



Strategic Science Plan and Monitoring and Research Plan

Glen Canyon Dam Adaptive Management Program
Adaptive Management Work Group Meeting
December 5, 2006

Overview

- **Goal**
- **Background**
- **Common Elements**
- **Strategic Science Plan (SSP) and Monitoring and Research Plan (MRP)**
- **Technical Work Group (TWG) Comments and Recommendations (Kurt)**

Background

- SSP and MRP were developed in cooperation with Science Planning Group (SPG) and TWG
- Both documents approved by TWG in 2006
- AMWG provided update in March 2006
- SSP and MRP are the foundation for fiscal year 2007 work plan

Strategic Science Plan



Prepared by the
Grand Canyon
Monitoring and
Research Center

Developed in cooperation
with the Glen Canyon Dam
Adaptive Management
Program

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

**Strategic Science Plan
to Support the Glen
Canyon Dam Adaptive
Management Program,
Fiscal Years 2007–11**

**Draft for AMWG Review
October 27, 2006**



Strategic Science Plan

- Purpose
- Mission of the Grand Canyon Monitoring and Research Center (GCMRC)
- Primary Roles of GCMRC
- Science Strategies
- GCMRC Budget and Administration

Purpose

- **The purpose of the Strategic Science Plan is to identify strategies that will be pursued by the GCMRC to achieve its mission in cooperation with the GCDAMP**
- **Based on Adaptive Environmental Assessment Approach (learn by doing)**

Mission of GCMRC

The mission of the GCMRC is to provide credible, objective scientific information to the GCDAMP on (1) the effects of the operation of Glen Canyon Dam and other related factors on resources of the Colorado River ecosystem (CRE), using an ecosystem approach, and (2) flow and nonflow measures to mitigate adverse effects.

Primary Roles of GCMRC

- Advocate quality, objective science
- Serve as technical advisor to the Secretary's Designee and the AMWG
- Develop and administer research proposals
- Coordinate activities of the independent review panels
- Report new scientific findings to the AMWG/TWG
- Coordinate, prepare, and distribute technical reports
- Prepare and forward technical management recommendations and annual reports to the TWG
- Manage all data collected as part of the GCDAMP
- Manage GCMRC finances and personnel efficiently and effectively

Focus on AMWG Priority Goals and Questions

- Why are humpback chub not thriving, and what can we do about it? How many humpback chub are there and how are they doing?
- Which cultural resources, including traditional cultural properties, are within the area of potential effect, which should we treat, and how do we best protect them? What are the status and trends of cultural resources and what are the agents of deterioration?
- What is the best flow regime?
- What is the impact of sediment loss and what should we do about it?
- What will happen when a temperature control device (TCD) is tested or implemented? How should it be operated? Are safeguards needed for management?

Other Sources of Direction

- **AMWG management objectives and associated information needs**
- **Protocol evaluation panel (PEP) recommendations**
- **Knowledge Assessment Report findings**
- **US Fish and Wildlife Service (USFWS) biological opinion requirements related to the operation of Glen Canyon Dam**

Science Strategies

- 1. Focus on interdisciplinary, integrated river science**
- 2. Bridge science and management**
- 3. Address strategic science questions related to priority AMWG goals and questions**
- 4. Address critical research and monitoring needs outside the scope of the GCDAMP**

Interdisciplinary Integrated River Science

- **Work with the Science Advisors to identify and implement opportunities for interdisciplinary, integrated science**
- **Refine and increase use of conceptual and predictive ecosystem models**
- **Realign staff**

Bridge Science and Management

- **More clearly define roles and responsibilities of GCMRC and GCDAMP**
- **Conduct an assessment of how to better integrate the use of scientific information into the GCDAMP process**
 - **assess feasibility of developing and using decision-support tools and**
 - **Identify and implement opportunities for improving the effectiveness of the GCDAMP process**

Address Relevant Strategic Science Questions

- **Focus on strategic science questions** related to priority AMWG goals and questions
- **Address strategic science questions** through core monitoring, experimental research, and research and development activities
- **Provide program balance** through the inclusion of at least one project for each goal
- **Coordinate with other relevant research entities** outside GCDAMP

Critical Research and Monitoring Needs Outside the GCDAMP

Example

- Little Colorado River water quality and quantity

Strategies

- Secure funding or develop partnerships to initiate science programs to address critical needs
- Assist in development of lower basin recovery program

GCMRC Budget and Administration

- **Develop biennial work plan/budget**
- **Establish a contingency fund to support anticipated experimental research projects**
- **Establish discretionary fund to address shortfalls in specific areas**
- **Seek additional funding to support research to address**
 - 1. testing of a temperature control device and other large capital projects, and**
 - 2. external factors or issues outside the scope of the GCDAMP that impact GCDAMP goals**

GCMRC Budget and Administration

- Rely on cooperators, in-house staff, and contractors, as appropriate
- Realign staff to facilitate an interdisciplinary, integrated ecosystem science approach (Deputy Chief)
- Rely on USGS Southwest Biological Science Center for administrative and information technology support
- Increase interaction with Upper Colorado River Recovery Implementation Program and the Lower Colorado River Multi-species Conservation Plan

Monitoring and Research Plan



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**Monitoring and
Research Plan to
Support the Glen
Canyon Dam Adaptive
Management Program,
Fiscal Years 2007–11**

**Draft
November 14, 2006**



Monitoring and Research Plan

- Purpose
- Organization
- Integrated, interdisciplinary science
- Critical research and monitoring needs outside the GCDAMP
- Monitoring and research activities summarized by GCDAMP goal
- Funding

Purpose

The purpose of the Monitoring and Research Plan is to specify the scope and objectives of a research and monitoring program to address priority goals, questions, and information needs specified by the GCDAMP during the next 5 years.

Relationship to Other Planning Activities

- Consistent with and implements the Strategic Science Plan e.g.,
 - Collaborative science planning process
 - Focus on AMWG priorities and related strategic science questions
- Basis for the fiscal year 2007 work plan
- Placeholder for the long-term experimental plan

Organization

Charter 1

- **Core monitoring activities**
- **Research and development activities**
- **Long-term experimental activities**
- **Integrated Interdisciplinary Science**
- **Critical Research Needs Outside the CRE**

Chapter 2

Monitoring and research activities by Goal

Chapter 3

Funding

Core Monitoring Activities

- **Core monitoring activities are scientifically validated protocols or methods to assess the condition and trend of priority GCDAMP resources**
- **Consistent with Provisional Core Monitoring Plan developed by GCDAMP Core Monitoring Team**

Core Monitoring Project Review

Initial focus on “green” projects

Schedule:

- Downstream surface water discharge and stage (FY 07)
- Downstream quality of water (FY 07)
- Status of Lees Ferry rainbow trout (FY 07)
- Status of humpback chub in the Colorado River (FY 08)
- Sand storage monitoring (FY 07)
- Camping beaches monitoring (FY 09)
- Terrestrial Ecosystem Monitoring (FY 07)
- Lake Powell quality of water (FY 09)
- Kanab ambersnail habitat and population monitoring (FY 09)
- Cultural site monitoring (FY 10)
- Aquatic food base (FY 10-11)

Tribal monitoring to be addressed once needs are defined



Core Monitoring Evaluation Process

1. General Core Monitoring Proposal

- Specify by resource area goal, objectives, preliminary information needs, scope, schedule, funding level
- Review/approval by TWG

2. Annual TWG Information Needs Workshop

- Scope: monitoring projects that will be evaluated for core monitoring status in a given fiscal year
- Outcome: Refine/formulate specific management goals, information needs, and project scope

3. Protocol Evaluation Panel Review

- Expert panel that defines monitoring protocols and technical specifications consistent with 1 and 2 above

4. Core Monitoring Evaluation Report to TWG

- Provide sufficient information for TWG to evaluate proposed projects for core monitoring status

TWG Core Monitoring Evaluation

- Annual review to incorporate new information, findings, or monitoring techniques
- Comprehensive review every 5 years
- Core monitoring projects will receive first consideration for funding

Research and Development Activities

- **Research and development activities are projects aimed at (a) addressing specific hypotheses or information needs related to a priority GCDAMP resources and/or (b) developing/ testing new technologies or monitoring procedures**

Research and Development Activities (cont.)

Examples

- Food base research
 - PIT tag reading technology
 - Develop downstream temperature model
 - Evaluate National Park Service archaeological database
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- Driven by strategic science questions, core monitoring information needs, and research information needs

Long-term Experimental Activities

- **Experimental activities are flow and nonflow experimental treatments and management actions designed to:**
 - **Improve conditions of target resources, and**
 - **Through monitoring and research, promote an understanding of the relationship between treatments/management actions and the condition of target resources.**

Long-term Experimental Activities (cont.)

- **Long-term experimental activities are based on hybrid design**
 - Experiments
 - Management actions (e.g., trout removal)
- **Still a work in progress**
- **Experimental Research Fund: \$500,000/year up to \$2.5 million**

Integrated, Interdisciplinary Science

- **Collaboration with Science Advisors**
- **Link flow-sediment dynamics to priority GCDAMP resources**
- **Enhance the conceptual ecosystem model to identify critical ecosystem interactions and data gaps**
- **Recruit a part-time/visiting ecosystem scientist/ecologist**
 - **Focused development/application of conceptual and predictive models and decision-support tools**

Interdisciplinary TCD Initiative

1. Develop and test water temperature model
2. Synthesize water-quality data for Lake Powell and link with Colorado River quality of water models (funding dependent)
3. Synthesize currently available water temperature data
4. Develop and test a nonnative fish management plan
5. Gather data on the effects of natural warming on the distribution, abundance, and reproductive success of native and nonnative fishes
6. Complete genetic management plan and establish a refuge for humpback chub (USFWS lead)
7. Develop a comprehensive science plan to address the operation of a TCD

Critical Research and Monitoring Needs Outside the GCDAMP

- USGS will seek an increase in base funding in FY 08/09 to address three critical needs:
 - Little Colorado River Threats
 - Lake Powell Water Quality
 - Effects of Climate Change and Drought on the GCDAMP

GCDAMP Goal 12—Quality Program

- GCMRC Staffing and GCDAMP support
- Scientific Reporting
- Independent Science Advice and Peer Review
- Bridging Science and Management
 - GCDAMP Effectiveness Action Plan
 - Decision-Support System Feasibility Study
- Logistics
- Data Acquisition, Storage, and Analysis

Monitoring and Research Activities Summarized by GCDAMP Goal

- **Identifies:**
 - Strategic science questions/information needs
 - Core monitoring activities
 - Research and development activities
 - Long term experimental activities (placeholder)
 - Integration with other goals/activities
 - Link to FY 07 Work Plan
- Refer to MRP Table 2.1

Funding

- Power Revenues – (\$8.1 million)
- USGS – (\$1 million, with possible increase to \$2 million in FY 09)
- Reclamation – Lake Powell (\$230,000)
- Reclamation – TCD (unknown)



Questions or comments?