

**Glen Canyon Dam Adaptive Management Work Group**  
**Agenda Item Form**  
**February 15-16, 2017**

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Agenda Item

Long-Term Experimental and Management Plan (LTEMP)—Overview of the Record of Decision and What it Means for AMWG, Dam Operations, and GCDAMP Priorities

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Purpose of Agenda Item

Provide an overview of the LTEMP ROD with focus on AMWG, dam operations, and GCDAMP priorities.

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Action Requested

Information item only; we will answer questions but no action is requested.

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Presenters

Paul Davidson, Hydraulic Engineer, Upper Colorado River Region, Bureau of Reclamation  
Katrina Grantz, Chief, Adaptive Management Group, Upper Colorado River Region, Bureau of Reclamation

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Previous Action Taken

The Secretary of the Interior signed the LTEMP ROD on December 15, 2016.

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Relevant Science

See the LTEMP EIS at <http://ltempeis.anl.gov/documents/final-eis/>.

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Summary of Presentation and Background Information

The presentation will provide an overview of the LTEMP ROD with focus on AMWG, dam operations, and GCDAMP priorities.

The operations of Glen Canyon Dam for the remainder of Water Year 2017, as well as the plan for the phased implementation through interim operations, will be discussed.

The presentation will also cover the plan for implementation of experiments and the Adaptive Management Program's role in implementing LTEMP.

The presentation is intended to serve as an opportunity for questions and discussion.

# RECLAMATION

*Managing Water in the West*

## Update on the LTEMP ROD

*Adaptive Management Work Group Meeting*

*Feb 15, 2017*



U.S. Department of the Interior  
Bureau of Reclamation

# Long-Term Experimental and Management Plan Record of Decision



RECLAMATION

# Presentation Overview

- LTEMP ROD overview
- Interim Operations for WY2017
  - Glen Canyon monthly volumes
  - Fluctuations and ramp rates
- LTEMP Communication and Consultation Process
- Annual Experiments
  - No Experiments until Oct 1, 2017
  - Annual review for upcoming experiments
- PA process update
- No changes to 2017 Budget

# LTEMP ROD Overview

- Interior's decision on the Glen Canyon Dam LTEMP EIS
- Signed by Secretary Jewell on December 15, 2016
- Selected, without modification, the Preferred Alternative identified in the LTEMP FEIS
- Culmination of 5-year process to develop a plan for operating Glen Canyon Dam over the next 20-years



**U.S. Department of the Interior**

**Record of Decision  
for the  
Glen Canyon Dam Long-Term  
Experimental and Management Plan  
Final Environmental Impact  
Statement**

December 2016

U.S. Department of the Interior

Bureau of Reclamation  
Upper Colorado Region  
Salt Lake City, Utah

National Park Service  
Intermountain Region  
Lakewood, Colorado

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Approved:

  
Sally Jewell  
Secretary of the Interior

Dec. 15, 2016  
Date

**RECLAMATION**

# LTEMP ROD Overview – the sections

1. Summary of Action
  2. Purpose and Need
  3. Alternatives Considered
  4. Decision and rationale for the decision
  5. Summary of comments on the Final EIS
  6. Environmental Commitments
  7. Implementation
  8. Disclaimer
  9. Attachments
- Summarize the 5-year LTEMP EIS process and the FEIS

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Alternative D  
(FEIS  
Preferred Alt)  
without  
modification,  
rationale: best  
balance of  
objectives and  
resource goals  
and best  
meets purpose  
and need

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# Glen Canyon Dam Adaptive Management Program (GCDAMP)

GCDAMP continues, GCMRC continues, Science Advisor Program continues, AMWG continues, TWG continues, LTEMP scientific monitoring plan

## **6.1 Glen Canyon Dam Adaptive Management Program (GCDAMP)**

### **a. Purpose and Continuation of the GCDAMP**

The GCDAMP was established under the authority of the 1992 GCPA and initiated with the 1996 ROD. The purpose of the GCDAMP is to provide an organization and process for cooperative integration of dam operations, downstream resource protection and management, and monitoring and research information for the purposes of protecting and improving the values for which the GCNRA and GCNP were established. The GCDAMP program will continue with this purpose under the selected preferred alternative. The Secretary of Interior retains sole discretion to decide how best to accomplish operations and experiments in any given year pursuant to the ROD and other binding obligations. As part of the GCDAMP, DOI bureaus, including Reclamation, USGS, NPS, FWS, and BIA, will continue to inform the Secretary and his/her designee on policies, scientific matters related to the GCDAMP, and the overall priorities and direction of the GCDAMP. The DOI bureau managers will continue to meet regularly to resolve questions of policies, priorities, and direction among the bureaus. Meetings among DOI managers will be part of the GCDAMP, which is independent of the AMWG. The WAPA may also be invited to participate in “Federal family” GCDAMP meetings as has occurred in recent years.

# Goals and Objectives

- Goals and Objectives of LTEMP are the goals and objectives of the AMP

## Resource goals:

- Archeological and cultural
- Natural processes
- Humpback chub
- Hydropower and energy
- Other native fish
- Recreational Experience
- Sediment
- Tribal resources
- Rainbow trout fishery
- Nonnative invasive species
- Riparian vegetation

RECLAMATION

# Goals and Objectives

Reclamation and NPS developed resource goals considering public input and desired future conditions (DFCs) previously adopted by the Adaptive Management Work Group (AMWG). The following resource goals were identified:

1. *Archaeological and Cultural Resources.* Maintain the integrity of potentially affected NRHP-eligible or listed historic properties in place, where possible, with preservation methods employed on a site-specific basis.
2. *Natural Processes.* Restore, to the extent practicable, ecological patterns and processes within their range of natural variability, including the natural abundance, diversity, and genetic and ecological integrity of the plant and animal species native to those ecosystems.
3. *Humpback Chub.* Meet humpback chub recovery goals, including maintaining a self-sustaining population, spawning habitat, and aggregations in the Colorado River and its tributaries below the Glen Canyon Dam.
4. *Hydropower and Energy.* Maintain or increase Glen Canyon Dam 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.
5. *Other Native Fish.* Maintain self-sustaining native fish species populations and their habitats in their natural ranges on the Colorado River and its tributaries.
6. *Recreational Experience.* Maintain and improve the quality of recreational experiences for the users of the Colorado River Ecosystem. Recreation includes, but is not limited to, flatwater and whitewater boating, river corridor camping, and angling in Glen Canyon.
7. *Sediment.* Increase and retain fine sediment volume, area, and distribution in the Glen, Marble, and Grand Canyon reaches above the elevation of the average base flow for ecological, cultural, and recreational purposes.
8. *Tribal Resources.* Maintain the diverse values and resources of traditionally associated Tribes along the Colorado River corridor through Glen, Marble, and Grand Canyons.
9. *Rainbow Trout Fishery.* Achieve a healthy high-quality recreational rainbow trout fishery in GCNRA and reduce or eliminate downstream trout migration consistent with NPS fish management and ESA compliance.
10. *Nonnative Invasive Species.* Minimize or reduce the presence and expansion of aquatic nonnative invasive species.
11. *Riparian Vegetation.* Maintain native vegetation and wildlife habitat, in various stages of maturity, such that they are diverse, healthy, productive, self-sustaining, and ecologically appropriate.

# Priorities and Funding

## **b. Priorities and Funding of the GCDAMP**

The GCDAMP priorities are set by the GCPA of 1992, the LTEMP FEIS, and ROD, and related mitigation requirements for endangered species and cultural resources. The

GCDAMP priorities include the management and experimental actions; mitigation and environmental commitments; and research and monitoring identified in the LTEMP FEIS and ROD, and these will be the highest priorities for GCDAMP over the term of the LTEMP. The GCDAMP activities that are eligible for funding from power revenues are those actions related to dam operations or the mitigation of dam operations within the CRE. These will be funded in compliance with Section 204 of Public Law (PL) 106-377.

Appropriated funds or other sources of funding may also be used for GCDAMP activities as specified in Section 1808 of the GCPA and Section 204 of PL 106-377.

# Commitments to Tribes

## 6.5 Commitments to Tribes

- Traditionally Associated Tribes<sup>3</sup> shall be notified at least 30 days in advance of planned experimental flows (including HFEs, TMFs, MPFs, and LSFs).
- The DOI is committed to finding beneficial uses with Traditionally Associated Tribes for nonnative fish that are mechanically removed as part of the LTEMP actions to the extent practicable.
- The DOI recognizes the opportunities for cooperative and collaborative partnerships with tribes in the management of Federal lands and resources related to the LTEMP as stated in Secretarial Order No. 3342.

# Additional Commitments

- Protecting, Mitigation and Monitoring of Cultural Resources
- ESA Compliance (commitments in the BO)
- Experimental Vegetation Treatment

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9. Attachments (A, B, C, D, E, F)



# Implementation

- Interim Operations in 2017- Base operations phased in :
  - Jan 1, 2017: implement LTEMP monthly releases
  - Annual volume not affected
  - Ramp rates, daily fluctuations phased in by October 1, 2017

## 7. IMPLEMENTATION

The Glen Canyon Dam LTEMP base operations shall be phased in through interim operations between January 1, 2017, and September 30, 2017. Beginning January 1, 2017, interim operations shall implement LTEMP general monthly release volume pattern. The LTEMP operations will not affect or change the total annual release volume stated in the Annual Operating Plan for Colorado River Reservoirs. The LTEMP ramp rates and daily fluctuations shall be phased in no later than October 1, 2017. The LTEMP experimental flows and non-flow experiments shall be implemented after September 30, 2017, to allow for agreements, planning, and budgeting to be adjusted for the new LTEMP priorities and operations. Spring HFES shall be implemented when conditions warrant, as described in the FEIS beginning September 30, 2019. The LSF experiments may be implemented no sooner than October 1, 2027. Research and monitoring projects already approved in the 2015–2017 triennial work plan and budget shall continue until September 30, 2017.

# Implementation

- Experiments after Sept. 30, 2017
  - Spring HFEs after Sept 30, 2019
  - LSF after October 1, 2027
- Projects in 2015-2017 budget and work plan shall continue until Sept 30, 2017

## 7. IMPLEMENTATION

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# Attachments

- A Objectives and Resource Goals of the LTEMP
- B Description of the Selected Alternative
- C HFE Protocol for Selected Alternative
- D Responses to Comments on the FEIS
- E Biological Opinion
- F Non Impairment Determination for Selected Alternative

# Presentation Overview

- LTEMP ROD overview
- **Interim Operations for WY2017**
  - Glen Canyon monthly volumes
  - Fluctuations and ramp rates
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  - No Experiments until Oct 1, 2017
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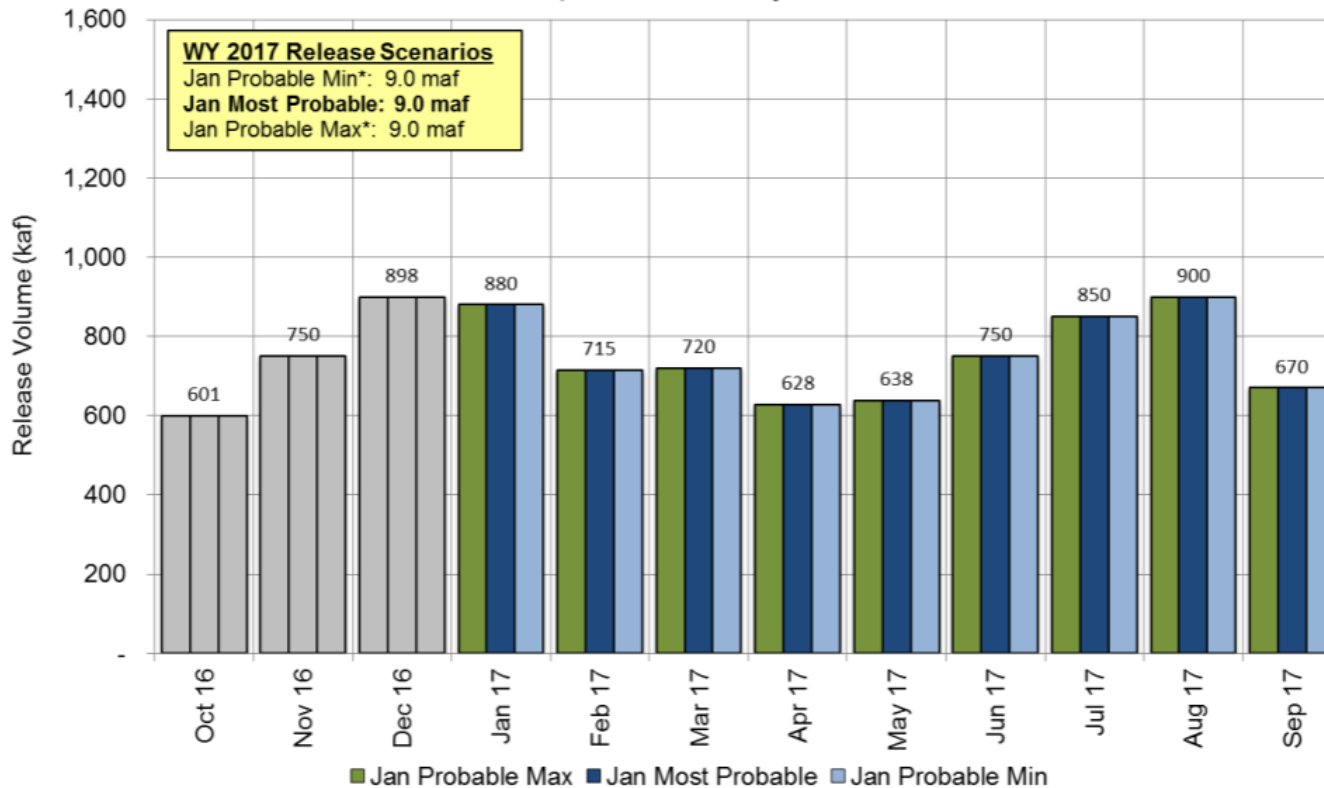
# Interim Operations – monthly volumes

LTEMP monthly volumes began Jan 1, 2017

## Potential Lake Powell Monthly Release Volume Distribution

Release Scenarios for Water Year 2017

Updated January 2017



\* Probable Min and Max annual release volume is based on April Min and Max inflow forecasts

# Monthly release volumes

**TABLE 1 Monthly Release Volumes of the Selected Alternative**

	Monthly Release Volume (thousand ac-ft) <sup>a</sup>									
	7,000	7,480	8,230	9,000	9,500	10,500	11,000	12,000	13,000	14,000
Total Annual	7,000	7,480	8,230	9,000	9,500	10,500	11,000	12,000	13,000	14,000
October	480	480	643	643	643	643	643	643	643	643
November	500	500	642	642	642	642	642	642	642	642
December	600	600	716	716	716	716	716	716	716	716
January	664	723	763	857	919	1,041	1,102	1,225	1,347	1,470
February	587	639	675	758	813	921	975	1,083	1,192	1,300
March	620	675	713	801	858	973	1,030	1,144	1,259	1,373
April	552	601	635	713	764	866	917	1,019	1,121	1,223
May	550	599	632	710	761	862	913	1,014	1,116	1,217
June	577	628	663	745	798	905	958	1,064	1,171	1,277
July	652	709	749	842	902	1,022	1,082	1,202	1,322	1,443
August	696	758	800	899	963	1,091	1,156	1,284	1,413	1,537
September	522	568	600	674	722	819	867	963	1,059	1,160

# LTEMP Hydrograph

- Monthly release volumes defined in LTEMP ROD
- Adjustments made with changing operations constraints, experiments
- Hydrology and Operations updates at each AMWG and TWG meeting
  - Opportunity to provide input



# Interim Operations

Fluctuations and ramp rates will be phased in before Oct 1, 2017

**TABLE 1 Operational Characteristics of Alternative D**

Elements of Base Operations <sup>a</sup>	Values under Preferred Alternative
Monthly pattern in release volume	Monthly volumes are described in Tables 2 and Table 3; volume released in Oct.–Dec. = 2.0 maf in $\geq 8.23$ -maf years and 1.5 maf in years $\leq 7.48$ maf
Minimum flows	8,000 cfs between 7 a.m. and 7 p.m. 5,000 cfs between 7 p.m. and 7 a.m.
Maximum non-experimental flows <sup>b</sup>	25,000 cfs
Daily range <sup>c</sup>	Equal to $10 \times$ monthly volume (in kaf) in Jun.–Aug., and $9 \times$ monthly volume (in kaf) in other months; daily range not to exceed 8,000 cfs
Ramp rates	4,000 cfs/hr up 2,500 cfs/hr down

WAPA and Reclamation working on Operating Criteria

RECLAMATION

# Communication and Consultation Process for Experiments

- Updates at AMWG and TWG meetings
- GCDAMP Annual reporting meeting
- TWG meeting to discuss upcoming experiments for the year
- Monthly operations coordination meetings (DOI, WAPA, States)
- Experimental (Tech) Team meetings (e.g., HFE Tech Team)
- Consultation with Tribes

# Annual Experiments

- Review possible experiments for upcoming year with TWG each year
  - Did this at Jan 2017 TWG meeting

# 2017 Experiments

- No Experiments until October 1, 2017
- Fall 2017 HFE
  - Pending sediment inputs
  - Pending status of other resources
  - Timing: early November, plan to decide on dates early in the planning process (e.g, spring or summer)
  - Up to 96-hr HFE OR Extended Duration (up to 196 hr)

# Programmatic Agreement

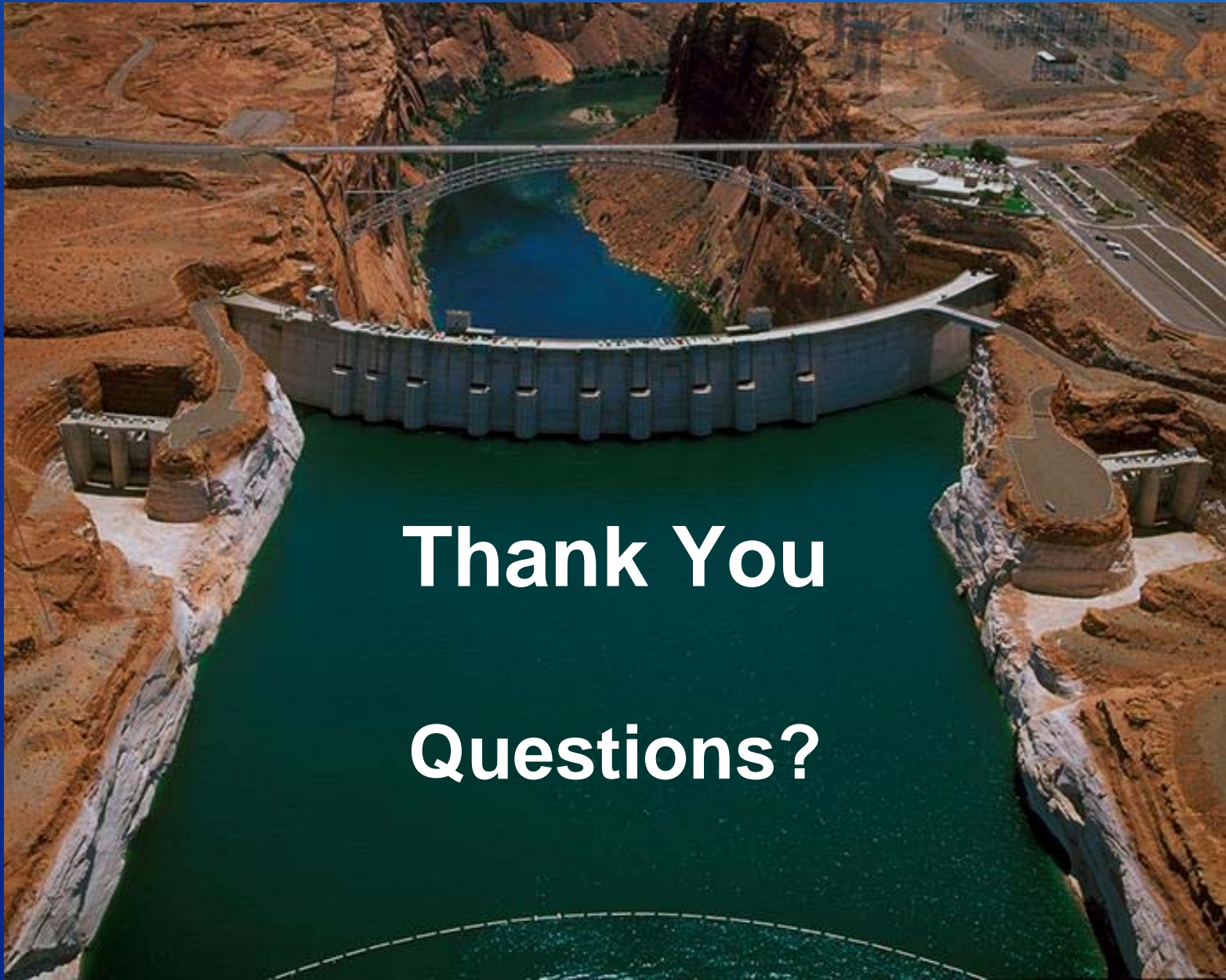
- Cultural Programmatic Agreement (PA) – we are near completion and looking to finalize in the near term.
  - Section 106 compliance

# 2017 Budget and Work Plan

- No changes need to be made
  - We are not doing any new experiments this year

## 7. IMPLEMENTATION

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**Thank You  
Questions?**

**RECLAMATION**

## Communication and Consultation Process

### 1.4 COMMUNICATION AND CONSULTATION PROCESS FOR ALTERNATIVE D

In implementing the processes described in Section 1.3 and the associated decision process shown in Figures 4 and 5, the DOI will exercise a formal process of stakeholder engagement to ensure decisions are made with sufficient information regarding the condition and potential effects on important resources. As an initial platform to discuss potential future experimental actions, the DOI will hold GCDAMP annual reporting meetings for all interested stakeholders; these meetings will present the best available scientific information and learning from previously implemented experiments and ongoing monitoring of resources. As a follow-up to this process, the DOI will meet with the TWG to discuss the experimental actions being contemplated for the year.

The DOI also will conduct monthly Glen Canyon Dam operational coordination meetings or calls with the DOI bureaus (USGS, NPS, FWS, BIA, and Reclamation), WAPA, AZGFD, and representatives from the Basin States and the UCRC. Each DOI bureau will provide updates on the status of resources and dam operations. In addition, WAPA will provide updates on the status of the Basin Fund, projected purchase power prices, and its financial and operational considerations. These meetings or calls are intended to provide an opportunity for participants to share and obtain the most up-to-date information on dam operational considerations and the status of resources (including ecological, cultural, Tribal, recreation, and the Basin Fund). One liaison from each Basin State and from the UCRC will be allowed to participate in the monthly operational coordination meetings or calls.

To determine whether conditions are suitable for implementing or discontinuing experimental treatments or management actions, the DOI will schedule implementation/planning meetings or calls with the DOI bureaus (USGS, NPS, FWS, BIA, and Reclamation), WAPA, AZGFD, and one liaison from each Basin State and from the UCRC, as needed or requested by the participants. The implementation/planning group will strive to develop a consensus recommendation to bring forth to the DOI regarding resource issues as detailed at the beginning of this section, as well as including WAPA's assessment of the status of the Basin Fund. The Secretary of the Interior will consider the consensus recommendations of the implementation/planning group, but retains sole discretion to decide how best to accomplish operations and experiments in any given year pursuant to the ROD and other binding obligations.

DOI will also continue separate consultation meetings with the Tribes, AZGFD, the Basin States, and UCRC upon request, or as required under existing RODs.



# Operational flexibility

## 1.2 OPERATIONAL FLEXIBILITY UNDER ALTERNATIVE D

Reclamation retains the authority to utilize operational flexibility at Glen Canyon Dam because hydrologic conditions of the Colorado River Basin (or the operational conditions of Colorado River reservoirs) cannot be completely known in advance. Consistent with current operations, Reclamation, in consultation with WAPA, will make specific adjustments to daily and monthly release volumes during the water year. Monthly release volumes may be rounded for practical implementation or for maintenance needs. In addition, when releases are actually implemented, minor variations may occur regularly for a number of operational reasons that cannot be projected in advance.

Reclamation also will make specific adjustments to daily and monthly release volumes, in consultation with other entities as appropriate, for a number of reasons, including operational, resource-related, and hydropower-related issues. Examples of these adjustments may include, but are not limited to, the following:

- For water distribution purposes, volumes may be adjusted to allocate water between the Upper and Lower Basins consistent with the Law of the River as a result of changing hydrology;
- For resource-related issues that may occur uniquely in a given year, release adjustments may be made to accommodate nonnative species removal, to assist with aerial photography, or to accommodate other resource considerations separate from experimental treatments under the LTEMP;
- For hydropower-related issues, adjustments may occur to address issues such as electrical grid reliability, actual or forecasted prices for purchased power, transmission outages, and experimental releases from other Colorado River Storage Project dams.

In addition, Reclamation may make modifications under circumstances that may include operations that are prudent or necessary for the safety of dams, public health and safety, other emergency situations, or other unanticipated or unforeseen activities arising from actual operating experience (including, in coordination with the Basin States, actions to respond to low reservoir conditions as a result of drought in the Colorado River Basin). In addition, the Emergency Exception Criteria established for Glen Canyon Dam will continue under this alternative. (See, e.g., Section 3 of the Glen Canyon Operating Criteria at 62 FR 9448,