

Core Monitoring Activities

Core Monitoring: Consistent, long-term, repeated measurements using scientifically accepted protocols to measure status and trends of key resources to answer specific questions. Core monitoring is implemented on a fixed schedule regardless of budget or other circumstances (e.g., water year, experimental flows, temperature control, stocking strategy, nonnative control, etc.) affecting target resources (Draft GCDAMP Strategic Plan, 2001).

The need for a long-term core monitoring plan for the GCDAMP has been identified as a critical program need since the inception of the program in 1996. However, completion of a long-term core monitoring plan has remained an elusive goal for a variety of reasons. First, the process for the systematic development of monitoring programs generally involves the establishment of a protocol evaluation panel (PEP) for each key resource area, followed by several years of pilot testing of monitoring protocols, then a period of analysis, synthesis, and re-evaluation, culminating in the implementation of long-term monitoring protocols. This process was initiated in 1998 and is in progress for many elements of the program today (e.g., terrestrial ecosystems, archaeological and tribal resources, aquatic food base, recreation, and fisheries). Other factors have hindered rapid progress in the development of a core monitoring plan, including:

- Lack of agreement among GCDAMP stakeholders about scope, purposes, and objectives of core monitoring projects under the GCDAMP
- Lack of agreement among GCDAMP stakeholders and scientists about what defines core monitoring as opposed to other kinds of monitoring, such as monitoring effects of experimental actions or monitoring the effectiveness of management actions
- Lack of agreement about the required levels of precision and accuracy in monitoring data necessary to achieve program goals

A Provisional Core Monitoring Plan (PCMP) (Fairley and others, 2005) was drafted by the GCMRC in cooperation with a GCDAMP Core Monitoring Team. However, the plan only addressed a few highly developed monitoring efforts (so-called “green” projects) and was neither formally adopted by the TWG or the AMWG, nor was it finalized. Nevertheless, the PCMP represents the best guidance currently available for the development of core monitoring projects for FY07–FY11.

The current monitoring projects associated with various GCDAMP resources will be subjected to an evaluation by the GCMRC in cooperation with the TWG. The evaluation of projects for core monitoring suitability is critical because the implementation of core monitoring activities has significant budget implications for the science program that could limit the flexibility of the GCMRC and the GCDAMP to respond to high-priority research needs. Accordingly, all monitoring projects considered for core monitoring status will undergo the following technical evaluation process for determining core monitoring status:

1. **General Core Monitoring Proposal:** In FY07, the GCMRC will draft a General Core Monitoring Proposal that identifies by resource area the general goals, objectives, scope, schedule, and funding level for each proposed core monitoring project. The proposal will be based on AMWG priorities, currently identified information needs, the feasibility of developing monitoring protocols to meet those needs, and other relevant information. The proposal will be provided to the TWG for review.

2. **Information Needs Workshop:** Annually, the GCMRC will conduct a TWG workshop to refine and formulate recommendations concerning specific management goals, information needs, and the scope of all monitoring projects that will be evaluated for core monitoring status in a given fiscal year. The workshop will also identify specific questions that managers would like to have addressed in the follow-up protocol evaluation panel for each resource goal.
3. **Protocol Evaluation Panel Review:** For each resource goal, the GCMRC will convene a PEP to evaluate the results of the information needs workshop, review the results of past monitoring efforts and relevant research and development activities, and recommend future monitoring protocols and other technical specifications for the monitoring project.
4. **Core Monitoring Program Reports:** Based on the results of the workshop and the PEP evaluation, the GCMRC will prepare a report to the TWG for each project being evaluated for core monitoring status. Core monitoring program reports will provide the TWG sufficient information to evaluate individual programs/projects for core monitoring status. The reports will include the following information:
 - AMWG goal(s) addressed
 - Project title
 - Principal investigator(s)
 - Geographic scope
 - Justification for monitoring effort
 - Project goals, tasks, and schedule by task
 - Key science questions and managers' information needs addressed
 - Linkage to other resources processes and models
 - Monitoring protocols, including sampling designs, level of data resolution, accuracy and precision assessment, etc.
 - Expected outcomes, including outputs by fiscal year, reports, guidelines, models, etc.
 - Costs of project/program by fiscal year

Those projects approved by the TWG for core monitoring status will receive first consideration for funding each year and will not undergo the same annual competitive review as other projects. However, core monitoring projects will be reviewed during the development of the BWP to incorporate new information, findings, and monitoring techniques that may improve their effectiveness. A more comprehensive review of core monitoring projects will be conducted at 5-year intervals.

The initial focus of the evaluation process described above will be to evaluate for core monitoring status those "green" projects that have undergone a PEP evaluation, have been piloted and results peer reviewed, and that have been implemented for one to several years using methods deemed adequate for long-term monitoring. Projects in this category and their anticipated review schedule include:

- Downstream surface-water parameters (discharge, stage measurements) and specific water-quality parameters related to sediment (e.g., suspended-sediment transport measurements and modeling) (FY07)
- Status of Lees Ferry rainbow trout (FY07)

- Status of humpback chub in the Little Colorado River (to be reviewed through PEP with Colorado River population) (FY08)

In addition, several monitoring projects that have undergone an initial PEP review have subsequently undergone a period of research and development or pilot testing and are now ready for a second PEP review before being implemented as part of the long-term core monitoring plan. Other projects, such as food base and cultural resources, have only recently started their multiyear research and development phase. These projects will be brought forward for review over the course of the next 5 years with the goal of having a fully developed core monitoring program in place by FY11. The proposed schedule for undertaking core monitoring reviews of these projects is as follows:

- Sand storage monitoring (FY07)
- Terrestrial ecosystem monitoring (FY07)
- Status of humpback chub in the mainstem of the Colorado River (to be reviewed through PEP with LCR population) (FY08)
- Integrated quality of water project (Lake Powell and downstream parameters, including specific conductivity, dissolved oxygen, and temperature) (FY09)
- Kanab ambersnail habitat and population monitoring (FY09)
- Camping beaches monitoring (FY09)
- Cultural site monitoring (archeological, traditional cultural properties) (FY10)
- Aquatic food base (FY10–FY11)

Monitoring of traditional cultural properties (TCPs) and tribal values in the CRE is a component of the GCDAMP; however, the GCMRC faces a number of challenges in determining how to integrate tribal perspectives into core monitoring. This is in part because of differing perceptions about what constitutes appropriate indicators of ecosystem “health” and also because most of the tribes have been reluctant to formally identify their TCPs. Furthermore, in many cases a tribe’s resource interests are tied to specific, culturally important places in the river corridor, the locations of which are considered to be proprietary information. Without a clear articulation of the tribes’ needs for monitoring data, it is impossible for the GCMRC to develop monitoring projects to meet tribal needs.

The tribes were funded by the GCDAMP in FY06 to define their monitoring projects and associated methods and metrics for evaluating the resources and places of specific tribal interest in the CRE. These projects are scheduled to be brought forward to the TWG for review and discussion in FY07. If the methods and rationales for these proposed monitoring projects are shared with the GCDAMP and subjected to peer review, then they may fit within the GCDAMP science program as currently defined. Otherwise, the information derived from the tribal monitoring effort may be more appropriately incorporated into the GCDAMP decision-making process via ongoing consultation between the tribes, GCDAMP stakeholders, and DOI agencies. The GCMRC will describe the tribal monitoring component of the 5-year science program with more specificity after the tribal monitoring needs are defined and brought forward for TWG review in FY07.

Core Monitoring Development Process

Technical Work Group
April 2, 2007

John Hamill, Chief
GCMRC

Helen Fairley, Socio-Cultural Program Manager
GCMRC

Overview

- **Purpose and background (John)**
- **Overview of provisions of the MRP (John)**
 - Relationship to CMT report/recommendations
- **General Core Monitoring Proposal (Helen)**
- **Information Needs Workshop (Helen)**
- **FY 07 PEPS (Helen)**
- **Core Monitoring Project Reports (Helen)**
- **Discussion and Comments (20 minutes)**

Background

- **Several failed attempts to develop/ implement a core monitoring plan**
- **Lack of agreement on:**
 - **Purpose, scope, objectives**
 - **What constitutes core monitoring**
 - **Required level of precision or accuracy**

Provisional Core Monitoring Approach

- Elements of the approach:
 - Identified **Green**, **Yellow** and **Red** projects
 - Criteria for ranking AMP goals
 - Criteria for prioritizing CMINs
 - Identified 53 factors for evaluating core monitoring data
- Proposed committee process to implement approach

MRP Provisions: A streamlined approach to Core Monitoring

Why is a Core Monitoring Plan Needed

- **Element of the Grand Canyon Protection Act**
- **Fundamental to Adaptive Management**
- **Core Monitoring R&D is consuming large portion of budget (62%) w/o a plan**
- **Need to focus monitoring on priority needs**

Basis for MRP Core Monitoring Approach

- **Core Monitoring:** Scientifically validated protocols or methods to assess the condition and trend of priority AMP resources
- Consistent with Provisional Core Monitoring Plan and proposed process—but streamlined
- Refine through an “adaptive management” approach (develop, implement, evaluate)
- Tribal monitoring to be addressed once needs are better defined

Schedule for Core Monitoring Review

FY 07

- Downstream surface water discharge, stage and quality of water (temp, conductivity, and suspended sediment)
- Sand storage monitoring
- Terrestrial Ecosystem Monitoring
- Lees Ferry rainbow trout

FY 08

- Humpback chub in the LCR and Colorado River

FY 09

- Camping beaches
- Lake Powell quality of water
- Kanab ambersnail

FY 10/11

- Cultural site (arch sites and TCPs)
- Aquatic food base

MRP Core Monitoring Evaluation Process

1. General Core Monitoring Proposal:

- Based on existing planning documents
- Specify by resource area goals, objectives, preliminary information needs, scope, priority, schedule, and funding level
- Review/approval by TWG (FY07)

2. Annual TWG Information Needs Workshop:

- **Scope:** monitoring projects that will be evaluated for core monitoring status in a given FY
- Refine/formulate specific management objectives, core monitoring information needs and project scope

3. PEP Review

- Independent science panel that recommends monitoring protocols and technical specifications consistent with 1 and 2 above

4. Core Monitoring Project Report to TWG

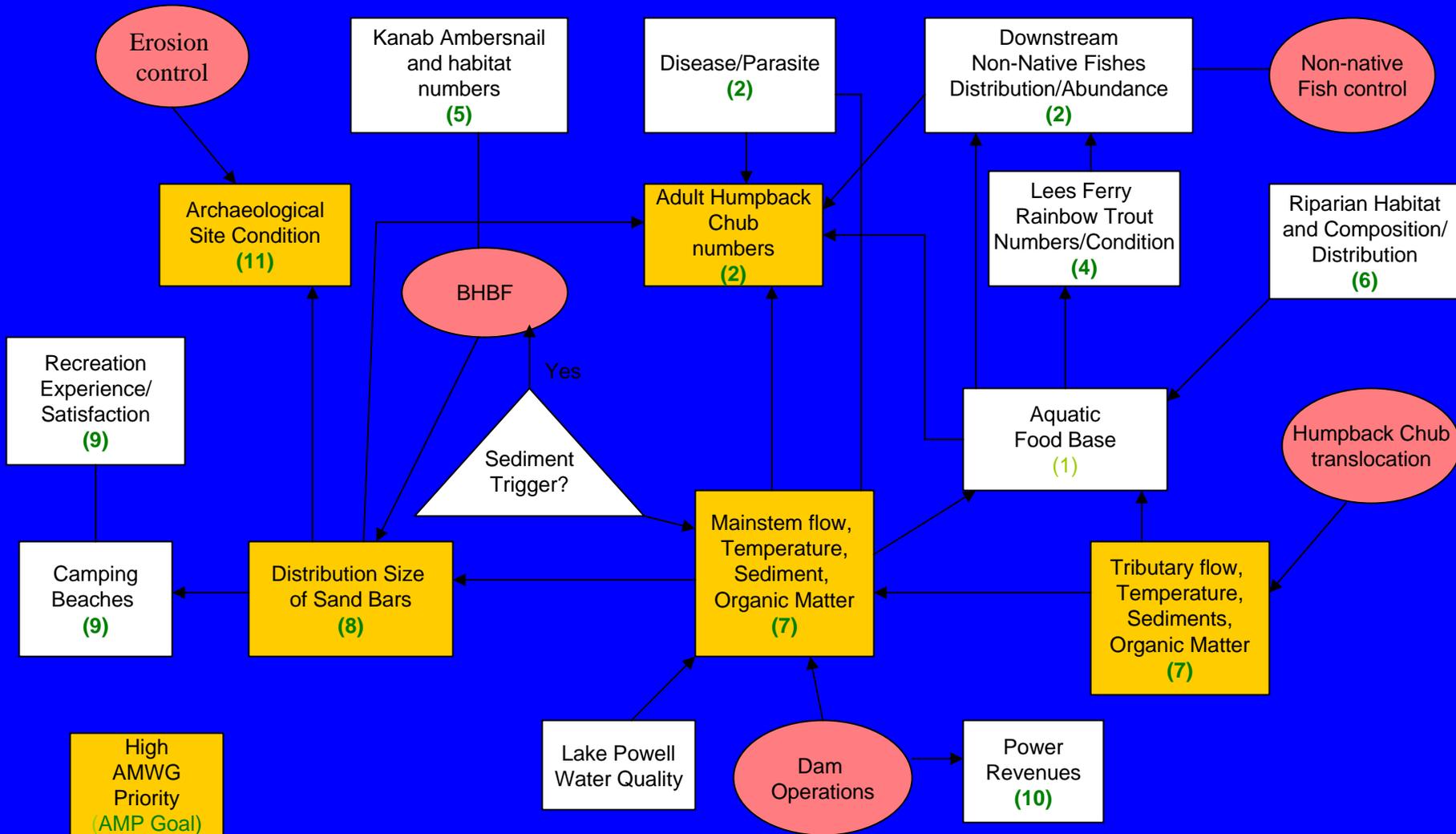
- **Scope:** Includes sufficient info for TWG to evaluate proposed projects for core monitoring status



Core Monitoring Reviews

- Annual project review to incorporate new information, findings or monitoring techniques.
- Comprehensive review each 5 years (including General Core Monitoring Plan).

INTEGRATED CORE MONITORING PROGRAM



Proposed treatments

Requested TWG action

TWG reaffirms its support of the core monitoring approach as described in the Draft November 14, 2006 MRP, and recommends that GCMRC proceed with implementation of the approach in FY 07

General Core Monitoring Proposal

This is a programmatic plan that will specify the scope of the core monitoring program

- NOT another Provisional Core Monitoring Plan
- Previews where we are heading and how & when we plan to get there via R&D, PEPs, Core Monitoring Reports
- Organized by AMP goals (including Goal 12)
- Plan will be incrementally implemented and modified based on experience, PEP reviews, and new information
- Estimates yearly \$\$\$
- TWG review (June 2007)

Outline of General Core Monitoring Proposal

Introduction: Background, Purpose, Need, Scope and Vision for Future Integration

(Remainder of report organized by AMP Goals 1-12)

- 1. Core monitoring objectives for each AMP Goal**
- 2. Core Monitoring Information Needs**
- 3. Proposed Geographic scope**
- 4. Previous work towards core monitoring**
- 5. Proposed implementation schedule**
- 6. Linkage to other goals/projects/models**
- 7. Data management plan and products (reports, models, etc)**
- 8. Estimated cost by fiscal year**

Information Needs Workshop

- Clarify manager's priorities for Core Monitoring Information Needs
 - Review work of SPG re: CMIN revisions
 - Focus is on resolving which CMINs are highest priority for focusing future monitoring projects
 - NOT a process to revise AMP Strategic Plan
- Solicit manager's input for FY07 PEPs
 - Lees Ferry Trout (September 2007)
 - Terrestrial & Riparian Communities (July 2007)
 - Socioeconomics (August 2007)

Protocol Evaluation Panels

- Independent panel of 8-10 subject experts
- PEP purpose: To review proposed or current monitoring protocols and resulting data & products and provide recommendations to GCMRC scientists on ways to improve or refine methods and results in consideration of AMP information needs, costs, efficiency, and scientific rigor

Core Monitoring Project Reports

Purpose: To document proposed core monitoring projects in response to high priority information needs for each goal

- Prepared by GCMRC program managers and staff using input from IN workshop and PEP
- Will be provided to TWG for review and comments
- Once revised and recommended by TWG, will be moved into core monitoring plan
- First report will be for Goal 8 (sediment) due June, 2007
- Other reports will be produced 2-3 months after the PEP

Core Monitoring Program Report

Report Content

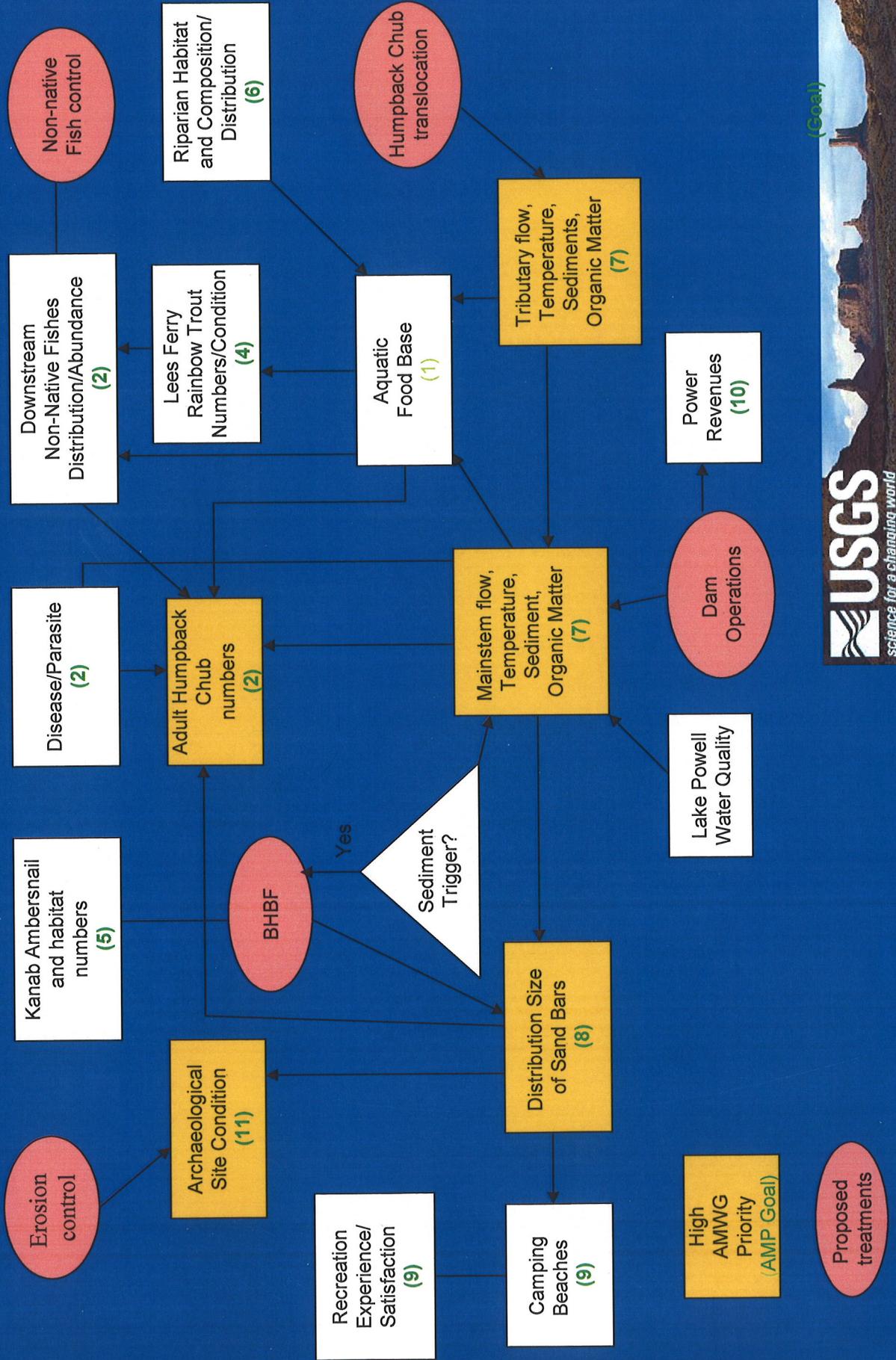
1. AMWG Goal
2. Project Title
3. Principal Investigator (if known)
4. Geographic scope
5. Justification for monitoring effort
6. Project tasks and schedule
7. Key science questions, management objectives and information needs
8. Linkage to other projects/models
9. Monitoring protocols including sampling design, methods, data resolution, accuracy, etc
10. Products (reports, models, etc)
11. Cost by fiscal year



Requested TWG action

TWG reaffirms its support of the core monitoring approach as described in the Draft November 14, 2006 MRP, and recommends that GCMRC proceed with implementation of the approach in FY 07.

INTEGRATED CORE MONITORING PROGRAM



(Goal)

