Glen Canyon Dam Adaptive Management Program Triennial Budget and Work Plan—Fiscal Years 2025-2027

Preliminary Draft

Prepared in cooperation with the Glen Canyon Dam Adaptive Management Program

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Chapter 1. Bureau of Reclamation, Glen Canyon Dam Adaptive Management Program Triennial Budget and Work Plan—Fiscal Years 2025–2027

Introduction

The Glen Canyon Dam Adaptive Management Program (GCDAMP) is a science-based process for continually improving management practices related to the operation of Glen Canyon Dam (GCD) by emphasizing learning through monitoring, research, and experimentation, in fulfillment of the consultation and research commitments of the Grand Canyon Protection Act (GCPA). The Bureau of Reclamation's (Reclamation) Upper Colorado Basin – Interior Region 7 is responsible for administering funds for the GCDAMP and providing those funds for monitoring, research, and stakeholder involvement. Historically, funding for this program was derived from hydropower revenues, however in 2019 funding shifted from power revenues to appropriations, and then back to power revenues in 2020 and 2021, before indefinitely shifting back to appropriations. Funding for this program is also provided by various Department of the Interior (DOI) agencies that receive appropriations. These agencies include the Bureau of Reclamation, the U.S. Geological Survey (USGS), the National Park Service (NPS), the U.S. Fish and Wildlife Service (USFWS), and the Bureau of Indian Affairs (BIA).

The previous triennial budget and work plan ran from FY 2021-2023 and was extended an additional year as directed by the Acting Secretary's Designee (Pullan, 2023) to the Adaptive Management Work Group in a memo date February 16, 2023. Similar to previous years, the budget and work plan for fiscal years (FY) 2025–2027 was largely developed in consideration of the Record of Decision for the Glen Canyon Dam Long-Term Experimental and Management Plan Environmental Impact Statement (LTEMP EIS) and on the basis of outcomes from previous work plans. Additional consideration was given to meeting commitments outlined in: (1) the 2007 USFWS Biological Opinion for the Proposed Adoption of Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (2007 Opinion); (2) the 2016 USFWS Biological Opinion for the Long-Term Experimental and Management Plan Environmental Impact Statement (LTEMP EIS) (2016 Opinion); (3) the 2024 USFWS Biological Opinion for Near-term Colorado River Operations and (4) Section 106 of the National Historic Preservation Act (NHPA), the 2017 Programmatic Agreement for the Glen Canyon Dam Long-Term Experimental and Management Plan, and the 2018 Historic Preservation Plan for the Glen Canyon Dam Long-Term Experimental and Management Plan.

Funding

Environmental programs associated with the Colorado River Storage Project (CRSP) have historically been funded by revenues collected from the generation of hydropower at CRSP facilities. As described above the funding for the environmental programs have shifted from power revenue to appropriated funding. These programs include the GCDAMP, the Upper Colorado River Endangered Fish Recovery Program (UCRIP) and the San Juan River Basin Recovery Implementation Program (SJRIP; collectively, the RIPs). The three programs together were awarded $22.5 million in FY2024; $12.5 million (56%) of this annual amount went to fund the GCDAMP while $10 million (44%) supported the two RIPs.

For the planning purposes it is assumed that $12.5 million will be available for the GCDAMP in FY2025-2027. This is an increase of $1.14 million from the previous triennial work plan (FY21-FY23). Reclamation will retain approximately 20% of the funds to administer program costs identified in projects (1 to 5) and 80% of the funds will be transferred to GCMRC to administer projects (A to N).

However, due to uncertainties in future funding levels, prioritization of projects outlined in the FY2025-2027 TWP may be necessary during the course of this TWP. Project priorities may change over time based on hydrology, resource conditions, evolving scientific understanding and uncertainties, administration objectives and other factors.

1. Adaptive Management Work Group (AMWG) Costs

1.A. AMWG Direct Costs and Administration

This budget represents Reclamation costs to perform the daily administrative activities required to support the Adaptive Management Work Group (AMWG), and the GCDAMP Federal Advisory Committee Act (FACA) committee. This includes planning and implementation of AMWG meetings, issuing federal register notices for meetings and managing the soliciting of nominees, processing member nominations, submitting meeting reports within 30 days of each committee meeting, renewing the committee charter every year, and preparing justification packages in response to federal advisory committee reviews. Reclamation responds to the requirements of the General Services Administration (GSA) to complete FACA reports and enter meeting and member information into the FACA database. Reclamation also organizes stakeholder travel to AMWG meetings. This includes activities that range from preparing travel authorizations to completing travel vouchers.

The primary goal is to perform all work associated with the AMWG in a timely and efficient manner in accordance with the requirements of the Federal Advisory Committee Act, while administering the funds as prudently as possible. Secondary goals include increasing each stakeholder's awareness of significant budget and legislative issues related to the GCDAMP, improving working relationships with the AMWG members/alternates, finding constructive ways to resolve differences, and addressing individual concerns in an open and accepting forum of discussion.

AMWG Travel

This budget supports travel expenses Reclamation staff incur to attend AMWG and ad hoc group meetings and AMWG related coordination. The primary goal is for Reclamation staff to be able to travel to meetings and participate in completing AMWG assignments. By doing so, the program benefits from greater interaction between Reclamation staff and GCDAMP stakeholders.

Reclamation staff will be involved with AMWG members in completing work assignments and resolving issues that affect the GCDAMP. They will develop good working relationships with all stakeholders involved and work toward consensus with AMWG members on a variety of issues.

AMWG Other

This budget represents some of the other "miscellaneous" expenses incurred in operation of the AMWG, including the following expenses:

- Meeting room rentals
- Purchasing materials to support meetings

- Purchasing audio visual equipment to support AMWG meetings (microphones, cords, clickers, projector, etc.)

Reclamation will work to ensure that costs will not exceed what has been proposed in the budget. Reclamation staff will provide budget information to the AMWG on a regular basis. Completed AMWG work products will be of high quality and promptly distributed to AMWG members/alternates and interested parties.

Budget: FY25 = $ 120,000 FY26 = $120,000 FY27 = $120,000

1.B. AMWG Member Travel Reimbursement

This budget covers the costs to reimburse AMWG members or alternates to attend regularly scheduled AMWG meetings. Reimbursing AMWG members or alternates for travel expenses is done to encourage and support their attendance at all meetings. Many members live outside of Phoenix or Flagstaff Arizona, where meetings are often held. As a result, many members must incur travel costs. Reclamation, per federal travel regulations, will purchase the airfare and pay for the lodging and any taxes associated with the lodging. Reclamation will provide reimbursement to AMWG members or alternates for mileage for the use of private vehicles, per diem, and transportation. This increases opportunities for members to participate in a variety of AMWG related activities.

The AMWG is made up of a group of diverse and committed stakeholders whose interests span the resources and values of Glen Canyon Dam and Glen, Marble, and Grand Canyon. The AMWG provides a forum of discussion for bringing key issues to resolution. As a collective body, the AMWG provides scientifically informed and broadly supported recommendations to the Secretary of the Interior regarding the operation of GCD and other management actions.

Budget: FY25 = $ 10,000 FY26 = $ 10,000 FY27 = $ 10,000

1.C. AMWG Facilitation and Notetaking

This budget supports a facilitator who is under contract to Reclamation to provide facilitation services for AMWG meetings. The facilitator may also assist AMWG, TWG, and any ad hoc groups associated with the program. The facilitator's primary responsibility is to keep the AMWG meetings organized and help the members reach consensus on important issues. The facilitator will create an atmosphere in which the members and other participants at AMWG meetings feel comfortable expressing their individual viewpoints. In addition, the facilitator assists Reclamation in meeting preparation and coordination, documents action items, administers meeting evaluations, and participates in post- meeting activities including planning team de-briefs, action item tracking, and review of meeting minutes.

In addition, the budget supports a notetaker who is under contract to Reclamation to provide note taking services for AMWG and TWG meetings. The note taker may also assist AMWG, TWG, Programmatic Agreement, and ad hoc group on an as-needed basis. The work groups require note taking at meetings to accurately document the discussions, decisions, motions, action items, and recommendations to further their goals and objectives.

Budget: FY25= $ 65,000 FY26 = $ 65,000 FY27 = $ 65,000

1.D. Public Outreach - Public Affairs and Public Outreach Ad Hoc Group

This budget covers the expenses for Reclamation staff and the Public Outreach Ad Hoc Group (POAHG) to develop materials for the GCDAMP public outreach efforts. This item also includes Reclamation public affairs staff attendance at AMWG meetings. Reclamation public affairs staff and the POAHG, as appropriate, will work to develop materials to inform and educate the public on the goals and administration of the GCDAMP. Products may include fact sheets, web site information, tribal outreach materials, video B-roll, special events, conference participation, and other pertinent means of advising the public and program members on the achievements of the GCDAMP.

Budget: FY25= $ 15,000 FY26 = $ 15,000 FY27 = $ 15,000

Table 1. Reclamation Adaptive Management Work Group Budget Summary.

1	**Adaptive Management Work Group**	**$ 210,000**	**$ 210,000**	**$ 210,000**
	percent of BOR budget	**8%**	**8%**	**8%**
1.A	AMWG Direct Costs and Administration	$ 120,000	$ 120,000	$ 120,000
1.B	AMWG Member Travel Reimbursement	$ 10,000	$ 10,000	$ 10,000
1.C	AMWG Facilitation and Notetaking	$ 65,000	$ 65,000	$ 65,000
1.D	Public Outreach - Reclamation public affairs, POAG	$ 15,000	$ 15,000	$ 15,000

2. Technical Work Group (TWG) Costs

2.A. TWG Direct Costs and Administration

This budget represents Reclamation staff costs to perform the daily activities required to support the TWG, a subgroup of the AMWG. The work includes completing assignments resulting from TWG meetings, consulting with stakeholders on a variety of GCDAMP issues relating to the operation of GCD, disseminating pertinent information to TWG members, preparing and tracking budget expenses, and updating the web pages Reclamation maintains for the program. Reclamation also completes all stakeholder travel activities, which range from preparing travel authorizations to completing travel vouchers. Reclamation staff will provide budget information to the TWG on a regular basis. Completed TWG work products will be promptly distributed to TWG members/alternates and interested parties.

TWG Reclamation Travel

This budget covers travel expenses that Reclamation staff will incur to prepare for and attend TWG meetings and ad hoc group meetings resulting from TWG assignments. The primary goal is for Reclamation staff to be able to travel to meetings and participate in completing TWG assignments. Reclamation staff will continue to be involved in meeting with TWG members to complete work assignments and resolve issues that affect the GCDAMP and operation of GCD. They will develop good working relationships with all TWG members and work toward consensus on a variety of GCDAMP issues.

TWG Other

This budget represents some of the other "miscellaneous" expenses incurred in support of the TWG, including the following expenses:

- Purchasing meeting materials
- Purchasing audio visual equipment (microphones, cords, clickers, projector, etc.)

It is expected that most, if not all, TWG meetings will be held at venues that do not incur additional costs to the GCDAMP. Other expenses will be kept to a minimum in an effort to keep within the GCDAMP budget.

Budget: FY25 = $ 160,000 FY26 = $ 160,000 FY27 = $ 160,000

2.B. TWG Member Travel Reimbursement

This budget provides funds to reimburse TWG members or alternates for expenses incurred to attend regularly scheduled TWG meetings.

Reimbursing TWG members or alternates for travel expenses is done to encourage and support their attendance at all meetings. Reclamation, per federal travel requirements, will purchase the airfare and pay for the lodging and any taxes associated with the lodging. Reclamation will provide reimbursement to TWG members or alternates for mileage for the use of private vehicles, per diem, and transportation which then increases opportunities for members to participate in a variety of TWG assignments.

The GCDAMP will benefit from having all the TWG members participate in regularly scheduled meetings. As a collective body, TWG members address and resolve concerns associated with the operation of GCD and make recommendations to the AMWG that incorporate the best scientific information available to the GCDAMP. It is important to support participation of all TWG members in regularly scheduled meetings so that they can stay abreast of TWG-related activities and the research and monitoring in the GCDAMP.

Budget: FY25 = $ 25,000 FY26 = $ 25,000 FY27 = $ 25,000

2.C. TWG Facilitation

This budget supports hiring of a facilitator who may be asked to help in TWG or Ad Hoc meetings on an as needed basis. The facilitator responsibility will be to create an atmosphere in which the members and other participants at meetings feel comfortable expressing their individual viewpoints.

Budget: FY25 = $ 5,000 FY26 = $ 5,000 FY27 = $ 5,000

Table 2. Reclamation Technical Work Group Budget Summary.

2	**Technical Work Group**	**$**	**190,000**	**$**	**190,000**	**$**	**190,000**
	percent of BOR budget		**8%**		**8%**		**8%**
2.A	Technical Work Group Costs (BOR)	$	160,000	$	160,000	$	160,000
2.B	TWG Member Travel Reimbursement	$	25,000	$	25,000	$	25,000
2.C	TWG Facilitation	$	5,000	$	5,000	$	5,000

3. Program Management

3.A. Administrative Support for NPS Permitting

This budget item provides funding to support the Grand Canyon National Park permitting of research and monitoring projects conducted under the GCDAMP. Grand Canyon National Park employs a permitting specialist and other staff who review all proposals for projects to be completed in the park and to determine NEPA, ESA and NHPA compliance requirements. The program provides these funds under the auspices of the GCDAMP to offset the park's administrative burden in providing permitting services. The primary goal is to ensure that projects conducted under the GCDAMP are reviewed and permitted by the NPS. Projects conducted under the GCDAMP will receive permits from the NPS in a timely manner.

Budget: FY25 = $ 135,000 FY26 = $ 135,000 FY27 = $ 135,000

3.B. Contract Administration

This budget covers the expenses for Reclamation acquisitions and contracting staff to prepare and execute contracts and grants associated with the GCDAMP. Specifically, these contracts include GCMRC science and monitoring, NPS monitoring and permitting, AMWG facilitation, AMWG and TWG note taking, Science Advisors program, Tribal participation and resource monitoring, and programmatic agreement (PA) contract work. Most of these contracts and financial assistance agreements are up to five years in duration.

Reclamation contract/grant specialists will accurately apply funds spent on individual contracts to ensure costs do not exceed contract limits. They will keep the Upper Colorado Operations Office Adaptive Management Group contracting and grant technical representatives informed as to those charges so accurate reporting can be made to both AMWG and TWG members.

Reclamation contracting and grant technical representatives will ensure that individual contractors are fulfilling the requirements of their contracts. They will maintain accurate records of payments made against the contracts and will keep Reclamation staff informed of discrepancies or concerns. Work will be completed on time and within the limits of the contract.

Budget: FY25 = $ 70,000 FY26 = $ 70,000 FY27 = $ 70,000

3.C. Reclamation Program Management

This budget represents Reclamation costs to support broad programmatic goals of the GCDAMP and is separate from the administrative support tasks outlined for AMWG and TWG Direct Costs and Administration. The work includes completing program and project management, assignments resulting from AMWG meetings, consulting with stakeholders on a variety of GCDAMP issues relating to the operation of Glen Canyon Dam, disseminating pertinent information to the AMWG, and preparing and tracking budget expenses. Program management priorities identified for the current work plan include the following:

- Streamline GCDAMP Guidance Documents (2016 LTEMP ROD Section 6.1.c)
- Facilitate Development of Monitoring Metrics (2016 LTEMP ROD Section 6.1.c)
- Budget and Contracts
    - FY2025-2027 Triennial Budget and Work Plan Project Prioritization
    - Project Management and Oversight
- Improved Communication and Coordination with Other Programs
    - Upper Colorado River Endangered Fish Recovery Program
    - San Juan River Basin Recovery Implementation Program
    - Lower Colorado River Multi-Species Conservation Program
- Assessment of Models and Evaluation Tools
    - Archive, Document, Review, and Validate existing models
    - Assess Needs for Additional Evaluation Tools
- Continued Compliance Tracking & Reporting
    - NHPA – LTEMP Programmatic Agreement and HPP Requirements
    - ESA – LTEMP Biological Opinion Requirements
    - NEPA – LTEMP FEIS
    - GCPA – Annual Report to Congress

Budget: FY25 = $ 145,000 FY26 = $ 145,000 FY27 = $ 145,000

3.D. Program Evaluation

As part of the adaptive management process, the LTEMP ROD states that "DOI will conduct a comprehensive review after October 1, 2027, to evaluate what has been learned from the experimental studies and an evaluation of resource conditions after 10 years of LTEMP operation experience". Part of this process could include an independent review of past management actions and suggestions of potential actions for the future. It is anticipating that this process will take considerable organization and participation from independent reviewers, DOI agencies, and stakeholders. In order to provide a thorough review of the program, time and effort will be needed prior to the October 1, 2027, deadline.

Additionally, significant NEPA process and Management Actions will have taken place during the FY2025-2027 Triennial Work Plans. Results from these Processes and actions will need evaluated for future planning efforts. Therefore, it is anticipated that resources will need to be dedicated towards determining how to address these potentially significant changes.

Budget: FY25 = $ FY26 = $50,000 FY27 = $ 150,000

Table 3. Reclamation Program Management and Contract Administration Budget Summary.

3	**Program Management and Contract Administration**	**$ 350,000**	**$ 400,000**	**$ 500,000**
	percent of BOR budget	**14%**	**16%**	**20%**
3.A	Administrative Support for NPS Permitting	$ 135,000	$ 135,000	$ 135,000
3.B	Contract Administration	$ 70,000	$ 70,000	$ 70,000
3.C	Program Management	$ 145,000	$ 145,000	$ 145,000
3.D	Program Evaluation	$ -	$ 50,000	$ 150,000

4. ESA Compliance and Management Actions

4.A. Integrated GCDAMP Stakeholder River Trips

The objective of this project is to provide an opportunity for GCDAMP members and stakeholders to articulate their respective values, concerns, and issues in a field setting. The river trip also provides the opportunity for GCDAMP members to visit the canyon and gain a greater understanding of GCDAMP resources and issues. The river trip will be agenda-driven and is intended to provide an opportunity for GCDAMP stakeholders to share perspectives about their values and positions respective to the Grand Canyon and the Colorado River. It is expected that one trip every 2 or 3 years is the appropriate frequency.

A second shorter trip will be offered to provide an opportunity for TWG members and GCDAMP stakeholders to articulate their respective values, concerns, and issues in a field setting. This short duration river trip also provides the opportunity for TWG members to visit the river and gain a greater understanding of GCDAMP resources and issues. The river trip will be agenda-driven and is intended to provide an opportunity for GCDAMP stakeholders to share perspectives about their values and positions respective to the Grand Canyon and the Colorado River.

Budget: FY25 = $ 50,000 FY26 = $ 10,000 FY27 = $

4.B. Science Advisors Program

This budget provides funding to support the Science Advisors Program (SAP), including the office of the Executive Coordinator for the Science Advisors Program. Consistent with Section 6.1 (f) of the 2016 LTEMP ROD, the SAP provides recommendations to the GCDAMP regarding research and monitoring priorities, knowledge integration, and the adaptive management of natural, cultural, and recreational resources affected by Glen Canyon Dam operations and associated adaptive management actions. As part of this effort, the SAP periodically conducts independent, external reviews of GCDAMP resource- specific monitoring and research programs and carries out other advisory tasks as directed by the Department of the Interior and in consultation with GCDAMP. The SAP will be composed of qualified individuals not otherwise participating in the long-term monitoring and research studies. The Executive Coordinator manages the SAP and may also carry out advisory tasks.

Priority tasks identified for the FY2025-2027 work plan are:

- Science Advisors Program administration
- AMWG and TWG meeting attendance and participation, as directed
- Establish and convene independent review panels, as directed
- Review #1 – Triennial Work Plan FY28-30
- Review #2 – Assistance in 2027 independent review of GCDAMP
- Review #3 – Review long-term data collection projects to gain insight on whether any changes should occur, or advancements need to be integrated
- Conduct a knowledge assessment for the program

Budget: FY25 = $ 150,000 FY26 = $ 150,000 FY27 = $ 150,000

4.C. Experimental Management Fund

This budget item reserves funds for conducting experiments or management actions within the GCDAMP, with priority given to LTEMP-related experiments and management actions that could not be anticipated in advance of the three-year budget and work plan and require timely implementation. The funds will be available to conduct experiments or management actions when conditions are appropriate. Reclamation will work with DOI agencies, the BAHG and TWG to identify projects that may be appropriate for the Experimental Management Fund. Each year, Reclamation will discuss with the TWG the possible projects or experiments for the upcoming year that may utilize the Experimental Management Fund. Projects that may utilize funds in the Experimental Management Fund include, but are not limited to, additional monitoring in the event of an extended duration fall HFE, additional experimentation related to native fish conservation and/or nonnative fish control, and other newly pressing scientific questions in the GCDAMP.

When implementing experiments under the LTEMP, Reclamation will collaborate with WAPA, GCMRC, and other GCDAMP partners to identify operational scenarios that improve hydropower resources and are consistent with the improvement and long-term sustainability of other downstream resources.

If the funds allocated to the Experimental Management Fund are not needed in a given year, FY2025-2027 work plan projects proposed but unfunded due to budget limitations will be considered for end of year funding support, assuming all other funding criteria are met.

Budget: FY25 = $ 350,000 FY26 = $ 350,000 FY27 = $ 350,000

4.D. GRCA and GLCA Experimental Vegetation Treatment

As described in the LTEMP Record of Decision, experimental riparian vegetation treatment is included as mitigation for dam operations within the Colorado River Ecosystem (CRE). This work is also listed as a priority in the most recent DOI policy guidance memo to the GCDAMP, which was issued by the Assistant Secretary Petty for Water and Science on August 14, 2019.

Vegetation treatment actions on NPS managed lands will be implemented by NPS consistent with NPS Management Policies (NPS 2006) and consistent with the goals and objectives of the LTEMP ROD. This will occur only within the CRE in areas that are influenced by dam operations. The NPS will work with tribal partners and GCMRC to plan, implement and evaluate a number of vegetation control and native replanting activities on the riparian vegetation within the CRE in Grand Canyon National Park and Glen Canyon National Recreation Area.

Principal elements of this experimental riparian vegetation proposal include:

- Control nonnative plant species affected by dam operations, including tamarisk and other highly invasive species through various control methods;
- Develop native plant materials for replanting through partnerships and the use of regional greenhouses;
- Replant native plant species to priority sites along the river corridor, including native species of interest to Tribes;
- Remove vegetation encroaching on campsites; and
- Manage vegetation to assist with cultural site protection.

The project area is from Glen Canyon dam to Pearce Ferry. Project partners are the National Park Service, associated Tribes, GCMRC, Reclamation, youth corps and volunteers. NPS will coordinate closely with GCMRC on this project. GCRMC projects C.5 and D.1 provide for the GCMRC's coordination with NPS and Tribal partners in developing the scientific design, project site selection, implementation and monitoring protocols for the experimental vegetation treatments. During this triennial work plan, NPS and GCRMC will develop and begin implementing experiments that evaluate techniques for campsite clearing (GRCA), native species replanting (GLCA), and invasive removal (GLCA, GRCA). Additionally, experiments developed in collaboration with GCMRC examining whether and how vegetation removal affects cultural resources and sediment dynamics will continue (see GCMRC TWP D.1).

The intent of these evaluations is to identify the most cost-effective and environmentally-sensitive methods to achieve the LTEMP ROD principle elements. This will allow for an adaptive management approach to adopt the more efficient approaches over time.

Coordinated activities would include removal of selected plant species of concern at targeted sites and subreaches (e.g., live and dead tamarisk, arrowweed), replanting of native species at targeted sites, and ongoing monitoring of treatment areas. GCMRC project D.1 also provides a formal experimental design for evaluating if vegetation removal increases the probability of "preservation in place" of archaeological sites near HFE-sediment supplied sand bars, including site selection and pre- and post- treatment data collection. This experiment provides the connection for how other LTEMP experiments such as spring, fall or extended HFEs relate to the vegetation work (as HFEs would be predicted to increase sediment at the strategic locations identified and then be available to be blown by wind to cover archeological sites). This experiment includes appropriate monitoring and controls to determine how much benefit to the covering of cultural sites actually accrues from such removals. In addition, GCMRC projects C.2, C.3, and L.1 contribute to the NPS vegetation work in the following ways. Project C.1 provides riparian vegetation monitoring data between Glen Canyon Dam and river mile 240, which can be used to prioritize treatment areas and identify sources of native species for propagation. Project C.2 proposes to conduct manipulative experiments on hydrological tolerances of riparian species of interest, which can be used to inform species used for planting, locations of plantings in relation to surface flows, and anticipated responses of removed plants. Project C.3 proposes to develop predictive models of vegetation responses to flows using existing data from many sources, including data derived from the LTEMP non-flow vegetation experiments described here. These models can be utilized to develop planting and removal plans to increase treatment success. Project L.1 will provide base maps for planning and navigating purposes, as well as spatial data sets that will contribute to project evaluation.

The project area is from Glen Canyon dam to Pearce Ferry. Project partners are the National Park Service (GLCA, GRCA), associated tribes, GCMRC, Bureau of Reclamation, youth corps and volunteers. Project costs include project coordination, planning and administration costs (including an annual coordination and planning meeting for NPS, GCMRC and tribes; GCMRC vegetation data processing and transfer to NPS), personnel costs (NPS seasonal and term biological technicians for field work, data entry and reporting; NPS term archeologist for on-site field work, GIS and data staff support; NPS tribal liaison to work with tribes; NPS compliance staff; funding tribal staff for tribal engagement as partners in planning and executing the experiment and for tribal on-site field work), supplies (tools and herbicides, plant propagation, fuel for boat travel), and contracts, agreements and river support (cooperative agreement for greenhouse operation costs, river support for field work, youth crew agreement to support field work). NPS will explore additional sources of funding external to the program to assist in funding tribal partners.

Budget: FY25 = $ 230,000 FY26 = $ 245,000 FY27 = $ 250,000

4.E. Southwestern Willow Flycatcher Surveys

In the 2016 Biological Opinion for the LTEMP, Reclamation committed to monitoring two endangered birds: the Yuma Ridgway's rail and the southwestern willow flycatcher. Reclamation will partially assist in funding National Park Service staff in conducting southwestern willow flycatcher surveys once every two years for the duration of the LTEMP. Reclamation funding for Yuma Ridgway's rail surveys was discontinued following 2022 surveys due to their absence in the Grand Canyon. The purpose of these surveys is to determine if potential habitat is occupied by breeding birds. These monitoring trips will be coordinated and combined with existing trips. Reporting and documentation will be provided to Reclamation by NPS staff certified to survey for nesting birds during the breeding season. The Southwest willow flycatcher would be surveyed in 2025 and 2027. This work will focus on the presence/absence surveys in accordance with the conservation measures outlined in the 2016 LTEMP Biological Opinion. Future GCDAMP budget cycles may also consider research questions associated with this species.

Budget: FY25 = $ 45,000 FY26 = $ FY27 = $45,000

4.F. Monitoring Metrics Development and Resource Condition Tracking

In Section 6.1 (c) of the 2016 LTEMP ROD states that "The DOI, in consultation with the AMWG, will develop monitoring metrics for the goals and objectives using those in Appendix C of the FEIS as a starting point." The need to prioritize development of resource condition metrics was further emphasized by the August 14, 2019, memo from Dr. Timothy Petty, Assistant Secretary for Water and Science and Secretary's Designee, which provided strategic guidance for the GCDAMP. During the FY2023-2025, Reclamation and GCMRC reviewed the metrics utilized for the LTEMP FEIS analysis (See Table 1, Appendix C, LTEMP FEIS) for appropriateness and implementation feasibility. Additionally, draft metrics were developed after working with the Science Advisors, Tribes, and other subject matter experts to address gaps, such as where existing metrics cannot be feasibly measured and reported, or where a resource goal does not lend itself to a science-based performance metric. These draft metrics were then presented to AMWG and TWG members throughout the process to collect feedback on whether these draft metrics are meeting the needs of the resource goals within the 2016 LTEMP ROD. Draft monitoring metrics were presented to the DOI agencies to determine which metrics are meeting goals and objectives of the 2016 LTEMP ROD.

For any monitoring metrics that have not met those goals and objective by the end of FY2024, further discussions and consultations will occur in FY2025. A final adoption by the DOI agencies of all monitoring metrics will occur by the end of FY2025. Once adoption of the monitoring metrics has occurred it is anticipated that these monitoring metrics will be incorporated into further data collection to monitoring resource goals.

Budget: FY25 = $ 35,000 FY26 = $ 15,000 FY27 = $15,000

4.G. Hydropower Monitoring and Research

The LTEMP (U.S. Department of the Interior, 2016a) states that the objective of the hydropower and energy resource goal is to, "maintain or increase Glen Canyon Dam (GCD) electric energy generation, load following capability, and ramp rate capability, and minimize emissions and costs to the greatest extent practicable, consistent with improvement and long-term sustainability of downstream resources." This project will identify, coordinate, and collaborate with external partners on monitoring and research opportunities associated with operational experiments at GCD designed to meet hydropower and energy resource objectives, as stated in the LTEMP EIS and its ROD (U.S. Department of the interior, 2016a, b), and guided by the memorandum (Guidance Memo) from the Secretary's Designee, dated August 14, 2019 (Petty, 2019). Operational experiments include proposed experiments in the LTEMP EIS (U.S. Department of Interior, 2016b), and other identified operational scenarios at GCD to improve hydropower and energy resources, while consistent with improvement and long-term sustainability of other downstream resources. This project will identify and prioritize research opportunities associated with operational experiments at GCD designed to meet hydropower and energy resource objectives.

Reclamation will coordinate a hydropower workshop and presentations to AMWG/TWG to inform and report to the AMP on hydropower status, trends, and current issues, and to identify opportunities to improve upon GCD flow experiments identified in LTEMP and any new flow experiments that may be developed during the course of this workplan. Experiments include, but are not limited to macroinvertebrate flows, trout management flows, and high-flow experiments. Additionally, this workshop will be used to identify potential experimental hydrographs at GCD that improve the value or production of hydropower, outside of flow experiments specific to biological and physical resources, to better achieve the hydropower and energy resource goal. These experimental hydrographs to improve the value or production of hydropower will be consistent with the improvement and long-term sustainability of downstream resources. Project 4.G will investigate research opportunities of proposed experiments in the LTEMP EIS and consider impacts on hydropower and energy as part of the experimental design. Coordinated project implementation and development will occur among Reclamation, Western Area Power Administration (WAPA), GCMRC, and other collaborators to utilize and build on existing hydropower and energy models and data, specifically those from Appendix K in the LTEMP EIS (U.S. Department of Interior, 2016b). Products from this project will include an annual workshop with stakeholders and report to TWG and AMWG that summarizes workshop outcomes.

Budget: FY25 = $ FY26 = $ 25,000 FY27 = $

In-Kind contributions from WAPA, Reclamation, and other collaborators are not reflected in this proposed budget.

Table 4. Reclamation ESA Compliance and Management Actions Budget Summary.

4	**ESA Compliance and Management Actions**	**$ 860,000**	**$ 795,000**	**$ 810,000**
	percent of BOR budget	**34%**	**32%**	**32%**
4.A	Integrated Stakeholder River Trip	$ 50,000	$ 10,000	$ -
4.B	Science Advisors Program	$ 150,000	$ 150,000	$ 150,000
4.C	Experimental Management Fund	$ 350,000	$ 350,000	$ 350,000
4.D	Experimental Vegetation Treatment - Grand Canyon	$ 150,000	$ 162,000	$ 165,000
4.D	Experimental Vegetation Treatment - Glen Canyon	$ 80,000	$ 83,000	$ 85,000
4.E	Ridgway Rail and Southwest Willow Flycatcher monitoring	$ 45,000	$ -	$ 45,000
4.F	Monitoring Metrics Development and Tracking	$ 35,000	$ 15,000	$ 15,000
4.G	Hydropower Monitoring and Research	$ -	$ 25,000	$ -

5. NHPA Compliance and Cultural Resources Program Management

5.A. Cultural Resources Program Administrative Costs

This budget funds the salary and travel expenses of Reclamation cultural resources staff to administer the National Historic Preservation Act (NHPA) compliance for the GCDAMP utilizing the 2017 Programmatic Agreement (PA), which includes the Section 106 compliance, documentation for the Determination of Eligibility, contracting and reviewing of proposals and reports, annual cultural resources reporting and meeting, costs associated with maintaining the grants for tribal participation in the GCDAMP and tribal contracts to implement tribal monitoring protocols, general consultations, and Historic Preservation Plan (HPP) implementation. This includes the implementation of the 2017 PA for Glen Canyon Dam Operations, as well as the 2012 Memoranda of Agreement (MOA) for Non-native Fish Control or its replacement. This budget item also supports Reclamation management involvement in tribal consultations and other cultural resources compliance activities.

The project goals and objectives are:

- Management of federal funding of five tribal grants for participation in the GCDAMP to provide implementation of tribal monitoring protocols.
- Management of the monitoring and mitigation of at-risk historic properties and other related projects associated with implementation of NHPA compliance agreements for the operation of Glen Canyon Dam.
- Reclamation cultural resource personnel attending, as needed, AMWG and TWG meetings, Cultural Ad Hoc Group meetings, and conducting meetings required by the 2017 PA and revised 2012 MOAs.

Completion of this project's components allow for compliance with the 2017 PA Stipulations I- IX, XI, and XII which also ensures accountability for the tribal grants and contracts and appropriate use of funds. The budget covers labor and travel for approximately 70% of one full time archeologist, as well as Reclamation management involvement in tribal consultations and other cultural resources compliance activities.

Budget: FY25 = $ 120,000 FY26 = $ 120,000 FY27 = $ 120,000

5.B. Cultural Resources Monitoring – Grand Canyon (NPS)

The NPS, Grand Canyon will conduct data review, field work within the CRE, data entry, analysis and report preparation to support Reclamation's Section 106 compliance and implementation of the 2017 LTEMP PA, Stipulations IV and VI. Field staff will utilize the existing 2016 Cultural Resource Management protocol and associated SOPs for all activities. Protocols will be used to streamline field activities. The project goals and objectives are:

- Support Reclamation's Section 106 compliance responsibilities under the 2017 PA, Stipulations IV and VI.
- Conduct field assessments to update condition and impact data using existing monitoring protocols and subsequent updates as defined in the Historic Preservation Plan (HPP).
- Provide Reclamation site data to support the development and implementation of the HPP.
- Review and update site information and associated treatment recommendations contained within Reclamation's 2007 Geoarchaeological Investigations and Treatment Plan.
- Coordinate with resource managers to design and implement appropriate management actions.
- 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 mitigation measures to remediate sites damaged by the operations of Glen Canyon Dam.

Budget: FY25 = $ 85,000 FY26 = $ 85,000 FY27 = $ 85,000

5.C. Cultural Resources Monitoring – Glen Canyon (NPS)

Long-term monitoring of cultural resources within the CRE of the Glen Canyon Reach is required for compliance with Section 106 of NHPA and the Grand Canyon Protection Act, and implementation of the 2017 LTEMP PA, Stipulations IV and VI. Implementation of long-term monitoring in the Glen Canyon reach will be conducted by National Park Service (NPS) through Glen Canyon National Recreation Area (NRA) and coordinated with other NPS entities, Reclamation, the Grand Canyon Monitoring and Research Center (GCMRC), Tribes, and other stakeholders.

This project will maintain a program of long-term monitoring in the Glen Canyon reach that meets the updated requirements of the 2017 PA for LTEMP and the associated HPP. It will support the evaluation and documentation of effects to historic properties and inform the development of any mitigation measures identified to protect historic properties from documented adverse effects of dam operations. NPS would work with Reclamation to identify mitigation measures for any documented adverse effects at specific sites in Glen Canyon NRA. NPS will continue consultation concerning tribal values associated with Glen Canyon Reach with the Hopi Tribe, Hualapai Tribe, Navajo Tribe, Southern Paiute Consortium, and Pueblo of Zuni. This consultation helps formulate a plan for ethnographic data collection to assist with mitigation of sites.

This project meets objectives of cultural resources protection on lands administered by Glen Canyon NRA using adaptive management processes for the NPS and Reclamation to achieve specific goals for identification, monitoring, documentation and mitigation actions with regard to cultural resources in the Glen Canyon reach during fiscal years 2025-2027. The project goals and objectives are:

- Support Reclamation's Section 106 compliance responsibilities under the 2017 PA, Stipulations IV and VI.
- Conduct field assessments to update condition and impact data using existing monitoring protocols and subsequent updates as defined in the Historic Preservation Plan (HPP).
- Provide Reclamation site data to support the development and implementation of the HPP.
- Conduct monitoring and data collection in support of evaluation of impacts to historic properties.
- Document effects to historic properties resulting from dam operations.
- Work with Reclamation to identify mitigation measures for any documented adverse effects at specific sites in Glen Canyon NRA.

Completion of this project component allows for compliance with the 2017 PA Stipulation VI. The ultimate goal of the long-term monitoring program is to monitor and document effects to historic properties in the Glen Canyon reach (as identified in 2017 PA Stipulation VI). The data will be useful for identifying mitigation measures to remediate any sites in the Glen Canyon reach damaged by the operations of Glen Canyon Dam.

Budget: FY25 = $ 45,000 FY26 = $ 45,000 FY27 = $ 45,000

5.D. Traditional Cultural Property (TCP) Documentation for Hualapai, Navajo and Paiute Tribes

Reclamation has identified the need to document individual Tribal Traditional Cultural Properties (TCPs) in order to treat the TCPs as historic properties under 2017 PA, Stipulations I, IV, and VI. Under previous contracts, Reclamation initiated the documentation process with the five AMWG member tribes. The Hopi Tribe and the Pueblo of Zuni have completed TCP documentation. The Hualapai Tribe, Navajo Nation, and Southern Paiute Consortium do not have documented TCPs.

The Pueblo of Zuni and the Hopi Tribe may require updates to their existing TCPs, as well. Funding from Tribal monitoring projects and the data and reports that result from this monitoring will also support the documentation of TCPs. It is anticipated that each tribe's documented TCP will be incorporated into the broader, canyon-wide multi-property TCP. The project goals and objectives are:

- Documentation of TCPs for Hualapai, Navajo and Paiute Tribes.
- Update documentation for Zuni and Hopi TCPs, as appropriate.

Completion of this project allows for 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.

Budget: FY25 = $ FY26 = $ FY27 = $

5.E. Public Outreach

This project follows the admonition of the Historic Preservation Plan, namely: "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. ... 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." (HPP, Appendix O).

Accordingly, these funds are to be used for providing the public with information about the program and its findings. Reclamation anticipates providing $20,000 each year for the primary purpose of covering the travel expenses of LTEMP-affiliated scientists and personnel for speaking at community events – with priority for Tribal outreach.

Budget: FY25 =$20,000 FY26 = $20,000 FY27 = $20,000

5.F. Zuni and NPS Data Recovery and Community Outreach Pilot

Note: Due to unexpected events during the FY21-23 workplan, this project has been extended into FY2025.

Purpose & Site Selection

The LTEMP Historic Preservation Plan identifies that historic property treatment plans (HPTP) implemented to date have lacked the integration of tribal knowledge and cultural values in the study of historic properties. Incorporation of tribal perspectives and knowledge in plans for mitigation of adverse effects will assist in interpreting the physical remains constituting historic properties. To that end, the NPS has determined that a Pueblo II habitation site is experiencing erosion that is exacerbated by flow releases from Glen Canyon Dam, which cumulatively threatens this site's National Register Integrity. Site condition monitoring since 2003 has consistently documented erosion as the factor impacting the NHPA Integrity of Feature 4 and Feature 5 (GRCA archaeological site database, NPS monitoring reports, Dierker 2019). NPS has determined that stabilization of some features is not possible and has recommended data recovery at Features 4 and 5. This recommendation is supported in the Bureau of Reclamation Treatment Plan (Damp et. al. 2007).

The Zuni people refer to this site as Heshoda uhta an De'lashinna (House by the Cliff Shrine) and Zuni Cultural Resource Advisory Team (ZCRAT) monitors have recommended to the NPS the development of an integrated Zuni/NPS treatment plan to address the erosion and to further an understanding of the historical, cultural, and emotional relationship between Zuni medicine societies, the shrine located at this site, and the role the site plays in Zuni migration history (See Pueblo of Zuni monitoring reports 2015-2018).

Description of Tasks

The NPS (GRCA) and Pueblo of Zuni propose a three-year multi-phased pilot project that will develop an integrated and culturally appropriate treatment plan that meaningfully incorporates an archaeological science perspective with a Zuni traditional perspective.

The result will serve as an effective and bi-culturally commensurate means of mitigating the erosion and associated adverse effects of Glen Canyon Dam operations on Features 4 and 5 at the selected site.

The project will involve GRCA archaeologists, Zuni religious leaders and Zuni youth in the development and implementation of the data recovery effort. The dynamic bi-cultural interchange between Western trained archaeologists and traditionally educated Zuni religious leaders will result in a processual and traditional hybrid narrative of the past. The involvement of Zuni youth in this project is intended to expose them to a vigorous bicultural pedagogical experience where they learn from both Western scientists and Zuni traditional religious leaders about Zuni heritage in relationship to the Grand Canyon. The exchanges that takes place between the Western scientists, the Zuni religious leaders and Zuni youth during the implementation of the mitigation will be documented on video.

Deliverables

The project team will finalize the draft treatment report and develop Zuni community outreach in the form of open houses where NPS archaeologists, participating Zuni tribal scholars and Zuni youth, and members of the Zuni community would interact and discuss the treatment of the selected site, including the identification and resolving of adverse effects to Zuni traditional cultural properties and the environment. During this phase, a video product will be finalized and distributed to the local Zuni school system, the A:shiwi A:wan museum, NPS Desert View visitor center and Reclamation and other GCDAMP stakeholders.

When fully implemented this project is intended to serve as a potential model for Reclamation and the other signatories to the LTEMP Programmatic Agreement to consider in the development of a larger-scaled HPTP that effectively and commensurately incorporate tribal values and perspectives.

This project was funded in the previous workplan, but due to various delays the work was not completed. Consequently, this project will extend into this TWP without additional funding beyond that which was previously obligated.

Budget: FY25 = $ FY26 = $ FY27 = $

5.G. Southern Paiute Consortium – Monitoring Paiute Places on the Colorado: An Educational Resource (Associative Values)

Note: Due to unexpected events during the FY21-23 workplan, this project has been extended into FY2025.

Overview and Purpose

This two-year project recognizes the need for improved understanding of the goals, processes, and products of tribal monitoring among two key audiences: (i) new generations of tribal monitors, and, (ii) new agency participants and other partners in the GCDAMP. In order to effectively perform their roles, each of these groups requires tools to promote rapid learning about tribal monitoring in the GCDAMP.

Based on the experience of the Southern Paiute Consortium (SPC) Monitoring and Education program, incomplete understanding among these two groups is impeding the effectiveness of monitoring work that forms the basis of tribal participation, and of effective agency collaboration.

SPC proposes to address this by creating an interactive, immersive training tool, allowing each group to experience how monitoring work is done, guided by narration of elders and experienced tribal program participants. The experience will be built around virtual tours integrating interactive educational content, including immersive 360-degree imagery and audio narration, recorded at key places of cultural significance for Southern Paiutes along the Colorado River corridor. This project will aid future generations of Southern Paiute monitors, inform trainee tribal monitors in multiple contexts, orient new agency personnel and partners participating in the GCDAMP, and promote increased respect for places of cultural significance in the Colorado River corridor and the Grand Canyon.

Site Selection

The proposed project will focus on two sites within the Colorado River corridor, monitored by the SPC during its annual river trips. Apart from accessibility and logistical feasibility, the following three criteria have been used to determine the selection of the project sites:

- The site can be used to demonstrate, positively or negatively, the impacts of dam operations, as flows cause sediment to be deposited or eroded within and adjacent to the river channel;
- The site demonstrates, positively or negatively, the interactions between sediment scour and fill dynamics, and the condition of natural and cultural resources;
- The site incorporates cultural materials, including habitation sites, which are of value and significance to tribal participants but not of such sensitivity that they would require restrictions on documentation and educational use of media from the site.

Based on these three criteria, the following sites were selected for this project:

- **Nankoweap**: This site is a former living area and home to many culturally important plants. The lack of new sediment deposits has altered plant growth at the site and is a clear example of sediment scour and side channel cutting and their impact on cultural and natural resources present at the site.
- **Indian Canyon**: This site is a former living and gathering area. The relatively stable interface between the side Canyon and the main channel has resulted in fewer direct impacts of the dam operations on the cultural materials at the site, though indirect impacts of visitor activity are monitored and documented.
- **Alternate sites**: Time and resources permitting, additional sites may be incorporated into this project to provide background for education on monitoring. Several sites in the Glen Canyon Reach monitored by SPC in recent years illustrate dam effects with interlinked impacts on cultural resources. These sites include the Descending Sheep Panel and Bullet Hole Panel. While monitor training would not focus on such sites, they could still prove valuable and logistically viable for this project.

The immersive tour produced for selected sites will include guidance on how to identify specific resources (such as roasting pits, ancestral structures, and culturally significant plant communities) and examine dam impacts on these resources. It will give viewers a chance to explore the tribal monitoring process and understand impacts of Glen Canyon Dam operations, in virtual reality. Within the virtual tour, content will be made available to the platform user by their proximity to key points in the virtual environment, and their interaction with embedded objects. The platform will be updatable and expandable to encompass additional locations and training content.

Description of Tasks

The project will produce an immersive virtual tour of resources and monitoring work at the two selected monitoring sites, focused on dam impacted resources. This proposed project will facilitate the training of SPC Monitors in the use of audiovisual and mapping technologies to prepare for visits to two key monitoring sites within the Colorado River corridor, with BARA researchers and contractors, in order to collect media and spatial data required for the project. A key emphasis of the project will be working with tribal youth to engage them in monitoring work and to promote their knowledge of new technologies for resource monitoring and preservation. Monitors may then participate in the production of interactive digital mapping for the two areas selected for the documentation. This will form the basis for producing immersive tours of the monitoring sites and activities, complete with VR vision and audio narration by Southern Paiute monitors. Project researchers from the SPC will work to carry out the following activities:

- Scoping and training: Workshops with SPC Monitors and participants from member tribes. This project will build on related projects, including the intergenerational knowledge project, Mapping Paiute Places: Connecting Generations Across Paiute Lands, funded by the Indian Land Tenure Foundation. This proposed project will train youth and interested adults in basic audio and video recording, field mapping, and landscape visualization techniques. Scoping and training will focus on the two areas of the Colorado corridor selected for the project.
- Data collection: During annual SPC river trips, stops at two key visitor- impacted sites along the Colorado River corridor with SPC Monitors, youth participants, BARA researchers, and multimedia media contractors. At each site selected, monitors will observe and record impacts of GCD operations and associated visitor impacts using site forms and 360-degrees 3D digital photography. They will record mapping data and audio narratives about monitoring and the selected sites. The 360-degree 3D digital photography will be captured with an 8K Ultra-high definition camera.
- Resource development workshops: Workshops with SPC, developing materials from data collected on the annual river monitoring trip, and working with mixed-generation groups to enhance virtual tour data. Activities will include the pairing of elders with youth and monitors to audio record narrations of the process of monitoring work, including oral narratives for virtual tours within and between places included the project.
- Digital resource production: Production of a 3D virtual tour of monitoring at a selected monitoring site by SPC and BARA researchers and media consultants. Tour users will be able to navigate between views within the site via clickable 'hotspots' embedded within the tour. Hotspots can also be used to incorporate interactive buttons revealing descriptive text, illustrations, and ambient sound or descriptive narration. This product will be tested and reviewed with SPC participants and interested agency participants and other partners in the GCDAMP.
- Resource piloting: Trial use of new training resource in tribal monitor training exercises, prior to annual river trip.

Objectives

Project objectives are as follows:

- Enhanced understanding of tribal monitoring goals, processes, and products for new generations of tribal monitors, new agency participants, and other partners in the GCDAMP;
- Improved ability to identify resources and impacts among trainee monitors;
- Development and adoption of culturally appropriate approaches integrating new digital technologies as part of cultural resource monitoring and education activities;
- Assessment of the need for further modifications to the SPC's Monitoring and Education Program and protocols, in keeping with the 2017 LTEMP PA

Stipulation VI (B)-(C);

- Assessment of the contribution of monitoring and education program to Goals 2 and 4 of the LTEMP HPP, and contribution to the projects outlined in Appendix N.1 and N.4.1; and
- Contribution to the fulfillment of Stipulation I(B)(2) and Stipulation IV(A)(10) of the 2017 Long Term Experimental and Management Plan Programmatic Agreement (LTEMP PA).

This project will help fulfill the obligations of the Bureau of Reclamation under Section 106 of the National Historic Preservation Act (NHPA) to mitigate potential adverse effects of Glen Canyon Dam operations. It will do so by integrating tribal knowledge, perspectives, and concerns in the GCDAMP, and thereby fulfilling Stipulation I(B)(2) and Stipulation IV(A)(10) of the 2017 Long Term Experimental and Management Plan Programmatic Agreement (LTEMP PA). As this project will seek to integrate tribal knowledge systems into the GCDAMP program—including cultural sensitivity training, fostering awareness of historic properties within the APE and their multiple histories and values, and improving the understanding of factors effecting cultural resources with new and innovative research methods—it will also contribute to Goals 2 and 4 of 2018 LTEMP Historic Preservation Plan (LTEMP HPP). Additionally, it has significant potential to contribute to the development of new training methods that might form part of cultural sensitivity training, as part of Appendix N.1: Cultural Sensitivity Training.

This project was funded in the previous workplan, but due to various delays the work was not completed. Consequently, this project will extend into this TWP without additional funding beyond that which was previously obligated.

Budget: FY25 = $ FY26 = $ FY27 = $

5.H. Hualapai – A Proposal to Study Hualapai Agricultural and Gardening Practices along the Colorado River

Note: Due to unexpected events during the FY21-23 workplan, this project has been extended into FY2025.

Project Overview

The Hualapai Tribe has occupied much of the length of the Colorado River in the Grand Canyon since time immemorial. Widely regarded by anthropologists and archaeologists as primarily a mobile hunting and gathering culture, there is ample evidence that varying scales of domestic plant husbandry were also practiced in many areas of the ancestral territory. This proposed project seeks to investigate and document the geographic extent and degree of domestic plant use along the Colorado River using archival sources, ethnohistoric information, and archaeological evidence.

The proposed work will help map out specific locations of plant husbandry practiced by ancestral Hualapai, and potentially estimate the areal extent of where food could be grown in these areas. Identifying relationships among plant samples would provide a greater understanding of how plants were used and shared across the region, create a stronger tie between current culture and traditional plants, and potentially establish to what degree people utilizing the Colorado River in Grand Canyon cultivated plants. In addition, the results of this study may well have bearing on National Register considerations of certain sites and perhaps groups of sites that are centered around optimal areas. This could pertain to archaeological aspects as well as contemporary cultural knowledge and values about the past Hualapai history of the river.

Description of Tasks and Timeline

This study will be pursued on several levels, including:

- Archival work to create a comprehensive overview of the current state of knowledge;
- Review of archaeological survey and excavation records for evidence of plant husbandry;
- Limited analysis of existing artifact collections held at repositories; and
- Ethnohistoric interviews focused on traditional ecological knowledge (TEK)

During Year 1 (FY2021), work will comprise project planning and research; collecting background information from archival sources and from archaeological site records; identification of repositories with relevant plant remains, following repository protocols for obtaining specimens for analysis (including applying for necessary permits, where applicable); interviewing tribal elders and other knowledgeable individuals regarding TEK information; and, hopefully, by the latter part of Year 1 conducting analysis. A progress report will be prepared by the end of the fiscal year.

During Year 2 (FY2022), work will continue with analysis and obtaining samples; continuing background research to supplement findings from Year 1; continuing interviews with tribal members.

During Year 3 (FY2023), most of the effort will be on reporting and data synthesis, with only limited additional new research to supplement previous findings.

Deliverables

The project will occur over the three-year period encompassing the FY2021 – 2023 Triennial Work Plan. A summary of each year's findings will be presented at Annual Reporting meetings, most likely as a poster session, with the final results presented to the overall audience during one of the day's sessions after Year 3.

Deliverables for the proposed project will include a descriptive technical report for Department of Cultural Resources and agency use, as appropriate, as well as one or more scientific publications. We also propose to create a popular summary of the project that will be targeted primarily toward Hualapai tribal members but could be of interest to the general public.

Objectives

The results of this study are expected to contribute to National Register evaluations and a better understanding of Hualapai history and culture along the river. The vast majority of archaeological sites recorded along the river corridor have been evaluated exclusively according to Criterion D for National Register of Historic Places (National Register) eligibility, which mainly pertains to a site's potential to contribute scientific research.

Consideration of other National Register criteria has been heretofore largely absent. For the Hualapai people, significance of these sites and the landscapes within which they are found extend much more broadly, however. Specifically, Criterion A, which "recognizes properties associated with single events, such as the founding of a town, or with a pattern of events, repeated activities, or historic trends" applies as well (emphasis added). The Colorado River and the Grand Canyon country has long been well-established as integral to the identity of the Hualapai people since time immemorial, and ancestral sites along the river are direct evidence of this link. By learning more about the nature of these sites, their significance in terms of National Register eligibility would be enhanced.

The project further meets Goal #4 of the Historic Preservation Plan (HPP), in that it will "Foster Awareness of and Appreciation for Historic Properties within the APE," which follows from discussion on Criterion A above. By contributing information about the nature of archaeological sites and landscapes along the Colorado River, project results will also bring to bear considerations for future treatment plans, should they become necessary, to resolve adverse effects within the APE (Goal #3). In terms of Goal #3, enhanced knowledge of sites and landscapes can drive more specific research questions that would be developed during future mitigation plans.

This project was funded in the previous workplan, but due to various delays the work was not completed. Consequently, this project will extend into this TWP without additional funding beyond that which was previously obligated.

Budget: FY25 = $ FY26 = $ FY27 = $

5.I. Hopi Grand Canyon (Öngtupqa) Oral History Project Proposal (Associative Values)

Note: Due to unexpected events during the FY21-23 workplan, this project has been extended into FY2025.

Project Summary

The Hopi Cultural Preservation Office (HCPO) is proposing a three-year ethnographic oral history project related to the Grand Canyon (Öngtupqa). The project will involve interviewing 20 Hopi elders, ten men and ten women about their knowledge of the Grand Canyon. HCPO will use the funding to pay for new audio and video recording equipment, to compensate for the interviewees' time, and to hire one individual to record and transcribe these interviews. The project serves to learn more about Hopi traditional knowledge concerning the cultural affiliation to the Grand Canyon, recounting areas of cultural sensitivity, and embodying cultural resources throughout the Grand Canyon.

This collected information will serve to mitigate adverse effects impacting both cultural and natural resources in the Grand Canyon and provide new knowledge on cultural resources monitoring.

HCPO strongly feels that this is a valuable time to record ethnography about the Grand Canyon because of the numerous development plans within the surrounding region. A critical component regarding this proposal is, in the past, HCPO has overlooked vita components in previous projects, including a Hopi Women's perspectives about the Grand Canyon.

Background

The Grand Canyon is an essential traditional cultural place for the Hopi people. It is central to their heritage and religious beliefs. This project is being proposed due to need to reconnect with our elders, for the Hopi people have lost a significant number of knowledgeable community members over time. In 1995, Dr. T.J Ferguson and the Hopi Cultural Preservation Office conducted ethnographic interviews of the Grand Canyon. A majority of these interviews were not used in the final report. Due to time, only 18 partial transcripts of these interviews survive, none of which were conducted with Hopi women. All interviews were recorded by hand notes and no audio or video were recorded. The Ferguson report concentrated more on Hopi clan migrations and the Hopi people’s general connections to the Grand Canyon. The Hopi Cultural Resources Advisory Task Team (CRATT) have been recorded for similar projects for their knowledge about the Grand Canyon over the years. CRATT members may or may not be interviewed if they have been interviewed before, but take note that CRATT have changed significantly over the years since the 1995 Ferguson study. The nearly 20 years of Hopi river monitoring trips will also serve as a basis for resource application for questions to pursue cultural affiliation, cultural sensitivity, and resources management. However, these interviews and Ferguson's report still serve as a foundation to start the oral history project.

A deeper affiliation and knowledge of the Grand Canyon has not been recorded from Hopi's own perspectives. The Hopi people do not regularly visit the Grand Canyon due to its immense, and sacred nature to them. The annual Grand Canyon River monitoring trip participants are not of this elder and knowledgeable population. Also, of importance and a cultural note to reviewers of our proposal, Hopi women are also not allowed traditionally within the canyon. Thus, their beliefs and voice in relationship to the Grand Canyon have been overlooked in past studies. This project would serve to address these issues, along with capturing heritage-based knowledge of the Grand Canyon before Hopi knowledge regarding the Grand Canyon is ultimately lost and how to approach cultural resource management with the numerous proposals and development in the work for the Grand Canyon.

Description of Tasks

The project serves to record knowledge of the Grand Canyon from twenty individuals, considered elders in the Hopi community. Ten men and ten women shall be interviewed. Interviews will serve to obtain precious Hopi knowledge of the Grand Canyon as a Traditional Cultural Place. The oral history projects hope to unveil how the Grand Canyon has changed over time, identify possible traditional cultural places that have been neglected, recommend areas of cultural sensitivity, and recommend impacts on archeological sites and natural resources that may need additional management. Interviewees will be chosen for age, religious society membership, and those clans associated to the Grand Canyon.

Interviewees will inform of previous research and work done in the canyon inducing the Ferguson's ethnographic report, CRATT interviews, and the Hopi monitoring trips reports, to serve as a foundation for interview questions and where HCPO may want to expand that knowledge. Interviewees will be paid for their time; each interview last approximately one hour.

The project will include funds to hire a Research Assistant for three years to conduct, transcribe, and write a report from the interviews and project findings. The Research Assistant will compile information from 20 years of Hopi work, digitize reports from before 2000, apply recommendations for river monitoring trips from the research being gained, and write the new report. They will also record and review material and transcribe video and audio recordings in both Hopi and English. Positions will be supervised by Stewart B. Koyiyumptewa, Hopi Cultural Resource Office Program Manager and THPO.

Objectives

Knowledge from Interviewees will aid the greater GCDAMP by:

- Providing new information on old and possible new sites.
- Obtain current clarity on the Grand Canyon as a traditional cultural place as a whole and recommend the best alternatives to protect its status as scared place.
- Recite stories for public access.
- Identify areas of cultural sensitivity and how to address them.
- Provide new recommendations for site mitigation, maintenance, and erosion.
- Work towards a starting place for the complex Hopi Tribal knowledge assessment

in regard to the Grand Canyon.

This project fulfills LTEMP Goals of the PA agreement between the Hopi, Park Service, and the Bureau of Reclamation.

- Look at sites from fresh eyes that may be impacted by future undertakings and provide recommendations for such undertakings.
- Create new and redefine old associated values with resources for future project recommendations.
- In general provide a new body of knowledge for new section 106 undertakings.

The report will be sent to the Bureau of Reclamation and serve as a base for additional Hopi recommendations on behalf of the Glen Canyon Dam Technical Work Group and the Adaptive Management Plan. The report will serve to also address areas of cultural sensitivity to aid in the cultural sensitivity project being conducted by the Bureau of Reclamation.

This project was funded in the previous workplan, but due to various delays the work was not completed. Consequently, this project will extend into this TWP without additional funding beyond that which was previously obligated.

Budget: FY25 = $ FY26 = $ FY27 = $

5.J. Southern Paiute Participation in the Glen Canyon AMP: 25 Years of Monitoring and Education, 1996-2021 (Associative Values)

Note: Due to unexpected events during the FY21-23 workplan, this project has been extended into FY2025.

Overview and Purpose

This two-year project proposes to complete a comprehensive, tribally directed history and review of Southern Paiute Monitoring and Education programs under the GCDAMP. The aim of this project is to assess the impacts of changes in the GCDAMP since the Southern Paiute Consortium (SPC) completed its Ten-Year Review of Southern Paiute monitoring, education, reporting, and participation in the GCDAMP in 2007. This project has the explicit goal of understanding how those changes have affected (1) the participation of Southern Paiutes; (2) the Southern Paiute tribal monitoring program, including modifications to the program and its methods; and (3) the integration of Southern Paiute knowledge and perspectives into the GCDAMP; and to (4) draw upon that understanding to contribute to cultural sensitivity training for GCDAMP activities and personnel.

Recent discussions between tribal representatives and other GCDAMP participants have acknowledged the need for a contemporary synthesis of tribal participant activities, monitoring protocols, and long-term results of tribal monitoring activities. This review is intended to inform Southern Paiute tribal leaders and GCDAMP participants. In its Ten Year Review the Southern Paiute Consortium (SPC) noted the following:

Attempts to resolve differences between Western scientific and Southern Paiute traditional knowledge and ways of understanding the Colorado River ecosystem have been unsuccessful, in spite of several efforts to integrate them. Significant improvements in the integration of Southern Paiute and other Native American perspectives are unlikely to occur without major changes in the organization and function of the GCDAMP (Austin et. al. 2007: ix).

Since that time, there have been numerous changes in the GCDAMP, including turnover in members and staff of the participating organizations, the addition of tribal liaisons, and the development of mechanisms, such as the Knowledge Assessment tool and implementation of associative values studies, to mitigate or identify mitigation strategies for any potential adverse effects to the character of historic properties as a result of the Glen Canyon Dam operations under the LTEMP Record of Decision (LTEMP ROD). This project will address whether and how these changes have affected the participation of Southern Paiutes and the integration of their knowledge and perspectives into the GCDAMP. The project will examine the opportunities for tribal engagement in numerous settings, from meetings, committees, and working groups of the GCDAMP, to river trips, as well as less formal interactions with scientists and other stakeholders. It then will examine whether and how the Southern Paiutes have taken advantage of these opportunities and the channels of communication they have employed in doing so. This project is especially timely as individuals who have been active in the SPC are retiring and passing on, and these people hold vital information for understanding the trajectory of the program. This project will be focused on several domains of GCDAMP activities that will serve as case studies within the review, including the following:

- GCDAMP program structures designed to engage tribal perspectives, including the tribal liaison role;
- Mechanisms and tools that have been developed within the GCDAMP to engage tribal perspectives, including associative values studies and the Knowledge Assessment tool;

Processes of transmitting information about the GCDAMP and of transferring institutional and cultural knowledge within the SPC and among its member tribes, as age cohorts of monitors and participants move through the program.

Description of Project Tasks

This project is designed within a collaborative research framework and will use a mix of archival and documents review, qualitative, and quantitative research methods. Project researchers from the SPC will carry out the following activities:

- Archival and documents review and synthesis. Researchers will review a list of all Grand Canyon Monitoring and Research Center (GCMRC) publications (https://www.usgs.gov/centers/sbsc/publications) and identify those which indicate tribal participation or review. They will then review the identified publications to characterize the nature of tribal participation, and whether and how the Southern Paiutes participated, if indicated in the publication. They will review all annual reports submitted by the SPC to synthesize key findings of the SPC monitoring program, changes in monitoring protocols, and the site-by-site and overall program recommendations.
- Participant observation at SPC and GCDAMP events. Researchers will participate in SPC and GCDAMP meetings, river trips, and other activities to document the nature of tribal member and SPC representative involvement and interactions with other AMP participants (costs for river trips and regular SPC- GCDAMP activities

are covered in SPC's annual budgets so are not reflected in the project budget). This will include working with the SPC and leaders of the member tribes to plan an event commemorating 25 years of participation in the GCDAMP and envisioning the next 25 years. At this event, researchers will present their preliminary findings and gather information from participants, including people who have and have not been involved in the SPC Monitoring and Education Program.

- Semi-structured interviews with Southern Paiute tribal members who have participated in any aspect of the SPC Monitoring and Education Program. Researchers will obtain lists of Southern Paiutes who participated in annual monitoring and education activities such as meetings and river trips. They will then identify key characteristics (e.g., level of participation, age at the time of participation) and select a sample of the participants to interview. The interview protocols and questions will be developed based on data gathered in steps I and II.
- Semi-structured interviews with other participants in the GCDAMP. Researchers will identify key individuals within the GCDAMP who have been involved in efforts to improve the integration of Southern Paiute and other Native American individuals and perspectives in the program. They will then identify key characteristics (e.g., level of participation, role at the time of participation) and select a sample of the participants to interview. The interview protocols and questions will be developed based on data gathered in steps I and II.
- Data synthesis and reporting. Following standard methods for qualitative data analysis, researchers will code field and interview notes to identify key themes and explore these themes during analysis. They will synthesize their findings in a written report and oral presentation for the SPC and participating tribes, and GCDAMP.

Objectives

The fundamental objective of the SPC, strengthening member tribe participation in the GCDAMP, will be promoted in the following specific project objectives:

- Provide a new synthesis of SPC participation in the GCDAMP since the Ten Year Review;
- Review the implementation of recommendations provided in the SPC Ten Year Review, especially those related to tribal participation and monitoring;
- Assess the integration of tribal perspectives and concerns in proposed and implemented mitigation projects, including associative values studies;
- Assess the need for further modifications to the SPC's Monitoring and Education Program and protocols, in keeping with the 2017 LTEMP PA Stipulation VI (B)-(C);
- Assess the contribution of monitoring and education program to the Goals 2 and 4 of the LTEMP HPP, and contribute to the project outlined in Appendix
- N.1 and N.4.1;
- Contribute to the fulfillment of Stipulation I(B)(2) and Stipulation IV(A)(10) of the 2017 Long Term Experimental and Management Plan Programmatic

Agreement (LTEMP PA); and

- Evaluate how SPC programs have met the needs of its member tribes and other AMP participants and provide strategic direction for future participation in the GCDAMP.

This project helps fulfill the obligations of the Bureau of Reclamation under Section 106 of the National Historic Preservation Act (NHPA) to mitigate potential adverse effects of Glen Canyon Dam operations and impacts and integrate tribal perspectives and concerns into any mitigation projects, especially as these are articulated through the 2017 Long Term Experimental and Management Plan Programmatic Agreement (LTEMP PA) and the 2018 LTEMP Historic Preservation Plan (LTEMP HPP). Specifically, with regard to integrating tribal knowledge, perspectives, and concerns in the GCDAMP, as well as to providing a valuable tribal history for use in cultural awareness training, this project will fulfill Stipulation I(B)(2) and Stipulation IV(A)(10) of the 2017 LTEMP PA. Additionally, as this project will seek to integrate tribal knowledge systems into the GCDAMP program—including cultural sensitivity training, fostering awareness of multiple histories and values, and reviewing the Adaptive Management Working Group's (AMWG) goals for cultural resources—it will contribute to Goals 2 and 4 of 2018 LTEMP HPP.

This project was funded in the previous workplan, but due to various delays the work was not completed. Consequently, this project will extend into this TWP without additional funding beyond that which was previously obligated.

Budget: FY25 = $ FY26 = $ FY27 = $

5.K. Hualapai Shared Histories Along the Colorado River in Grand Canyon (Associative Values)

Note: Due to unexpected events during the FY21-23 workplan, this project has been extended into FY2025.

Introduction and Rationale

The proposed project will be to investigate the Hualapai people's shared relationships and histories with other tribes that inhabited the Colorado River in the Grand Canyon below Glen Canyon Dam. There has long been a tendency to connect cultural resource sites (primarily archaeological sites) along the Colorado River with one tribe or another, or if multiple tribes are acknowledged to be affiliated with a site, they are not seen as necessarily being affiliated in a mutually collective way (e.g., there is a tendency to view sites as "multi-component," or occupied by different cultures during different time periods, for instance). There is ample ethnohistoric evidence, however, to demonstrate that throughout history tribes interacted frequently throughout the canyon and river corridor in various ways, such as trade, marriage, resettlement, political alliances, and, at times, even conflict. The phenomena that tribal histories often intermingled in these various ways has been largely neglected.

As one example, the archaeological culture known as the Cohonina, of which there are many sites in the canyon and surrounding South Kaibab Plateau, are acknowledged to be ancestral to the Hualapai, Havasupai, and Hopi. The Hualapai Tribe seeks to investigate these shared histories with the other tribes participating in the Glen Canyon Dam Adaptive Management Program (GCDAMP).

The results of this study are expected to contribute to National Register evaluations on landscape and possibly site-specific scales, and lead to a better understanding of the complexities of the history of the Colorado River and Grand Canyon, in a way that current archaeological methods are ill-equipped to describe alone. The project could therefore be viewed as complementary to archaeological research.

Project Description

The proposed project will consolidate ethnohistoric and archival information, coupled with contemporary interviews with tribal elders and other knowledgeable individuals, as well as archaeological considerations, to convey a more nuanced interpretation of Hualapai history in Grand Canyon, and the Colorado River corridor in particular.

Ethnohistoric and archival sources will include past ethnographies, unpublished manuscripts, interview accounts (recordings and transcripts), and congressional testimony (mainly, but not exclusively, from the 1950s). Major sources for congressional testimony are the U.S. Senate hearings from the Indian Claims Commission. Extensive interview information can be found from the Doris Duke Oral History Project, undertaken mainly in the late 1960s, and in the Hualapai Department of Cultural Resources archives, where recordings and transcripts from the department's cultural monitoring river trips and related interviews from the early 1990s up to the present are stored.

Archaeological evidence may very likely also contribute to this understanding, by reconsidering those sites that may suggest multi-component use, as suggested predominantly by artifact assemblages. For example, sites that are situated near routes that facilitate travel cross-canyon or along the river for extended distances may be related to cross-cultural interactions. It is fair to say that pre-European contact history in the Grand Canyon is far more complicated than current archaeological methods are equipped to comprehend fully, but a consideration of ethnohistoric information could contribute substantively to understanding the nature of these sites and their place in the broader cultural landscape.

It will be very important that, at each step of this project, close coordination and agreement between the Hualapai Tribe and the other GCDAMP participant tribes be paramount. This will include planning, sharing of potentially unpublished manuscripts and other documents, interviews with tribal elders and other knowledgeable individuals, and vetting project results and reports in draft and final form. Participation in this project will be strictly voluntary, and will be framed as a collaboration that may be mutually beneficial.

Description of Project Tasks

The proposed project will consist of the following work activities:

- Synthesize archival and ethnohistoric materials concerning the Hualapai people's interactions and relationships with neighboring tribes;
- Re-examine existing archaeological site records and other evidence for clues to inter-tribal histories; and
- Initiate joint meetings between Hualapai and other participant tribal members to discuss current knowledge about past shared histories.

The Hualapai propose to undertake this project over a three-year period encompassing the FY2021 – 2023 Triennial Work Plan. A proposed timeline is as follows:

- During Year 1 (FY2021), work will include compiling archival resources, such as relevant ethnographic and archaeological publications and reports, unpublished manuscripts, previous oral history interviews (which may be written or in audio or video format), photographs, and other material; making contact with other GCDAMP participant tribes to plan for the nature and level of participation they wish to be involved; begin interviewing Hualapai elders and other knowledgeable individuals about their knowledge of interactions with other tribes along the river; initiate interviews and joint meetings with Hualapai and other tribal members to discuss inter-tribal histories in the Grand Canyon and along the Colorado River.
- During Year 2 (FY2022), work will include continuing with joint discussions between Hualapai and other participant tribal members; sharing by the Hualapai Department of Cultural Resources regarding what we have learned up this point with other tribes; continuing with archival research; by the end of FY2022, preparation of a preliminary report to be vetted by other tribes. Information in this report will consist exclusively of information shared between Hualapai and

singular participant tribes, such as Hualapai—Southern Paiute, etc.

- During Year 3 (FY2023), work will primarily comprise preparing a final report, based on continuing discussions with participant tribes as to what will be appropriate to divulge to a wider audience, although some supplemental information (archival or contemporary) may be identified and considered.

Objectives

The proposed project will address LTEMP Resource Goals "Archaeological and Cultural Resources" and "Tribal Resources." Further, the project is in keeping with the objectives of the Grand Canyon Protection Act (GCPA), "to protect, mitigate damages to, and improve the condition of the environmental, cultural, and recreational resources of Grand Canyon National Park and Glen Canyon National Recreation Area downstream of Glen Canyon Dam." By enhancing our knowledge of and incorporating a more holistic view of the indigenous cultural landscape along the river, we will have better tools for managing and potentially mitigating adverse effects in the future. The project itself should be viewed as inherently improving resource condition by broadening our understanding of them.

The project also meets Goal #4 of the Historic Preservation Plan (HPP), in that it will "Foster Awareness of and Appreciation for Historic Properties within the APE." By contributing information about cultural landscapes and archaeological sites along the Colorado River, project results will also have implications for future treatment plans, should they become necessary, to resolve adverse effects within the APE (Goal #3). In terms of Goal #3, enhanced knowledge of sites and landscapes can contribute to more nuanced research questions that would be developed during future mitigation plans.

The study will have National Register of Historic Places implications by enhancing the cultural significance of the canyon at varying scales, potentially from the site level to the landscape level, in a way previously not well integrated into prior evaluations. Most sites in the canyon have currently been evaluated solely under Criterion 'D' of the National Register, under which historic properties "have yielded or may be likely to yield, information important in history or prehistory." We anticipate that other criteria will also become applicable, particularly Criterion 'A,' under which historic properties "are associated with events that have made a significant contribution to the broad patterns of our history." The broadening of National Register criteria may have implications for future mitigation measures.

This project was funded in the previous workplan, but due to various delays the work was not completed. Consequently, this project will extend into this TWP without additional funding beyond that which was previously obligated.

Budget: FY25 = $ FY26 = $ FY27 = $

5.L. Cultural Sensitivity Training Development

This project is to fund tribal expertise in the development of a GCDAMP cultural sensitivity training. Per the HPP, Native American Indian 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. 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. This project will fund 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.

In conjunction with the development of the cultural sensitivity training, a video or on-line version of the training will be developed and circulated to allow the cultural sensitivity training to be more accessible for all GCDAMP researchers and stakeholders. This project includes the development of audio and visual elements of the training as well as other training materials. Coordination with the project coordinator and tribal experts is critical to the success of this project.

The project goals and objectives are:

- Develop and implement a cultural sensitivity training program that will be used by all researchers working within the GCDAMP.
- Produce a training video, podcast, etc. to be viewed by all personnel on GCDAMP projects.

Additional sources of external funding will be explored and utilized, if appropriate. Funds may be reallocated to this budget item during the GCDAMP annual reassessment of the budget and work plan.

Completion of this project allows for compliance with the 2017 PA Stipulation IV.A(9). The ultimate goal is to develop a training course for GCDAMP funded researchers and other interested GCDAMP participants.

Budget: FY25 = $ 50,000 FY26 = $ FY27 = $

5.M. Contingency Fund for NHPA Section 106 Compliance

Compliance with the 2017 PA Stipulation I B for mitigation of potential adverse effects requires the mitigation of identified adverse effects to historic properties. Although no specific adverse effects or actions have been identified, this project is to set aside funding for possible future mitigation needs.

Reclamation's compliance with the 2017 PA Stipulation I B is the primary outcome of this project. The goal of this budget item is to ensure that funds are available to Reclamation in the event that 2017 PA Stipulation I B mitigation actions are required. Mitigation of documented adverse effects to historic properties due to operations of Glen Canyon dam under LTEMP during this budget cycle are eligible for use of these funds. Prior to utilization of these funds, Reclamation's Regional Archeologist will participate in an already planned river trip to assess and determine the level of mitigation necessary.

If funds allocated to the Experimental Management Fund (Reclamation project 4.C) are not needed in a given year; at the end of the year, some of the funds may be allocated to the Contingency Fund for NHPA Section 106 Compliance.

Budget: FY25 = $ 80,000 FY26 = $ 80,000 FY27 = $ 80,000

5.N. Tribal Resources Monitoring

This budget item provides funds to identify and monitor traditional cultural properties (TCPs) and to implement Native American monitoring protocols that were developed in FY 2007 and recommended by the TWG as part of efforts to develop a core-monitoring program.

In addition, the five GCDAMP Tribes (Hopi Tribe, Hualapai Tribe, Southern Paiute Consortium, Pueblo of Zuni, and Navajo Nation) will work with Reclamation and the NPS to implement monitoring of historic properties in Glen and Grand 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.

This project includes funding for five tribes for up to $35,000 each year.

Budget: FY25 = $ 175,000 FY26 = $ 175,000 FY27 = $ 175,000

5.0. Tribal Participation in the GCDAMP

This budget item provides funding through DOI agency funding (i.e., not power revenues) for the participation in GCDAMP meetings of the five GCDAMP Tribes (Hopi Tribe, Hualapai Tribe, Southern Paiute Consortium, Pueblo of Zuni, Navajo Nation). This funding covers preparation for meetings, participation in meetings, and travel costs associated with participation in the meetings. The purpose of the funding is to ensure tribal viewpoints are integrated into continuing GCDAMP dialogs, votes, and in the final recommendations made to the Secretary of the Interior. The five DOI agencies (U.S. Geological Survey, National Park Service, Bureau of Reclamation, U.S. Fish and Wildlife Service, and Bureau of Indian Affairs) provide funding to support this budget item, with Reclamation serving as lead agency for administration of these funds. This project is also a component of the tribal monitoring and referenced in the 2017 PA Stipulation VI.

Budget: FY25 = $ 605,000 FY26 = $ 605,000 FY27 = $ 605,00
(*Funded through DOI Agencies*)

5.P. Tribally Informed Bird Inventory and Habitat Use Throughout the Colorado River Corridor

Background

How the Colorado River is managed from Glen Canyon dam downstream influences plant and insect communities in dramatic ways when compared to pre-dam ecology and river dynamics. The U.S. Geological Survey Grand Canyon Monitoring and Research Center (GCMRC) is one group that studies the ways in which the damming of the Colorado River has changed the river system and flora and fauna within the canyon. Similarly, tribes associated with the Colorado River have extensive historical pre-dam and post-dam knowledge that has, until recently, been excluded from the collective decision-making process and understanding of this important river system.

Some natural resources and interests of Colorado River stakeholders have been well studied, such as archeological sites, native fishes, sediment movement, and riparian plant communities. There has been little study of resources that interest the Tribes and even fewer studies that have been informed by Tribal values. One such example is bird communities along the river corridor and in the Grand Canyon region. Early bird studies from the 1980's - 1990's have reported on bird species inventories and species assemblages (Kearsley and others, 2001; Spence, 2006; Stevens and others, 1997; Willson and Carothers, 1979), as well as associations with habitat and bird diets (Brown and Trosset, 1989; Yard and others, 2004). However, much of the work has not been as robust or as extensive as work with other species of wildlife, such as native river fish. Regardless, ongoing monitoring of bird species listed under the Endangered Species Act, like, Southwestern Willow Flycatcher, have been the longest running monitoring of birds in the canyon, especially in the lower river sections towards the river delta (Grand and others, 2024).

Despite all of this work, little research has occurred that incorporates traditional ecological knowledge to help guide research questions, objectives or analysis. This proposal is an attempt to setup a system to collect baseline and long-term bird community data using acoustic monitoring units, a novel technology for bird studies in remote and difficult to reach locations. This tribally led research proposal will be informed by traditional ecological knowledge and analysis from Navajo community members, medicine people and other sources of Navajo traditional ecological knowledge. We are proposing to use a novel technology (remote audio recording) to address the logistical issues with bird survey work. That is, most bird survey work requires an observer to be present during the survey time period (e.g., dawn and dusk). Obviously, having a robust monitoring methodology and observers in the canyon to monitor through migratory season or longer survey time periods is a major challenge. The use of these remote recording units in this type of landscape is novel and unproven, but could be an efficient, cost-effective method of collecting robust bird community data. Hence, this proposal is a pilot study to determine the challenges and benefits of using this type of remote data logging system in the Colorado River canyon system for terrestrial migrating birds.

Need

Bird life is an important cultural element to the Diné. Birds are used for more than just ceremonies or found in songs and oral traditions. Birds form the very foundation of the Navajo emergence story and are critical in understanding Navajo lifeways, oral traditions and ceremonies. For example, it is said that Cliff Swallows showed the first people how to build the first hogan (traditional Navajo dwelling) as the birds used mud (clay and silt) to form the adobe walls of their nests; the entry ways are placed on the side of the structure for both bird and human (Martin, 2009). Swallows and many other species of bird are used or referenced in Navajo traditional teachings, songs, ceremonies or in traditional regalia. Simply put, birds form the foundation for Navajo cultural tradition.

The loss of ancestral lands, climate change driven habitat changes (e.g., loss of surface water) and access to areas where these species occur has resulted in a loss of cultural teachings, identity and material uses of wildlife for traditional practicing Navajo's. This project aims to restore those connections through monitoring terrestrial neotropical migrating birds along the Colorado River corridor. Data collected from this project will be analyzed through both western scientific and traditional Navajo lenses.

This study is a pilot study in that we propose to use new technology to monitor birds throughout the river system. These acoustic monitoring units have been deployed in the canyon system to monitor bats, but they have not been used to record bird calls. We plan to design this study in collaboration with GCMRC scientists to identify bird species distributions, seasonal movement patterns, migratory stop-over areas and habitat associations when combined with existing plant community data sets managed by GCMRC (FY25-27 GCMRC Triennial Work Plan Project C.1).

Wildlife habitat consists of four basic factors; forage, water, cover, and space. Since the construction of Glen Canyon dam, the river and its ecological functioning have seen dramatic changes. Plant communities in the canyon have changed as a result of Glen Canyon Dam operations (Palmquist and others, 2023; Sankey and others, 2015). Similarly, the timing and amount of water releases has had significant impact and influences on the aquatic insect community in along the river corridor (Kennedy and others, 2016). Plant communities and insect life are two of the four factors that make up a suitable wildlife habitat. Birds rely on plant communities for cover and forage (e.g., insects, nectar, hard and soft fruits). Of particular importance is the vertical and horizontal structure of the plant community in a given location. This often reflects suitability for certain bird species and not others. For example, mesquite trees or tall shrubs provide suitable nest habitat for yellow warblers, whereas reeds and cattails provide nesting habitat for species like sedge wrens. Wildlife biologists use these factors to predict wildlife habitat suitability and occupancy. Bird habitat (e.g., terrestrial vegetated areas) and insect diversity occur along environmental gradients that likely also influence bird species richness, abundance, migratory movements and territorial nesting occupancy rates (Palmquist and others, 2018). This proposal aims to work towards developing new ways to monitor bird life in the canyon, while collaborating with GCMRC to evaluate associated bird habitat. This study will provide data on bird use, seasonal movements, occupancy and habitat associations. Finally, through analyzing the data through a traditional Navajo lens we hope to bring into the study a unique way to interrupt these data that is meaningful to the Diné.

Proposal

Navajo Nation in conjunction with GCMRC research staff propose to use acoustic monitoring units at 25 locations to monitor bird use, territorial occupancy, habitat use/affiliations, and seasonal movement patterns (e.g., migrations). Additional work with specific species of bird might be proposed after the initial inventory work is completed (i.e., after year one of the project). Focus species will be selected based on tribal member and medicine people input, interests and questions that are generated from the initial inventory work.

To accomplish this pilot study, we proposed to install acoustic monitoring units (e.g., Wildlife Acoustics SM4), similar to what has been used in the canyon to monitor bats. These units are made by Wildlife Acoustics and are designed for long-term deployment when equipped with solar battery charging capacity and 2Tb SD card data capacity. Installation requires no ground disturbance or permanent infrastructure. At the conclusion of the project all equipment can be removed, if desired by the project team, National Park Service (NPS) and other Colorado River stakeholders.

Monitoring locations will be located with the help of Emily Palmquist, USGS – GCMRC as a part of FY25-27 GCMRC Triennial Work Plan Project C.1 . These locations can include vegetation restoration areas, areas of native dominated plant communities and non-native dominated plant communities. The placement of these units will be chosen such that the data can be used to determine if this method of bird data collection can be used to evaluate habitat associations. Additionally, these units can be placed in a way that a single call can be triangulated. A subset of sites will have multiple recording units placed within the habitat patch such that the data can be used to determine if triangulations of calls is possible in the canyon. If so, we hope this will help narrow down habitat use by specific bird species at a finer spatial scale similar to traditional pedestrian-based survey methods.

The recording units will be set to record during peak bird calling hours, typically, dawn and dusk. This will limit how fast the SD cards are filled with data. At least twice a year the units will need to be checked and have SD cards swapped out. We expect this work will be conducted in collaboration with existing river trips, likely including the Navajo Nation monitoring trip and the riparian plant community monitoring trips. Ideally, SD card changes would occur before the spring and fall migration time periods.

Post-recording processing will be conducted with the help of GCMRC and Navajo Nation staff. We also plan to utilize existing internship programs to try to recruit student(s) with Tribal affiliations to assist with data processing. An automatic data analysis software system can help with identification of calls to species and populate data for additional processing and analysis. If this study can properly triangulate calls it would then be possible to conduct higher levels of analysis when these data are combined with existing vegetation data sets. But this has not been done before in a location like the Colorado River canyon. Some experimentation and field adjustments will likely be needed after the first year of the study.

Objectives

1. To understand habitat preferences and use by birds of cultural importance to Navajo.
2. To Identify bird “hot spots” and important migratory stop-over areas.
3. To understand seasonal use and migratory habits of birds in the Colorado River corridor.

Questions

1. Does vegetation type and horizontal structure influence where insectivorous birds reside in the canyon?
2. Does aquatic insect life influence insectivorous bird diversity and richness?
3. When is migration season in the canyon?
4. At what times of year is there the highest diversity of bird life in the canyon?

Methods

The project proposes to use non-invasive monitoring technology to inventory and monitor birds in the Colorado River corridor from Glen Canyon Dam to the high-water elevation of Lake Mead. We proposed to establish at least 25 sites, some of which may overlap with existing bat acoustic monitoring stations. Specific locations were selected through collaboration with staff at USGS - GCMRC, specifically, Emily Palmquist for sites that intersect with vegetation study plots.

We will use Wildlife Acoustics, SM4 audio recording devices to record bird calls throughout the year. These units will also include associated equipment such as batteries, solar chargers, mounting pole and stabilizing lines. These units have a data capacity of two (2) SD card slots. We proposed to use two, 1 Tb SD cards in each unit with a second set of 1 Tb SD cards for data changes. Recording time period will be programed to dawn and dusk, when birds are most likely to be calling and will last for a few hours during each recording window.

At each location at least one (1) monitoring unit will be deployed. The selected location will be based on site specific habitat conditions, topography and visibility to river trip goers. A subset of locations will have multiple units deployed to test if bird calls can be triangulated within habitat patches.

We have chosen to use a point count sampling method as this method best reflects the habitat within the canyon. Habitat for terrestrial neotropical migrating birds can best be described as "patches" where side canyons flow into the mainstem river depositing sediment to build locations where there is areas of suitable upland habitat for plants (e.g., trees and shrubs) and consequently terrestrial birds. Point count bird surveys use a fixed observation point where the "observer" or in this case acoustic monitoring unit, records all bird observations (visual and auditory calls) and estimates distance to the observation (Figure 3). This study is not designed to collect visual observations but will collect auditory data. A potential limitation of this technology is that an individual unit does not account for distance from the observation point to the calling bird. This makes understanding detection probability difficult. This type of data also doesn't account for where the bird is in the habitat (e.g., top of a tree, small shrub, shoreline). Hence, a sub-setof locations will have multiple units deployed to aid in triangulating the calls. Furthermore, it is unclear how far these units can detect a call within this type of landscape. To address this, we will develop a call distance control protocol to better understand at what sound level and distance do these units detect calls. Similarly, we will deploy this sound control check in differing habitats so understand how vegetation and topography influence the ability to detect calls from various distances and sound intensity levels (e.g., d.b. level).

Protocols and Procedures

Bird monitoring units will be placed in the most unintrusive way possible with no ground disturbance or vegetation removal (Figure 4.) Once installed the units will remain in place until the end of the study at which time they can be removed, if desired, or maintained for future monitoring needs.

Field checks will occur periodically by collaborators from Navajo Nation, USGS and other river trips (e.g., boatmen). At a minimum, each unit will be checked twice a year: once before the start of the spring migration (February/March) and again before the fall migration (August/September). During each field check the SD cards in the unit will be changed out. The SD card will be sent back to USGS - GCMRC or Navajo Nation for data downloads, processing and analysis.

Analysis

We propose to use standard analysis of call data to determine species presence, species diversity, abundance and if possible (depending on how monitoring units are set up) habitat associations. Additionally, based on the initial data analysis we propose to present preliminary data to tribal members. In the presentation we will be conducting ethnographic studies to determine what of the species recorded are of greatest interest to tribal members. Based on the successes or challenges of that first year of data collection and input from preliminary data analysis we may elect to shift recording locations, study design or focal species.

Permitting

We expect to require permits from NPS for placement of units within the canyon system. Due to the non-invasive nature of these monitoring units we do not expect the need to for additional permits other than consultation with the tribes. A IPAC and Section 7 interagency consultation for Endangered and Threatened species will be performed before work begins. Additionally, permits for archeological impacts will be filed and reviewed prior to implementation of the project. Any other permits, authorizations or approvals will be sought prior to the start of work.

Reporting

After the spring migration 2027 the final data set will be collected and incorporated into the larger data set for analysis. A final report will be written for distribution with members of the AMWG and TWG.

Budget: FY25 = $30,000 FY26 = $30,000 FY27 = $25,000

5.Q. Southern Paiute Expansion of Interactive, Immersive Tool for Broader Audience

This two-year project builds upon the successful creation of an interactive, immersive training tool for tribal monitors and others who need to learn about tribal monitoring in the GCDAMP. The monitor training tool has been built around virtual tours integrating interactive educational content, including immersive 360o imagery and audio narration, recorded at two key places of cultural significance for Southern Paiutes along the Colorado River corridor. The training tool will be completed by the end of summer 2024, following a pilot test with the 2024 SPC monitors and river trip participants and adjustments in response to feedback. In the course of gathering the information and constructing the platform for the tool, tribal leaders and members have become familiar with the purpose, structure, and content incorporated in the tool and have asked that the tool be expanded to other sites along the Colorado River corridor and to reach a broader audience. This project to develop an expanded interactive immersive tool for exploring Southern Paiute understandings of and connections to the Colorado River corridor will incorporate materials collected over the past 30 years that are being made accessible once again through (1) the archiving projects and (2) the new data collection taking place during FY2024. These materials include still images and videos along with audio recordings and written text from oral history and other interviews. Through the archiving projects, they are being digitized, electronic file formats are being updated, and new organization schemes are being developed.

Budget: FY25 = $ FY26 = $96,000 FY27 = $86,000

5.R. Southern Paiute Assessment of Visitors to the Colorado River Corridor

Recognizing that significant impacts to important places and features within the Colorado River Corridor between Glen Canyon Dam and Diamond Creek are caused by human visitors, the Southern Paiute Consortium (SPC) has devoted considerable resources to understanding visitor behavior, developing materials, and communicating with visitors before and during their visits. For example, the SPC has incorporated visitor monitoring at key places such as Deer Creek, collected data on visitor behavior during an upriver trip between Glen Canyon Dam and Lees Ferry, participated in education programs on the North and South rims of the Grand Canyon, given presentations to the Grand Canyon River Guides, and developed and shared websites and videos about Southern Paiute connections to the Corridor. Regrettably, these efforts have produced mixed results, and negative impacts continue to be reported and documented through the SPC's monitoring and education program. The SPC thus proposes to develop and conduct a study of visitors to the Colorado River Corridor. The study will focus on visitors who enter the Corridor on river trips (over 200,000 annually, split fairly evenly between commercial and noncommercial trips), though information about hikers will be gathered where relevant. The study will aim to answer the following questions: What are visitors aiming to learn and experience during their visits? How did they hear about, plan for, and succeed in making their visit? What did they do to prepare for their visit? Where have they gotten information about the area prior to their trip? What information do they wish they had received before their trip? The study will use qualitative research methods (participant observation, interviews, and focus groups) to gain a deeper understanding of the motivations, backgrounds, and interests of the visitors and those who recruit them to participate in river trips as well as potential ways to reach them before their trips. Study participants will include passengers and guides on past and current private and commercial trips (as approved), NPS rangers and others who provide information and orientation to river trips, scientists and other specialists who work in the Corridor, and Southern Paiute tribal members who have participated in river trips. The outputs of the study will include a written report and a plan for the SPC for targeting its education and outreach efforts to better meet its responsibilities to its member tribes and under Section 106 of the National Historic Preservation Act.

Budget: FY25 = $ FY26 = $70,000 FY27 = $75,000

Table 5. Reclamation Cultural Resources Budget Summary.

5	**NHPA Compliance**	**$ 605,000**	**$ 721,000**	**$ 711,000**
	percent of BOR budget	**30%**	**31%**	**27%**
5.A	Cultural Resources Program Management (BOR) - 2017 PA Stipulations I-IX, XI, and XII	$ 120,000	$ 120,000	$ 120,000
5.B	Cultural Resources Monitoring - Grand Canyon - 2017 PA Stipulation VI	$ 85,000	$ 85,000	$ 85,000
5.C	Cultural Resources Monitoring - Glen Canyon - 2017 PA, Stipulation VI	$ 45,000	$ 45,000	$ 45,000
5.D	Traditional Cultural Property Documentation - 2017 PA, Stipulations I, IV, and VI	$ -	$ -	$ -
5.E	Public Outreach (HPP Appendix O)	$ 20,000	$ 20,000	$ 20,000
5.F	Zuni and NPS Data Recovery and Community Outreach Pilot - 2017 PA, Stipulation I(B)(2)	$ -	$ -	$ -
5.G	Monitoring Paiute Places on the Colorado: An Educational Resource 2017 PA, Stipulation I(B)(4)	$ -	$ -	$ -
5.H	Hualapai Agricultural and Gardening Practices along the Colorado River - 2017 PA, Stipulation I(B)(4)	$ -	$ -	$ -
5.I	Hopi Grand Canyon (Öngtupqa) Oral History Project - 2017 PA, Stipulation I(B)(4)	$ -	$ -	$ -
5.J	Southern Paiute Participation in the Glen Canyon AMP: 25 Years of Monitoring and Education, 1996-2021 - 2017 PA, Stipulation I(B)(4)	$ -	$ -	$ -
5.K	Hualapai Shared Histories Along the Colorado River in Grand Canyon - 2017 PA, Stipulation I(B)(4)	$ -	$ -	$ -
5.L	Cultural Sensitivity Training Development - 2017 PA Stipulation III(C)	$ 50,000	$ -	$ -
5.M	Contingency fund for NHPA section 106 compliance - 2017 PA Stipulation I(B)	$ 80,000	$ 80,000	$ 80,000
5.N	Tribal resources monitoring - 2017 PA Stipulation VI	$ 175,000	$ 175,000	$ 175,000
5.O	*Tribal participation in AMP (Funded through DOI Agencies) - 2017 PA Stipulation VI*	*$ 605,000*	*$ 605,000*	*$ 605,000*
5.P	Tribally Informed Bird Inventory and Habitat Use Throughout the Colorado River Corridor	$ 30,000	$ 30,000	$ 25,000
5.Q	Southern Paiute Expansion of Interactive, Immersive Tool for Broader Audience	$ -	$ 96,000	$ 86,000
5.R	Southern Paiute Assessment of Visitors to the Colorado River Corridor	$ -	$ 70,000	$ 75,000

Table 6. Reclamation Total Budget Summary.

Reclamation Adaptive Management Program Budget Summary FY25-27		2025	2026	2027
	GCDAMP Total	**$12,500,000**	**$12,500,000**	**$12,500,000**
	Reclamation Total (20%)	$ 2,500,000	$ 2,500,000	$ 2,500,000
	GCMRC Total (80%)	$10,000,000	$10,000,000	$10,000,000
1	**Adaptive Management Work Group**	**$ 210,000**	**$ 210,000**	**$ 210,000**
	percent of BOR budget	**8%**	**8%**	**8%**
1.A	AMWG Direct Costs and Administration	$ 120,000	$ 120,00	$ 120,000
1.B	AMWG Member Travel Reimbursement	$ 10,000	$ 10,000	$ 10,000
1.C	AMWG Facilitation and Notetaking	$ 65,000	$ 65,000	$ 65,000
1.D	Public Outreach - Reclamation public affairs, POAG	$ 15,000	$ 15,000	$ 15,000
2	**Technical Work Group**	**$ 190,000**	**$ 190,000**	**$ 190,000**
	percent of BOR budget	**8%**	**8%**	**8%**
2.A	Technical Work Group Costs (BOR)	$ 160,000	$ 160,000	$ 160,000
2.B	TWG Member Travel Reimbursement	$ 25,000	$ 25,000	$ 25,000
2.C	TWG Facilitation	$ 5,000	$ 5,000	$ 5,000
3	**Program Management and Contract Administration**	**$ 350,000**	**$ 400,000**	**$ 500,000**
	percent of BOR budget	**14%**	**16%**	**20%**
3.A	Administrative Support for NPS Permitting	$ 135,000	$ 135,000	$ 135,000
3.B	Contract Administration	$ 70,000	$ 70,000	$ 70,000
3.C	Program Management	$ 145,000	$ 145,000	$ 145,000
3.D	Program Evaluation	$ -	$ 50,000	$ 150,000
4	**ESA Compliance and Management Actions**	**$ 860,000**	**$ 795,000**	**$ 810,000**
	percent of BOR budget	**34%**	**32%**	**32%**
4.A	Integrated Stakeholder River Trip	$ 50,000	$ 10,000	$ -
4.B	Science Advisors Program	$ 150,000	$ 150,000	$ 150,000
4.C	Experimental Management Fund	$ 350,000	$ 350,000	$ 350,000
4.D	Experimental Vegetation Treatment - Grand Canyon	$ 150,000	$ 162,000	$ 165,000
4.D	Experimental Vegetation Treatment - Glen Canyon	$ 80,000	$ 83,000	$ 85,000
4.E	Ridgway Rail and Southwest Willow Flycatcher monitoring	$ 45,000	$ -	$ 45,000
4.F	Monitoring Metrics Development and Tracking	$ 35,000	$ 15,000	$ 15,000
4.G	Hydropower Monitoring and Research	$ -	$ 25,000	$ -
5	**NHPA Compliance**	**$ 605,000**	**$ 721,000**	**$ 711,000**
	percent of BOR budget	**30%**	**31%**	**27%**
5.A	Cultural Resources Program Management (BOR) - 2017 PA Stipulations I-IX, XI, and XII	$ 120,000	$ 120,000	$ 120,000

5.B	Cultural Resources Monitoring - Grand Canyon - 2017 PA Stipulation VI	$ 85,000	$ 85,000	$ 85,000
5.C	Cultural Resources Monitoring - Glen Canyon - 2017 PA, Stipulation VI	$ 45,000	$ 45,000	$ 45,000
5.D	Traditional Cultural Property Documentation - 2017 PA, Stipulations I, IV, and VI	$ -	$ -	$ -
5.E	Public Outreach (HPP Appendix O)	$ 20,000	$ 20,000	$ 20,000
5.F	Zuni and NPS Data Recovery and Community Outreach Pilot - 2017 PA, Stipulation I(B)(2)	$ -	$ -	$ -
5.G	Monitoring Paiute Places on the Colorado: An Educational Resource 2017 PA, Stipulation I(B)(4)	$ -	$ -	$ -
5.H	Hualapai Agricultural and Gardening Practices along the Colorado River - 2017 PA, Stipulation I(B)(4)	$ -	$ -	$ -
5.I	Hopi Grand Canyon (Öngtupqa) Oral History Project - 2017 PA, Stipulation I(B)(4)	$ -	$ -	$ -
5.J	Southern Paiute Participation in the Glen Canyon AMP: 25 Years of Monitoring and Education, 1996-2021 - 2017 PA, Stipulation I(B)(4)	$ -	$ -	$ -
5.K	Hualapai Shared Histories Along the Colorado River in Grand Canyon - 2017 PA, Stipulation I(B)(4)	$ -	$ -	$ -
5.L	Cultural Sensitivity Training Development - 2017 PA Stipulation III(C)	$ 50,000	$ -	$ -
5.M	Contingency fund for NHPA section 106 compliance - 2017 PA Stipulation I(B)	$ 80,000	$ 80,000	$ 80,000
5.N	Tribal resources monitoring - 2017 PA Stipulation VI	$ 175,000	$ 175,000	$ 175,000
5.O	*Tribal participation in AMP (Funded through DOI Agencies) - 2017 PA Stipulation VI*	*$ 605,000*	*$ 605,000*	*$ 605,000*
5.P	Tribally Informed Bird Inventory and Habitat Use Throughout the Colorado River Corridor	$ 30,000	$ 30,000	$ 25,000
5.Q	Southern Paiute Expansion of Interactive, Immersive Tool for Broader Audience	$ 96,000	$ 86,000	$ -
5.R	Southern Paiute Assessement of Visitors to the Colorado River Corridor	$ -	$ 70,000	$ 75,000
	TOTAL Anticipated Budget Available to Reclamation	**$ 2,500,000**	**$ 2,500,000**	**$ 2,500,000**
	TOTAL Estimated Reclamation Expenditures	**$ 2,311,000**	**$ 2,306,000**	**$ 2,335,000**

Projects Funded Outside the GCDAMP

Reclamation supports projects and management actions outside of the GCDAMP in order to meet compliance obligations under the biological opinions for the 2007 Interim Guidelines, 2016 LTEMP EIS, and the 2024 Near-term Colorado River Operations and to inform other Grand Canyon ecosystem goals. Findings and data from these projects are leveraged into GCDAMP research and monitoring. Reclamation supported projects outside the GCDAMP currently being implemented include:

Native Fish Conservation Contingency Funds

This budget item tracks the native fish conservation contingency fund. The goal of this budget item is to ensure that funds are available for native fish conservation actions or nonnative fish control in the event this conservation action is needed for endangered humpback chub in accordance with Reclamation's ESA compliance obligations. This is a fund consisting of GCDAMP carryover funds from prior years and serves to ensure that funds are available for the conservation actions should the need arise. The first priority for use of these funds is to implement conservation actions as defined in the 2007 and 2016 biological opinions. Should excess funds become available beyond those needed for conservation actions, these funds could be expended on other research, monitoring, and management actions that help conserve native fish.

In past years, Reclamation has targeted a balance of approximately $1M to $1.5M in the Native Fish Conservation Contingency Fund given anticipated conservation actions and the status of native and nonnative fish. Should anticipated conservation actions and/or the status of native and nonnative fish significantly change, Reclamation may adjust the target balance of the fund.

Razorback Sucker Monitoring and Research

Partners: TBD/ National Park Service / Reclamation

In 2010, Reclamation's Upper Colorado Region and the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) initiated a joint project to evaluate Razorback Sucker use of the Colorado River Inflow Area of Lake Mead (CRI). As a result of this study it was determined that razorback sucker were utilizing lower Grand Canyon and moving upstream into Grand Canyon. Additional sampling showed that humpback chub were also using lower Grand Canyon. Reclamation funded BioWest, and NPS to assist, in monitoring larval and small-bodied fishes in the lower Grand Canyon. This monitoring is used to determine the presence, distribution at different life stages, habitat use, and spawning of both of both Razorback Sucker and Humpback Chub. This work is expected to continue during the course of this triennial work plan. Reclamation will coordinate with the GCRMC and GCDAMP on the results of the monitoring and research.

Brown Trout Control

Partner: National Park Service

The Brown Trout Control project is a continuation of funding provided to the NPS to implement comprehensive brown trout control activities in Bright Angel Creek and the Bright Angel Creek Inflow reach of the Colorado River.

Additional actions may include brown trout control where new or expanded spawning populations develop, if study indicates those areas are sources of brown trout in GRCA. This project may also support future planning efforts, including sonic-telemetry studies of habitat use and vulnerability to electrofishing for brown trout in Glen and Marble canyons.

Humpback Chub Translocations

Partner: National Park Service

Reclamation is funding NPS to implement humpback chub translocations into Colorado River tributaries. This requires removal of nonnatives and periodic monitoring. Currently translocations are successful in Havasu Creek and may be implemented in Shinumo and Bright Angel Creeks if they are determined viable. Actions include working in partnership with FWS, GCMRC, and most importantly, the Havasupai Tribe, to conduct preliminary surveys and a feasibility study for translocation of humpback chub into Upper Havasu Creek (above Beaver Falls). Other tributaries will also be assessed to determine their potential for additional translocations.

Lake Powell Water Quality Monitoring

Partner: Reclamation Upper Colorado Basin Region, Water Quality Group

Physical and biogeochemical processes in Lake Powell affect the nutrient concentration of dam releases. In the Colorado River Ecosystem temperature and nutrients affect trends in all aquatic resources as well as vegetation colonization on sandbars, and beach resources. Through its water quality group, Reclamation's Upper Colorado Basin Region conducts water quality sampling in Lake Powell assisting the GCDAMP to better understand the effects of reservoir elevation, seasonal reservoir stratification and other factors that may be affecting the water quality of releases from the dam.

Releases from Glen Canyon Dam that are relatively low in dissolved oxygen concentration (< 5 mg/L) have the potential to negatively impact the Colorado River Ecosystem between Glen Canyon Dam and Lees Ferry. Low reservoir levels may increase the likelihood of low DO plumes occurring near Lake Powell's penstock level during late summer, prior to reservoir mixing and destratification. Reclamation will evaluate its current sampling methods and frequency and determine if additional data collection is warranted.

Historic hydrologic conditions, including lake levels and inflow volumes, that existed during years with low DO releases will be evaluated and an approach to forecast the potential for such conditions to develop will be considered. A literature and case study review will be conducted, and a synthesis of potential mitigation approaches will be shared with the GCDAMP for consideration.

Pearce Ferry Rapid Fish Movement Study

Partner: Arizona Game and Fish Department

Reclamation is funding AGFD to implement a study to determine if Pearce Ferry Rapid is a potential barrier to fish movement between Lake Mead and Grand Canyon. The inflow areas for Lakes Mead and Powell are known areas occupied by Razorback Sucker. Studies on sonically tagged Razorback Sucker indicate that they use the inflow area between the Colorado River and Lake Mead; however, in recent years it appears that movement upstream has been reduced or halted, which may be due in part to Pearce Ferry Rapid. The goal of this project is to monitor and assess the relative abundance, distribution, and movement of native and nonnative fishes in the Colorado River upstream and downstream of the Pearce Ferry Rapid. This project will fill existing knowledge gaps on fish movement, species composition, and population dynamics in this minimally-studied section of the Colorado River, and inform managers on whether active management actions (e.g. native fish translocations; non-native removals) may be required to conserve native fishes in the western Grand Canyon.

Table 7. Summary of Conservation Measures Activities.

Consevation Measure		Activity that addresses it	Who is doing the work
Humpback Chub			
Translocations	Tributaries (Shinumo, Havasu, Bright Angel)	**NPS**-Humpback Chub Tributary Translocations and Associated Monitoring and Nonnative Fish Control	NPS/FWS/GCMRC
	Chute falls	**GCMRC** - Project G	GCMRC/FWS
	Explore other tribs	**GCMRC**- Project G; **NPS** - Humpback Chub Tributary Translocations and Associated Monitoring and Nonnative Fish Control; **FWS** - coordination with Havasupai Tribe on translocations on Havasupai lands	GCMRC/NPS/FWS
	Nonnative removal in tribs	**NPS**-Humpback Chub Tributary Translocations and Associated Monitoring and Nonnative Fish Control; NPS - brown trout control	NPS/FWS/GCMRC
Mainstem	Expand aggregations outside LCR	**GCMRC** Project G; NPS-Humpback chub tributary translocations	GCMRC/FWS/NPS
	Mainstem augmentation	**GCMRC** Project G; NPS translocations	GCMRC/FWS/NPS
LCR Monitoring	Spring and Fall Population estimates	**GCMRC** Project G	GCMRC/FWS
	LCR mainstem aggregation monitoring	**GCMRC** Project G	GCMRC/FWS
	Multistate model	**GCMRC** Project G	GCMRC
Mainstem monitoring	Aggregations	**GCMRC** Project G	GCMRC/NPS/FWS
	New populations & outside agregations	**GCMRC** Project G; **NPS/BioWest/FWS**	GCMRC/NPS/BioWest/ FWS
	Parasite monitoring	**GCMRC** Project I	GCMRC
Refuge	Fund FWS Humpback Chub refuge (SNARRC)	**Reclamation**	FWS / Reclamation
Razorback Sucker			
	Habitat use	**BioWest/BOR/NPS**-Razorback Sucker Monitoring and Adaptive Management, Larval and Small-bodied Fish Sampling	BioWest/BOR/NPS
	Determine effects of dam operations-TMFs	**BioWest/BOR/NPS**-Razorback Sucker Monitoring and Adaptive Management, Larval and Small-bodied Fish Sampling	GCMRC/BioWest/BOR/ NPS
	Determine extent of hybridization	Reclamation funded masters degree project	Reclamation
Benefit Native Aquatic Species			
	Remove brown trout from Bright Angel, inflow & and other areas	**NPS**-Humpback Chub Tributary Translocations and Associated Monitoring and Nonnative Fish Control; GCMRC- Project H	NPS/GCMRC
	Evaluate use of piscicide or other tools to renovate Bright Angel and Shinumo		NPS
	Evaluate TMFs for brown trout	**GCMRC**-Project H	GCMRC
	Rapid Response	**GCMRC**- Project I; **NPS**-Invasive Species Monitoring & Management	NPS/GCMRC
	Evaluate temperature control methods	**Reclamation** Project C.10	Reclamation
	Evaluate means to prevent fish passage through the dam	**Reclamation** Project C.9	Reclamation
	Backwater slough	**NPS**- Invasive Species Monitoring and Management	NPS/Reclamation
Southwest Willow Flycatcher			
	monitor every 2 years	**Reclamation** Project C.11	NPS
Yuma Ridgway's Rail			
	monitor every 3 years	**Reclamation** Project C.11	NPS