



United States Department of the Interior

BUREAU OF RECLAMATION
Washington, D.C. 20240

IN REPLY REFER TO:
PXAO-6000
ADM-10.00

MAY 03 2000

To: Adaptive Management Work Group Members and Alternates
Technical Work Group Members and Alternates, and
Interested Parties

Subject: Transmittal of Draft Adaptive Management Work Group (AMWG) Minutes
and Upcoming AMWG Meetings

Enclosed for your review and comment is a DRAFT of the AMWG Minutes from the meeting held in Phoenix, Arizona, on January 20-21, 2000.

There was some earlier discussion about a possible AMWG meeting to be held on June 6, 2000. As a result of scheduling conflicts and concern about insufficient quantity of agenda items, we have decided to not hold a meeting. The next meeting will be held on July 6-7, 2000, at the Bureau of Indian Affairs Office in Phoenix, Arizona. Tentative agenda items for that meeting will be: review and approval of the Management Objectives, status on the low steady summer flow, FY 2002 budget, results of the Protocol Evaluation Panel (PEP) reviews, renewal of the AMWG Charter, and other environmental compliance issues.

A block of rooms has been reserved at the following hotel at the rate of **\$59 + tax** under the "Bureau of Reclamation:"

Hyatt Regency Phoenix @ Civic Plaza
122 N. 2nd Street
602-252-1234

The block will close on June 6, 2000, so make your reservations early.

If you have any questions or comments regarding any of the above, please let me know.

Sincerely,

Stephen V. Magnussen
Chairman, Adaptive Management Work Group

Enclosure

MEMO

DATE: June 6, 2000

TO: AMWG

FROM: Barry D. Gold
Chief, GCMRC

SUBJECT: FY 2002 GCMRC Bottom-line Budget

At the July 6-7, 2000 AMWG meeting you will be asked to review and make a recommendation regarding your support or opposition to GCMRC's FY 2002 budget request in support of the AMP. Attached to this memo are the following documents which support GCMRC's budget request:

- Attachment 1 - Three-year Budget Summary
- Attachment 2 - FY 2002 Proposed Budget Summary
- Attachment 3 - FY 2002 Brief Project Descriptions

The FY 2002 GCMRC budget was developed by looking at the work that will be required to support the Management Objectives and Information Needs of the AMP, in conjunction with the knowledge we have gained from the existing program as well as the advice and recommendations that have been provided from the various Protocol Evaluation Panels. In addition, the budget reflects changes that have been made to develop a more integrated approach to scientific activities by presenting future work as integrated projects as opposed to individual programs.

Our FY 2002 budget request is approximately \$1.1 million dollars more than the FY 2001 program budget. Consistent with the Mark Schaefer memo of March 31, 2000 that called for GCMRC support from power revenues to be capped at FY 2000 level increase for inflation we are seeking \$1 million dollars in appropriate funds from the USGS to cover these proposed budget increases. Areas on increase that we propose to cover out of appropriate funds are indicated in the FY 2002 budget summary. Should these funds not materialize, we will need to re-prioritize the work at that point in time and make appropriate decisions about redirecting funds.

TO: AMWG members
FROM: Ad Hoc Committee on the Strategic Plan
CC: TWG members
DATE: June 9, 2000
RE: Recommended action on the Strategic Plan for the July AMWG meeting

Attached you will find the updated Strategic Plan. It combines the new draft Management Objectives into one document with the Vision/Mission statement, the Principles, the Goals, and the Glossary. These are for your consideration for the July AMWG meeting.

The Strategic Plan Ad Hoc Committee was assigned several tasks at the 20-21 January 2000 AMWG meeting. The following motions were approved:

MOTION: Interim approval of the goals document as presented, with the exception of Goal 12, and the following changes:

- a. Goal 15 - the word "revenue" is changed to "funding"
- b. Glossary, page 8, "Reasonable and Prudent Alternative" and "Reasonable and Prudent Measure:" remove the word [Regional].
- c. Glossary, page 9, "Removal of Jeopardy" next to last line, replace "done" with "intended to be accomplished,"

and that the ad hoc committee on Strategic Planning consider adding new language as follows:

- d. "Enhance" opportunities for Indian Tribes in the GCD AMP.
- e. GCD and its operation provide regulation of the flow of the Colorado River and storage of water for beneficial consumptive use.

MOTION: To tentatively approve [a new] goal 12: "Cultural resources within the river corridor shall be preserved, protected, managed, and treated for inspiration and benefit of past, present, and future generations."

MOTION: That the Ad Hoc Committee on Strategic Planning be charged by AMWG to do the following:

- a. produce the first draft of MOs for the TWG
- b. obtain comments on that draft from the TWG
- c. incorporate TWG comments into a second draft and revise Goals and Objectives as necessary.
- d. meet with the TWG to review revised Goals and MOs and responses to comments, and make any further needed revisions, and
- e. present the MOs to the AMWG spring meeting for approval.

The committee has accomplished these tasks and you can review the results in the attached updated Strategic Plan. In addition, the committee made the following changes from the draft that was given interim approval at the January meeting:

- a. Proposed amendment to Principle 6 (change is highlighted on the attached copy).
- b. Proposed amendments to Goals 1, 4, 6, 8, and 12 (changes are highlighted on the attached copy).
- c. Merging of Goals 14 and 15 with Goal 13.
- d. Development of draft Management Objectives.

At the July meeting, you will be asked to validate that the Goals, as modified, will help us approach the Vision/Mission. At the January meeting you provisionally approved the Goals, but acknowledged

that their meaning would become clearer with the MOs arrayed beneath them. This is your opportunity to review, once again, whether the Goals are appropriate for the Vision/Mission that you have approved.

You will also be asked to approve the draft of the Management Objectives, if you feel that as a group they are sufficient to achieve the Goals and the Vision/Mission. You will have another opportunity for input and approval of MOs at a future date when the current and target levels are completed.

Please review the “Recommended Action by AMWG,” below. This is the Ad Hoc Committee’s recommendation to you for action at the July meeting.

You will note that there are many Information Needs (INs) in the MOs document, both in the “Current Level” and “Target Level” columns. Some of these INs will be able to be completed fairly easily; others will become part of the workplan for the GCMRC. If you approve recommendation #4, below, charging the Ad Hoc Committee to continue the development of the Strategic Plan, the differentiation between those kinds of INs will be part of your charge to that committee.

Because of the Low Steady Summer Flows experiment that is proceeding this summer, the GCMRC staff will be unavailable to work on the Strategic Plan until sometime this fall. However, it is our goal to have the AMP Strategic Plan completed and approved no later than July 2001.

Recommended Action by AMWG

The Ad Hoc Committee for Strategic Planning recommends that the AMWG:

1. Approve the proposed changes to Goals 1, 4, 6, 8, and 12 and to Principle 6.
2. Validate that the Goals are each necessary and as a group, sufficient, to achieve the Vision/Mission.
3. Approve the MOs: validate that the MOs, when the target and current levels are determined, are each necessary and as a group, sufficient, to achieve the Goals and the Vision/Mission.
4. Charge the ad hoc committee with facilitating the following:
 - A. Work with GCMRC, the TWG, and experts both within and outside the AMP to:
 - i. complete metrics (define what we will measure) for all Management Objectives; and
 - ii. complete current condition levels and proposed target levels for Management Objectives, as far as is possible.
 - B. Continue developing the AMP Strategic Plan.
 - C. Work with GCMRC staff to complete the first draft of the Information Needs and Management Actions.
 - D. Develop a process for prioritization of INs.
 - E. Obtain and respond to TWG comments on all these documents and modify as appropriate.
 - F. Obtain concurrence on the metrics, current condition and target levels, draft Strategic Plan, prioritization process, and draft INs and MAs from the TWG.
 - G. Present to the AMWG for action.

Glen Canyon Dam Adaptive Management Work Group

Ad Hoc Committee on Strategic Planning

Report to AMWG, June 2000

Strategic Plan Update

This document consists of the following components, which should be viewed as an integrated whole. Together, they guide the work of the Glen Canyon Dam Adaptive Management Work Group.

- Vision and Mission
- Principles
- Goals
- Objectives
- Glossary

Vision and Mission

The Grand Canyon is a homeland for some, sacred to many, and a national treasure for all. In honor of past generations, and on behalf of those of the present and future, we envision an ecosystem where the resources and natural processes are in harmony under a stewardship worthy of the Grand Canyon.

We advise the Secretary of the Interior on how best to protect, mitigate adverse impacts to, and improve the integrity of the Colorado River ecosystem affected by Glen Canyon Dam, including natural biological diversity (emphasizing native biodiversity), traditional cultural properties, spiritual values, and cultural, physical, and recreational resources through the operation of Glen Canyon Dam and other means.

We do so in keeping with the federal trust responsibilities to Indian tribes, in compliance with applicable federal, state, and tribal laws, including the water delivery obligations of the Law of the River, and with due consideration to the economic value of power resources.

This will be accomplished through our long-term partnership utilizing the best available scientific and other information through an adaptive ecosystem management process.

Principles

The Glen Canyon Dam Adaptive Management Work Group embraces the following Principles. They guided development of the Goals and Objectives for the Glen Canyon Dam Adaptive Management Program (GCDAMP). These Principles are:

1. The Goals represent a set of desired outcomes that together will accomplish our Vision and achieve the purpose of the Grand Canyon Protection Act. Some of the Objectives and actions that fall under these Goals may not be the responsibility of the GCDAMP, and may be funded by other sources, but are included here for completeness.
2. The construction of Glen Canyon Dam and the introduction of non-native species have irreversibly changed the Colorado River ecosystem.
3. Much remains unknown about the Colorado River ecosystem below Glen Canyon Dam and how to achieve GCDAMP ecosystem Goals.
4. The Colorado River ecosystem is a managed ecosystem. An ecosystem management approach, in lieu of an issues, species, or resources approach, will guide our efforts. Management efforts will prevent any further human-induced extirpation or extinction of native species.
5. An adaptive management approach will be used to achieve GCDAMP ecosystem Goals, through experimentation and monitoring, to meet the intent of the Grand Canyon Protection Act, the Environmental Impact Statement, and the Record of Decision.
6. Management actions, including changes in dam operations, will be tried that attempt to return ecosystem patterns and processes to their range of natural variability. When this is not appropriate, or beyond the range of operational flexibility of the dam, experiments will be conducted to test other approaches.
7. Because management actions to achieve a Goal may benefit one resource or value and adversely affect another, those action alternatives that benefit all resources and values will be pursued first. When this is not possible, actions that have a neutral impact, or as a last resort, actions that minimize negative impacts on other resources will be pursued, consistent with the final Glen Canyon Dam EIS and the Record of Decision.
8. Recognizing the diverse perspectives and spiritual values of the stakeholders, the unique aesthetic value of the Grand Canyon will be respected and enhanced.

Goal 1. Protect or improve the aquatic foodbase so that it will support viable populations of desired species at higher trophic levels

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
1	Maintain or attain	Algae and periphyton	Biomass	Mainstem from Glen Canyon Dam to Paria River	17.5 g/m ² (Cobble) ⁽²⁷⁾ 2.7 g/m ² (Pool) ⁽²⁷⁾	150 g/m ² ⁽²⁷⁾	Also see McKinney et al. 1999 ⁽²²⁾
			Composition		49.60% <i>Cladophora</i> 33.10% Chlorophyta 9.10% <i>Fontinalis</i> 3.35% Chromophyta 2.40% Rhodophyta 2.50% Cyanobacteria ⁽²⁷⁾	Obtain from literature	
			Production		Information Need	Information Need	Metric is g/m ² /time of <i>Cladophora</i>
2	Maintain or attain	Benthic invertebrates	Biomass	Mainstem from Glen Canyon Dam to Paria River	5.0 g/m ² (Cobble) ⁽²⁷⁾ 1.0 g/m ² (Pool) ⁽²⁷⁾	5000 g/m ² ⁽²⁷⁾	Also see McKinney et al. 1999 ⁽²²⁾
			Composition		0.4% Worms 3.6% <i>Gammarus</i> 5.5% Oligochaetes 0.1% Simulium 28.8% Midges 3.8% Miscellaneous 57.7% Gastropoda (Cobble) ⁽²⁷⁾ 1.0% Worms 0.9% Gammarus 35.7% Oligochaete 22.3% Midges (Pool) ⁽²⁷⁾	Information Need	
			Production		Information Need	Information Need	Metric is g/m ² /time

Goal 1. Protect or improve the aquatic foodbase so that it will support viable populations of desired species at higher trophic levels

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
3	Maintain or attain	Aquatic macrophytes	Biomass	Mainstem from Glen Canyon Dam to Paria River	Information Need	Information Need	Metric is g/m ² /time
			Composition		Information Need	Information Need	
			Production		Information Need	Information Need	
4	Maintain or attain	Algae and periphyton	Biomass	Mainstem below the Paria River	12.21 g/m ² (Cobble) ⁽²⁷⁾ 0.35 g/m ² (Pool) ⁽²⁷⁾	50 g/m ² ⁽²⁷⁾	Metric is relative % of algal species. MAMB is for miscellaneous algae, macrophytes, and bryophytes
			Composition		29.9% <i>Cladophora</i> 23.7% MAMB 46.6% <i>Oscillatoria</i> (Cobble) ⁽²⁷⁾ 51.0% <i>Cladophora</i> 48.9% MAMB 0.1% <i>Oscillatoria</i> (Pool) ⁽²⁷⁾	Obtain from literature	
			Production		Information Need	Information Need	

Goal 1. Protect or improve the aquatic foodbase so that it will support viable populations of desired species at higher trophic levels

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
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4 (continued)	Maintain or attain	Algae and periphyton	Distribution	Mainstem below the Paria River	Mile	% <i>Cladophora</i>	% MAMB	% <i>Oscillatoria</i>	Information Need	
					Cobble ⁽²⁷⁾					
					2	49.3	43.3	7.4		
					61	22.4	43.1	34.5		
					68	8.7	7.2	84.1		
					127	5.6	12.4	82.0		
					205	63.7	12.4	23.9		
					Pool ⁽²⁷⁾					
					2	60.0	40.0	0.0		
					61	28.6	71.4	0.0		
					68	80.0	20.0	0.0		
					127	15.2	84.8	0.0		
					205	71.2	28.5	0.3		

Goal 1. Protect or improve the aquatic foodbase so that it will support viable populations of desired species at higher trophic levels

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
5	Maintain or attain	Benthic invertebrates	Biomass	Mainstem below the Paria River	0.960 g/m ² (Cobble) ⁽²⁷⁾ 0.054 g/m ² (Pool) ⁽²⁷⁾	Obtain from literature	
			Composition		0.4% Worm 7.1% <i>Gammarus</i> 8.2% Oligochaete 4.3% Simulium 55.4% Chironomid 3.6% Miscellaneous 21.0% Gastropod (Cobble) ⁽²⁷⁾ 0.4% Worm 1.1% <i>Gammarus</i> 30.1% Oligochaete 14.3% Simulium 48.9% Chironomid 1.2% Miscellaneous 4.0% Gastropod (Pool) ⁽²⁷⁾	Obtain from literature	Metric is relative % of species.
			Production		Information Need	Information Need	Metric is g/m ² /time
			Distribution		20 Worms 500 <i>Gammarus</i> 120 Oligochaetes 10 Simulium 2150 Midges 20 Miscellaneous 1580 Gastropod (Cobble at Mile 2) ⁽²⁷⁾	Information Need	

Goal 1. Protect or improve the aquatic foodbase so that it will support viable populations of desired species at higher trophic levels

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
6	Maintain or attain	Aquatic macrophytes	Biomass	Mainstem below the Paria River	Obtain from literature	Information Need	
			Composition		Obtain from literature	Information Need	
			Production		Obtain from literature	Information Need	
			Distribution		Obtain from literature	Information Need	
7	Maintain or attain	Foodbase drift	Abundance	Mainstem below GCD	0.024 g/m ³ /s (Plants) 0.056 g/m ³ /s (Detritus) 0.001 g/m ³ /s (Inverts)	Obtain from literature	
			Composition		29.2% (Plants) 69.3% (Detritus) 1.1% (CPOM inverts) 0.4% (FPOM inverts)	Obtain from literature	CPOM is coarse particulate organic matter. FPOM is fine particulate OM.

Goal 2. Maintain or attain viable populations of existing native fish and remove jeopardy from humpback chub and razorback sucker.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
8	Maintain or attain	Humpback chub (150 mm and larger)	Abundance	LCR and mainstem within 3 miles of LCR	8096 individuals ^(3; 36)	Information Need	Target to be based on 91-96 population estimate, PVA, & N _e
				Mainstem except within 3 miles of the LCR	225 individuals ^(3; 36)	Information Need	Target to be based on 91-96 population estimate, PVA, & N _e
9	Maintain or attain	Humpback chub (51 mm to 150 mm)	Abundance	LCR and mainstem within 3 miles of LCR	Obtain from literature	Information Need	Metric is “catch per unit effort” (CPUE). See Gorman and Bramblett. ⁽⁹⁾ See synthesis by Coggins.
				Mainstem except within 3 miles of the LCR	0-74 captures/trip ⁽⁹⁾	Information Need	
10	Establish	Humpback chub	Populations	CRE downstream of GCD	One self-sustaining population in the LCR	One additional self-sustaining population	

Goal 2. Maintain or attain viable populations of existing native fish and remove jeopardy from humpback chub and razorback sucker.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
11	Attain	Humpback chub	Condition	LCR and mainstem within 3 miles of LCR	Information Need	Information Need	
				Mainstem except within 3 miles of the LCR	Information Need	Information Need	
			Health	LCR and mainstem within 3 miles of LCR	Information Need	Information Need	
				Mainstem except within 3 miles of the LCR	Information Need	Information Need	
12	Maintain or attain	Humpback chub	Spawning	LCR and mainstem within 3 miles of LCR	Information Need	Information Need	See Gorman and Bramblett. ⁽⁹⁾
				Mainstem except within 3 miles of the LCR	Information Need	Information Need	See Gorman and Bramblett. ⁽⁹⁾

Goal 2. Maintain or attain viable populations of existing native fish and remove jeopardy from humpback chub and razorback sucker.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
13	Reduce	Non-native fish	Predation on native fish	CRE below GCD	Information Need	Information Need	Metric is rate of predation. See Gorman and Bramblett. ⁽⁹⁾
			Competition with native fish	CRE below GCD	Information Need	Information Need	
14	Attain	Razorback sucker	Populations	CRE below GCD	0 individuals ⁽⁹⁾	Information Need	Target is capability of the habitat to support the species
15	Maintain	Flannelmouth sucker	Abundance	CRE below GCD	113 captures (5.3%) ⁽⁹⁾	Information Need	Appropriate metric to be determined
		Bluehead sucker			41 captures (1.9%) ⁽⁹⁾	Information Need	Appropriate metric to be determined
		Speckled dace			391 captures (18.2%) ⁽⁹⁾	Information Need	Appropriate metric to be determined

Goal 3. Restore populations of extirpated species, as feasible.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
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16	Restore	Colorado pikeminnow	Abundance	CRE downstream of GCD	0 individuals ⁽⁹⁾	Information Need	
		Bonytail			0 individuals ⁽⁹⁾	Information Need	
		Roundtail Chub			0 individuals ⁽⁹⁾	Information Need	
		River otter			0 individuals ⁽¹⁰⁾	Information Need	

Goal 4. Maintain a wild reproducing population of rainbow trout above Lees-Ferrythe Paria River, to the extent practicable and consistent with the maintenance of viable populations of native fish.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
17	Maintain or attain	Rainbow trout	Abundance	Mainstem from Glen Canyon Dam to Paria River	262,000 Age II+ individuals ⁽²³⁾	100,000 Age II+ individuals	
			Growth rate		15" by Age III ⁽²³⁾	18" by Age III	
			Condition		$W_r = 0.82^{(23)}$	$W_r = 0.90$	
			Health		Information Need	Information Need	Metric is level of disease and parasite infections
			Spawning		Information Need	Information Need	

Goal 5. Establish water temperature, quality, and flow dynamics to achieve GCDAMP ecosystem goals.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
18	Attain	Water	Temperature range	Mainstem	6.93-18.56 °C ⁽¹⁷⁾	Use decision process	Target may include several stations in the mainstem.
			Seasonal variability of temperature		Information Need	Use decision process	
19	Maintain	Water	Quality	Mainstem	Information Need (for the specific water quality parameters to use).	Obtain from literature and use decision process	Parameters may include nutrients, salinity, pH, DO, nitrogen, phosphorus, microbes, and others. Data available from NASQWAN ⁽³⁵⁾
20	Maintain	Flow dynamics	Power plant operations	Mainstem	ROD operating criteria	ROD operating criteria	
			BHBF flows		Maximum 45,000 cfs (March to April)	Use decision process	
			Habitat maintenance flows		ROD operating criteria	Use decision process	

Goal 6. ~~Increase fine sediment storage~~ Maintain or attain levels of sediment within the main channel and along shorelines to achieve GCDAMP ecosystem goals.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
21	Maintain or attain	Sediment	Abundance	Main channel below power plant capacity	329,000 m ³ (35 sites) ^(12; 31)	Information Need	Metric is area (m ²) and volume (m ³) as a rolling average. Target level should consider spawning habitat for trout in Glen Canyon.
			Grain-size		0.3-0.4 mm ^(12; 31)	Information Need	Also see Kondolf. ⁽¹⁶⁾ Target level should consider spawning habitat for trout in Glen Canyon.
			Distribution		Information Need	Information Need	Metric is # sandbars by reach. Target level should consider spawning habitat for trout in Glen Canyon.
22	Maintain or attain	Sediment	Abundance	Eddies up to power plant capacity	289,120 m ³ (35 sites) ^(12; 31)	Information Need	Metric is area (m ²) and volume (m ³) as a rolling average
			Grain-size		0.15-0.18 mm ^(12; 31)	Information Need	
			Distribution		Information Need	Information Need	Metric is # sandbars by reach

Goal 6. ~~Increase fine sediment storage~~ Maintain or attain levels of sediment within the main channel and along shorelines to achieve GCDAMP ecosystem goals.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
23	Maintain or attain	Sediment	Abundance	Shorelines between power plant capacity and maximum BHBF	0.37m (Glen Canyon) 0.60m (Marble Canyon) 0.80m (Grand Canyon) (12)	Information Need	Metric is area (m ²) and volume (m ³) as a rolling average
			Grain-size		0.15-0.18mm ⁽³¹⁾	Information Need	
			Distribution		Information Need	Information Need	Metric is # sandbars by reach

Goal 7. Maintain or attain viable populations of Kanab ambersnail.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
24	Attain and maintain	Kanab ambersnail	Population	Vasey's Paradise	7100 (April 1999) 6400 (May 1999) 20,000 (July 1999) 35,000 (Sept/Oct 1999) (Individuals below 70,000 cfs stage) ⁽²⁴⁾	Information Need	The metric is the population parameter(s) that indicate viability. Target is a viable population.
				AZ (except Vasey's Paradise)	3 individuals (Keyhole) 21 individuals (Elves) 0 individuals (Deer Creek) ⁽¹⁾	Information Need	The metric is the population parameter(s) that indicate viability. Target is a viable population.
25	Maintain	Kanab ambersnail	Habitat	Vasey's Paradise	82-99m ² (monkeyflower) 36.6 m ² (watercress) (area below 70,000 cfs stage) ⁽²⁴⁾	Information Need	Target is level needed to sustain a viable population.

Goal 8. Protect the presence of southwestern willow flycatcher and its critical habitat in a manner consistent with riparian ecosystem goals.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
26	Maintain or increase	Southwest willow flycatcher	Abundance	CRE below GCD	12 breeding pairs ⁽²⁶⁾	Information Need	Target is the capability of the habitat to support the species
			Distribution	CRE below GCD	Information Need	Information Need	Target is the capability of the habitat to support the species
			Fledging success	CRE below GCD	Information Need	Information Need	See GCMRC ⁽⁷⁾
27	Maintain	Southwest willow flycatcher	Habitat	CRE below GCD	Information Need	Information Need	
28	Reduce	Brown-headed cowbird	Brood parasitism	CRE	50% of nests parasitized ⁽²⁾	Information Need	

Goal 9. Protect or improve the biotic riparian and spring communities.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
29	Maintain	Marsh	Abundance	CRE below GCD	1215 patches (4.6 ha) ⁽⁷⁾	Information Need	See Kearsley ⁽¹⁵⁾ and Stevens et al. ⁽²⁹⁾
			Composition		Information Need	Information Need	See Kearsley ⁽¹⁵⁾ and Stevens et al. ⁽²⁹⁾
			Distribution		Information Need	Information Need	See Kearsley ⁽¹⁵⁾ and Stevens et al. ⁽²⁹⁾
30	Maintain	New high water zone	Abundance	CRE below GCD	Information Need	Information Need	See Kearsley ⁽¹⁵⁾ and Stevens et al. ⁽²⁹⁾
			Composition		Information Need	Information Need	See Kearsley ⁽¹⁵⁾ and Stevens et al. ⁽²⁹⁾
			Distribution		Information Need	Information Need	See Kearsley ⁽¹⁵⁾ and Stevens et al. ⁽²⁹⁾
31	Maintain	Old high water zone	Abundance	CRE below GCD	Information Need	Information Need	See Kearsley ⁽¹⁵⁾ and Stevens et al. ⁽²⁹⁾
			Composition		Information Need	Information Need	See Kearsley ⁽¹⁵⁾ and Stevens et al. ⁽²⁹⁾
			Distribution		Information Need	Information Need	See Kearsley ⁽¹⁵⁾ and Stevens et al. ⁽²⁹⁾
32	Maintain	Sand beach	Abundance	CRE below GCD	Information Need	Information Need	See Kearsley ⁽¹⁵⁾ and Stevens et al. ⁽²⁹⁾
			Composition		Information Need	Information Need	See Kearsley ⁽¹⁵⁾ and Stevens et al. ⁽²⁹⁾
			Distribution		Information Need	Information Need	See Kearsley ⁽¹⁵⁾ and Stevens et al. ⁽²⁹⁾

Goal 9. Protect or improve the biotic riparian and spring communities.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
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33	Maintain	Culturally important species	Abundance	CRE below GCD	157 species (Plants) ^(21; 30)	Information Need	
			Distribution		Information Need	Information Need	
34	Reduce	Invasive non-native species	Abundance	CRE below GCD	95+ species (Plants) ⁽²⁸⁾ 3 species (Birds) ⁽²⁸⁾	Information Need	
			Distribution		Information Need	Information Need	

Goal 10. Maintain or improve the quality of recreational experiences for users of the Colorado River ecosystem, within the framework of GCDAMP ecosystem goals.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
35	Maintain	Visitor	Physical access and safety	Mainstem	Information Need	Information Need	Target level should be within the capacity of the CRE to absorb visitor impacts. Target level should consider GLCA and GRCA Management Plans. See Myers et al. ⁽²⁵⁾
36	Maintain or improve	Recreational spectrum	Quality and quantity	Glen Canyon	Information Need	GLCA Management Plan levels	NPS studies underway.
37	Maintain or increase	Camping beaches	Size	Mainstem	Information Need	Information Need	Metric includes parameters for vegetation, sanitation, and shade
			Quality		Information Need	Information Need	
			Number		262 campsites ⁽¹⁴⁾	Information Need	
			Distribution		37% of campsites in critical reaches ⁽¹⁴⁾	Information Need	
38	Maintain or improve	Rapids	Navigability	Mainstem	Information Need	Information Need and Decision Process	Target level to be developed from NPS on-river accident rates. See Myers et al. ⁽²⁵⁾

Goal 10. Maintain or improve the quality of recreational experiences for users of the Colorado River ecosystem, within the framework of GCDAMP ecosystem goals.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
39	Maintain or enhance	Experience	Wilderness	Grand Canyon	Information Need	Information Need	Metric to include parameters for primitive character, unconfined experience, undeveloped natural and wild character, opportunities for solitude, sounds of nature and scenic beauty.

Goal 11. Maintain or increase power and energy generation within the framework of GCDAMP ecosystem goals.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
40	Maintain or increase	Power	Generation flexibility	GCD	ROD and current operating practices ⁽³³⁾	Information Need	

Goal 12. Preserve, protect, manage, and treat ~~C~~cultural resources ~~within the river corridor shall be preserved, protected, managed and treated~~ for the inspiration and benefit of past, present and future generations.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
41	Preserve	Register-eligible properties	National Register integrity	APE	Information Need	100% of extant historic properties	Target level should consider recreational impacts. See USBR ⁽³²⁾ and Leap et al. ⁽¹⁹⁾
42	Preserve	Other cultural resources	Cultural values	CRE	Information Need	Information Need	Target level should consider recreational impacts.
43	Attain and maintain	Management action	Consultation	CRE	Information Need	100% of management actions	See USBR ⁽³²⁾
44	Protect and maintain	Traditional cultural resources	Physical access	CRE	Information Need	Information Need	See USBR ⁽³⁴⁾
45	Integrate	Information	Cultural and other resources	CRE	Synthesis report ⁽³⁰⁾	Information Need	

Goal 13. Maintain a high-quality monitoring, research, and adaptive management program.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
46	Maintain or attain	Socio-economic data	Hydropower	N/A	Information Need	Information Need	The current level is how much socioeconomic data we have on the attributes. The target level is how much socioeconomic data is needed for adequate decision-making.
			Air quality	N/A	Information Need	Information Need	
			Wilderness	N/A	Information Need	Information Need	
			Recreation	N/A	Information Need	Information Need	
			Non-use values	N/A	Information Need	Information Need	
			Tribal & spiritual values	N/A	Information Need	Information Need	
47	Attain and maintain	Monitoring and research program	Natural, cultural, and recreational resources	CRE	GCMRC Strategic Plan	Updated GCMRC Strategic Plan	
48	Attain and maintain	AMP composed of all stakeholders	That acknowledges uncertainty and uses experimentation, monitoring & research	N/A	Information Need	Information Need	
49	Attain and maintain	Full tribal participation	Funding	AMP	\$75,000 (Appropriated) \$400,000 (Power revenues)	\$475,000 (Appropriated in FY2002)	

Goal 13. Maintain a high-quality monitoring, research, and adaptive management program.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
50	Conduct	Experimental flows	Flow dynamics	Mainstem	Information Need	Information Need	See GCMRC, ⁽⁶⁾ Webb et al. ⁽³⁷⁾ and Topping et al. ⁽³¹⁾ Target level is the experiments needed to gain critical understanding of ecosystem function.
51	Conduct	Management experiments	Other management actions	CRE	Information Need	Information Need	Target level is the experiments needed to gain critical understanding of management alternatives.
52	Build	AMP	Public support	N/A	Information Need	Information Need	Metric should include GCMRC and BOR web pages; GCD programs and tours; AMWG Outreach Committee; publications; various AMWG member activities.
53	Maintain or attain	Funding	Foundation and Corporate	N/A	\$0	Information Need	
			Appropriated	N/A	\$75,000 (FY2000)	\$1,485,000 (FY2002)	
			State Agency	N/A	Obtain from literature	Information Need	
			Power revenues	N/A	\$6.22M (for GCMRC) \$1.443M (for BOR)	Information Need	

Goal 13. Maintain a high-quality monitoring, research, and adaptive management program.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
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54	Maintain or attain	Participation	Externally-funded investigators	CRE	Information Need	Information Need	Current and target levels should include small and cost-shared projects in NPS, AGFD, etc.
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~~Goal 14. Build a broad, effective outreach program.~~ NOTE: This goal is now part of Goal 13.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
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~~Goal 15. Broaden the funding base to achieve GCDAMP Goals and Objectives.~~ NOTE: This goal is now part of Goal 13.

ID#	Perform some action	On some element	On some attribute	At some place	From the current level	To the target level	Comments
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Glossary

ADAPTIVE MANAGEMENT

Adaptive management is an iterative process, designed to experimentally compare selected management actions by evaluating alternative hypotheses about the ecosystem being managed. It consists of three parts: management actions, monitoring, and adaptation. Management actions are treated as experiments subject to modification. Monitoring is conducted to detect the effects of the management actions. Finally, management actions are refined based on the enhanced understanding about how the ecosystem responds.

BIODIVERSITY

Biodiversity is “the variety of organisms considered at all levels, from genetic variants belonging to the same species through arrays of species to arrays of genera, families, and still higher taxonomic levels [including] ... the variety of ecosystems...”⁽³⁸⁾

BIOTIC COMMUNITY

A biotic community is a “group of organisms ... that co-occur in the same habitat or area and interact through trophic and spatial relationships...”⁽²⁰⁾

COLORADO RIVER ECOSYSTEM

The Colorado River ecosystem is the Colorado River mainstem corridor and interacting resources in associated riparian and terrace zones, located primarily from the forebay of Glen Canyon Dam to the western boundary of Grand Canyon National Park. It includes the downstream inundation level to which dam operations impact physical, biological, recreational, cultural, and other resources. The scope of GCDAMP activities may include limited investigations into some tributaries (e.g., the Little Colorado and Paria Rivers).

CONCEPTUAL MODEL

A conceptual model is an “assessment of the dynamics of the more important compartments and fluxes of material or energy in a system [*i.e.*, patterns and processes], or of changes in a population.”⁽²⁰⁾ A conceptual model is a heuristic tool to provide a framework for thinking about how an ecosystem functions and to discover gaps in our knowledge.

CULTURAL RESOURCES

Cultural resources includes, but is not necessarily limited to, any prehistoric or historic district, site, building, structure, landscape, or object included in, or eligible for inclusion in the National Register, including artifacts, records, and material remains related to such a property or resource. Properties of traditional religious and cultural importance to an Indian tribe are included in this definition under Section 101(d)(6)(A) of NHPA.

ECOSYSTEM

An ecosystem is “a community of organisms and their physical environment interacting as an ecological unit.”⁽²⁰⁾ An ecosystem consists of patterns and processes that are dynamic and occur within a particular range of temporal and spatial variability.

ECOSYSTEM INTEGRITY

Ecosystem integrity is “the ability to support and maintain a balanced, integrated, adaptive biological system having the full range of elements (genes, species, and assemblages) and

Glossary

processes (mutation, demography, biotic interactions, nutrient and energy dynamics, and metapopulation processes) expected in the natural habitat of a region.”⁽¹³⁾ Ecosystem integrity is related to ecosystem resilience (*i.e.*, the capacity to maintain characteristic patterns and processes) following a disturbance.

ECOSYSTEM MANAGEMENT

An ecosystem management approach differs from an issue-, species-, or resource-specific approach. Ecosystem management is a method for sustaining or restoring ecosystems and their functions and values. “It is goal driven, and it is based on a collaboratively developed vision of desired future conditions that integrates ecological, economic, and social factors. It is applied within a geographic framework defined primarily by ecological boundaries.”⁽¹¹⁾ Ecosystem management is a process that attempts to mimic appropriate ecosystem patterns (abundance and distribution of species and habitats) and ecosystem processes (drivers of ecosystem patterns). It includes managing for viable populations of all native species.

ECOSYSTEM PATTERNS

Ecosystem pattern is the abundance of species, biotic communities, and physical habitats, as well as their spatial and temporal distribution. This is a broader concept than “composition and structure.” Composition usually refers only to species presence or absence, and structure usually refers to the distribution of biotic communities.

ECOSYSTEM PROCESSES

Ecosystem processes are the abiotic (*i.e.*, non-living) and biotic (*i.e.*, living) functions, disturbances, or events that shape ecosystem patterns. There are physical processes (*e.g.*, fire, hydrologic, geomorphic, and climatic regimes; air chemistry, nutrient cycling), biological processes (*e.g.*, competition, predation, herbivory, parasitism, disease, migration, dispersal, gene flow, succession, recruitment, maturation), and anthropogenic processes (*e.g.*, habitat conversion, novel toxins, vandalism).

MONITORING

Monitoring is the “collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting a management objective.”⁽⁴⁾ Monitoring needs to produce data of sufficient statistical power to detect a trend if in fact it is occurring.⁽⁸⁾

Monitoring differs from inventorying, which is the measurement of environmental attributes at a given point in time to determine what is there. It also differs from research, which is the measurement of environmental attributes to test a specific hypothesis.

RANGE OF NATURAL VARIABILITY

The Range of Natural Variability is the spatial and temporal variation in ecosystem patterns and ecosystem processes under which the ecosystem has evolved. The range of natural variability for ecological processes is usually defined by their frequency (*e.g.*, number/year), intensity (*e.g.*, cubic feet per second), duration (*e.g.*, number of days), magnitude (*e.g.*, acres), seasonally, and rate of change. See Landres⁽¹⁸⁾ for a full discussion.

Glossary

REASONABLE AND PRUDENT ALTERNATIVE

“Reasonable and prudent alternatives refer to alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction, that is economically and technologically feasible, and that the Director believes would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat.”⁽⁵⁾

REASONABLE AND PRUDENT MEASURE

“Reasonable and prudent measures refer to those actions the Director believes necessary or appropriate to minimize the impacts, i.e., amount or extent of incidental take.”⁽⁵⁾

RECOVERY

Recovery is improvement in the status of a listed species to the point at which listing is no longer appropriate, under the criteria set out in section 4(a)(1) of the Endangered Species Act ⁽⁵⁾.

REMOVAL OF JEOPARDY

To “jeopardize the continued existence of [a listed species] means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.”⁽⁵⁾ Removing (or avoiding) jeopardy is intended to be accomplished through the implementation of reasonable and prudent alternatives.

RIPARIAN ECOSYSTEM

The riparian ecosystem is the streamside zone that is influenced by riverine processes, e.g., flood regime and distance to subsurface water.

RIVERINE ECOSYSTEM

The riverine ecosystem is any area typically inundated by the river.

VIABLE POPULATION

A population is considered viable when there is a high chance of persistence over a long timeframe without demographic or genetic augmentation. Population viability is not the same as “recovery” or “removal of jeopardy” for a species. However, the concept of population viability is an important consideration in determining recovery and removal of jeopardy.

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United States Department of the Interior

BUREAU OF RECLAMATION

Upper Colorado Regional Office
125 South State Street, Room 6107
Salt Lake City, Utah 84138-1102

IN REPLY REFER TO:

PXAO-6000
ADM-10.00

JUN 12 2000

To: Adaptive Management Work Group Members

Subject: Transmittal of Documents for Upcoming AMWG Meeting

Enclosed are the following documents in preparation for the upcoming AMWG Meeting to be held in Phoenix, Arizona, on July 6-7, 2000:

1. Agenda
2. Draft Minutes from AMWG meeting held Jan. 20-21, 2000
3. Management Objectives and related materials
4. AMWG Charter
5. AMWG Operating Procedures
6. TWG Operating Procedures
7. AMP FY 2002 Budget
8. GCRMC FY 2002 Budget
9. GCD Release Schedule and LSSF Update (handout at meeting)

If there are any other issues added to the agenda, copies of applicable documents will be provided at the meeting.

Sincerely,

Stephen V. Magnussen
Chairman, Adaptive Management Work Group

Enclosures 9

cc: AMWG Alternates (via e-mail/fax)
Interested Parties (via e-mail/fax)
(each w/o encls)

From: Linda Whetton
To: Anderson, D. Larry; Arnberger, Rob; Barnard, Geoffrey S.; Begay, Robert M.; Calhoun, Charley; Cohen, Dave; Drye, Brenda; Evans, Peter; Fassett, Gordon W.; Gold, Barry; Harris, Christopher S.; Heuslein, Amy; James, Leslie; Kuwanwisiwma, Leigh; Lehr, Phillip; Lohofener, Renne; Magnussen, Steve; Rampton, Ted; Randall Peterson; Sabo, Dave; Taubert, Bruce; Turney, Thomas; Zimmerman, Gerald
Date: 6/13/00 10:01AM
Subject: AMWG Meeting Materials

The meeting materials for the upcoming AMWG Meeting on July 6-7, 2000, were mailed to all the AMWG members last night. The documents have also been posted to the Bureau of Reclamation web page (www.uc.usbr.gov/amp).

AMWG Alternates:

If you will be representing and/or attending the meeting and would like your own set of tabbed materials, please contact me. I can either mail, give to you at the meeting, or you can obtain from the above web site. You may wish to bring a 1-inch, 3-ring binder with you as all the pages have been hole-punched and tabbed for easy access.

Attached is the agenda in WordPerfect and Acrobat format. If you cannot read, let me know and I'll fax it to you.

CC: Ack, Brad; Barger, Mary; Barrett, Clifford; Behan, Jeff; Cantley, Garry; Collins, Shane; Cook, Wayne; Coulam, NANCY; Dongoske, Kurt; Fairley, Helen; Fenn, Denny; Garrett, L. David; Gold, Rick; Gonzales, Mark; Gunn, Terry; Harkins, Jayne; Hueftle, Susan; Hyde, Pamela; Jacobs, Jeffrey; Johnson, Rick; Karas, Chris; Kennaway, Todd; Kieffer, Vickie; King, Robert; Kohl, Keith; Kubly, Dennis; Lambert, Ruth; Liszewski, Mike; Lynch, Robert; Mankiller, Serena; Melis, Ted; Montague, Jerome; Orton, Mary; Persons, Bill; Port, Patricia; Ralston, Barbara; Ramsey, Nikolai; Ryan, Tom; Seaholm, Randy; Shannon, Joe; Shields, John; Spiller, Sam; Stevens, Larry; Vernieu, Bill; Weisheit, John; Westcoat, Jr., James; Wirth, Barry; Yeatts, Mike



United States Department of the Interior

BUREAU OF RECLAMATION

Upper Colorado Regional Office
125 South State Street, Room 6107
Salt Lake City, Utah 84138-1102

IN REPLY REFER TO:

PXAO-6000
ADM-10.00

JUN 23 2000

To: Adaptive Management Work Group Members
Subject: Transmittal of Documents for Upcoming AMWG Meeting

Enclosed are the following documents:

- Revised GCMRC memo dated June 23, 2000 with accompanying attachments
- Redline/strikeout version of Revised AMWG Charter
- Redline/strikeout version of Revised AMWG Operating Procedures

If you have any questions, please contact Linda Whetton at 801-524-3880.

Sincerely,

Stephen V. Magnussen
Chairman, Adaptive Management Work Group

Enclosures 3

From: Linda Whetton
To: Anderson, D. Larry; Arnberger, Rob; Barnard, Geoffrey S.; Begay, Robert M.; Calhoun, Charley; Cohen, Dave; Drye, Brenda; Evans, Peter; Fassett, Gordon W.; Harris, Christopher S.; Heuslein, Amy; Kuwanwisiwma, Leigh; Lehr, Phillip; Lohofener, Renne; Magnussen, Steve; Potochnik, Andre; Rampton, Ted; Sabo, Dave; Taubert, Bruce; Turney, Thomas; Zimmerman, Gerald
Date: 7/5/00 10:43AM
Subject: AMWG Packet -> Issue Papers

In your AMWG packet for the upcoming meeting on July 6-7, there is a section marked "**Issue Papers.**" These contain the statement and resolution of several major issues that were addressed by the Ad Hoc Committee on Strategic Planning as it developed the Management Objectives.

We recommend that you read through these papers. They are not on the AMWG agenda for approval, however, they should improve your understanding of the meaning and direction of the Management Objectives, particularly in the development of target levels.

Linda Whetton, UC-703
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CC: Barrett, Clifford; Cantley, Garry; Clayton Palmer; Cook, Wayne; Don Metz; Dongoske, Kurt; Gold, Barry; Gold, Rick; Hornewer, Nancy; Hyde, Pamela; Johnson, Rick; Kaplinski, Matt; King, Robert; Mankiller, Serena; Norm Henderson; Orton, Mary; Persons, Bill; Randall Peterson; Robert King; Robert Winfree; Seaholm, Randy; Shields, John; Spiller, Sam; Wayne Cook; William E. Davis

Issue A: Potential development of Management Objectives for Lake Powell

Issue: The issue is whether MO's should be developed for Lake Powell or whether the MO's should be limited to downstream resources. Management Objectives are defined as the desired future condition of a particular resource. Monitoring and research in Lake Powell is needed, as outlined in the IWQP and the Black/Gray/White monitoring decision document in order to understand and predict the downstream impact of changing Lake Powell water quality parameters.

Response: Management Objectives should be developed for resources downstream of Glen Canyon Dam. Defining downstream water quality MO's implicitly mandates water quality monitoring and research work in Lake Powell, but appropriately focuses the impacts and benefits of such targets on the downstream resources

Rationale: The GCPA directs the operation of GCD to protect the resources of the Grand Canyon National Park and the Glen Canyon National Recreation Area. In several places, the committee language accompanying the statute further defines the area of concern as the GCNP and GCNRA downstream of the dam, noting that while "the primary purpose of this title is to authorize changes in the operation of Glen Canyon Dam to prevent damage to downstream resources," other authorities were identified "to address downstream effects of Glen Canyon Dam if such other remedial measures meet this title's goal of protecting, mitigating damage to, and improving the resources downstream of the dam." With this strong focus on the downstream resources, we believe it important to have the management objectives tied directly to these downstream resources, both for directness of application and appropriateness of measurement.

Specific downstream targets associated with these MO's that are directly tied to Lake Powell characteristics will need to be monitored in order to both predict and ensure that the downstream management objectives are met. The IWQP was developed with this conclusion as a basic premise. The Loveless Guidance Document also confirms that work above Lake Powell is justified based on the impacts to downstream resources. The term Colorado River Ecosystem used in the principles and goals was defined in such a way to include the forebay of Lake Powell and appropriate tributaries of the downstream Colorado River to allow monitoring and research activities in these areas if necessary to understand and improve and protect the conditions in the downstream riverine environment.

Issue B: Native fish versus Lee's Ferry rainbow trout

Issue: Is there a conflict between Adaptive Management Program (AMP) goals and management objectives for native fish versus the goals for Lees Ferry rainbow trout?

Response: Upstream of the Paria River, naturally reproducing Rainbow trout and native fish populations will attempted to be conserved and enhanced concurrently. Downstream of the Paria River, native fish are accorded preferential status over all non-native fish.

Rationale: This issue is focused on the need to concurrently manage for two desired resources that may be in conflict with each other, specifically: endangered native fishes and non-native Rainbow trout. Healthy populations of native fish in the ecosystem are a primary management objective as reflected in National Park Service policy directives. A healthy Rainbow trout fishery is also desired. Both fisheries are considered resources of concern by the AMP stakeholders and in the GCDEIS.

The principles, goals, and management objectives developed by the AMP imply that the rainbow trout above the Paria River in the Lees Ferry reach have a different status as compared to other non-native fish in the Colorado River ecosystem. These same principles, goals and management objectives provided guidance for resolving conflicts between native fish and rainbow trout above the Paria River in the Lees Ferry reach. Under the above guidance, flows, temperature regimes and other management actions one might consider to benefit native fish throughout the Colorado River ecosystem are initially constrained by the range of flows, temperatures, and other effects that provide for the continued existence of rainbow trout above the Paria River in the Lees Ferry reach.

Issue C: Responsibility scope of the Management Objectives

Issue: Should we include only those MOs that are the responsibility of the AMP, or should we include all MOs needed to accomplish the Goal? Is it appropriate to include MOs that cannot be accomplished solely through modifications to dam operations, or that may require activities that may not be funded by hydropower revenues?

Response: In summary, the MOs should be focused on resources and impacts within Glen Canyon National Recreation Area and Grand Canyon National Park below Glen Canyon Dam. The question of whether nonreimbursable CRSP hydropower revenues may be used to accomplish an MO does not have to be resolved when an MO is listed. The GCPA authorizes both changes to dam operations and activities other than changes to dam operations to accomplish the purposes of the act.

Rationale: This question is addressed by Principle 1, which states that "Some of the Objectives and actions that fall under these Goals may not be the responsibility of the GCDAMP, and may be funded by other sources, but are included here for completeness." There are two underlying assumptions. First is that the MOs will be focused on resources within the scope of the program and second, that some of the actions needed to accomplish the MOs may be accomplished through "other authorities" and other funding. The GCPA clearly states that the Secretary has the authority to implement changes to dam operations as well as non-operational measures to accomplish the purposes of the act.

The basis for this Principle stems from the Grand Canyon Protection Act (GCPA), the Senate Report Language for the Act (Report Language), the Charter of the Adaptive Management Work Group (Charter), and the Glen Canyon Dam Adaptive Management Program AMWG FACA Committee Guidance document (Guidance) prepared by Scott Loveless.

Sections 1807, 1805, 1804 (c, B) and 1802 of the GCPA authorize the Secretary to use CRSP hydropower revenue for research, monitoring, consultation, and other activities that will ensure Glen Canyon Dam is operated in such a manner "as to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established, including, but not limited to natural and cultural resources and visitor use." The nonreimbursable expenditures allowed under the GCPA included preparation of the EIS and its supporting studies as well as the other actions mentioned in this paragraph.

According to the Report Language "All measures undertaken pursuant to the authority of this Act have as their focus the improvement of conditions for downstream resources within the two Park Service units." The geographic focus of the AMP is also described in the definition of the Colorado River Ecosystem contained in this Strategic Plan. We recognize that there may be operational impacts on resources beyond the narrow geographic area defined above. Examples of activities that may be funded through nonreimbursable CRSP hydropower revenues and other sources are included in the Guidance (p. 7).

Issue C: Responsibility scope of the Management Objectives

According to the Guidance "The relevant Senate Report language says, after discussion of the primary purpose of the Act, that: "other reasonable remedial measures may be available to the Secretary. The phrase 'exercise other authorities under existing law' means that the Secretary should consider and may implement non-operational measures to address downstream effects of Glen Canyon Dam if such other remedial measures meet this title's goal of protecting, mitigating damage to, and improving the resources downstream of the dam."

The Charter further allows that "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." However, the aspect of nonreimbursable funding applies only to specific expenditures within the authority of the GCPA.

Issue D: Riparian biotic community

Issue: This paper is focused on clarifying whether the AMP objectives for riparian biotic communities should be focused on native biotic communities (e.g., old high-water zone and sand beach), or on the naturalized biotic community (e.g., new high-water zone, marshes, tamarisk-dominated).

Response: The Strategic Plan ad hoc group believes that we should set objectives to attain and maintain viable examples of the native biotic communities, but we should also maintain examples of the naturalized biotic community, especially where it provides habitat for southwestern willow flycatcher. The riparian objectives may be attained and maintained through dam operations and/or other management actions. The sequence of management actions should be consistent with principle seven.

Rational: Both the native communities and the naturalized community are of value to the stakeholders. Setting objectives to attain and maintain both native and naturalized communities is consistent with the emphasis on native biodiversity articulated in our Vision-Mission statement and Principle six.

Issue E: Consistency between recovery plans and Management Objectives

Issue: Should AMP management objectives for T&E species parallel objectives in USFWS recovery plans?

Response: AMP management objectives for T&E species need to be consistent with our Vision-Mission and Goals and the current FWS recovery plans.

Rational: AMP objectives need to be consistent with our Vision-Mission and Goals to meet Principle 1. AMP objectives may not identical to recovery plan objectives simply because those objectives descend from different goals.

Issue F: Socio-economics

Issue: Should there be a goal for Socio – Economics instead of Goal 11 related only to hydropower?

Response: Goal 11 will be retained and the related MO's will be measured in metrics having other than dollar values. Determination and consideration of socio-economic values will be included in a MO for Goal 13.

Rationale: Although it is not a natural resource, hydropower generation was recognized as a resource of concern in developing the GCPA, the EIS, the ROD and the Guidance Document. Goals need to be developed for all resources of concern including both hydropower and recreation as well as others that are not considered to be primarily natural resources.

Socio – economic values are not a goal. They are a way to measure the value of the resources of concern and, as suggested by the NRC Downstream report, may provide a useful tool in presenting data to be used in making decisions. Development of socio – economic data (including non-use values) for use in decision making has been made a management objective in Goal 13.

Issue G: Principle six

Issue: Does Principle No. 6 appropriately recognize the continuing existence of Glen Canyon Dam (GCD) as well the possibility for management actions other than changes in dam operations?

Response: The ad hoc group suggests a more appropriate statement of the principle is “Management actions, including changes in dam operations, will be tried that attempt to return ecosystem patterns and processes to their range of natural variability. When this is not appropriate, or beyond the range of operational flexibility of the dam, experiments will be conducted to test other approaches.”

Rationale: Principle No. 6 must be read and interpreted within the context of the Vision statement, the Guidance Document, and in combination with Principles 5 and 7. The second paragraph of the Vision Statement clearly states the AMP program will be accomplished through the operation of GCD and other means. The Guidance Document has several references to continued dam operations; page 2 paragraph 2 refers to the legislative intent in GCPA, and on page 4 quotes from the ROD on finding “an alternative dam operating plan.” Given the statements in the underlying documents it is clear that Principle 6 assumes continued operation of the dam and places that restriction on the range of natural variability target. The principle should be modified to reflect that situation and to be more clear that non-operational actions are available to achieve some goals.

From: Linda Whetton
To: Anderson, D. Larry; Arnberger, Rob; Barnard, Geoffrey S.; Begay, Robert M.; Calhoun, Charley; Cohen, Dave; Drye, Brenda; Harris, Christopher S.; Heuslein, Amy; James, Leslie; Kuwanwisiwma, Leigh; Lehr, Phillip; Lohofener, Renne; Magnussen, Steve; Potochnik, Andre; Rampton, Ted; Sabo, Dave; Taubert, Bruce; Turney, Thomas; Zimmerman, Gerald
Date: 8/1/00 4:08PM
Subject: AMWG Conference Call

Attached are the Draft Minutes from the AMWG Meeting held July 6-7, 2000, in Phoenix, Arizona. Please review and forward any comments/corrections you have to me.

Attached is a cleaned up version of the currently proposed AMWG Charter which was provided to you with the July AMWG meeting materials. Additionally, we invite comments on the following charter issues:

1. Scope and specifics of travel reimbursement - We propose that all AMWG and TWG members be allowed to receive travel reimbursement and propose replacing the words "per diem in lieu of subsistence," with a directive to follow Federal travel regulations.
2. Reimbursement for non-AMWG meetings - Instead of "approved business away from home," we would define those activities to be reimbursed as official AMWG and TWG meetings, ad hoc committee meetings, and protocol evaluation panel meetings.
3. Notifications of alternate attendance for voting purposes - In the January 2000 meeting, the alternate notification issue was discussed briefly and action was postponed on a motion that would allow a member's alternate to attend an AMWG meeting and vote without prior notification. One of the concerns raised was that this had the potential for multiple alternates primarily participating in these meetings instead of AMWG members. We therefore propose: "The designated alternate (to the AMWG member) can attend an AMWG meeting in lieu of the member and participate in voting without prior notification."

As comments are received, they will also be e-mailed (forwarded) or faxed to all AMWG members so everyone is aware of what changes are being suggested. Upon receipt of the comments, a revised AMWG Charter will be e-mailed/faxed to you on August 15, 2000.

The AMWG Conference Call will be held on August 31, 2000, at 1 p.m. (MST) and will focus on the following two motions: 1) "recommend adoption of the revised Charter," and 2) "recommend that the USGS seek appropriated funds to help support GCMRC monitoring and research activities."

To participate in the conference call, please dial:

303-445-3911 (for Federal AMWG members)

800-822-7681 (for non-Federal AMWG members)

We anticipate the duration of the call will be approximately one hour.

Linda Whetton, UC-703
Bureau of Reclamation
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Salt Lake City UT 84138-1147
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CC: Barrett, Clifford; Cantley, Garry; Cook, Wayne; Dongoske, Kurt; Gold, Barry; Gold, Rick; Hyde, Pamela; Johnson, Rick; King, Robert; Persons, Bill; Randall Peterson; Seaholm, Randy; Shields, John; Spiller, Sam

From: Linda Whetton
To: Anderson, D. Larry; Arnberger, Rob; Barnard, Geoffrey S.; Begay, Robert M.; Calhoun, Charley; Cohen, Dave; Drye, Brenda; Harris, Christopher S.; Heuslein, Amy; James, Leslie; Kuwanwisiwma, Leigh; Lehr, Phillip; Lohofener, Renne; Magnussen, Steve; Potochnik, Andre; Rampton, Ted; Sabo, Dave; Taubert, Bruce; Turney, Thomas; Zimmerman, Gerald
Date: 8/15/00 8:18AM
Subject: AMWG Conference Call

Attached is the latest revision of the proposed AMWG Charter. Please review prior to the AMWG conference call on:

August 31, 2000

Start time: 1 p.m. MST

303-445-3911 (for Federal AMWG members)

800-822-7681 (for non-Federal AMWG members)

The conference call will focus on any additional revisions to the Charter and the following two motions:

- 1) Recommend adoption of the revised Charter, and
- 2) Recommend the USGS seek appropriated funds to help support GCMRC monitoring and research activities.

We anticipate the duration of the call will be approximately one hour.

If you are unable to open the attached file (Adobe or WP format), please call me and I'll send you a hard copy.

Thank you.

CC: Barrett, Clifford; Cantley, Garry; Cook, Wayne; Cross, Jeffrey; Dongoske, Kurt; Gold, Rick; Hyde, Pamela; Johnson, Rick; King, Robert; Persons, Bill; Peterson, Randall; Seaholm, Randy; Shields, John; Spiller, Sam

**Glen Canyon Dam Adaptive Management Work Group
Federal Advisory Committee**

CHARTER

Official Designation: Glen Canyon Dam Adaptive Management Work Group.

Scope and Objectives: The Committee will provide advice and recommendations **to the Secretary of the Interior relative to operate the operation of Glen Canyon Dam in accordance with the additional criteria and operating plans specified in Section 1804 of the Act** and to exercise authorities under existing laws 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 of the Interior will implement the Grand Canyon Protection Act (Act) of October 30, 1992, embodied in Public Law 102-575. The Act calls for implementation of long-term monitoring programs and activities. 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.

Duration: It is the intent that the AMWG shall continue indefinitely, unless otherwise terminated by the Secretary.

Agency or Official to ~~who~~ Whom the Committee Reports: The AMWG reports to the Secretary through the Secretary's designee who shall serve as the chairperson and Designated Federal Official of the AMWG. In the absence of the Chairperson, ~~the Chairperson will appoint an alternate who is a member of the Department of the Interior~~ **a senior level Interior representative will act as Chairperson for the AMWG..**

The Secretary's designee shall be responsible for preparation of meeting agendas and scheduling meetings of the AMWG. The Secretary's designee shall attend and chair all meetings of the AMWG. **The Secretary's designee will also be responsible for sending a formal summary report after each Advisory Committee meeting directly to the Secretary of the Interior with copies of subject summary report to be provided to all AMWG members.**

Bureau Responsible for Providing Necessary Support: The logistical and support services for the meetings of the AMWG shall be provided by the Bureau of Reclamation (Reclamation).

Estimated Annual Operating Costs: The operating costs are estimated at ~~\$203,000~~ 200,000 annually for the establishment and support of the AMWG. This includes costs for required staff support, of about 0.3 of a person year. Expenses would also include the travel and per diem of some **Reclamation staff and AMWG** members, and employees of the Department of the Interior while attending meetings of the AMWG, and for expenses incurred in the recording and reproduction of the **meeting** minutes, reports, notices, etc.

Description of Duties: The duties or roles and functions of the AMWG are to:

- a. Establish AMWG operating procedures.
- b. Advise the Secretary in meeting environmental and cultural commitments of the EIS, as ~~requested:~~ **as mandated in the Record of Decision.**
- c. Recommend the framework for the AMP policy, goals, and direction.
- d. Develop recommendations for modifying operating criteria and other resource management actions pursuant to the Act.
- e. Define and recommend resource management objectives for development and implementation of a long-term monitoring plan, and any necessary research and studies required to determine the effect of the operation of Glen Canyon Dam on the natural, recreational, and cultural resources of the Grand Canyon National Park and Glen Canyon National Recreation Area.
- f. Review and provide input to the Secretary on the report required in Section 1804 (c)(2) ~~and 1804 (d)~~ of the Act.
- g. Facilitate input and coordination of information from stakeholders to the Secretary to assist in meeting consultation requirements under Sections 1804 (c)(3) and 1805 (c) of the Act.
- h. Monitor and report on compliance of all program activities with applicable laws, permitting requirements, and the Act.

The duties and functions of the AMWG are in an advisory capacity only.

Allowances for Committee Members (compensation, travel, per diem, etc.) While engaged in the performance of approved business away from home or their regular places of business, **all AMWG** members of the AMWG (~~tribal, environmental, recreation, and Contractors who purchase Federal power~~) shall be reimbursed for travel expenses, including per diem in lieu of subsistence **in accordance with current Federal travel regulations.**

Estimated Number and Frequency of Meetings: The AMWG is expected to meet biannually. The Secretary's designee, who will serve as the Designated Federal Official, may call additional meetings as deemed appropriate. Fifteen members must be present at any meeting of the AMWG to constitute a quorum.

In accordance with FACA, a notice of each meeting of the AMWG shall be published in the Federal Register at least 15 days prior to the meeting advising the date, time, place, and purpose of the meeting. If it becomes necessary to postpone or cancel an announced meeting, a subsequent notice shall be published in the Federal Register as early as possible and shall explain the reasons for the postponement or cancellation. A news release for each meeting, postponement, or cancellation shall also be provided to selected major newspapers in Arizona, California, Colorado, Nevada, New Mexico, Wyoming, and Utah. News releases shall also be provided to agencies and organizations expressing interest in publishing meeting announcements in newsletters.

In accordance with FACA, all meetings of the AMWG shall be open to the general public. Any organization, association, or individual may file a written statement or, at the discretion of the AMWG, provide verbal input regarding topics on a meeting agenda in accordance with FACA.

Termination Date: It is the intent that the AMWG shall continue indefinitely, unless otherwise terminated by the Secretary. The committee is subject to the provisions of the Federal Advisory Committee Act (FACA), 5.U.S.C. Appendix 2, and will take no action unless the charter filing requirements of section 9 of FACA have been complied with. The Committee is subject to biennial review and will terminate 2 years from the date the charter is filed, unless, prior to that time, the charter is renewed in accordance with Section 14 of the FACA.

Committee Membership: Members of the AMWG to be appointed by the Secretary shall be comprised of:

- a. Secretary's Designee, who shall serve as chairperson for the AMWG.
- b. One representative each from the 12 cooperating agencies associated with the EIS:
 - (1) Bureau of Reclamation
 - (2) Bureau of Indian Affairs
 - (3) U.S. Fish and Wildlife Service
 - (4) National Park Service
 - (5) Western Area Power Administration
 - (6) Arizona Game and Fish Department
 - (7) Hopi Tribe
 - (8) Hualapai Tribe
 - (9) Navajo Nation
 - (10) San Juan Southern Paiute Tribe

- (11) Southern Paiute Consortium
- (12) Pueblo of Zuni

c. One representative each from the seven basin states:

- (1) Arizona
- (2) California
- (3) Colorado
- (4) Nevada
- (5) New Mexico
- (6) Wyoming
- (7) Utah

d. Two representatives each from:

- (1) Environmental groups
- (2) Recreation interests
- (3) Contractors who purchase Federal power from Glen Canyon Powerplant

Members will be appointed to the AMWG by the Secretary, with input and recommendations from the cooperating agencies, States, tribes, contractors for Federal power from Glen Canyon Dam, environmental representatives, and other stakeholders. To be eligible for appointment to the AMWG, a person must (a) be qualified through education, knowledge, or experience to give informed advice on water supply, diversion and delivery facilities, and their operation and management, or the environmental aspects of such operation; and (b) have the capability to constructively work in a group setting toward a common objective of structuring a mechanism for program implementation.

Members of the AMWG will be appointed for a 4-year term. At the discretion of the Secretary, members may be reappointed to additional terms. Vacancies occurring by reason of resignation, death, or failure to regularly attend meetings will be filled by the Secretary for the balance of the vacating member's term using the same method by which the original appointment was made. Failure of ~~the member~~ an organization to be represented ~~(or a the designated alternate) to attend~~ at two consecutive meetings will substantiate grounds for dismissal. The Chairperson will make the final determination in dismissing a member.

To avoid conflict of interest issues arising from entities having representatives on the AMWG and also submitting responses to request for proposals to perform work, the Federal procurement process shall be strictly adhered to. While members of the AMWG may give advice to the Secretarial Designee, all decisions in the procurement process shall be made by Federal procurement officials free of influence from AMWG members.

Subgroups: The committee may establish such workgroups or subcommittees as it deems

necessary for the purposes of compiling information, ~~or conducting research, discussing issues, and reporting back to the AMWG.~~ However, such workgroups may not conduct business and must report to the full committee.

Authority: 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.

Secretary of the Interior

Date signed

Date Filed