Glen Canyon Dam Adaptive Management Work Group
Agenda Item Information
February 3-4, 2010

Agenda Item

General Core Monitoring Plan Workshop Results

Action Requested

- ✓ Information item only. We will answer questions but no action is requested.

Presenters

Ted Melis, Deputy Chief, Grand Canyon Monitoring and Research Center
Shane Capron, Chair, Technical Work Group (Western Area Power Administration)

Previous Action Taken

- ✓ By AMWG: During its August 29-30, 2007 meeting, AMWG recommended approval to the Secretary of the Interior of the GCMRC Monitoring and Research Plan, which included a core monitoring approach.
- ✓ By the Secretary of the Interior: The SOI approved the above recommendation.

Relevant Science

- ✓ The following describes the relevant research or monitoring on this subject: General monitoring proposals are being developed on the basis of research and development of methods, as well as review of those methodologies (various Protocol Evaluation Panels) for a range of resources of interest to the GCDAMP in its Strategic Plan.

Background Information

GCMRC and TWG co-hosted a workshop on the development of a General Core Monitoring Plan (GCMP) for the GCDAMP on December 1, 2009. The purpose of the meeting was to:

- Achieve understanding of the GCMRC proposed general strategy for long term core monitoring (measuring trends in "signals" for resources of critical interest to GCDAMP).
- Enhance support for the general Core Monitoring Plan (including timelines, budget, staffing requirements) and completion of remaining steps for all resource areas.
- Reach a tentative agreement on timeframe and steps for TWG to develop a recommendation to AMWG.

This agenda item is a report to AMWG on the results of that workshop.

History and Major Highlights of the General Core Monitoring Plan

Development of a core monitoring plan for the Colorado River ecosystem below Glen Canyon Dam began following Phase I of the Glen Canyon Environmental Studies program (GCES) in the late 1980s. Core monitoring data are an essential need of adaptive ecosystem assessment and management; however, previous planning efforts by both the GCES (1989-95) and the GCMRC (1996-06) have not been fully resolved or completed. Following GCDAMP approval of the FY2008-

12 Monitoring and Research Plan, the GCMRC began developing a draft General Core Monitoring Plan (GCMP) during FY 2009. The draft GCMP was intended to provide the TWG with a more complete "package" of general descriptions, estimated budget, and staffing needs required for monitoring resources associated with each of the goals in the GCDAMP's strategic plan. One exception was the exclusion of a general monitoring proposal for extirpated species (Goal 3), due to the fact that no Goal 3 activities have been undertaken by the GCDAMP to date. During the 2009 planning effort, the GCMRC committed to develop a general monitoring strategy focused on an ecosystem approach, and to also carefully consider the costs associated with each of the general monitoring elements.

During development of the 2009 draft GCMP, GCMRC carefully considered comments from a 1994 review by the National Research Council of the monitoring plan developed by the Glen Canyon Environmental Studies program during the Glen Canyon Dam EIS. Dr. Duncan Patton, former Senior Scientist of the GCES, led development of that draft plan. GCMRC also considered suggestions on core monitoring from members of the TWG during the 2003 to 2005 era of core monitoring planning, as well as priority questions developed by the AMWG (August 2004) and priorities identified for core monitoring information needs (through the 2005 Science Planning Group ad hoc group).

The draft GCMP was completed in late July 2009 and delivered to the Science Advisors for their review in early August. A report from the Executive Coordinator of the Science Advisors was returned to the GCMRC Chief in mid-September 2009. By October 24, GCMRC had prepared written responses to each of the Science Advisors' comments and revised the draft plan accordingly. On that date, GCMRC sent to TWG the original draft plan, the revised draft plan, and the Science Advisors' comments with GCMRC responses, with a request for comments to be returned to the GCMRC by close of business on November 16.

Shane Capron, TWG Chair, compiled a summary list of major TWG comments on the draft plan, with review and comments from GCMRC staff, for use during the workshop.

Workshop Results and Plan for Revisions

Eighteen participants, six GCMRC staff, and the Science Advisors Executive Coordinator attended the workshop; Mary Orton facilitated. After a review of the history of plan development and an overview of the plan, the group reviewed the compilation of major issues, compiled by the TWG Chair, from all the comments that were submitted on the Plan. TWG members were then invited to add to the list of 21 items on the compiled list and to modify existing items on the list. TWG members then used a dot-voting exercise to establish priority items for resolution. Please see the workshop summary report for details on the dot-voting exercise.

The most critical aspect of the GCMP is that it defines a general process for the development of the individual core monitoring plans. However, the discussion at the workshop was focused primarily on the need to include an adaptive management framework within the individual plan development process. The intent of such a framework is to define a process that includes the use of risk assessment and trade-off analysis to better inform TWG and AMWG decision-making about the long-term monitoring of resources in the CRE. The discussion at the workshop generally favored the need to consider the trade-offs of monitoring, expense, and needs of the GCDAMP as a whole.

Additional major concerns included the following:

- Many participants felt that the current draft plan was too expensive and that a process was needed which allowed for science-based evaluation of the individual plans in order to focus the program on critical needs.
- Some members expressed caution that if we walk through a process of defining core monitoring, we should do so while maintaining our ability to answer critical questions within the GCDAMP.
- The sense of the group was that Desired Future Conditions are needed in order to have a successful monitoring program. The lack of DFCs hinders the program's ability to define a focused and efficient core monitoring program, and without them, any CMP would likely be more expansive than it would need to be.
- The group felt that work needed to be done to better integrate tribes and tribal perspectives into the monitoring program. A number of issues were raised regarding the integration of tribal monitoring programs, tribal concerns, and consideration of tribal values in the monitoring program.

Other issues such as better integration with other AMP entities, concern over GCMRC staffing levels, and roles were also discussed as important items to resolve before TWG could make a recommendation to AMWG on a General Core Monitoring Plan.

Timeline and next steps:

A small group of participants agreed to work with the TWG Chair and GCMRC to help revise Section 2 of the document, which describes the process of developing the individual core monitoring plans by AMP goal. On January 21, 2010, GCMRC and the TWG workshop group will report to TWG on the progress of revisions and major tasks outlined at the workshop, and further assess the revision process. Then, at the March TWG meeting GCMRC will provide a response to comments table, which addresses all of the comments received on the draft plan, as well as a revised GCMP for TWG review. Given the substantial issues left to resolve, TWG will potentially have a recommendation for AMWG at its fall 2010 meeting.

Specific Workshop Results

The result of the workshop is the following list of issues that need to be resolved, in order of priority from higher to lower priority. (Additional detail can be found in the workshop summary report.)

1. Describe criteria for activity inclusion in core monitoring proposals, such as priority and confidence. *(More examples and detail are provided in the report.)*
2. How can we accurately determine which of the core monitoring proposals meets our needs, or perhaps is beyond our needs without specified DFCs for the MOs? Can we proceed without DFCs, and if so how and what does it mean to the program? Many of the elements may not need DFCs, others might really need them; how do we move forward and advise AMWG? Goals need to be revisited.
3. Risk assessment for critical choices (qualitative or quantitative based on available resources). We lack information on trade-offs between statistical precision and sampling intensity that will drive costs, these analyses should drive our decision making. *(Examples provided in the report.)*
4. Missing are concerns of the Core Monitoring Team and others to avoid the "Christmas tree" approach and to keep the budget in the 40-60% range of the science budget. Support a process that allows for core monitoring choices which use less of the budget. Budget should be divided into core monitoring, research, and development with monitoring, and experimental

components (e.g., Knowledge Assessment color approach). Add distinction between monitoring and core monitoring.

5. The strategy discussion needs to be a greater focus of the document describing the two strategies (science and management; Chapter 2). Section 2 should be rewritten to describe in greater detail the process for the development of the individual plans (i.e., expanded discussion of Step 4). This should include an adaptive management component with sideboards on the process to allow forward movement of the plan.
5. More integration of tribal monitoring in each CMP/goal, critical lack of tribal integration now with emphasis on other areas that may be a responsibility of the NPS. Better integrate tribal values in ecosystem management (Figure 4), TCPs. Include how tribes will be consulted in developing overall and independent CMPs.
6. Need to identify how other agency monitoring programs will be integrated (e.g., NPS I&M program).
7. Include socioeconomic core monitoring.
8. Geographic scope is defined as CRE, which discusses tribes. Tribes should be included. GCMRC seems to have constrained the scope of monitoring beyond the language identified in the plan. To include areas necessary for successfully monitoring the CRE.
8. CMP should be focused on monitoring for dam operations.
9. Need for more discussion about other monitoring programs and monitoring in general (LTER, literature) background, lessons learned, approaches, sampling design.
9. The description of the present staffing plan should include how many individuals are employed in what capacity, why some positions are or are not filled, more detail on how well the program involves outside collaborators, and how many students are supported by the program. A justification should be provided about how the present staffing varies from the original concept for GCMRC in the ROD. How does the plan for 26 FTEs fit with budgetary constraints we know are coming? Higher staff levels inevitably mean increasing costs greater than CPI. Relate staffing needs with organization chart.
9. Develop strategic plan for monitoring required to support reintroduction of extirpated species. Roles and responsibilities of GCMRC, TWG, AMWG, and DOI should be directly discussed; who is responsible for what in this process and what are the sideboards?

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General Core Monitoring Plan for the GCD-AMP

AMWG Meeting
February 4, 2010

John Hamill, Chief
USGS-GCMRC
Flagstaff, AZ

Overview

- Background and Rationale for Plan
- General Framework
- Major Elements
- Staffing and Cost

Past TWG/AMWG actions

- TWG, AMWG and SOI approved the 4-Step core monitoring approach described and included in the FY 07-11 MRP

Core Monitoring Process (from 2007-2011 MRP)

1 – General Core Monitoring Plan

2 – Annual Information Needs Workshops

3 – Protocol Evaluation Panel Reviews

4 – Detailed Core Monitoring Plans for each Resource Area

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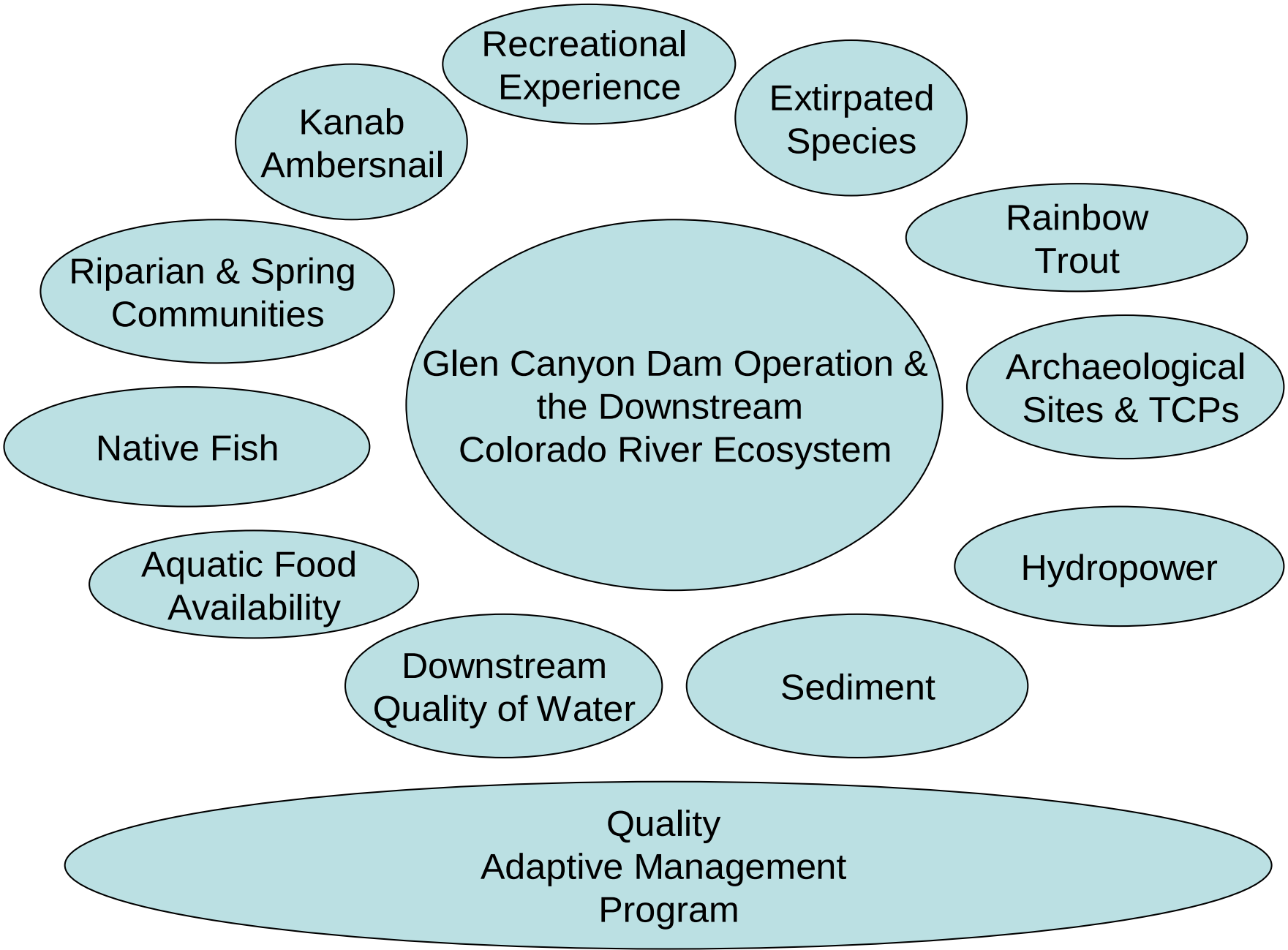
What is Core Monitoring

- *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 affecting target resources (AMP Strategic Plan).*
- *Addresses monitoring of resources and CMINs associated with GCDAMP goals*

GCD AMP Strategic Goals



Why is a Core Monitoring Plan Needed

- Fundamental to Adaptive Management
- Meet the requirement of Grand Canyon Protection Act
- Core Monitoring R&D consumes large portion of budget (~65%)
- Needed to support budget and staff planning
- Needed to resolve fundamental issues about the scope and direction of core monitoring

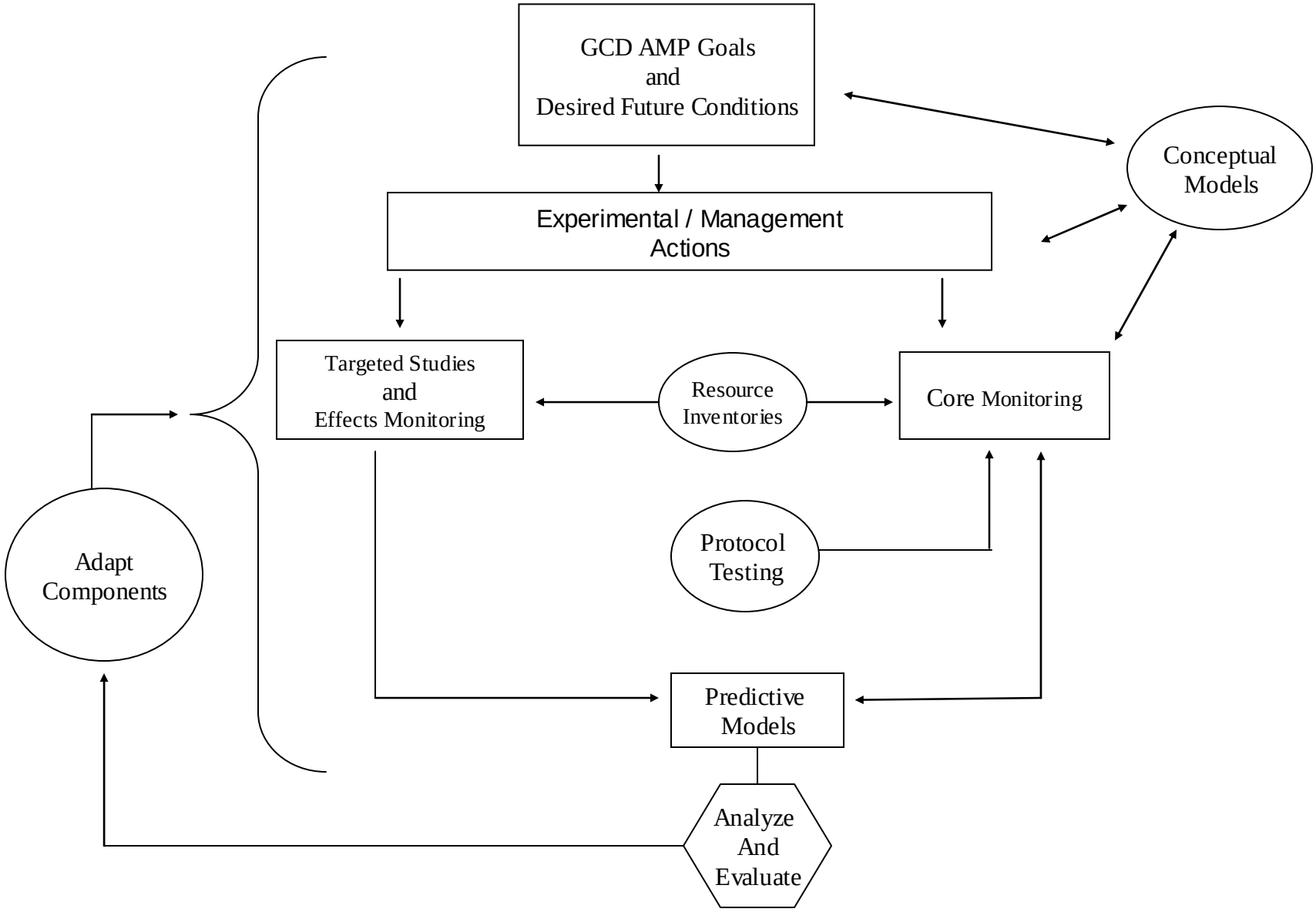
Programmatic Plan

- Outlines the general scope and objectives of the core monitoring program
- Identifies where we are headed and how & when to get there
- Plan will be incrementally implemented and modified based on experience, PEP reviews, and new information
- Estimates yearly $$$ and staffing needs
- Plan will be incorporated into 2012-2017 MRP

Foundational Elements

- AMP Strategic Plan and Core Monitoring Information Needs (Identify What, Where, When)
- Various TWG deliberations (core monitroing team, SPG, etc.)
- Independent reviews and guidance
  - NRC review of 1995 monitoring plan
- Inventories
- Extensive R&D—Protocol development and testing
- Missing element: Desired Future Conditions (work in progress)

Context of the Core Monitoring Program



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Reporting

- Publish and serve core monitoring data/results
- Annual reporting workshop
- Annual Status and Trends Fact Sheet
- SCORE Report (~every 5 years)

Role of GCMRC and Cooperators

- Overall Lead: GCMRC (oversight; data analysis; reporting)
- Cooperator Role: lead for specific tasks if:
  - Interested and capable
  - Fair price
  - Meet technical requirements
  - Peer review
- Competitive awards

Program Cost

- Cost: $6.3M/year
  - Consistent with independent estimates
  - Based on existing or estimated work
  - Refined in detailed core monitoring reports
  - Suitable for general budget planning

Staffing

- 25 full time equivalents by 2015
  - Program management
  - Data collection/analysis
  - Reporting and publication
  - Data Management
  - Contracting/agreements
  - Logistics and survey support
- Shift in staff expertise
- Shift to permanent positions (19 to 26)

Review/Approval Process

- SA Review—August 2009
- TWG Review—December 2009 Workshop
- AMWG Update– February 2010
- TWG Review/Recommendation—March/June 2010
- AMWG Recommendation–Summer 2010

Concern: Many TWG issues are management or policy related and will not be resolved in a timely manner

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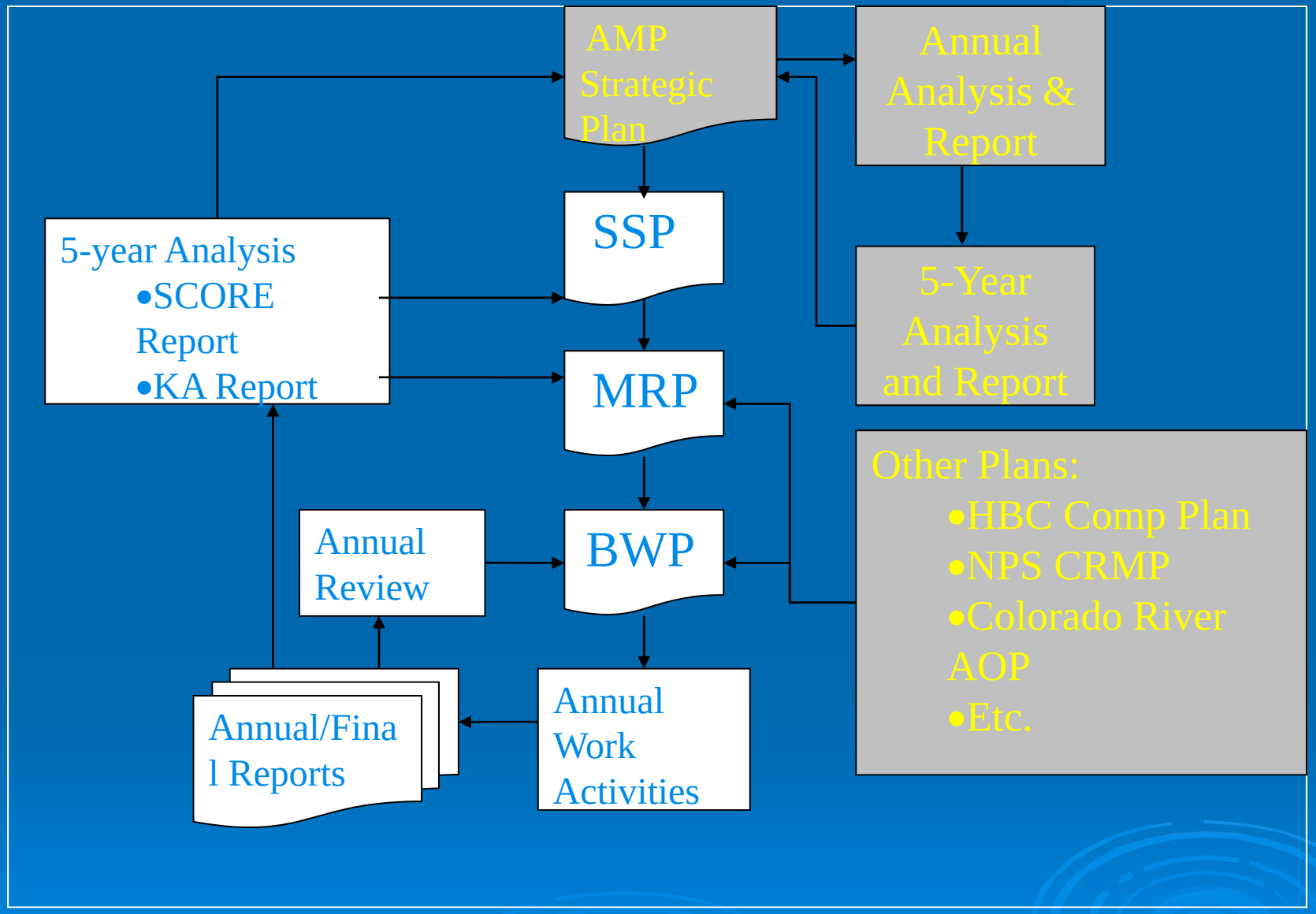

AMP Strategic Plan
Annual Analysis & Report
SSP
5-year Analysis
•SCORE Report
•KA Report
5-Year Analysis and Report
MRP
Other Plans:
•HBC Comp Plan
•NPS CRMP
•Colorado River AOP
•Etc.
Annual Review
BWP
Annual/Final Reports
Annual Work Activities

Step 1: General Core Monitoring Plan

- Specify by resource area the goals, objectives, preliminary information needs, scope, priority, schedule, and funding level

Step 2: Annual TWG Information Needs Workshop

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

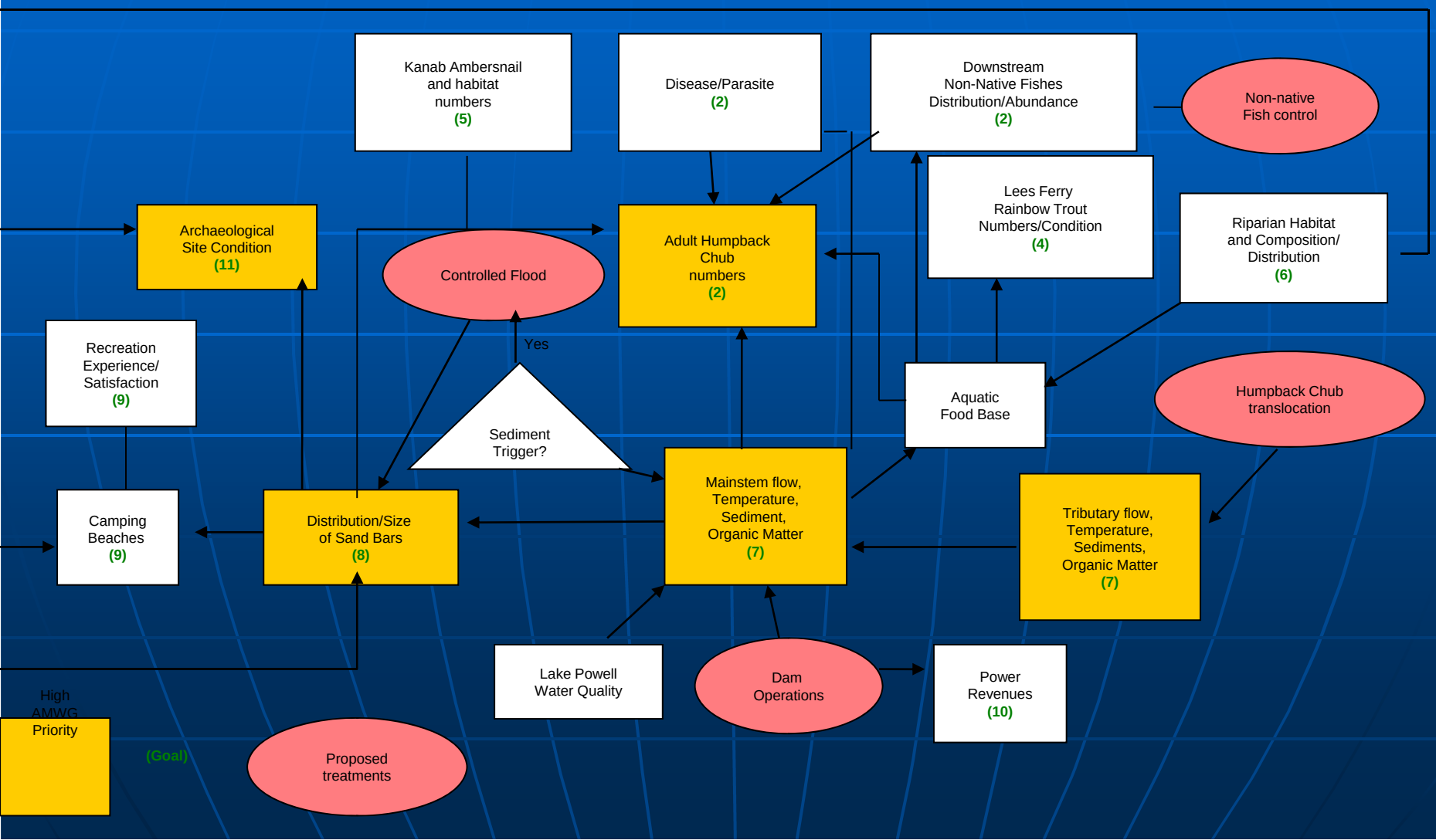
Step 3 PEP Reviews

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

Step 4: Detailed Core Monitoring Project Reports

- **Scope**: Detail plan for each resource area:
  - Principal investigator(s)
  - Geographic scope
  - 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.
  - Projected cost of project or program by fiscal year
- **TWG review and endorsement**

INTEGRATED CORE MONITORING PROGRAM



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MRP Core Monitoring Evaluation Process

1. General Core Monitoring Plan:
   - Based on existing planning documents
   - Specify by resource area goals, objectives, preliminary information needs, scope, priority, schedule, and funding level
   - Review/approval by TWG/AMWG
2. Annual TWG Information Needs Workshops:
   - **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 Reviews
   - Independent science panel that recommends monitoring protocols and technical specifications consistent with 1 and 2 above
4. Detailed Core Monitoring Project Reports
   - **Scope**: Includes sufficient info for TWG to evaluate proposed projects for core monitoring status

Step 1: General Core Monitoring Plan:

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

Step 2: Annual TWG Information Needs Workshop

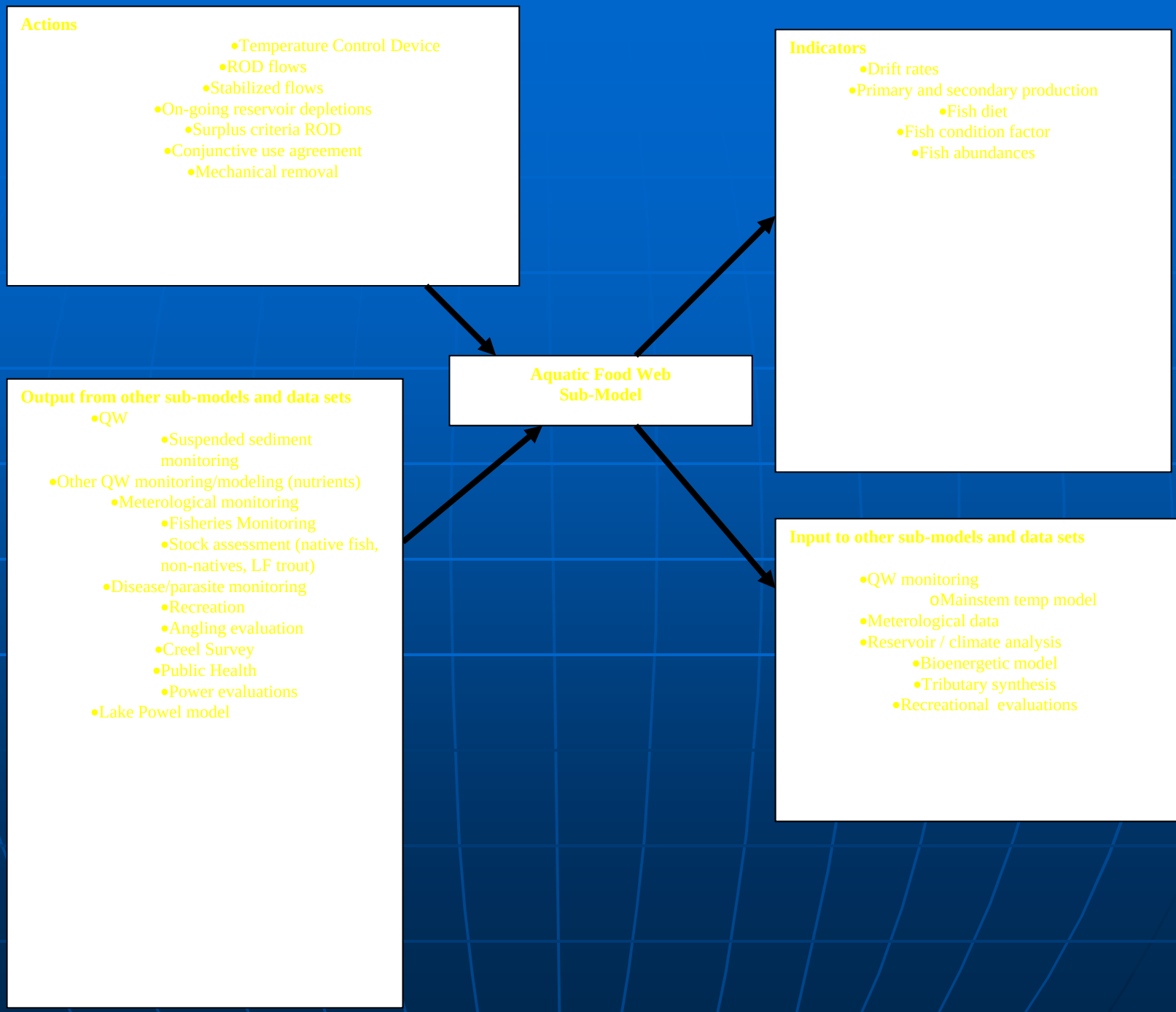
- **Scope**: monitoring projects that will be evaluated for core monitoring status in a given FY
- **Purpose:** Refine/formulate specific management objectives, core monitoring information needs and project scope

Step 3 PEP Reviews

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

Step 4: Detailed Core Monitoring Project Reports

- **Scope**: Includes sufficient info for TWG to evaluate proposed projects for core monitoring status
  - Project title
  - Principal investigator(s)
  - Geographic scope
  - 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.
  - Projected cost of project or program by fiscal year


Actions
•Temperature Control Device
•ROD flows
•Stabilized flows
•On-going reservoir depletions
•Surplus criteria ROD
•Conjunctive use agreement
•Mechanical removal
Indicators
•Drift rates
•Primary and secondary production
•Fish diet
•Fish condition factor
•Fish abundances
Aquatic Food Web Sub-Model
Output from other sub-models and data sets
•QW
•Suspended sediment monitoring
•Other QW monitoring/modeling (nutrients)
•Meterological monitoring
•Fisheries Monitoring
•Stock assessment (native fish, non-natives, LF trout)
•Disease/parasite monitoring
•Recreation
•Angling evaluation
•Creel Survey
•Public Health
•Power evaluations
•Lake Powel model
Input to other sub-models and data sets
•QW monitoring
oMainstem temp model
•Meterological data
•Reservoir / climate analysis
•Bioenergetic model
•Tributary synthesis
•Recreational evaluations

Schedule (cont)

Goal	Resource	Completed PEPs	R&D/Pilot Phases	CMIN Workshop/Final PEP	CMP Report	Implement CMP
6	Riparian and spring communities	FY00	FY01–06	FY07, FY12	FY07	FY08
7*	Quality of Water	FY98 FY02	FY98–06	FY11	FY12	FY13
8	Sediment	FY98 FY02	FY98–06	FY06	FY07	FY08
9**	Recreational Experience Quality	FY05	FY07–09**	FY11**	FY11*	FY11*
10	Hydropower	N/A	FY07	FY10	FY10	FY11
11	Cultural Resources	FY00	FY07–12	FY12	FY12	FY12

Schedule

Goal	Resource	Completed PEPs	R&D/Pilot Phases	CMIN Workshop/Final PEP	CMP Report	Implement CMP
1*	Food base	FY00	FY06–08	FY11	FY11	FY12
2	Native fish	FY00	FY10	FY07/09	FY10	FY11
4	Lees Ferry trout	FY00	FY01–06	FY09 FY07	FY10	FY10
5	Kanab ambersnail	FY00	FY01–10	FY11	FY11	FY12
6	Riparian and spring communities	FY00	FY01–06	FY07, FY12	FY07	FY08