



Glen Canyon Dam Adaptive Management Program

FIRST DRAFT. Bureau of Reclamation, Glen Canyon Dam Adaptive Management Program Triennial Budget and Work Plan—Fiscal Years 2021–2023

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. The majority of program funding is derived from hydropower revenues; however, supplemental funding is provided by various Department of the Interior (DOI) agencies that receive appropriations. These agencies include 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 budget and work plan for fiscal years (FY) 2021–2023 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); and (3) Section 106 of the National Historic Preservation Act (NHPA) and the 2017 Programmatic Agreement for the Glen Canyon Dam Long-Term Experimental and Management Plan.

A. Adaptive Management Work Group (AMWG) Costs

A.1. AMWG Program Management

This budget represents Reclamation staff costs to perform the daily activities required to support the Adaptive Management Work Group (AMWG), the GCDAMP Federal Advisory Committee Act (FACA) committee. The work includes completing assignments resulting from AMWG meetings, consulting with stakeholders on a variety of GCDAMP issues relating to the operation of GCD, disseminating pertinent information to the AMWG, preparing and tracking budget expenses, and updating Reclamation's web pages. Reclamation also responds to regular requests from the General Services Administration (GSA) to complete FACA reports and incorporate meeting and member information into the FACA database. Reclamation also organizes stakeholder travel to AMWG meetings, 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, while using the funds available 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.

Reclamation will work to ensure that personnel 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: FY21 = \$220,000 FY22 = \$220,000 FY23 = \$220,000

A.2. 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. Having Reclamation provide reimbursement to AMWG members or alternates for air travel or mileage for the use of private vehicles, as well as other related travel costs such as hotel, per diem, and rental cars increases opportunities for members to participate in a variety of AMWG

assignments. Because Reclamation can purchase airline tickets at the Federal Government rate, there are cost savings to the program.

The GCDAMP benefits from having all AMWG members participating in regularly scheduled meetings. The AMWG is made up of a group of diverse and committed stakeholders that span the resources and values of Glen Canyon Dam and Glen and Grand Canyon below. 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: FY21= \$20,000 FY22 = \$20,000 FY23 = \$20,000

A.3. AMWG Reclamation 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.

Budget: FY21= \$20,000 FY22 = \$20,000 FY23 = \$20,000

A.4. 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 ad hoc groups or TWG in completing assignments.

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 coordinating meetings and developing agendas, and provides follow up after meetings that include action items and meeting minutes.

Budget: FY21= \$75,000 FY22 = \$75,000 FY23 = \$75,000

A.5. 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: FY21= \$25,000 FY22 = \$25,000 FY23 = \$25,000

A.6. AMWG Other

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

- Meeting room rentals
- Overnight mailings of AMWG meeting packets
- Copying of reports
- Purchasing meeting materials (cassette tapes, markers, paper, etc.)
- Purchasing audio visual equipment (microphones, cords, phones, projector, etc).

In addition to the expenses noted above, training courses are often required for staff to keep current on environmental issues, FACA changes, computer technology improvements, etc. Other expenses will be kept to a minimum in an effort to reduce the administrative portion of the GCDAMP budget

Budget: FY21 = \$15,000 FY22 = \$15,000 FY23 = \$15,000

Table 1. Reclamation Adaptive Management Work Group Budget Summary

<i>Fiscal Year 2021</i>						
	Project Description	Reclamation Salaries	Travel	Operations / Supplies	Contracts / Cooperators	Total
A	Adaptive Management Work Group					\$ 375,000
A.1	Adaptive Management Work Group Costs (BOR)	\$ 220,000				\$ 220,000
A.2	AMWG Member Travel Reimbursement		\$ 20,000			\$ 20,000
A.3	AMWG Reclamation Travel		\$ 20,000			\$ 20,000
A.4	AMWG Facilitation Contract				\$ 75,000	\$ 75,000
A.5	Public Outreach - Reclamation public affairs, POAG	\$ 25,000				\$ 25,000
A.6	AMWG Other			\$ 15,000		\$ 15,000
A	Total	\$ 245,000	\$ 40,000	\$ 15,000	\$ 75,000	\$ 375,000
<i>Fiscal Year 2022</i>						
	Project Description	Reclamation Salaries	Travel	Operations / Supplies	Contracts / Cooperator	Total
A	Adaptive Management Work Group					\$ 375,000
A.1	Adaptive Management Work Group Costs (BOR)	\$ 220,000				\$ 220,000
A.2	AMWG Member Travel Reimbursement		\$ 20,000			\$ 20,000
A.3	AMWG Reclamation Travel		\$ 20,000			\$ 20,000
A.4	AMWG Facilitation Contract				\$ 75,000	\$ 75,000
A.5	Public Outreach - Reclamation public affairs, POAG	\$ 25,000				\$ 25,000
A.6	AMWG Other			\$ 15,000		\$ 15,000
A	Total	\$ 245,000	\$ 40,000	\$ 15,000	\$ 75,000	\$ 375,000
<i>Fiscal Year 2023</i>						
	Project Description	Reclamation Salaries	Travel	Operations / Supplies	Contracts / Cooperator	Total
A	Adaptive Management Work Group					\$ 375,000
A.1	Adaptive Management Work Group Costs (BOR)	\$ 220,000				\$ 220,000
A.2	AMWG Member Travel Reimbursement		\$ 20,000			\$ 20,000
A.3	AMWG Reclamation Travel		\$ 20,000			\$ 20,000
A.4	AMWG Facilitation Contract				\$ 75,000	\$ 75,000
A.5	Public Outreach - Reclamation public affairs, POAG	\$ 25,000				\$ 25,000
A.6	AMWG Other			\$ 15,000		\$ 15,000
A	Total	\$ 245,000	\$ 40,000	\$ 15,000	\$ 75,000	\$ 375,000

B. Technical Work Group (TWG) Costs

B.1. TWG Program Management

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.

Personnel costs will not exceed what has been proposed in the budget unless Federal employee salaries are increased above the CPI. 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.

Budget: FY21 = \$120,000 FY22 = \$120,000 FY23 = \$120,000

B.2. 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. By providing reimbursement to TWG members or alternates for air travel or mileage for the use of private vehicles, as well as other related travel costs such as hotel, per diem, and rental car increases opportunities for members to participate in a variety of TWG assignments. Because Reclamation can purchase airline tickets at the Federal Government rate, there are cost savings to the program.

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: FY21 = \$25,000 FY22 = \$25,000 FY23 = \$25,000

B.3. 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.

Budget: FY21 = \$20,000 FY22 = \$20,000 FY23 = \$20,000

B.4. TWG Chair Reimbursement/Facilitation

This budget supports a person who is under contract to Reclamation to serve as the chairperson for the TWG. This person may also assist AMWG/TWG ad hoc groups in completing assignments.

The chairperson's primary responsibility is to conduct regularly scheduled TWG meetings. The chairperson also participates in ad hoc group assignments and works closely with Reclamation and GCMRC staff in setting meeting agendas. The chairperson follows up on TWG and ad hoc group assignments and ensures that information is shared with the members and alternates in a timely manner.

The chairperson creates an atmosphere in which the members and other participants at TWG meetings feel comfortable expressing their individual viewpoints. The chairperson will bring the TWG members to consensus on sensitive issues with the ultimate goal of making recommendations to the AMWG that incorporate the best scientific information available to the GCDAMP. The chairperson will follow up on action items and make assignments as necessary to accomplish TWG objectives.

In the event that the TWG chair salary is covered through funding outside the GCDAMP, these funds can be used by Reclamation for TWG-related administrative purposes or to cover facilitation and support for TWG-related issues. Part, or all, of this budget may be used for facilitation services for TWG meetings, support for TWG ad hoc groups, or support completing TWG assignments.

Budget: FY21 = \$25,000 FY22 = \$25,000 FY23 = \$25,000

B.5. TWG Other

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

- Overnight mailings of AMWG meeting packets
- Copying of reports
- Purchasing meeting materials (cassette tapes, markers, paper, etc.)
- Purchasing audio visual equipment (microphones, cords, phones, 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: FY21 = \$10,000 FY22 = \$10,000 FY23 = \$10,000

Table 2. Reclamation Technical Work Group Budget Summary

<i>Fiscal Year 2021</i>						
	Project Description	Reclamation Salaries	Travel	Operations / Supplies	Contracts / Cooperator	Total
B	Technical Working Group					\$ 200,000
B.1	TWG Costs (BOR)	\$ 120,000				\$ 120,000
B.2	TWG Member Travel Reimbursement		\$ 25,000			\$ 25,000
B.3	TWG Reclamation Travel		\$ 20,000			\$ 20,000
B.4	TWG Chair Reimbursement/Facilitation				\$ 25,000	\$ 25,000
B.5	TWG Other			\$ 10,000		\$ 10,000
B	Total	\$ 120,000	\$ 45,000	\$ 10,000	\$ 25,000	\$ 200,000
<i>Fiscal Year 2022</i>						
	Project Description	Reclamation Salaries	Travel	Operations / Supplies	Contracts / Cooperator	Total
B	Technical Working Group					\$ 200,000
B.1	TWG Costs (BOR)	\$ 120,000				\$ 120,000
B.2	TWG Member Travel Reimbursement		\$ 25,000			\$ 25,000
B.3	TWG Reclamation Travel		\$ 20,000			\$ 20,000
B.4	TWG Chair Reimbursement/Facilitation				\$ 25,000	\$ 25,000
B.5	TWG Other			\$ 10,000		\$ 10,000
B	Total	\$ 120,000	\$ 45,000	\$ 10,000	\$ 25,000	\$ 200,000
<i>Fiscal Year 2023</i>						
	Project Description	Reclamation Salaries	Travel	Operations / Supplies	Contracts / Cooperator	Total
B	Technical Working Group					\$ 200,000
B.1	TWG Costs (BOR)	\$ 120,000				\$ 120,000
B.2	TWG Member Travel Reimbursement		\$ 25,000			\$ 25,000
B.3	TWG Reclamation Travel		\$ 20,000			\$ 20,000
B.4	TWG Chair Reimbursement/Facilitation				\$ 25,000	\$ 25,000
B.5	TWG Other			\$ 10,000		\$ 10,000
B	Total	\$ 120,000	\$ 45,000	\$ 10,000	\$ 25,000	\$ 200,000

C. Program Administration, ESA Compliance, and Management Actions

C.1. 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: FY21 = \$120,000 FY22 = \$120,000 FY23 = \$120,000

C.2. Contract Administration

This budget covers the expenses for Reclamation acquisitions and contracting staff to prepare and execute contracts associated with the GCDAMP. Specifically, these contracts include GCMRC science and monitoring, NPS monitoring and permitting, AMWG facilitation, TWG chairperson reimbursement, Science Advisors program, Tribal participation and resource monitoring, Administrative History, and programmatic agreement (PA) contract work.

Reclamation contract specialists will accurately apply funds spent on individual contracts to ensure costs do not exceed contract limits. They will keep the Reclamation Resources Management Division (RMD) contracting technical representative informed as to those charges so accurate reporting can be made to both AMWG and TWG members.

Reclamation contracting 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: FY21 = \$70,000 FY22 = \$120,000 FY23 = \$70,000

C.3. Integrated GCDAMP Stakeholder River Trip

The objective of this project is to provide an opportunity for AMWG members and GCDAMP stakeholders to articulate their respective values, concerns and issues in a field setting. The river trip also provides the opportunity for AMWG 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.

Budget: FY21 = \$0 FY22 = \$50,000 FY23 = \$0

C.4. Science Advisor Program

This budget provides funding to support the Science Advisor Program, including the office of the Executive Coordinator for the Science Advisor Program. The Science Advisor Program provides recommendations to the AMWG and the GCMRC 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 Science Advisor Program periodically conducts independent, external reviews of GCDAMP resource-specific monitoring and research programs and carries out other advisory tasks as requested by the AMWG. The Executive Coordinator manages the Science Advisor Program and may also carry out advisory tasks.

Tasks identified for the FY2021-2023 work plan are:

- Science Advisor Program administration
- Regular AMWG and TWG meeting attendance and participation
- Establish and convene Science Advisor panel, as appropriate
- Conduct one or two external reviews
 - Review #1 – Monitoring Metrics
 - Review #2 – TBD
- Support and guide three-year Knowledge Assessment process

Budget: FY21 = \$150,000 FY22 = \$150,000 FY23 = \$150,000

C.5. 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. If the funds allocated to the Experimental Management Fund are not needed in a given year, at the end of the year, they will be transferred to the Native Fish Conservation Contingency Fund (Reclamation project C.6); some year-end experimental management funds may also be allocated to the Contingency Fund for NHPA Section 106 Compliance (Reclamation project D.9). 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. These efforts will be coordinated with GCMRC's Project N.

Budget: FY21 = \$400,000 FY22 = \$400,000 FY23 = \$400,000

C.6. Native Fish Conservation Contingency Fund

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.

Carryover balance:

- End of FY20 anticipated carryover = TBD

C.7 and C.8. 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).

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 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 experimentally 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. (GCMRC project C.X describes GCMRC's coordination with NPS and tribal partners in developing the scientific design, implementation and monitoring protocols for the experimental vegetation treatment.) These activities would include ongoing monitoring and removal of selected nonnative plants, species in the corridor, systematic removal of nonnative vegetation at targeted sites, and native replanting at targeted sites and subreaches, which may include complete removal of tamarisk (both live and dead) and revegetation with native vegetation. Treatments fall into two broad categories, including the control of nonnative plant species and revegetation with native plant species. Principal elements of this experimental riparian vegetation proposal include:

- Control nonnative plant species affected by dam operations, including tamarisk and other highly invasive species;
- 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, 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; 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: GRCA FY21 = \$170,000 FY22 = \$170,000 FY23 = \$170,000
GLCA FY21 = \$65,000 FY22 = \$65,000 FY23 = \$65,000

C.9. Evaluation of Means to Prevent Fish Passage through GCD

In the 2016 LTEMP EIS BO, Reclamation committed to evaluate means of preventing the passage of deleterious invasive nonnative fish through Glen Canyon Dam. Potential options to minimize or eliminate passage through the turbine or bypass intakes, or minimize survival of nonnative fish that pass through the dam would be assessed. While feasible options may not currently exist, technology may be developed later in the LTEMP period that could help achieve this goal.

Specific tasks under consideration.

Budget: FY21 = \$0 FY22 = \$0 FY23 = \$0

C.10. Evaluation of Temperature Control Methods at GCD

In the 2016 LTEMP EIS BO, Reclamation committed to explore the efficacy of a temperature control device, or methods, at Glen Canyon Dam to respond to potential extremes in hydrologic conditions due to climate conditions that could result in nonnative fish establishment. This includes evaluations of current and evolving technological advances that could provide for warming and cooling the river in both high- and low-flow discharge scenarios, and high and low reservoir levels.

Specific tasks under consideration.

Budget: FY21 = \$0 FY22 = \$0 FY23 = \$0

C.11. Southwestern Willow Flycatcher and Yuma Ridgway's Rail Surveys

In the 2016 LTEMP EIS BO, Reclamation committed to monitoring the two endangered birds consulted on in the BO: the Yuma Ridgway's rail and the southwestern willow flycatcher. Reclamation will partially assist in funding National Park Service staff in conducting Yuma Ridgway's rail surveys once every three years and conduct southwestern willow flycatcher surveys once every two years for the duration of the LTEMP. 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. Both birds would be surveyed in 2018, while only the Southwest willow flycatcher would be surveyed in 2020. This work will focus on the presence/absence surveys in accordance with the conservation measures outlined in the BO. Future GCDAMP budget cycles may also consider research questions associated with these species.

Budget: FY21 = \$17,000 FY22 = \$0 FY23 = \$10,000

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Table 4. Reclamation Program Administration, ESA Compliance, and Management Actions Budget Summary

<i>Fiscal Year 2021</i>						
	Project Description	Reclamation Salaries	Travel	Operations / Supplies	Contracts / Cooperators	Total
C	Program Administration, ESA Compliance, and Management Actions					\$ 992,000
C.1	Administrative Support for NPS Permitting				\$ 120,000	\$ 120,000
C.2	Contract Administration	\$ 70,000				\$ 70,000
C.3	Integrated Stakeholder River Trip					\$ -
C.4	Science Advisors Program				\$ 150,000	\$ 150,000
C.5	Experimental Management Fund				\$ 400,000	\$ 400,000
C.6	Native Fish Conservation Contingency Fund					\$ -
C.7	Experimental Vegetation Treatment - Grand Canyon				\$ 170,000	\$ 170,000
C.8	Experimental Vegetation Treatment - Glen Canyon				\$ 65,000	\$ 65,000
C.9	Evaluation of means to prevent fish passage through GCD					\$ -
C.10	Evaluation of temperature control methods at GCD					\$ -
C.11	Ridgway's Rail and Southwest Willow Flycatcher monitoring				\$ 17,000	\$ 17,000
C	Total	\$ 70,000	\$ -	\$ -	\$ 922,000	\$ 992,000
<i>Fiscal Year 2022</i>						
	Project Description	Reclamation Salaries	Travel	Operations / Supplies	Contracts / Cooperators	Total
C	Program Administration, ESA Compliance, and Management Actions					\$ 1,075,000
C.1	Administrative Support for NPS Permitting				\$ 120,000	\$ 120,000
C.2	Contract Administration	\$ 120,000				\$ 120,000
C.3	Integrated Stakeholder River Trip			\$ 50,000		\$ 50,000
C.4	Science Advisors Program				\$ 150,000	\$ 150,000
C.5	Experimental Management Fund				\$ 400,000	\$ 400,000
C.6	Native Fish Conservation Contingency Fund					\$ -
C.7	Experimental Vegetation Treatment - Grand Canyon				\$ 170,000	\$ 170,000
C.8	Experimental Vegetation Treatment - Glen Canyon				\$ 65,000	\$ 65,000
C.9	Evaluation of means to prevent fish passage through GCD					\$ -
C.10	Evaluation of temperature control methods at GCD					\$ -
C.11	Ridgway's Rail and Southwest Willow Flycatcher monitoring					\$ -
C	Total	\$ 120,000	\$ -	\$ 50,000	\$ 905,000	\$ 1,075,000
<i>Fiscal Year 2023</i>						
	Project Description	Reclamation Salaries	Travel	Operations / Supplies	Contracts / Cooperators	Total
C	Program Administration, ESA Compliance, and Management Actions					\$ 985,000
C.1	Administrative Support for NPS Permitting				\$ 120,000	\$ 120,000
C.2	Contract Administration	\$ 70,000				\$ 70,000
C.3	Integrated Stakeholder River Trip					\$ -
C.4	Science Advisors Program				\$ 150,000	\$ 150,000
C.5	Experimental Management Fund				\$ 400,000	\$ 400,000
C.6	Native Fish Conservation Contingency Fund					\$ -
C.7	Experimental Vegetation Treatment - Grand Canyon				\$ 170,000	\$ 170,000
C.8	Experimental Vegetation Treatment - Glen Canyon				\$ 65,000	\$ 65,000
C.9	Evaluation of means to prevent fish passage through GCD					\$ -
C.10	Evaluation of temperature control methods at GCD					\$ -
C.11	Ridgway's Rail and Southwest Willow Flycatcher monitoring				\$ 10,000	\$ 10,000
C	Total	\$ 70,000	\$ -	\$ -	\$ 915,000	\$ 985,000

D. NHPA Compliance and Cultural Resources Program Management

D.1. 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 five tribal grants from both appropriated funds for participation in the GCDAMP and power revenues 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, TWG and AMWG 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: FY21 = \$120,000 FY22 = \$120,000 FY23 = \$120,000

D.2. Support to Reclamation for Cultural Resources Compliance

Due to the workload involved in the implementation of the 2017 PA and limited Reclamation cultural resources staff, this budget item is for assistance with Reclamation's cultural resources compliance management. The awardee(s) will assist in the implementation of the HPP, and will support Reclamation's ongoing section 106 compliance activities carried out under the 2017 PA Stipulations.

Tasks for the awardee(s) include support for planning, coordinating and attending the annual PA implementation meetings, and drafting annual reports. Coordination with Reclamation's Regional Archeologist, the contracting officer, Tribes, GCMRC, and GCDAMP stakeholders and Program Manager is also expected. The awardee(s) may solicit GCDAMP expertise and input on cultural resources issues to support the fulfillment of these tasks. The primary tasks are:

- Provide assistance to Reclamation for the administration and implementation of the GCDAMP cultural resources program, including assistance with Reclamation's compliance with Section 106 of the NHPA as defined in the 2017 PA.

Some of this funding may be used to support tribal participation (outside of formal consultation) in the development of planning and compliance documents (e.g. Memoranda of Agreement for Non-native Fish Control), where their unique expertise is necessary for adequately addressing issues, particularly associated with the management of their traditional cultural properties. The awardee will work cooperatively with GCMRC on Project D.X.

Completion of this Administrative support to Reclamation allows for compliance with the 2017 PA Stipulations I-IX, XI, and XII.

Budget: FY21 = \$40,000 FY22 = \$40,000 FY23 = \$40,000

D.3. 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. Additional data collection related to geospatial references and condition of archaeological sites will be gathered using a hardened field computer or hand-held unit and imported directly into the Cultural Resource geodatabase. The project goals and objectives are:

- 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: FY21 = \$50,000 FY22 = \$50,000 FY23 = \$50,000

D.4. 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 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 2021-2023. 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: FY21 = \$30,000 FY22 = \$30,000 FY23 = \$30,000

D.5. Tribal Associative Values Studies and Mitigation

Multiple proposals submitted by Tribal Partners are currently under review. Projects TBD.

Completion of this project allows for compliance with the 2017 PA Stipulation I B(4), IV and VI. The ultimate goal is the mitigation of adverse effects to historic properties or to identify mitigation strategies for adverse effects. If these funds are not needed in a given year, they may be utilized for other 2017 PA compliance activities. Data sharing and cooperation with GCMRC Project X will occur if appropriate and in consultation with Tribes.

Budget: FY21 = \$150,000 FY22 = \$150,000 FY23 = \$150,000

D.6. Cultural Sensitivity Training Development - Tribal Expertise

This project is to fund tribal expertise in the development of a GCDAMP cultural sensitivity training. Native American tribes possess special expertise in religious and cultural significance. It is recognized that this expertise is the outcome of extensive traditional learning and training

that certain Native individuals go through to receive tribal recognition as an initiated individual, a medicine person, or a spiritual leader. Reclamation acknowledges and respects traditional knowledge and traditional education systems and recognizes that the inclusion of individuals with this knowledge is a vital component for the identification, evaluation, analysis, recording, treatment, monitoring or disposition of historic properties. Because not every researcher within the GCDAMP is able to undergo the intense training that certain Native individuals complete, this project will fund those experts to 1) assist the researchers to identify key aspects of religious and cultural significance; 2) develop training methods to pass this information on, and 3) to participate in the cultural sensitivity training.

This training will be developed and then revised on a recurring basis, as needed. Information from each of the five GCDAMP associated tribes will be incorporated into this training; the training will be developed by tribal members and lead by a project coordinator. The project coordinator's role is to develop a written plan for the training, in coordination with representatives from each of the five GCDAMP associated tribes, and then to facilitate the implementation of the training. Funding in the FY21 will be for the project coordinator to develop a written plan for the cultural sensitivity training. Funding in FY22 and FY23 is intended for the development and implementation of the cultural sensitivity training, including coordination with the development of a video version of the training. If additional funds are deemed necessary for FY22 and FY23, the project coordinator will write a project proposal for the development and implementation of the cultural sensitivity training; additional funds may be reallocated to this budget item during the GCDAMP annual reassessment of the budget and work plan. Coordination with the implementation of the 2017 PA and the HPP, and with the cultural sensitivity training video (Reclamation project D.7) will be required. 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.

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. Additional sources of external funding will be explored and utilized, if appropriate.

Budget: FY21 = \$15,000 FY22 = \$15,000 FY23 = \$15,000

D.7. Cultural Sensitivity Training Video

Following the development of the cultural sensitivity training identified in Reclamation project D.6, 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. This project will be implemented by a contractor. Coordination with the project coordinator and tribal experts identified in Reclamation project D.6 is critical to the success of this project. The project goals and objectives are:

- Produce a Cultural Sensitivity Training video for use by all GCDAMP researchers and stakeholders

Completion of this project allows for compliance with the 2017 PA Stipulation IV A(9). The product is a video based on the Sensitivity Training developed in Reclamation project D.7 which will be a component of the Historic Preservation Plan under the PA.

Additional sources of external funding will be explored and utilized, if appropriate.

Budget: FY21 = \$35,000 FY22 = \$35,000 FY23 = \$35,000

D.8. 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. Funds in this budget item may accumulate over time, rolling from one year to the next, serving to ensure that funds are available for the mitigation actions should the need arise.

If funds allocated to the Experimental Management Fund (Reclamation project C.5) 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. If adequate funds are available, funds will be transferred with the goal of bringing the balance of the Contingency Fund for NHPA Section 106 Compliance up to a balance of \$200,000.

Budget: FY21 = \$25,000 FY22 = \$25,000 FY23 = \$25,000

Carryover balance:

- End of FY20 carryover = TBD

D.9. 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, Kaibab-Paiute Tribe, 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: FY21 = \$175,000 FY22 = \$175,000 FY23 = \$175,000

D.X. Tribal Participation in the GCDAMP

This budget item provides funding through DOI agency appropriations (i.e., not power revenues) for the participation in GCDAMP meetings of the five GCDAMP Tribes (Hopi Tribe, Hualapai Tribe, Kaibab Paiute Tribe, 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, Reclamation, U.S. Fish and Wildlife Service, and Bureau of Indian Affairs) provide appropriated 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: FY21 = \$475,000 FY22 = \$475,000 FY23= \$475,000

Table 5. Reclamation Cultural Resources Budget Summary

<i>Fiscal Year 2021</i>						
	Project Description	Reclamation Salaries	Travel	Operations / Supplies	Contracts / Cooperators	Total
D	Cultural Resources					\$ 640,000
D.1	Reclamation Cultural Resources Program Management	\$ 120,000				\$ 120,000
D.2	Support to Reclamation for cultural resources				\$ 40,000	\$ 40,000
D.3	Cultural Resources Monitoring - Grand Canyon				\$ 50,000	\$ 50,000
D.4	Cultural Resources Monitoring - Glen Canyon				\$ 30,000	\$ 30,000
D.5	Associative Values Studies and Mitigation				\$ 150,000	\$ 150,000
D.6	Cultural sensitivity training development - tribal				\$ 15,000	\$ 15,000
D.7	Cultural sensitivity training video				\$ 35,000	\$ 35,000
D.8	Contingency fund for NHPA section 106 compliance				\$ 25,000	\$ 25,000
D.9	Tribal cultural resources monitoring				\$ 175,000	\$ 175,000
D.X	Tribal participation in AMP (not funded by power revenues)				\$ 475,000	\$ 475,000
D	Total	\$ 120,000	\$ -	\$ -	\$ 520,000	\$ 640,000
<i>Fiscal Year 2022</i>						
	Project Description	Reclamation Salaries	Travel	Operations / Supplies	Contracts / Cooperators	Total
D	Cultural Resources					\$ 640,000
D.1	Reclamation Cultural Resources Program Management	\$ 120,000				\$ 120,000
D.2	Support to Reclamation for cultural resources				\$ 40,000	\$ 40,000
D.3	Cultural Resources Monitoring - Grand Canyon				\$ 50,000	\$ 50,000
D.4	Cultural Resources Monitoring - Glen Canyon				\$ 30,000	\$ 30,000
D.6	Associative Values Studies and Mitigation				\$ 150,000	\$ 150,000
D.7	Cultural sensitivity training development - tribal				\$ 15,000	\$ 15,000
D.8	Cultural sensitivity training video				\$ 35,000	\$ 35,000
D.9	Contingency fund for NHPA section 106 compliance				\$ 25,000	\$ 25,000
D.10	Tribal cultural resources monitoring				\$ 175,000	\$ 175,000
D.X	Tribal participation in AMP (not funded by power revenues)				\$ 475,000	\$ 475,000
D	Total	\$ 120,000	\$ -	\$ -	\$ 520,000	\$ 640,000
<i>Fiscal Year 2023</i>						
	Project Description	Reclamation Salaries	Travel	Operations / Supplies	Contracts / Cooperators	Total
D	Cultural Resources					\$ 640,000
D.1	Reclamation Cultural Resources Program Management	\$ 120,000				\$ 120,000
D.2	Support to Reclamation for cultural resources				\$ 40,000	\$ 40,000
D.3	Cultural Resources Monitoring - Grand Canyon				\$ 50,000	\$ 50,000
D.4	Cultural Resources Monitoring - Glen Canyon				\$ 30,000	\$ 30,000
D.5	Associative Values Studies and Mitigation				\$ 150,000	\$ 150,000
D.6	Cultural sensitivity training development - tribal				\$ 15,000	\$ 15,000
D.7	Cultural sensitivity training video				\$ 35,000	\$ 35,000
D.8	Contingency fund for NHPA section 106 compliance				\$ 25,000	\$ 25,000
D.9	Tribal cultural resources monitoring				\$ 175,000	\$ 175,000
D.X	Tribal participation in AMP (not funded by power revenues)				\$ 475,000	\$ 475,000
D	Total	\$ 120,000	\$ -	\$ -	\$ 520,000	\$ 640,000

Table 6. Reclamation Total Budget Summary

Reclamation Adaptive Management Program Budget Summary FY2021-2023				
		2021	2022	2023
	GCDAMP Total	\$ 11,360,000	\$ 11,360,000	\$ 11,360,000
	Reclamation Total (20%)	\$ 2,272,000	\$ 2,272,000	\$ 2,272,000
	GCMRC Total (80%)	\$ 9,088,000	\$ 9,088,000	\$ 9,088,000
A	Adaptive Management Work Group	\$ 375,000	\$ 375,000	\$ 375,000
	<i>percent of BOR budget</i>	17%	16%	17%
A.1	Adaptive Management Work Group Costs (BOR)	\$ 220,000	\$ 220,000	\$ 220,000
A.2	AMWG Member Travel Reimbursement	\$ 20,000	\$ 20,000	\$ 20,000
A.3	AMWG Reclamation Travel	\$ 20,000	\$ 20,000	\$ 20,000
A.4	AMWG Facilitation and Notetaking	\$ 75,000	\$ 75,000	\$ 75,000
A.5	Public Outreach - Reclamation public affairs, POAG	\$ 25,000	\$ 25,000	\$ 25,000
A.6	AMWG Other	\$ 15,000	\$ 15,000	\$ 15,000
B	Technical Working Group	\$ 200,000	\$ 200,000	\$ 200,000
	<i>percent of BOR budget</i>	9%	9%	9%
B.1	TWG Costs (BOR)	\$ 120,000	\$ 120,000	\$ 120,000
B.2	TWG Member Travel Reimbursement	\$ 25,000	\$ 25,000	\$ 25,000
B.3	TWG Reclamation Travel	\$ 20,000	\$ 20,000	\$ 20,000
B.4	TWG Chair Reimbursement/Facilitation	\$ 25,000	\$ 25,000	\$ 25,000
B.5	TWG Other	\$ 10,000	\$ 10,000	\$ 10,000
C	Program Admin, ESA Compliance, and Management Actions	\$ 992,000	\$ 1,075,000	\$ 985,000
	<i>percent of BOR budget</i>	45%	47%	45%
C.1	Administrative Support for NPS Permitting	\$ 120,000	\$ 120,000	\$ 120,000
C.2	Contract Administration	\$ 70,000	\$ 120,000	\$ 70,000
C.3	Integrated Stakeholder River Trip	\$ -	\$ 50,000	\$ -
C.4	Science Advisors Program	\$ 150,000	\$ 150,000	\$ 150,000
C.5	Experimental Management Fund	\$ 400,000	\$ 400,000	\$ 400,000
C.6	Native Fish Conservation Contingency Fund	carryover from previous years		
C.7	Experimental Vegetation Treatment - Grand Canyon	\$ 170,000	\$ 170,000	\$ 170,000
C.8	Experimental Vegetation Treatment - Glen Canyon	\$ 65,000	\$ 65,000	\$ 65,000
C.9	Evaluation of means to prevent fish passage through GCD	\$ -	\$ -	\$ -
C.10	Evaluation of temperature control methods at GCD	\$ -	\$ -	\$ -
C.11	Ridgway Rail and Southwest Willow Flycatcher monitoring	\$ 17,000	\$ -	\$ 10,000
D	Cultural Resources	\$ 640,000	\$ 640,000	\$ 640,000
	<i>percent of BOR budget</i>	29%	28%	29%
D.1	Reclamation Cultural Resources Program Management	\$ 120,000	\$ 120,000	\$ 120,000
D.2	Support to Reclamation for cultural resources	\$ 40,000	\$ 40,000	\$ 40,000
D.3	Cultural Resources Monitoring - Grand Canyon	\$ 50,000	\$ 50,000	\$ 50,000
D.4	Cultural Resources Monitoring - Glen Canyon	\$ 30,000	\$ 30,000	\$ 30,000
D.5	Associative Values Studies and Mitigation	\$ 150,000	\$ 150,000	\$ 150,000
D.6	Cultural sensitivity Training Development - tribal	\$ 15,000	\$ 15,000	\$ 15,000
D.7	Cultural sensitivity training video	\$ 35,000	\$ 35,000	\$ 35,000
D.8	Contingency fund for NHPA section 106 compliance	\$ 25,000	\$ 25,000	\$ 25,000
D.9	Tribal cultural resources monitoring	\$ 175,000	\$ 175,000	\$ 175,000
D.X	Tribal participation in AMP (not funded by power revenues)	\$ 475,000	\$ 475,000	\$ 475,000
TOTAL Anticipated Available to Reclamation		\$ 2,272,000	\$ 2,272,000	\$ 2,272,000
TOTAL Reclamation Budget		\$ 2,207,000	\$ 2,290,000	\$ 2,200,000
(Over) / Under budget		\$ 65,000	\$ (18,000)	\$ 72,000

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 and 2016 LTEMP EIS 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:

Razorback sucker monitoring and research

Partners: BioWest / National Park Service / Reclamation / Northern Arizona University / GCMRC

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 utilizing lower Grand Canyon. Reclamation will continue to fund BioWest and NPS to assist in continuing this small-bodied and larval fish monitoring of both species to determine their presence and distribution at different life stages, habitat use, and spawning of both species. Reclamation will coordinate with the GCMRC 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.

Consistent with its 2018 Expanded Non-Native Aquatic Species Management Plan and Environmental Assessment (NNAS EA), NPS expects to test the efficacy of incentivized harvest as a potential tool to manage the Brown Trout population at Lees Ferry beginning in FY2021. Reclamation supports this effort and expects to contribute partial funding for up to two years. The GCDAMP will support the proposal through increased monitoring and research of Brown Trout population dynamics and angler behavior, as described in GCMRC Project X.X.

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 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 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.

Reservoir release temperature control methods

Partner: Reclamation, Science and Technology Program

Temperature control of reservoir releases is a high priority throughout Reclamation as it helps Reclamation to comply with biological opinions, water quality requirements, and supports the recovery of endangered fish species under the Endangered Species Act. There are currently several approaches in place at Reclamation dams to address temperature control; these include temperature control devices, temperature curtains, and reoperation strategies. Reclamation, through the Science and Technology program, is initiating a scoping-level project aimed to better understand the current state-of-the-practice on temperature control, identify needs and research gaps, develop partnerships, identify subject matter experts, and recommend future actions.

Table 7. Summary of Conservation Measures Activities

Conservation Measure			Activity that addresses it	Who is doing the work	Funding Source
Humpback Chub					
<i>Translocations</i>	Mainstem tributaries (Shinumo, Havasu Upper Havasu)		NPS -Humpback Chub Tributary Translocations and Associated Monitoring and Nonnative Fish Control; GCMRC -	NPS/GCMRC	AMP
	Chute falls		GCMRC - Project G	GCMRC/FWS	AMP
			GCMRC - Project G; NPS - Humpback Chub Tributary Translocations and Associated Monitoring and Nonnative Fish Control; FWS - coordination with Havasupai Tribe on translocations	GCMRC/NPS/FWS	AMP
	Explore other tribes		NPS -Humpback Chub Tributary Translocations and Associated Monitoring and Nonnative Fish Control	NPS/GCMRC	AMP
	Nonnative removal in tribes				
<i>Mainstem</i>	Expand aggregations outside		GCMRC Project G	GCMRC/FWS	AMP
	Mainstem augmentation		GCMRC Project G	GCMRC/FWS	AMP
<i>LCR Monitoring</i>	Spring and Fall Population estimates		GCMRC Project G	GCMRC/FWS	AMP
	LCR mainstem aggregation monitoring		GCMRC Project G	GCMRC/FWS	AMP
	Multistate model		GCMRC Project G	GCMRC	AMP
<i>Mainstem monitoring</i>	Aggregations		GCMRC Project G	GCMRC/NPS/FWS	AMP
	New populations & outside aggregations		GCMRC Project G; NPS/BioWest/FWS	GCMRC/NPS/BioWest/FWS	AMP/ Reclamation
	Parasite monitoring		GCMRC Project I	GCMRC	AMP
<i>Refuge</i>	Fund FWS Humpback Chub refuge (SNARRC)		Reclamation	FWS / Reclamation	Reclamation (outside AMP)
Razorback Sucker					
		Habitat use	GCMRC -Project F; NPS/BioWest -Razorback Sucker Monitoring and Adaptive Management, Larval and Small-bodied Fish	GCMRC/NPS/BioWest	AMP / Reclamation (outside AMP)
		Determine effects of dam operations-TMFs	GCMRC - Project H; NPS -Razorback Sucker Monitoring and Adaptive Management, Larval and Small-bodied Fish	NPS/GCMRC	AMP
		Determine extent of hybridization	Reclamation funded masters degree project	Reclamation	Reclamation (outside AMP)
Benefit Native Aquatic Species					
		Remove brown trout from Bright Angel, inflow & and other areas	GCMRC - Project F ; NPS -Humpback Chub Tributary Translocations and Associated Monitoring and Nonnative Fish	GCMRC/NPS	AMP
		Evaluate use of piscicide or other tools to renovate Bright Angel and Shinumo		NPS	
		Evaluate TMFs for brown trout	GCMRC -Project H	GCMRC	AMP
		Rapid Response	GCMRC - Project I; NPS -Invasive Species Monitoring & Management	NPS/GCMRC	AMP / NPS
		Evaluate temperature control methods	Reclamation Project C.3	Reclamation	AMP
		Evaluate means to prevent fish passage through the dam	Reclamation Project C.8	Reclamation	AMP
		Backwater slough	NPS - Invasive Species Monitoring and Management	NPS/Reclamation	NPS / Reclamation
Southwest Willow Flycatcher					
	monitor every 2 years		Reclamation Project C.10	NPS	AMP
Yuma Ridgway's Rail					
	monitor every 3 years		Reclamation Project C.10	NPS	AMP