry trip	A,D	11/27/1991	2		4				
C:05:0005	Prehistoric	Protected Habitation, Non-structural	Rockshelter with hearth(s), perishables, wall	D	11/27/1991			1				
C:05:0009	Prehistoric	Habitation – Single Unit	Rockshelter with masonry wall and artifacts	D	11/27/1991			1				
C:05:0031	Prehistoric	Habitation – Single Unit	Masonry room outline and three (3) concentrations of FCR	A,D	11/27/1991	5		5				
C:05:0033	Prehistoric	Artifact Scatter	Open lithic scatter on talus ridge	D	11/27/1991			1				
C:05:0037	Prehistoric Protohistoric	Hunting/Fishing/ Gathering Features	Two (2) FCR clusters with a sparse sherd and lithic scatter	D	11/27/1991	5		4				
C:05:0039	Prehistoric	Other	Isolated pot; jar fragments in Redwall solution hole	D	11/27/1991			1				
C:06:0002	Historic	Other	Historic inscription 1889	A,B	11/27/1991 06/27/2011			1	June 27, 2011			
C:06:0003	Prehistoric Historic	Habitation – Single Unit	Possible wall alignment, hearth, and artifact scatter	D	11/27/1991			5				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
C:06:0004	Historic	Other	Historic inscription, glyph of geologist’s rock hammer	A	11/27/1991 06/27/2011			1	June 27, 2011			
C:06:0005	Prehistoric	Rock Art	Bedrock petroglyph panel	A,D	11/27/1991 06/27/2011	2		1	June 27, 2011			
C:06:0010	Prehistoric	Habitation – Single Unit	Masonry structure outline in a rockshelter	D	11/27/1991			1				
C:09:0001	Prehistoric	Storage Structure	Nankoweap Granaries – only the granaries, structures on the ledges below the main granaries, the two- (2-) story structure to the south, and the big alcove south of the two- (2-)story structure. The series of six granaries in a Muav cliff that can be seen from the river	D	11/27/1991			1				
C:09:0004	Prehistoric	Habitation – Single Unit	Masonry wall outlines and two (2) granaries	D	11/27/1991			1				
C:09:0005	Prehistoric	Habitation – Single Unit	Three (3) to five (5) room outlines against cliff	D	11/27/1991			1				

Site Information						Priority for Treatment					Total	Notes
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C:09:0030	Historic	Other	Peter Hansbrough grave and Boy Scout grave Graves of P. Handbrough and David Quigley	A	11/27/1991	5		1				
C:09:0032	Prehistoric	Habitation-Multiple Units	Several habitations and storage	D	11/27/1991			1				
C:09:0033	Prehistoric Historic	Other	Historic boat remains and granary remnant	D	11/27/1991			2				
C:09:0034	Historic	Artifact Scatter	Remains of Bert Loper's boat	A,B		3		3				
C:09:0050	Prehistoric	Artifact Scatter	Five (5) whole pots in cutbank, possible rock alignment	D	11/27/1991			2				
C:09:0051	Prehistoric	Habitation-Multiple Units	Complex of roomblocks and roasting features	D	11/27/1991	5		3				
C:09:0052	Prehistoric	Habitation – Single Unit	Masonry structure outlines, artifacts, fire ring. Originally Locus G of C:09:0001	A,D	11/27/1991			3				
C:09:0053	Prehistoric	Habitation – Single Unit	Possible masonry structure with artifact scatter	D	11/27/1991			3				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
C:09:0054	Prehistoric	Habitation – Single Unit	Masonry habitation structures and check dams	D	11/27/1991			4				
C:09:0056	Prehistoric	Artifact Scatter	Artifact scatter, two (2) upright slabs in rockshelter	D	11/27/1991			1				
C:09:0058	Prehistoric	Protected Habitation, Non-structural	Three (3) cleared areas under overhanging boulders, ashy soil	D	11/27/1991			1				
C:09:0059	Prehistoric	Agricultural Structures	Three (3)+ (possibly 9+) check dams with light sherd and flake scatter	D	11/27/1991			3				
C:09:0060	Prehistoric	Habitation-Multiple Units	Two (2) rooms, a granary, and scatter	D	11/27/1991			1				
C:09:0061	Prehistoric	Habitation-Multiple Units	Two- (2-)room structure, rock alignments	D	11/27/1991	4		3				
C:09:0062	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Roaster, rock alignment, and artifact scatter	A,D	11/27/1991			3				
C:09:0064	Prehistoric	Cave	Cave with 12-row corn cob and bone	D	11/27/1991			4				
C:09:0065	Historic	Other	Features related to testing of dam site	A,D		4		1				

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C:09:0067	Prehistoric	Habitation – Single Unit	Masonry room outline, rubble mound, two (2) retaining walls, and light artifact scatter	D				1				
C:09:0068	Prehistoric	Artifact Scatter	Light ceramic sherd and lithic scatter	A,D		5		4				
C:09:0069	Prehistoric Protohistoric	Hunting/Fishing/ Gathering Features	Roaster, rock alignments, artifact scatter	D				3				
C:09:0070	Prehistoric	Habitation – Single Unit	Two (2) masonry rooms under an overhanging boulder, light artifact scatter	D				1				
C:09:0071	Prehistoric	Habitation – Single Unit	Single masonry structure and artifact scatter	D				4				
C:09:0072	Prehistoric	Habitation – Single Unit	Rock alignments/structures and ceramic scatter	D		5		4				
C:09:0073	Prehistoric	Habitation – Single Unit	Three (3) rubble mounds, one (1) mano	D	11/27/1991			4				
C:09:0074	Prehistoric	Storage Structure	Slab cist with lithic scatter	D	11/27/1991			1				
C:09:0075	Prehistoric	Agricultural Structures	Series of check dams in two drainages	D	11/27/1991			1				

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C:09:0076	Prehistoric	Habitation – Single Unit	Masonry wall remnant under boulder overhang, possible cist and lithic scatter	D	11/27/1991			1				
C:09:0080	Prehistoric	Storage Structure	Masonry granary remains, sherd scatter, mano Was originally recorded as C:09:0001 Locus D.	D	11/27/1991			3				
C:09:0082	Prehistoric	Hunting/Fishing/Gathering Features	Artifact scatter with roaster	D	11/27/1991	3		3				
C:09:0083	Historic	Other Structures	Historic camp with tent platforms, tables	D				3				
C:09:0084	Prehistoric	Artifact Scatter	Two (2)sherds, flakes, one (1) corn cob, ceramic sherd, flakes, and a corn cob	D	11/27/1991	3		3				
C:09:0085	Prehistoric	Hunting/Fishing/Gathering Features	Hearth and seven (7) sherds	D	11/27/1991			1				
C:09:0088	Historic	Other Structures	Features related to alternate Marble Canyon Dam Site	D	06/27/2011	2		3	June 27, 2011			
C:09:0184	Prehistoric	Habitation-Multiple Units	Two- (2-)room structure outline	D				1				

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C:09:0185	Protohistoric	Hunting/Fishing/Gathering Features	Roaster with artifact scatter	D				5				
C:09:0186	Prehistoric	Storage Structure	Two (2) granaries	D				1				
C:09:0187	Prehistoric	Other Structures	Rock alignments, possible cist, artifact scatter	D				1				
C:09:0188	Prehistoric	Other Structures	Rock alignment and light artifact scatter	D				1				
C:09:0189	Prehistoric	Habitation-Multiple Units	Two- (2-)room masonry outline and granary	D				1				
C:13:0001	Prehistoric	Habitation-Multiple Units	Numerous structures at Unkar Delta Primary pueblo and kiva complex at Unkar Delta, associated rock alignments	C,D	11/27/1991			1				
C:13:0003	Historic Prehistoric Protohistoric Pueblo (Unspecified)	Other	Salt mines, rock art, groundstone Salt mine with two (2) shallow alcoves where salt has been procured	-D	11/27/1991			1				

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C:13:0005	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Eight (8) roasting features and a boulder rockshelter A boulder rockshelter with roasting features	A,D	11/27/1991	2		3				
C:13:0006	Prehistoric	Habitation-Multiple Units	Possible masonry rooms and an artifact scatter	D	11/27/1991	4		4				
C:13:0007	Prehistoric	Habitation – Single Unit	Habitation structures, sherd and flake scatter	D	11/27/1991	3		4				
C:13:0008	Prehistoric	Habitation – Single Unit	Masonry structures, thermal features, storage cists, artifact scatter Series of habitation rooms and smaller, ill-defined structures; along with several cists, roasting pits, and hearths	D	11/27/1991			4				

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C:13:0009	Prehistoric	Habitation-Multiple Units	Masonry ruins, thermal features and artifacts Twenty-five (25) non-architectural and structural features with an artifact assemblage dominated by PII–early PIII Anasazi ceramic debris	D	11/27/1991 06/27/2011	2		4	June 27, 2011			
C:13:0010	Prehistoric	Habitation-Multiple Units	Habitation site with at least 11 structures and 42 non-structural features, including hearths and storage cists	D	11/27/1991 06/27/2011	2		5	June 27, 2011			
C:13:0033	Prehistoric	Habitation – Single Unit	Single-room masonry structure with flakes	D	11/27/1991			1				
C:13:0069	Prehistoric	Habitation – Single Unit	Masonry structures and several cists	D	11/27/1991	3		4				
C:13:0070	Prehistoric	Habitation – Single Unit	Habitation site with large quantity of artifacts; some logs but few architectural features	D	11/27/1991	3		3				

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C:13:0092	Prehistoric Historic	Habitation – Single Unit	Historic tent platform, historic and prehistoric artifact scatter	A,D	11/27/1991	3		3				
C:13:0098	Historic/ Prehistoric	Extractive Site	Historic cabin remains, two (2) mine adits, historic trash scatter Mining camp with adits and remnants of log cabin and windbreak; chert flakes and cist	A,D	11/27/1991	4		2				
C:13:0099	Prehistoric	Habitation – Single Unit	Artifacts, charcoal/FCR concentrations, rooms, slab-lined cists	D	11/27/1991	3		2				
C:13:0100	Prehistoric	Habitation – Single Unit	Masonry rooms, rock alignments, cists, artifacts	D	11/27/1991	3		2				
C:13:0101	Prehistoric	Habitation – Single Unit	Masonry room, roasting features, slab-lined cists, artifact scatter	A,D	11/27/1991	3		2				
C:13:0272	Prehistoric	Habitation – Single Unit	Two (2)+ masonry structures, hearths, rubble	A,D	11/27/1991	3		2				
C:13:0273	Prehistoric	Hunting/Fishing/ Gathering Features	Roaster complex with two (2) artifact concentrations	A,D	11/27/1991	4		2				

Site Information						Priority for Treatment					Total	Notes
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C:13:0274	Prehistoric	Agricultural Structures	Rock alignments that may be agricultural or room outlines, one roasting pit, six (6) flakes	D	11/27/1991			1				
C:13:0291	Prehistoric	Habitation – Single Unit	Small eroding structures and a cist	D	11/27/1991 06/27/2011	1		3	June 27, 2011			
C:13:0321	Prehistoric Historic	Hunting/Fishing/ Gathering Features	Roaster complex with a Dox Sandstone rubble mound and artifact scatter	A,D	11/27/1991	3		5				
C:13:0322	Prehistoric	Rock Art	Petroglyph panel	A	11/27/1991	2		1				
C:13:0323	Prehistoric	Hunting/Fishing/ Gathering Features	Hearth and lithic scatter	A,D	11/27/1991			4				
C:13:0324	Prehistoric	Hunting/Fishing/ Gathering Features	Three (3) roasters and lithic scatter	D	11/27/1991			4				
C:13:0325	Historic Prehistoric	Historic Camp	Historic tent pad and corral, prehistoric roaster, sherd, flakes, mano, historic trash	A,D	11/27/1991			2				
C:13:0327	Prehistoric	Hunting/Fishing/ Gathering Features	Eroded roasting feature, one (1) sherd and dense flake scatter	A,D	11/27/1991			4				
C:13:0329	Prehistoric	Protected Habitation, Non-structural	Rockshelter, rock circle, artifact scatter	D	11/27/1991	2		3				

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C:13:0331	Historic Prehistoric	Open Air Habitation, Non-structural	Protohistoric campsite with various artifacts	D	11/27/1991			1				
C:13:0332	Historic Prehistoric	Habitation – Single Unit	Masonry structure, roaster, artifact scatter	D	11/27/1991			2				
C:13:0333	Prehistoric	Hunting/Fishing/Gathering Features	Roaster, one (1) sherd, and light lithic scatter; artifact scatter with FCR	D	11/27/1991	4		2				
C:13:0334	Prehistoric	Habitation – Single Unit	Masonry structure, roaster, circular cist, midden; small structure with roasting feature and artifact scatter	A,D	11/27/1991	4		2				
C:13:0335	Prehistoric	Hunting/Fishing/Gathering Features	Burned rock/bone scatter	D	11/27/1991			2				
C:13:0336	Prehistoric	Hunting/Fishing/Gathering Features	Roasters, rock alignment, artifact scatter	A,D	11/27/1991	3		2				
C:13:0337	Prehistoric	Hunting/Fishing/Gathering Features	Roaster and few flakes	A,D	11/27/1991			2				
C:13:0338	Prehistoric	Hunting/Fishing/Gathering Features	Roaster complex with a cist and lithic scatter	A,D	11/27/1991	3		4				
C:13:0339	Prehistoric	Habitation – Single Unit	Possible habitation structures, roasters, rock alignments	A,D	11/27/1991	3		2				

Site Information						Priority for Treatment					Total	Notes
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C:13:0340	Prehistoric	Hunting/Fishing/Gathering Features	Slab-lined cist, roasting pit, artifact scatter	A,D	11/27/1991			4				
C:13:0341	Prehistoric	Habitation – Single Unit	Two (2) masonry structure outlines, roasters, rock alignments	D	11/27/1991			4				
C:13:0342	Historic Prehistoric	Habitation – Single Unit	Collapsed historic wooden structure, historic trash, prehistoric sherds	A,D	11/27/1991	5		3				
C:13:0343	Prehistoric	Habitation – Single Unit	Possible slab-lined structures, artifact scatter	D	11/27/1991	4		2				
C:13:0344	Prehistoric	Hunting/Fishing/Gathering Features	Roasting feature and cist with sparse artifacts	D	11/27/1991			3				
C:13:0345	Prehistoric	Habitation – Single Unit	Rock alignment, two (2) FCR areas, two (2) cists	D	11/27/1991			3				
C:13:0346	Prehistoric	Storage Structure	Four (4)+ slab-lined cists and abundant sherd/lithic scatter, jacal	D	11/27/1991	4		3				
C:13:0347	Prehistoric	Habitation – Single Unit	Wall eroding from a cutbank	D	11/27/1991 06/27/2011	2		3	June 27, 2011			
C:13:0348	Prehistoric	Habitation – Single Unit	Jacal fragments, suggesting a small structure; dense artifact scatter	D	11/27/1991	5		3				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
C:13:0349	Prehistoric Historic	Habitation – Single Unit	Historic cabin remains, four (4) prehistoric roasters with artifact scatter; prehistoric site and a historic structure	D	11/27/1991	3		3				
C:13:0350	Prehistoric	Hunting/Fishing/Gathering Features	Isolated roasting pit	D	11/27/1991			3				
C:13:0351	Prehistoric	Artifact Scatter	Sherd and lithic scatter	D	11/27/1991			3				
C:13:0352	Prehistoric	Artifact Scatter	Sherd, flake, and groundstone scatter in three loci	D	11/27/1991	5		3				
C:13:0353	Prehistoric	Habitation – Single Unit	One- (1)-room masonry structure under rock overhang, one (1) sherd, one (1) flake	D	11/27/1991	3		4				
C:13:0354	Prehistoric	Storage Structure	Four (4) granaries	D	11/27/1991			1				
C:13:0355	Protohistoric	Hunting/Fishing/Gathering Features	Four (4) hearths, Paiute ceramics	A,D	11/27/1991	3		2				
C:13:0359	Prehistoric	Habitation – Single Unit	Masonry structures, few artifacts	D	11/27/1991	3		4				
C:13:0360	Prehistoric	Habitation – Single Unit	Wall remnant inside rockshelter, two (2) sherds	D	11/27/1991			1				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
C:13:0361	Prehistoric	Storage Structure	Granary wall remnant with corn kernels	D	11/27/1991			1				
C:13:0362	Prehistoric	Habitation – Single Unit	Rock wall and roasting features. Area of 3,700 square meters based on geographic information system (GIS). A rock wall, four (4) hearths, and an artifact scatter	D	11/27/1991							
C:13:0363	Prehistoric	Habitation – Single Unit	Two (2) walls inside a rockshelter, one (1) sherd, one (1) mano	D	11/27/1991			3				
C:13:0364	Prehistoric	Habitation – Single Unit	Masonry room outline, one (1) corrugated sherd	D	11/27/1991	4		3				
C:13:0365	Prehistoric	Habitation – Single Unit	Rock alignment, two (2) roasters, light lithic scatter	D	11/27/1991			4				
C:13:0368	Prehistoric	Protected Habitation, Non-structural	Rockshelter with Elko side-notched point and few lithic flakes	D	11/27/1991	3		4				
C:13:0370	Prehistoric	Habitation – Single Unit	Rockshelter with masonry wall, ground stone	D	11/27/1991			2				
C:13:0371	Prehistoric	Habitation – Single Unit	Masonry rooms, roasters, artifact scatter	D	11/27/1991	2		5				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
C:13:0372	Prehistoric	Hunting/Fishing/Gathering Features	Roaster and a few lithics	D	11/27/1991			2				
C:13:0373	Protohistoric	Hunting/Fishing/Gathering Features	Hearth with ceramics, bone, and FCR	D	11/27/1991			2				
C:13:0374	Historic Prehistoric	Other	Rockshelter with historic inscriptions, one (1) hearth, prehistoric artifacts, and historic trash	A,D	11/27/1991			3				
C:13:0375	Prehistoric	Habitation – Single Unit	Masonry walls under rockshelter, granaries, artifact scatter	D	11/27/1991			1				
C:13:0376	Prehistoric	Habitation – Single Unit	Rockshelter with wall alignment and ground stone	D	11/27/1991			1				
C:13:0377	Prehistoric	Artifact Scatter	Sherds, flakes, groundstone in four (4) loci (and a depression that may be a structure), flakes, chopper, groundstone, and a pot	A,D	11/27/1991	4		2				
C:13:0379	Prehistoric	Habitation – Single Unit	Masonry structures, cist, and artifact scatter	D	11/27/1991	3		4				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
C:13:0380	Prehistoric	Habitation – Single Unit	Rockshelter with crude wall, sherds, lithics	D	11/27/1991			1				
C:13:0381	Prehistoric	Hunting/Fishing/Gathering Features	Eroded hearth, charcoal, bone, and lithics	D	11/27/1991	5		4				
C:13:0382	Prehistoric	Habitation – Single Unit	Room outline and lithic scatter	D	11/27/1991			1				
C:13:0383	Historic Prehistoric	Protected Habitation, Non-structural	Cleared areas, rock shelter, corn cobs, groundstone	D	11/27/1991			1				
C:13:0384	Historic Prehistoric	Hunting/Fishing/Gathering Features	Thermal feature with one (1) flake and undescribed historic artifacts in cutbank	D	11/27/1991			4				
C:13:0385	Prehistoric	Storage Structure	Small structure; slab feature with sherds and lithics	A,D	11/27/1991			3				
C:13:0386	Prehistoric	Other Structures	Two (2) slab-lined cists and burial Small structure with groundstone and ceramics Human remains	A,D	11/27/1991			4				
C:13:0387	Prehistoric	Habitation – Single Unit	Masonry room, storage cists, few artifacts	D	11/27/1991	5		4				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
C:13:0389	Prehistoric Protohistoric	Habitation – Single Unit	Rockshelter with walls, two (2) roasters, artifact scatter	A,D	11/27/1991	3		5				
C:13:0390	Prehistoric	Storage Structure	Two (2) granaries and rockshelter with upright slabs	D	11/27/1991			5				
C:13:0391	Protohistoric	Habitation – Single Unit	Rockshelter with possible wall, few artifacts	D	11/27/1991			4				
C:13:0392	Prehistoric	Hunting/Fishing/ Gathering Features	Two (2) roasting features and artifact scatter	D	11/27/1991			3				
C:13:0393	Prehistoric	Artifact Scatter	Sherds, lithics, groundstone	D	11/27/1991			3				
C:13:0486	Prehistoric	Artifact Scatter	Four (4) sherds and one (1) biface	D				1				
C:13:0776	Prehistoric	Habitation - Multiple Units	Pueblo II stone masonry structure, artifact scatter	D				1				
C:13:0779	Prehistoric	Artifact Scatter	Potsherd, chipped stone, fire-cracked rocks	D				3				
C:13:0780	Prehistoric	Habitation - Multiple Units	Remains of architectural features, fire pit, and scatter of groundstone, lithics and ceramics.	D				4				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
C:13:0786	Prehistoric	Habitation - Multiple Units	Habitation site with at least six rooms, multiple storage bins, rock alignment, slab-lined hearth, artifact concentrations and a burial.	D				2				
C:13:0787	Prehistoric	Habitation - Multiple Units	Limestone block and cobble architectural remains with an artifact scatter.	D				2				
C:13:0788	Prehistoric	Habitation - Multiple Units	Limestone block, cobble and shale slab architectural remains with artifact scatter.	D				3				
G:02:0100	Historic	Other Structures	Bridge Canyon City work center	A,D	11/27/1991			5				
G:02:0101	Historic	Other	Rockshelter, quarry, test hole, and trash scatter	D				1				
G:02:0102	Historic	Historic Camp	Historic camp with trail and tent platforms	A	11/27/1991			4				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
G:02:0103	Historic	Other	Commemorative plaque located at Separation Canyon that pays tribute to the location and solemn event of the parting of the ways of three men from Major Powell's first expedition down the river in 1869	A,B								
G:02:0105	Historic	Other	Three (3) tent platforms, historic trash	A	11/27/1991			1				
G:02:0106	Historic	Other Structures	Tent platforms and historic trash	A	11/27/1991			3				
G:03:0002	Historic Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Roasting features and artifacts	A,D	11/27/1991	5		4				
G:03:0003	Historic Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Roaster complex; rockshelter with several roasting features	A,D	11/27/1991	4		4				
G:03:0004	Historic Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Rockshelter, midden, roasters, prehistoric artifact scatter, rock art, historic trash, and inscription	D	11/27/1991			3				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
G:03:0006	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Rockshelter, roasting features, and associated artifacts	D	11/27/1991			4				
G:03:0020	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Eight (8) roasting features and FCR scatters with an artifact scatter on either side of a side canyon drainage Two (2) Loci Roaster complex with artifact scatter	E-D	11/27/1991	4		4				
G:03:0023	Historic Prehistoric	Artifact Scatter	Historic scatter; shelter with mostly historic trash	E	11/27/1991			4				
G:03:0024	Historic Prehistoric Protohistoric Unknown historic	Hunting/Fishing/Gathering Features	Five (5) roasting features and associated artifacts	E-D	11/27/1991	4		4				
G:03:0025	Historic Protohistoric Prehistoric	Hunting/Fishing/Gathering Features	Roasting complex with historic trash	E-D	11/27/1991	5		4				
G:03:0026	Historic Protohistoric Prehistoric	Hunting/Fishing/Gathering Features	Roasting features and artifacts	E-D	11/27/1991	4		4				
G:03:0028	Historic Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Roasting complex with artifacts	E-D	11/27/1991	5		4				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
G:03:0029	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Two (2) roasting features with artifacts	E	11/27/1991	5		4				
G:03:0030	Protohistoric	Hunting/Fishing/Gathering Features	Roasting features with a few lithics	E-D	11/27/1991	3		3				
G:03:0032	Protohistoric	Hunting/Fishing/Gathering Features	Roasting features with sparse flakes	E-D	11/27/1991	5		4				
G:03:0034	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Roasting features and artifacts; possible burial?	E-D	11/27/1991	5		3				
G:03:0036	Protohistoric	Hunting/Fishing/Gathering Features	Roasting features and artifact scatter	E				4				
G:03:0037	Prehistoric Protohistoric	Protected Habitation, Non-structural	Two (2) loci of artifact scatters	E-D	11/27/1991	5		2				
G:03:0038	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Roasting features and wickiup outline	E-D	11/27/1991	2		4				
G:03:0040	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	FCR features with many tools	E-D	11/27/1991	5		3				
G:03:0041	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Three (3) large roasting features and an artifact scatter Roasting features and artifacts	E-D	11/27/1991	3		3				
G:03:0042	Prehistoric	Other	One (1) to three (3) or more bedrock mortars	E-D	11/27/1991			1				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
G:03:0043	Prehistoric	Hunting/Fishing/Gathering Features	Burned rock areas with groundstone Thermal features with lithics and groundstone	E	11/27/1991	3		3				
G:03:0044	Protohistoric	Habitation-Multiple Units	Habitation structure and thermal feature complex Five (5) habitation/activity areas and roasters	E-D	11/27/1991	4		4				
G:03:0045	Prehistoric	Hunting/Fishing/Gathering Features	FCR scatter and mano	E	11/27/1991			3				
G:03:0046	Protohistoric	Hunting/Fishing/Gathering Features	FCR, sherd, couple of flakes	E-D	11/27/1991			4				
G:03:0048	Prehistoric	Protected Habitation, Non-structural	Overhang with a variety of artifacts	E-D	11/27/1991			1				
G:03:0049	Protohistoric	Protected Habitation, Non-structural	Rockshelter with artifacts Overhang with a variety of artifacts	E-D	11/27/1991			4				
G:03:0052	Prehistoric	Hunting/Fishing/Gathering Features	Three (3) roasting features and an artifact scatter	E-D	11/27/1991	5		3				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
G:03:0053	Prehistoric	Artifact Scatter	Lithic scatter with metate	E-D	11/27/1991			3				
G:03:0054	Prehistoric	Hunting/Fishing/Gathering Features	Roasting feature with flakes and groundstone	E	11/27/1991			4				
G:03:0055	Protohistoric	Hunting/Fishing/Gathering Features	Thermal features with lithics and groundstone, two (2) FCR clusters, mano, lithics	E-D	11/27/1991	5		5				
G:03:0056	Prehistoric	Hunting/Fishing/Gathering Features	Roaster complex with lithic scatter and groundstone	E-D	11/27/1991	5		4				
G:03:0057	Prehistoric	Hunting/Fishing/Gathering Features	Shelter with hearth and artifact scatter	E-D	11/27/1991	5		1				
G:03:0058	Unknown historic	Hunting/Fishing/Gathering Features	Roasting feature with a mano	E-D	11/27/1991			3				
G:03:0059	Prehistoric	Hunting/Fishing/Gathering Features	FCR, three flakes, and cobble manos	E-D	11/27/1991			5				
G:03:0060	Prehistoric	Hunting/Fishing/Gathering Features	Roasting feature complex with artifacts	E-D	11/27/1991	3		4				
G:03:0061	Unknown historic	Hunting/Fishing/Gathering Features	Shelter with lithics, quids, hearth	E-D	11/27/1991			3				
G:03:0062	Historic	Artifact Scatter	Historic scatter; perhaps mule pannier items	E-A,D	11/27/1991			1				
G:03:0063	Unknown historic	Hunting/Fishing/Gathering Features	Isolated thermal feature and a dispersed scatter of FCR	E-D	11/27/1991			5				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
G:03:0064	Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Roasting features with a small artifact scatter	E-D	11/27/1991	3		3				
G:03:0065	Unknown historic	Artifact Scatter	Lither scatter; ledge shelter with flakes and tools A ledge shelter with a lithic scatter of flakes and tools	E-D	11/27/1991			1				
G:03:0066	Unknown historic	Hunting/Fishing/Gathering Features	Roasting feature and grinding slick	E-D	11/27/1991			5				
G:03:0067	Prehistoric	Hunting/Fishing/Gathering Features	Roaster complex; five (5) FCR middens with lithics	E-D	11/27/1991	3		4				
G:03:0071	Prehistoric, Protohistoric	Hunting/Fishing/Gathering Features	Camp; rockshelter with sherds Small rockshelter and artifact scatter	E-D	11/27/1991	4		3				
G:03:0072	Prehistoric, Protohistoric	Hunting/Fishing/Gathering Features	Roaster complex – 13 roasting features	E-D	11/27/1991	3		5				
G:03:0073	Historic Prehistoric Protohistoric	Hunting/Fishing/Gathering Features	Two (2) roasters, prehistoric artifact scatter, historic trash	E-D	11/27/1991			3				

Site Information						Priority for Treatment					Total	Notes
Site Number	General Time Period	Site Type	Short Site Description	NRHP DOE Criteria ¹	Date of SHPO Concurrence ²	Inundation Level ³	LiDAR Elevation Changes	Aeolian Deposit ⁴	Site Condition ⁵	Tribal Perspective Priority		
G:03:0076	Prehistoric	Hunting/Fishing/Gathering Features	Roasting feature with mano, three (3) roasters, one (1) mano	E-D	11/27/1991			3				
G:03:0077	Prehistoric	Rock Art	Pictograph panel and grinding slicks	E-D	11/27/1991	5		1				
G:03:0080	Protohistoric	Habitation – Single Unit	Structures, roasters, artifacts, rock art Roaster complex and rock art	E-D	11/27/1991	3		4				
G:03:0081	Prehistoric	Hunting/Fishing/Gathering Features	One (1) roaster with lithic scatter and one (1) sherd	E	11/27/1991			3				
G:03:0082	Protohistoric, Pueblo (Unspecified)	Habitation – Single Unit	Rockshelters with wall alignments, artifact scatter	E-D	11/27/1991			1				
G:03:0083	Historic	Artifact Scatter	Historic cache, possibly from power boat up-run			3		1				
G:03:0085	Protohistoric	Artifact Scatter	Pot break with lithic tools and debitage	E-D	11/27/1991			3				

TABLE P.2 Contributing Buildings, Sites, and Structures in the Lee's Ferry and Lonely Dell National Historic District.

Site Area and Number	Feature Name	Description
<i>Lonely Dell Ranch</i>		(Residential Cluster)
HS-232	Emma's Cabin (a.k.a. Lee's Cabin or J.D. Lee Ranch House)	Constructed ca. 1873 by John D. Lee. Contributing Building
HS-233	Blacksmith Shop	Constructed ca. 1873 by John D. Lee. Contributing Building
HS-234	Root Cellar (a.k.a. Dugout Cellar)	Possibly constructed in 1871 by John D. Lee. Contributing Building
HS-236	Jackson's Cabin (a.k.a. Picture Window Shack or Barn)	Constructed ca. 1873 by James Jackson(?). Contributing Building
HS-235	Grand Canyon Bar Z Cattle Co. bunkhouse (a.k.a. Weaver ranch house)	Constructed 1916–1938. Contributing Building
HS-237	Warren Johnson House Foundation	Contributing Site
	Cemetery, 1874–1925	Contributing Site
	Irrigation System, 1871–1970	Contributing Structure
	Settling Ponds, ca. 1940–1980	Noncontributing Structures (2)
<i>Upper Ranch</i>		Building Cluster
	Frame House	Constructed ca. 1920. Contributing Building
	Tack Shed	Construction date unknown (pre 1955). Contributing Building
	Corral	Construction date unknown (post 1955). Noncontributing Structure
	Hogan	Construction date unknown (pre 1955). Contributing Site
<i>Lee's Ferry</i>		Building Cluster
	Lee's Lookout	Contributing Site
HS-220	Lee's Ferry Fort	Constructed 1874 by crew from St. George Stake, LDS and modified in 1911 by Charles Spencer. Contributing Building
HS-221	Post Office	Constructed ca. 1873 by Warren Johnson(?). Contributing Building
HS-224	Chicken Coop	Construction date unknown (either by Johnson ca. 1875 or Spencer ca. 1910). Contributing Building

TABLE P.2 (Cont.)

Site Area and Number	Feature Name	Description
<u>HS-225</u>	Root Cellar	Construction date unknown (by Johnson ca. 1875 or Spencer ca. 1910). Contributing Site
	East and West Hogan ruins	Construction date unknown. Contributing Sites (2)
HS-222	Spencer Bunkhouse (a.k.a. Old Spencer Cabin or Building)	Constructed 1910 by Charles Spencer. Contributing Building
	Spencer Boiler	1910. Contributing Object
	Spencer Trail	Constructed 1911. Excluded from district boundaries
HS-226	<i>Charles H. Spencer</i>	Constructed 1911 by James Robertson and Herman Rosenfelt of the Robertson-Schultz Co. Contributing Structure
	Upper (Main) Ferry site	Road, cabin, and corral remains, 1873–1927. Contributing Site
	Lower Ferry Site	1878–1896. Contributing Site
HS-223	U.S. Geological Survey (USGS) Building	Constructed ca. 1955 by USGS. Noncontributing Building
	<i>Navajo Paddlewheel</i>	1921. Contributing Object

