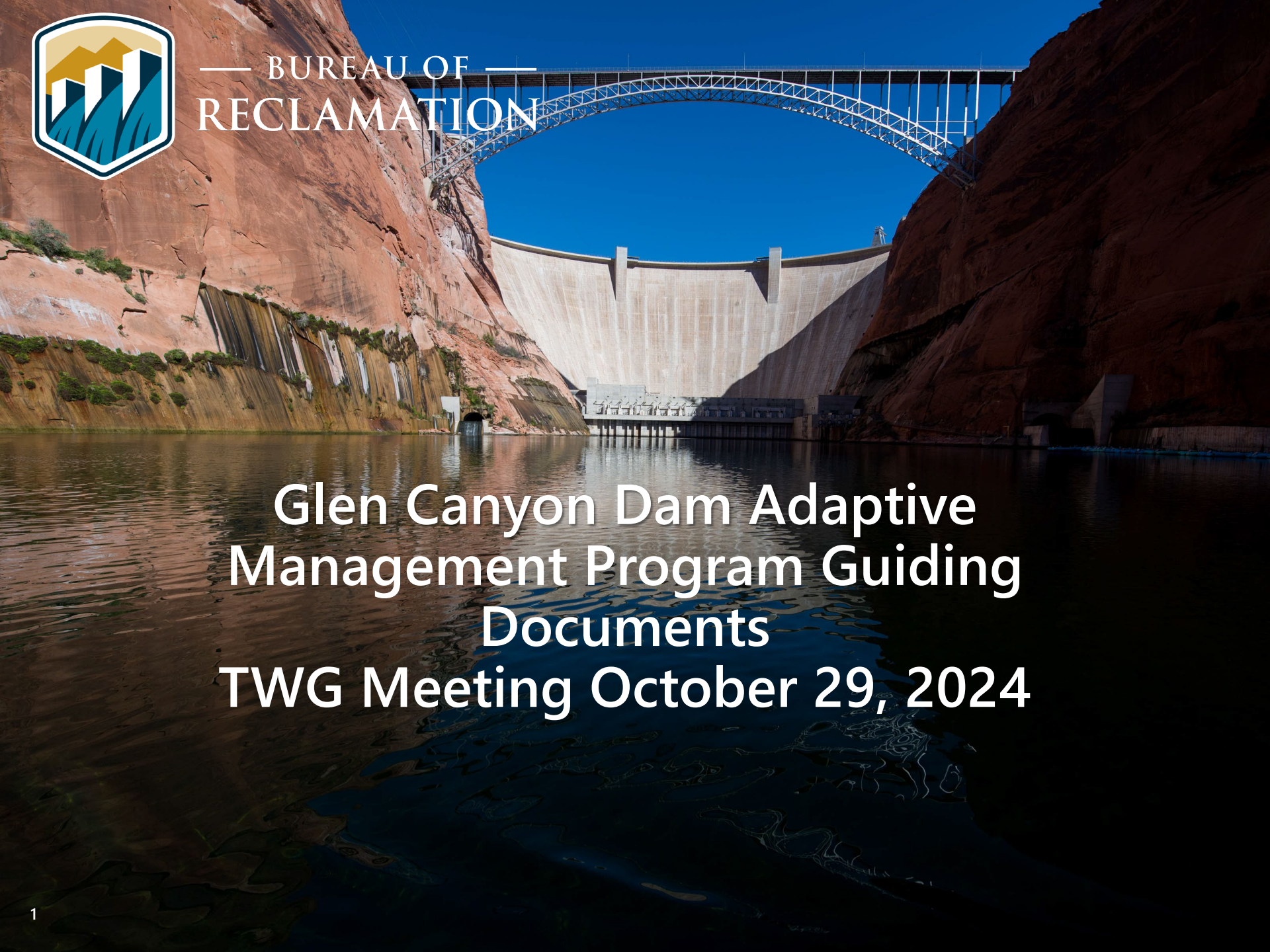
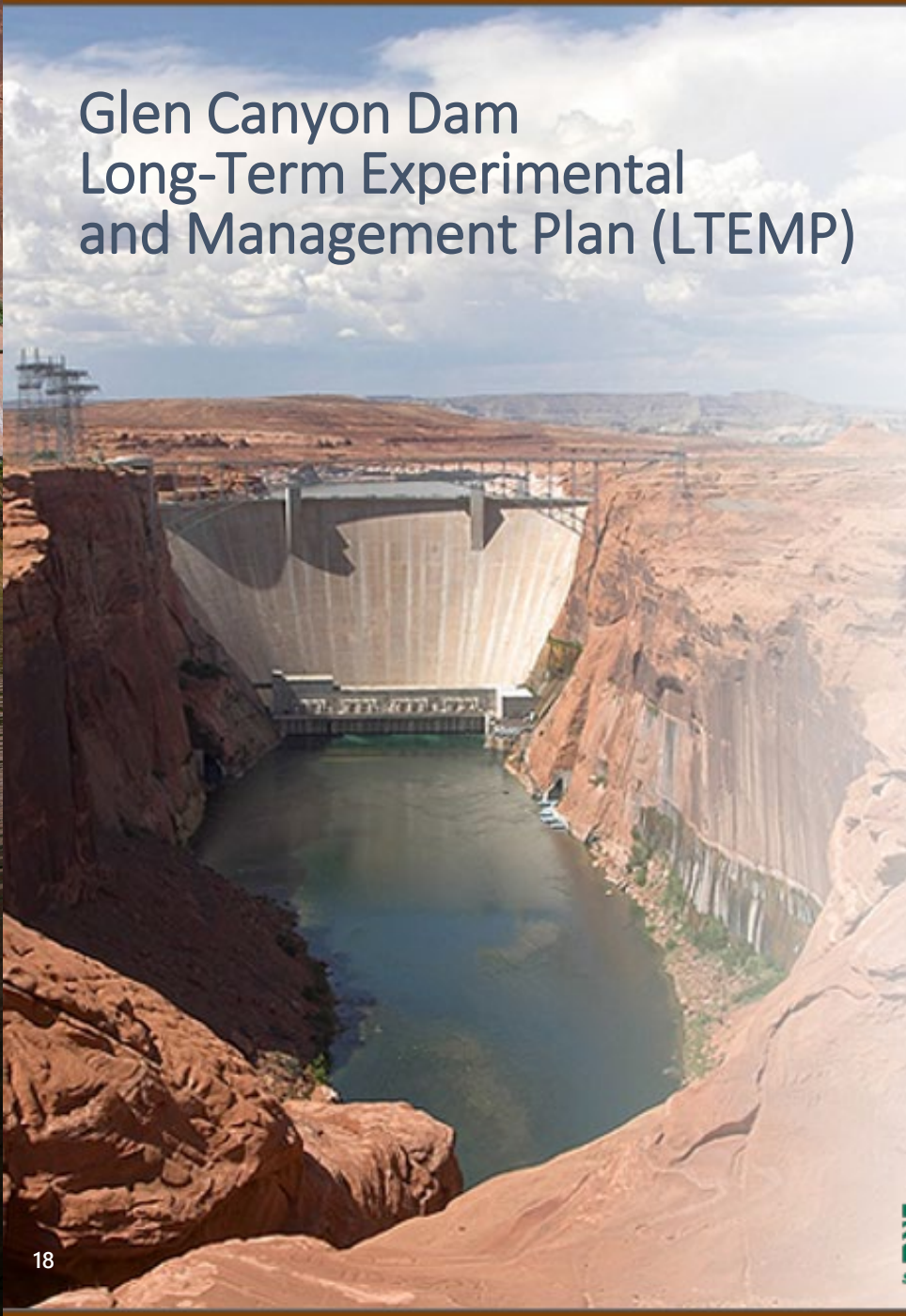


Glen Canyon Dam Adaptive Management Program Guiding Documents
TWG Meeting October 29, 2024

Glen Canyon Dam Long-Term Experimental and Management Plan (LTEMP)



- LTEMP is a framework for adaptively managing Glen Canyon Dam (20 years)
- Sub annual operations
  - Monthly patterns
  - Minimum flows
  - Max (non-experimental) flows
  - Daily range
  - Ramp rates
- Experimental Flows
  - Planning and Implementation Process
- Continuation of GCDAMP
- Protection, Mitigation, and Monitoring of cultural resources
- Endangered Species Act Compliance (LTEMP BO)

USGS science for a changing world

Argonne NATIONAL LABORATORY

Potential LTEMP Flow Experiments

- **Sediment** (High Flow Experiments)
  - Spring HFE
  - Fall HFE
- **Aquatic Resource**
  - Bug Flows
  - Trout Management Flows
  - Low summer flows (2nd ten years of LTEMP)
- **LTEMP SEIS**
  - Smallmouth Bass Flows
  - HFE protocol revision

LTEMP ROD

(Page 20-21)

As part of the adaptive management process, 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 operational experience. If after this review it is determined that there is significant new scientific information and a compelling need to conduct new experiments or modify existing experiments for the improvement of resources, then new experiments outside of what was analyzed and selected in this NEPA process could be considered. Additional NEPA processes related to these experiments may need to be completed as appropriate.

Grand Canyon Protection Act (1992)

SEC. 1805. LONG-TERM MONITORING.

(a) IN GENERAL.—The Secretary shall establish and implement long-term monitoring programs and activities that will ensure that Glen Canyon Dam is operated in a manner consistent with that of section 1802.

(b) RESEARCH.—Long-term monitoring of Glen Canyon Dam shall include any necessary research and studies to determine the effect of the Secretary's actions under section 1804(c) on the natural, recreational, and cultural resources of Grand Canyon National Park and Glen Canyon National Recreation Area.

(c) CONSULTATION.—The monitoring programs and activities conducted under subsection (a) shall be established and implemented in consultation with—

(1) the Secretary of Energy;

(2) the Governors of the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming;

(3) Indian tribes; and

(4) the general public, including representatives of academic and scientific communities, environmental organizations, the recreation industry, and contractors for the purchase of Federal power produced at Glen Canyon Dam.

Reference: Public Law 102-575

GLEN CANYON DAM MANAGEMENT OBJECTIVES
July 2, 1996

PURPOSE

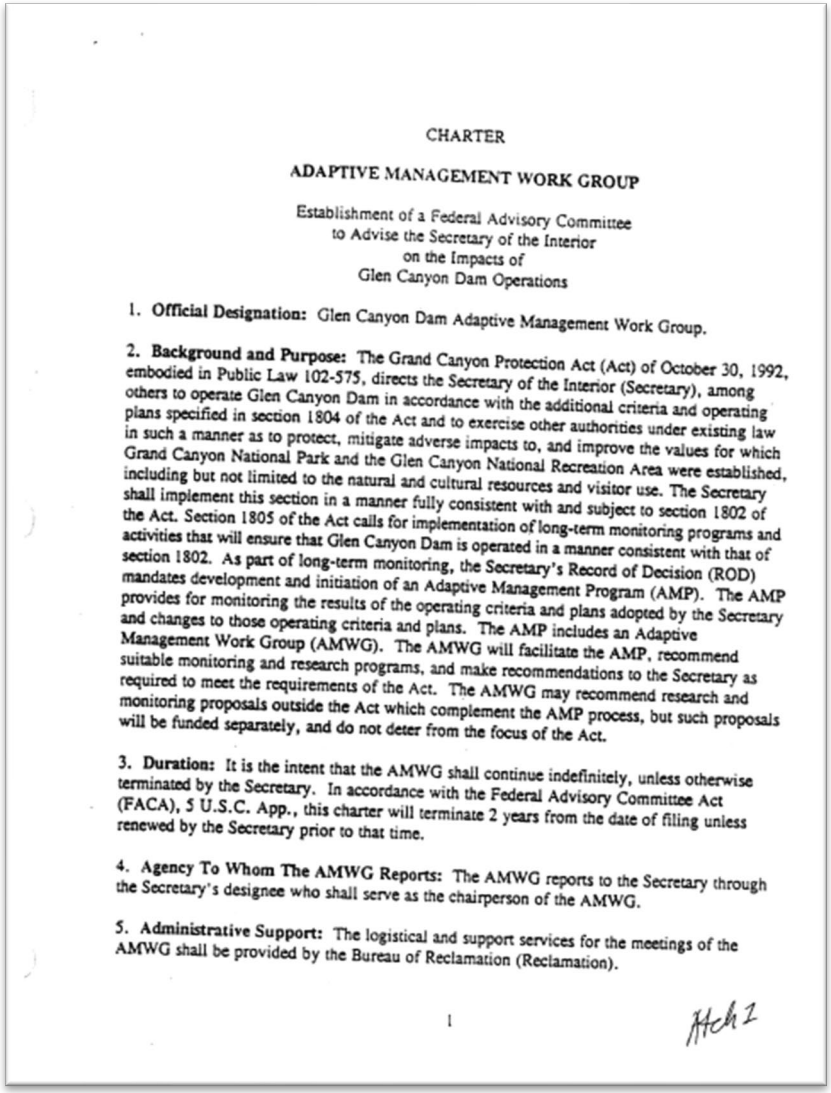
The purpose of the management objectives is to define measurable standards of desired conditions which will serve as targets expected to be achieved by the participants in the Glen Canyon Dam EIS process. These expectations are framed within the Preferred Alternative and implemented by specific dam operating criteria. It is the purpose of this effort to monitor impacts of and or change where necessary these specific operating criteria to achieve the overall goals of the EIS process.

Attachment 6.pdf

- **1996** - Transition Work Group develops management objectives
  - Water
  - Sediment
  - Fish and Aquatic
  - Vegetation and Terrestrial Wildlife
  - Threatened and Endangered Species
  - Cultural Resources
  - Recreation
  - Hydropower

AMWG/TWG Operating Procedures

- **1996** – First TWG Meeting
- **1997 –** Initial AMWG Charter (renewed every 2 years)
- **1997** – First AMWG Meeting
- **1997** – First TWG Operating Procedures
- **1998** – First AMWG Operating Procedures
- **1999** – TWG Operating Procedures updated
- **2001** – TWG Operating Procedures updated
- **2002** – Updated AMWG Operating Procedures
- **2011** – Updated AMWG Operating Procedures
- **2013** – Updated TWG Operating Procedures



CHARTER

ADAPTIVE MANAGEMENT WORK GROUP

Establishment of a Federal Advisory Committee
to Advise the Secretary of the Interior
on the Impacts of
Glen Canyon Dam Operations

1. **Official Designation:** Glen Canyon Dam Adaptive Management Work Group.

2. **Background and Purpose:** The Grand Canyon Protection Act (Act) of October 30, 1992, embodied in Public Law 102-575, directs the Secretary of the Interior (Secretary), among others to operate Glen Canyon Dam in accordance with the additional criteria and operating plans specified in section 1804 of the Act and to exercise other authorities under existing law in such a manner as to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park and the Glen Canyon National Recreation Area were established, including but not limited to the natural and cultural resources and visitor use. The Secretary shall implement this section in a manner fully consistent with and subject to section 1802 of the Act. Section 1805 of the Act calls for implementation of long-term monitoring programs and activities that will ensure that Glen Canyon Dam is operated in a manner consistent with that of section 1802. As part of long-term monitoring, the Secretary's Record of Decision (ROD) mandates development and initiation of an Adaptive Management Program (AMP). The AMP provides for monitoring the results of the operating criteria and plans adopted by the Secretary and changes to those operating criteria and plans. The AMP includes an Adaptive Management Work Group (AMWG). The AMWG will facilitate the AMP, recommend suitable monitoring and research programs, and make recommendations to the Secretary as required to meet the requirements of the Act. The AMWG may recommend research and monitoring proposals outside the Act which complement the AMP process, but such proposals will be funded separately, and do not deter from the focus of the Act.

3. **Duration:** It is the intent that the AMWG shall continue indefinitely, unless otherwise terminated by the Secretary. In accordance with the Federal Advisory Committee Act (FACA), 5 U.S.C. App., this charter will terminate 2 years from the date of filing unless renewed by the Secretary prior to that time.

4. **Agency To Whom The AMWG Reports:** The AMWG reports to the Secretary through the Secretary's designee who shall serve as the chairperson of the AMWG.

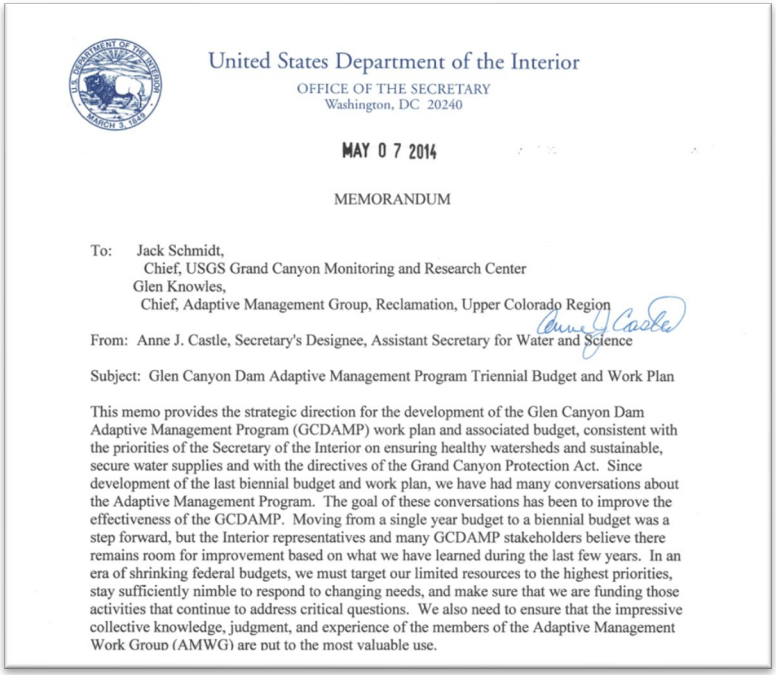
5. **Administrative Support:** The logistical and support services for the meetings of the AMWG shall be provided by the Bureau of Reclamation (Reclamation).

1

Attch 1

Budget and Work Plan Procedures

- **1999** - Initial GCMRC annual work plan
- **1999** – BAHG formed
- **2010** – Transitioned from annual to biennial workplan
- **2015** – Transition to triennial workplan
- **2016** – Triennial budget and work plan process developed



United States Department of the Interior
OFFICE OF THE SECRETARY
Washington, DC 20240

MAY 0 7 2014

MEMORANDUM

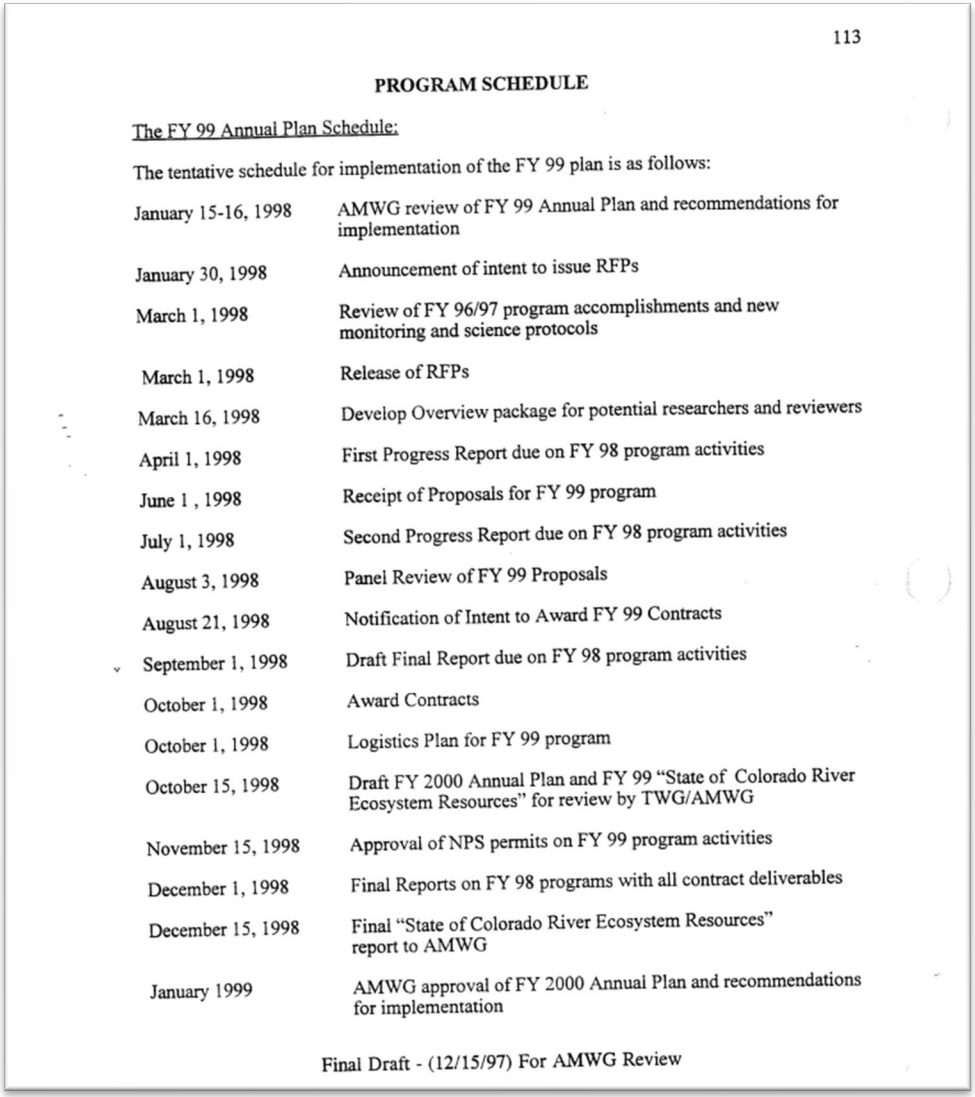
To: Jack Schmidt,
Chief, USGS Grand Canyon Monitoring and Research Center
Glen Knowles,
Chief, Adaptive Management Group, Reclamation, Upper Colorado Region

From: Anne J. Castle, Secretary's Designee, Assistant Secretary for Water and Science

Subject: Glen Canyon Dam Adaptive Management Program Triennial Budget and Work Plan

This memo provides the strategic direction for the development of the Glen Canyon Dam Adaptive Management Program (GCDAMP) work plan and associated budget, consistent with the priorities of the Secretary of the Interior on ensuring healthy watersheds and sustainable, secure water supplies and with the directives of the Grand Canyon Protection Act. Since development of the last biennial budget and work plan, we have had many conversations about the Adaptive Management Program. The goal of these conversations has been to improve the effectiveness of the GCDAMP. Moving from a single year budget to a biennial budget was a step forward, but the Interior representatives and many GCDAMP stakeholders believe there remains room for improvement based on what we have learned during the last few years. In an era of shrinking federal budgets, we must target our limited resources to the highest priorities, stay sufficiently nimble to respond to changing needs, and make sure that we are funding those activities that continue to address critical questions. We also need to ensure that the impressive collective knowledge, judgment, and experience of the members of the Adaptive Management Work Group (AMWG) are put to the most valuable use.

[Anne Castle Memo]



113

PROGRAM SCHEDULE

The FY 99 Annual Plan Schedule:

The tentative schedule for implementation of the FY 99 plan is as follows:

January 15-16, 1998	AMWG review of FY 99 Annual Plan and recommendations for implementation
January 30, 1998	Announcement of intent to issue RFPs
March 1, 1998	Review of FY 96/97 program accomplishments and new monitoring and science protocols
March 1, 1998	Release of RFPs
March 16, 1998	Develop Overview package for potential researchers and reviewers
April 1, 1998	First Progress Report due on FY 98 program activities
June 1 , 1998	Receipt of Proposals for FY 99 program
July 1, 1998	Second Progress Report due on FY 98 program activities
August 3, 1998	Panel Review of FY 99 Proposals
August 21, 1998	Notification of Intent to Award FY 99 Contracts
September 1, 1998	Draft Final Report due on FY 98 program activities
October 1, 1998	Award Contracts
October 1, 1998	Logistics Plan for FY 99 program
October 15, 1998	Draft FY 2000 Annual Plan and FY 99 "State of Colorado River Ecosystem Resources" for review by TWG/AMWG
November 15, 1998	Approval of NPS permits on FY 99 program activities
December 1, 1998	Final Reports on FY 98 programs with all contract deliverables
December 15, 1998	Final "State of Colorado River Ecosystem Resources" report to AMWG
January 1999	AMWG approval of FY 2000 Annual Plan and recommendations for implementation

Final Draft - (12/15/97) For AMWG Review

Program Guidance

2002 – GCDAMP Strategic Plan

GOALS

The 12 goals of the Adaptive Management Program are:

1. Protect or improve the aquatic foodbase so that it will support viable populations of desired species at higher trophic levels.
2. Maintain or attain viable populations of existing native fish, remove jeopardy from humpback chub and razorback sucker, and prevent adverse modification to their critical habitat.
3. Restore populations of extirpated species, as feasible and advisable.
4. Maintain a naturally reproducing population of rainbow trout above the Paria River, to the extent practicable and consistent with the maintenance of viable populations of native fish.
5. Maintain or attain viable populations of Kanab ambersnail.
6. Protect or improve the biotic riparian and spring communities, including threatened and endangered species and their critical habitat.
7. Establish water temperature, quality, and flow dynamics to achieve the Adaptive Management Program ecosystem goals.
8. Maintain or attain levels of sediment storage within the main channel and along shorelines to achieve the Adaptive Management Program ecosystem goals.
9. Maintain or improve the quality of recreational experiences for users of the Colorado River ecosystem, within the framework of the Adaptive Management Program ecosystem goals.
10. Maintain power production capacity and energy generation, and increase where feasible and advisable, within the framework of the Adaptive Management ecosystem goals.
11. Preserve, protect, manage, and treat cultural resources for the inspiration and benefit of past, present, and future generations.
12. Maintain a high quality monitoring, research, and adaptive management program.

GCDAMP Strategic Plan

Program Guidance

2002 – GCDAMP Strategic Plan

Goal 2. Maintain or attain viable populations of existing native fish, remove jeopardy from humpback chub and razorback sucker, and prevent adverse modification to their critical habitat.

MO #	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
2.1	Maintain or attain	Humpback chub (150 mm and larger) (Length is based on the size at which a HBC is able to be pit-tagged.)	Abundance	LCR aggregation (The definition of the LCR aggregation will be resolved following completion of the stock assessment workshop and the PEP review.)	4330-4811 individuals[3] with a mean of 4508 individuals	Information Need	The target is viable populations and removal of jeopardy. Target to be based on 91-96 population estimate, PVA, & N_e.
				Eight mainstem aggregations	Information Need Confidence interval with a mean of 225 individuals?	Information Need	

GCDAMP Strategic Plan

Program Guidance

2007 to 2011 – Strategic Science Plan

USGS
science for a changing world

Developed in cooperation with the Glen Canyon Dam Adaptive Management Program

Strategic Science Plan to Support the Glen Canyon Dam Adaptive Management Program, Fiscal Years 2007-2011

Prepared by the USGS Grand Canyon Monitoring and Research Center

Final
March 22, 2007
Amended and approved
April 29, 2009

U.S. Department of the Interior
U.S. Geological Survey

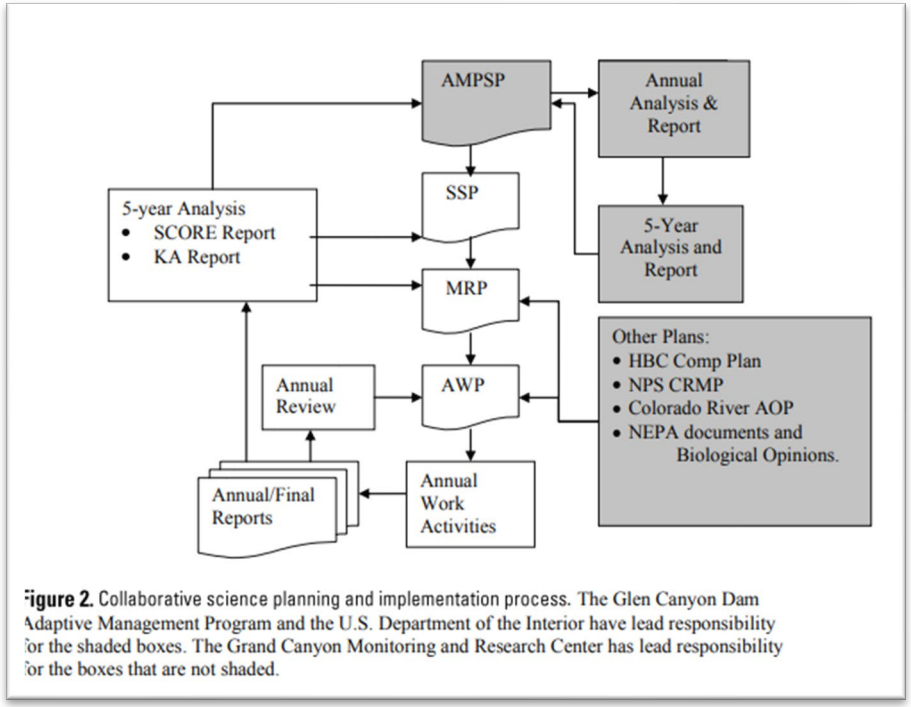
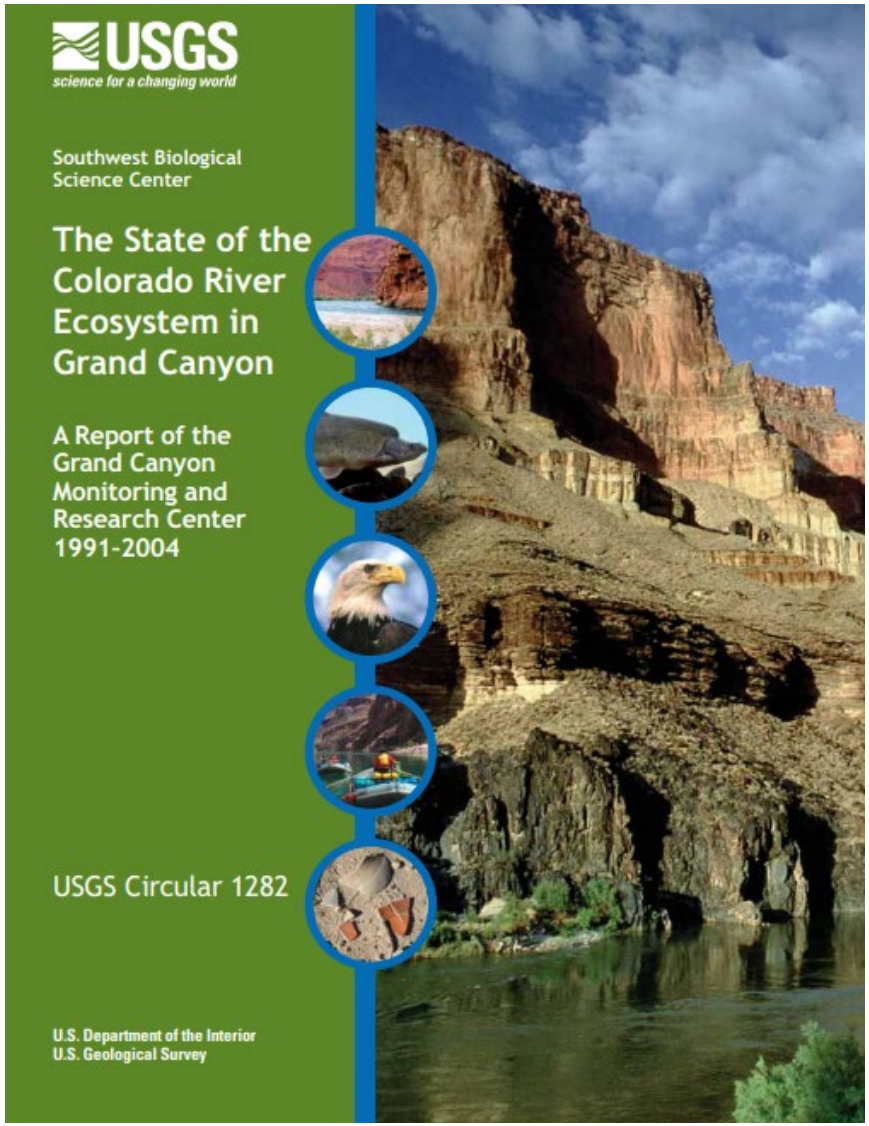


Figure 2. Collaborative science planning and implementation process. The Glen Canyon Dam Adaptive Management Program and the U.S. Department of the Interior have lead responsibility for the shaded boxes. The Grand Canyon Monitoring and Research Center has lead responsibility for the boxes that are not shaded.

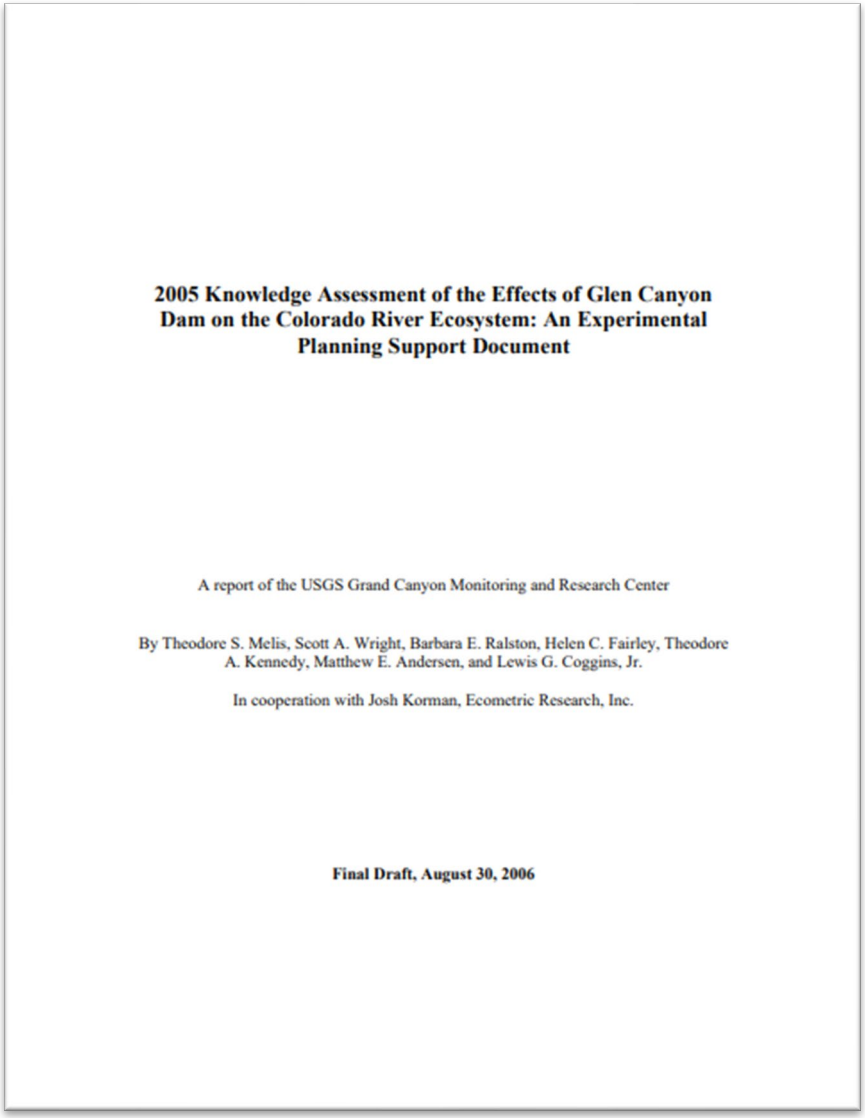
[Strategic Science Plan - Glen Canyon Dam AMP]

Program Guidance

2005 – SCORE REPORT



Knowledge Assessment



2005 Knowledge Assessment of the Effects of Glen Canyon Dam on the Colorado River Ecosystem: An Experimental Planning Support Document

A report of the USGS Grand Canyon Monitoring and Research Center

By Theodore S. Melis, Scott A. Wright, Barbara E. Ralston, Helen C. Fairley, Theodore A. Kennedy, Matthew E. Andersen, and Lewis G. Coggins, Jr.

In cooperation with Josh Korman, Ecometric Research, Inc.

Final Draft, August 30, 2006

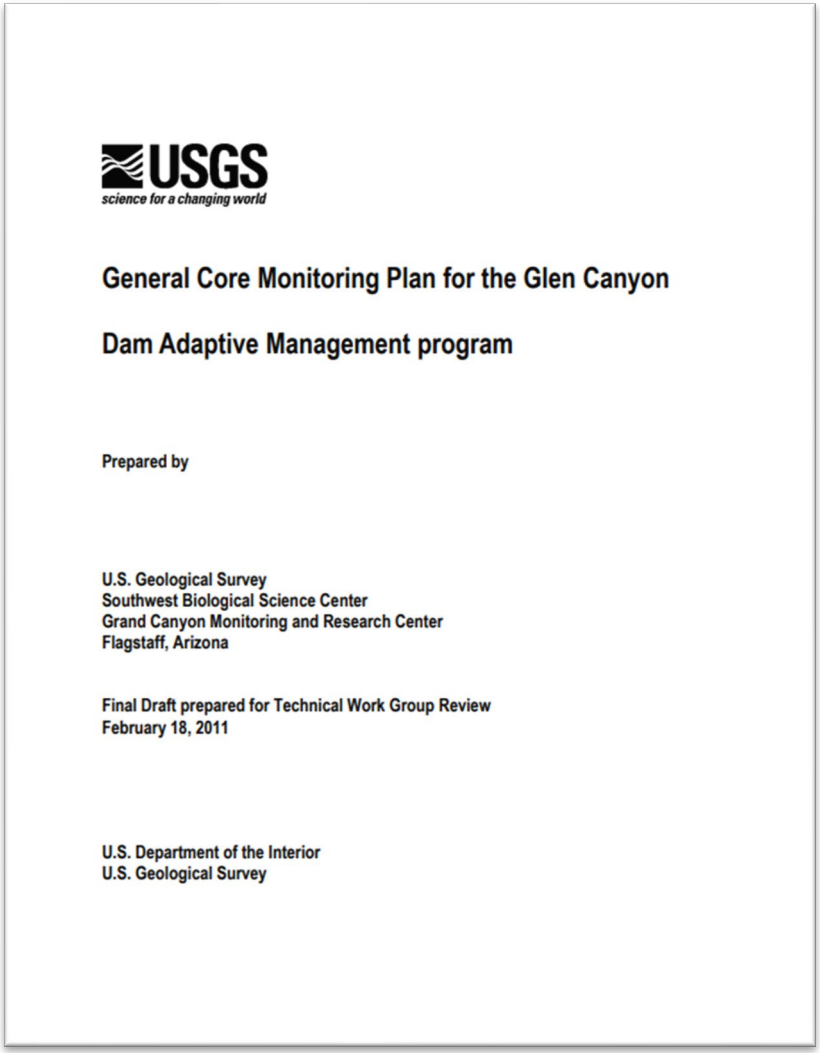
SCORE Report

2005 KA

2017 KA

Program Guidance

2011 – Core Monitoring Plan



USGS
science for a changing world

General Core Monitoring Plan for the Glen Canyon

Dam Adaptive Management program

Prepared by

U.S. Geological Survey
Southwest Biological Science Center
Grand Canyon Monitoring and Research Center
Flagstaff, Arizona

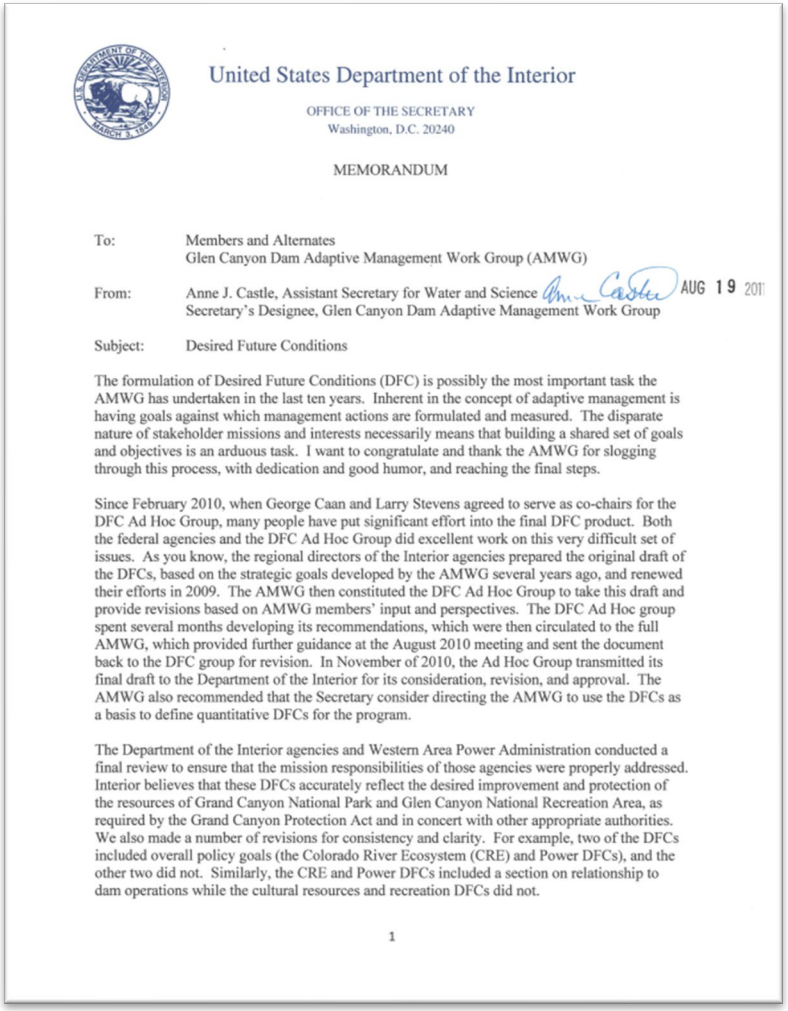
Final Draft prepared for Technical Work Group Review
February 18, 2011

U.S. Department of the Interior
U.S. Geological Survey

Core Monitoring Plan

Program Guidance

2012 – Desired Future Conditions



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

MEMORANDUM

To: Members and Alternates
Glen Canyon Dam Adaptive Management Work Group (AMWG)

From: Anne J. Castle, Assistant Secretary for Water and Science AUG 19 201
Secretary's Designee, Glen Canyon Dam Adaptive Management Work Group

Subject: Desired Future Conditions

The formulation of Desired Future Conditions (DFC) is possibly the most important task the AMWG has undertaken in the last ten years. Inherent in the concept of adaptive management is having goals against which management actions are formulated and measured. The disparate nature of stakeholder missions and interests necessarily means that building a shared set of goals and objectives is an arduous task. I want to congratulate and thank the AMWG for slogging through this process, with dedication and good humor, and reaching the final steps.

Since February 2010, when George Caan and Larry Stevens agreed to serve as co-chairs for the DFC Ad Hoc Group, many people have put significant effort into the final DFC product. Both the federal agencies and the DFC Ad Hoc Group did excellent work on this very difficult set of issues. As you know, the regional directors of the Interior agencies prepared the original draft of the DFCs, based on the strategic goals developed by the AMWG several years ago, and renewed their efforts in 2009. The AMWG then constituted the DFC Ad Hoc Group to take this draft and provide revisions based on AMWG members' input and perspectives. The DFC Ad Hoc group spent several months developing its recommendations, which were then circulated to the full AMWG, which provided further guidance at the August 2010 meeting and sent the document back to the DFC group for revision. In November of 2010, the Ad Hoc Group transmitted its final draft to the Department of the Interior for its consideration, revision, and approval. The AMWG also recommended that the Secretary consider directing the AMWG to use the DFCs as a basis to define quantitative DFCs for the program.

The Department of the Interior agencies and Western Area Power Administration conducted a final review to ensure that the mission responsibilities of those agencies were properly addressed. Interior believes that these DFCs accurately reflect the desired improvement and protection of the resources of Grand Canyon National Park and Glen Canyon National Recreation Area, as required by the Grand Canyon Protection Act and in concert with other appropriate authorities. We also made a number of revisions for consistency and clarity. For example, two of the DFCs included overall policy goals (the Colorado River Ecosystem (CRE) and Power DFCs), and the other two did not. Similarly, the CRE and Power DFCs included a section on relationship to dam operations while the cultural resources and recreation DFCs did not.

1

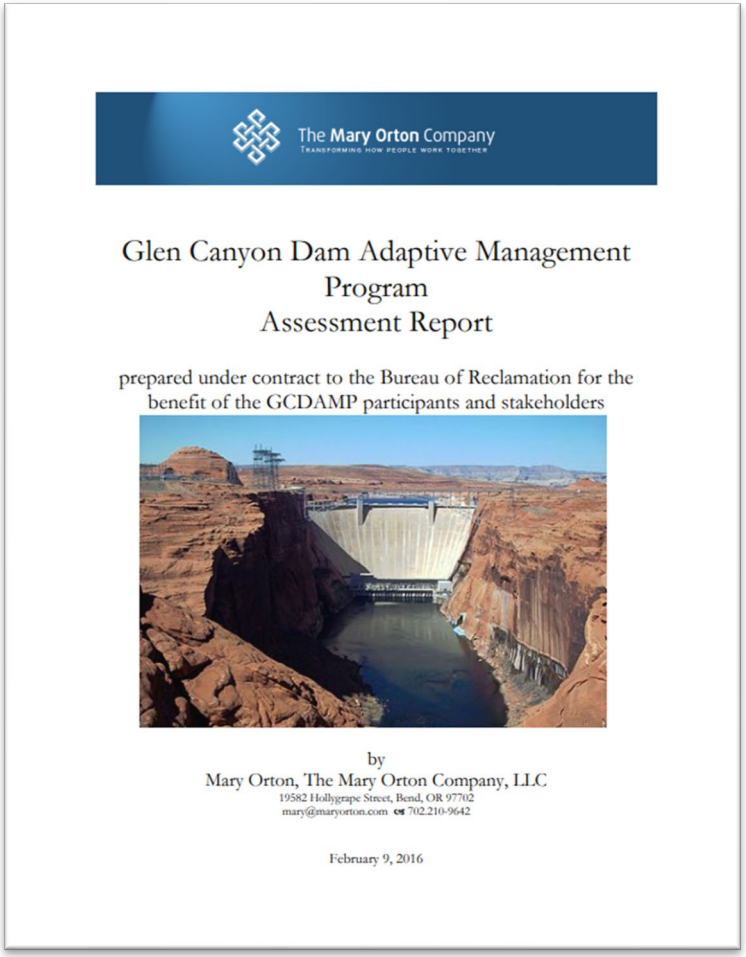
CRE DFCs

- **DFC 1** – An aquatic food base capable of supporting viable populations of desired species at higher trophic levels;
- **DFC 2** – Viable populations of existing native fishes, and the prevention of adverse modification to their habitat (including critical habitat);
- **DFC 3** – Restoration of viable populations of extirpated species;
- **DFC 4** – A sustainable recreational trout fishery in the Lees Ferry reach;
- **DFC 5** – Viable populations of the Kanab ambersnail;
- **DFC 6** – Healthy biotic riparian, wetland, spring and old high water zone plant communities and healthy associated biological processes within the CRE (including threatened and endangered species and their habitat);
- **DFC 7** – A level of water quality that supports ecosystem functions (dissolved oxygen, nutrient contributions and cycling, and temperature to the extent feasible consistent with the life history requirements of focal aquatic species;
- **DFC 8** – Levels of sediment storage within the main channel and along shorelines that achieve ecosystem goals.

Attach_04a.pdf

Program Guidance

2016 – GCDAMP Program Assessment



The Mary Orton Company
TRANSFORMING HOW PEOPLE WORK TOGETHER

Glen Canyon Dam Adaptive Management Program
Assessment Report

prepared under contract to the Bureau of Reclamation for the benefit of the GCDAMP participants and stakeholders

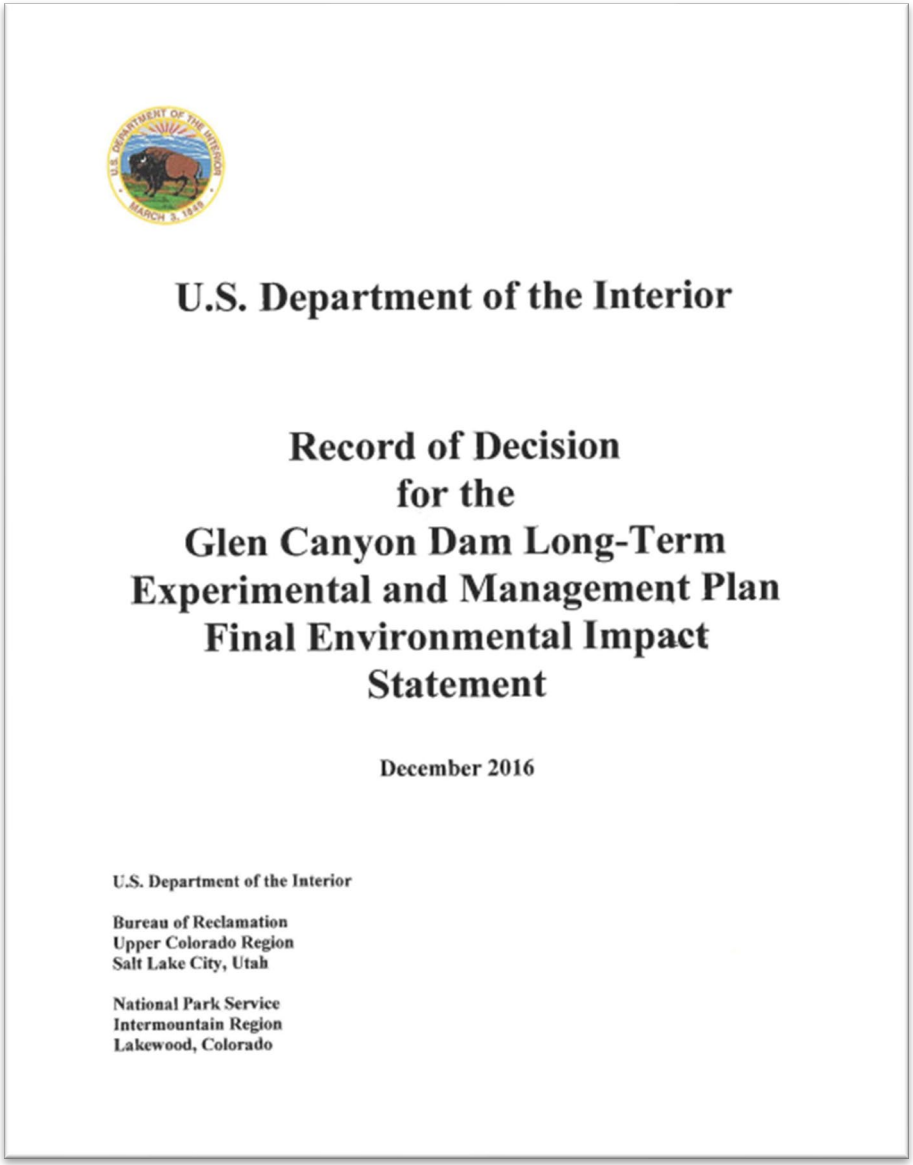
by
Mary Orton, The Mary Orton Company, LLC
19582 Hollygrape Street, Bend, OR 97702
mary@maryorton.com or 702.210-9642

February 9, 2016

[Program Assessment]

Program Guidance

2016 – LTEMP



U.S. Department of the Interior

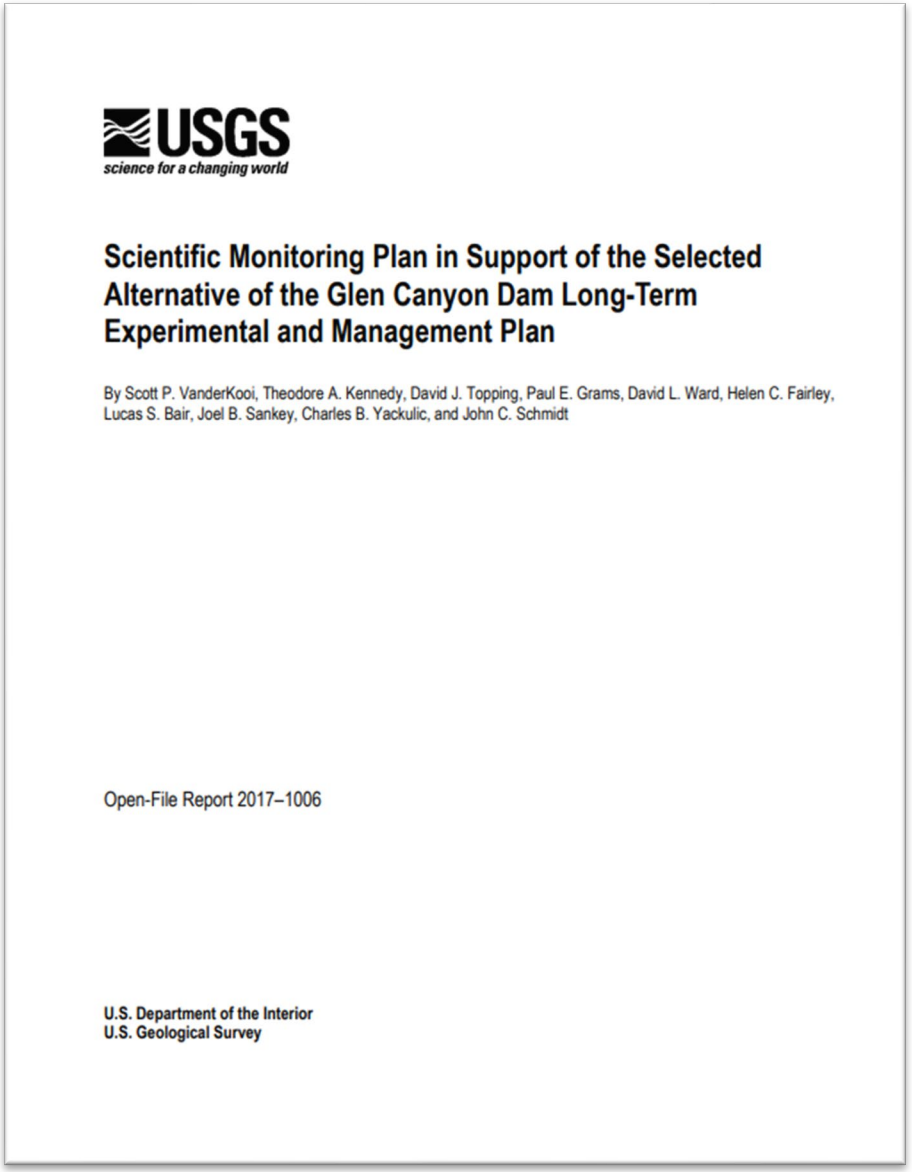
Record of Decision
for the
Glen Canyon Dam Long-Term
Experimental and Management Plan
Final Environmental Impact
Statement

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



USGS
science for a changing world

Scientific Monitoring Plan in Support of the Selected Alternative of the Glen Canyon Dam Long-Term Experimental and Management Plan

By Scott P. VanderKooi, Theodore A. Kennedy, David J. Topping, Paul E. Grams, David L. Ward, Helen C. Fairley, Lucas S. Bair, Joel B. Sankey, Charles B. Yackulic, and John C. Schmidt

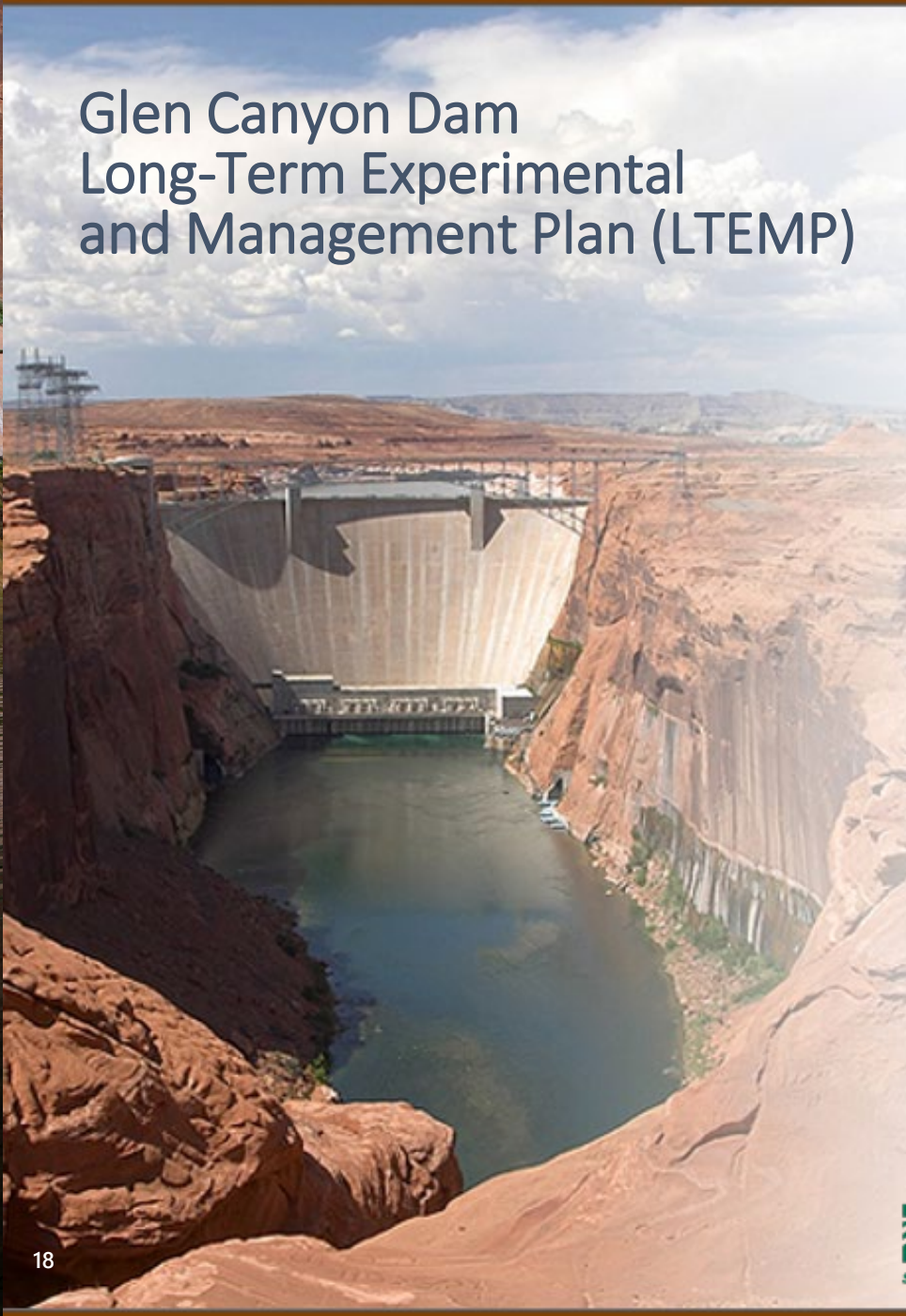
Open-File Report 2017–1006

U.S. Department of the Interior
U.S. Geological Survey

LTEMP ROD

LTEMP Scientific Monitoring Plan

Glen Canyon Dam Long-Term Experimental and Management Plan (LTEMP)



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USGS science for a changing world

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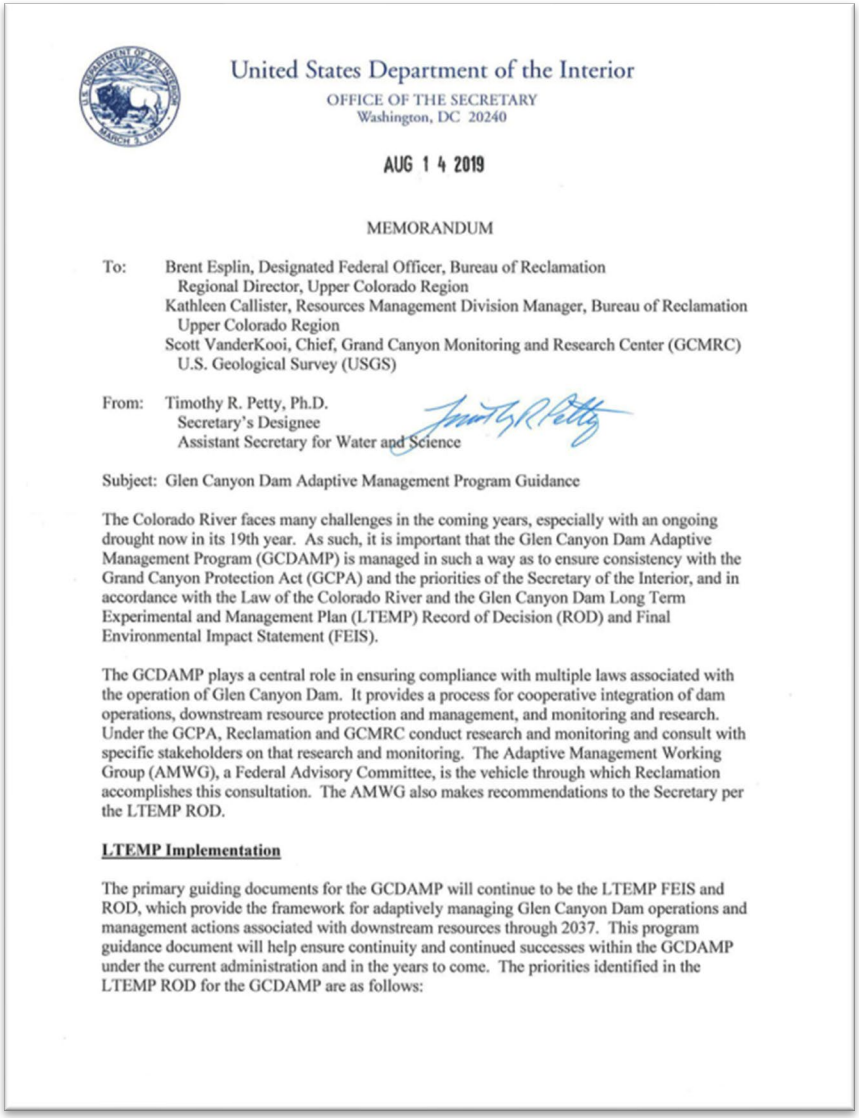
Program Guidance

2019 – Tim Petty Memo



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240

AUG 1 4 2019

MEMORANDUM

To: Brent Esplin, Designated Federal Officer, Bureau of Reclamation
Regional Director, Upper Colorado Region
Kathleen Callister, Resources Management Division Manager, Bureau of Reclamation
Upper Colorado Region
Scott VanderKooi, Chief, Grand Canyon Monitoring and Research Center (GCMRC)
U.S. Geological Survey (USGS)

From: Timothy R. Petty, Ph.D.
Secretary's Designee
Assistant Secretary for Water and Science

Subject: Glen Canyon Dam Adaptive Management Program Guidance

The Colorado River faces many challenges in the coming years, especially with an ongoing drought now in its 19th year. As such, it is important that the Glen Canyon Dam Adaptive Management Program (GCDAMP) is managed in such a way as to ensure consistency with the Grand Canyon Protection Act (GCPA) and the priorities of the Secretary of the Interior, and in accordance with the Law of the Colorado River and the Glen Canyon Dam Long Term Experimental and Management Plan (LTEMP) Record of Decision (ROD) and Final Environmental Impact Statement (FEIS).

The GCDAMP plays a central role in ensuring compliance with multiple laws associated with the operation of Glen Canyon Dam. It provides a process for cooperative integration of dam operations, downstream resource protection and management, and monitoring and research. Under the GCPA, Reclamation and GCMRC conduct research and monitoring and consult with specific stakeholders on that research and monitoring. The Adaptive Management Working Group (AMWG), a Federal Advisory Committee, is the vehicle through which Reclamation accomplishes this consultation. The AMWG also makes recommendations to the Secretary per the LTEMP ROD.

LTEMP Implementation

The primary guiding documents for the GCDAMP will continue to be the LTEMP FEIS and ROD, which provide the framework for adaptively managing Glen Canyon Dam operations and management actions associated with downstream resources through 2037. This program guidance document will help ensure continuity and continued successes within the GCDAMP under the current administration and in the years to come. The priorities identified in the LTEMP ROD for the GCDAMP are as follows:

Update of Guidance Documents (LTEMP ROD section 6.1)

c. The GCDAMP Guiding Documents

The DOI will work in consultation with the AMWG to update GCDAMP guiding documents (e.g., GCDAMP strategic plan, vision, mission, and charters) to reflect and be fully consistent with the priorities expressed in the FEIS and in this ROD. The goals and objectives in Section 1.4 of the LTEMP FEIS will be carried forward as the goals in the GCDAMP guiding documents. Processes and documents will be evaluated and streamlined or combined as necessary. 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.

1. Archeological and cultural
2. Natural processes
3. Humpback Chub
4. Hydropower and energy
5. Other native fish
6. Recreational Experience
7. Sediment
8. Tribal Resources
9. Rainbow trout fishery
10. Nonnative invasive species
11. Riparian vegetation

[2019 Petty Memo]

What is next?

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 = $65,000 FY26 = $65,000 FY27 = $ 65,000

Questions/Discussion