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Collaborative Planning and Adaptive Management in Glen Canyon: A Cautionary Tale[†]

Lawrence Susskind,[*] Alejandro E. Camacho,[**] and Todd Schenk[***]

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INTRODUCTION

Increasingly, governmental bodies[1] and scholars[2]—including the authors[3]—have been promoting the integration of adaptive management and collaborative planning into regulatory processes to address deficiencies in conventional regulatory decision making. Adaptive management advocates stress that resource management should be more dynamic, changing over time to adjust to new information and shifting ecological and social conditions.[4] Proponents of collaborative planning maintain that the best management processes involve stakeholders working jointly to

1. *See, e.g.*, Negotiated Rulemaking Act of 1990, 5 U.S.C. §§ 561–570a (2000) (promoting collaborative planning in the federal administrative rulemaking process); Notice of Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process, 65 Fed. Reg. 35,242, 35,252 (June 1, 2000) (adopting U.S. Fish and Wildlife Service ("FWS") guidance seeking to integrate adaptive management and collaborative planning under the Endangered Species Act); U.S. FISH & WILDLIFE SERV., STRATEGIC HABITAT CONSERVATION: THE USFWS FRAMEWORK FOR LANDSCAPE CONSERVATION (2008), *available at* http://www.fws.gov/science/doc/SHCFactSheet1008pdf.pdf (adopting "Strategic Habitat Conservation" policy framework to promote the use of adaptive management in identified priority areas or regions); Office of the Secretary of Interior, Protection and Enhancement of Environmental Quality, 43 C.F.R. § 46.145 (2008) (incorporating adaptive management into Department of the Interior rules implementing the National Environmental Policy Act); Regulatory Reinvention (XL) Pilot Projects, 60 Fed. Reg. 27,282 (May 23, 1995) (setting up collaborative planning process for negotiation of Final Project Agreements under the Environmental Protection Agency's Project XL).

2. *See, e.g.*, Jody Freeman, *Collaborative Governance in the Administrative State*, 45 UCLA L. REV. 1, 21–33 (1997) (proposing a normative model of collaborative governance as a more effective and legitimate process for resolving regulatory disputes); J.B. Ruhl, *Taking Adaptive Management Seriously: A Case Study of the Endangered Species Act*, 52 U. KAN. L. REV. 1249, 1271–84 (2004); J.B. Ruhl, *Regulation by Adaptive Management—Is It Possible?*, 7 MINN. J. L. SCI. & TECH. 21, 28 n.12 (2005).

3. *See, e.g.*, Alejandro E. Camacho, *Can Regulation Evolve? Lessons from a Study in Maladaptive Management*, 55 UCLA L. REV. 293 (2007) [hereinafter Camacho, *Can Regulation Evolve?*]; Alejandro E. Camacho, *Mustering the Missing Voices: A Collaborative Model for Fostering Equality, Community Involvement and Adaptive Planning in Land Use Decisions, Installment Two*, 24 STAN. ENVTL. L.J. 269 (2005) [hereinafter Camacho, *Mustering the Missing Voices*]; Lawrence Susskind et al., *Integrating Scientific Information, Stakeholder Interests, and Political Concerns in Resource and Environmental Planning and Management*, *in* FOSTERING INTEGRATION: CONCEPTS AND PRACTICE IN RESOURCE AND ENVIRONMENTAL MANAGEMENT 181–203 (Kevin S. Hanna & D. Scott Slocombe eds., 2007); Herman A. Karl et al., *A Dialogue, Not A Diatribe: Effective Integration of Science and Policy Through Joint Fact Finding*, 49 ENV'T 20, 22–24 (2007).

4. Description of the Collaborative Adaptive Management Network, http://www.adaptivemanagement.net (last visited Jan. 22, 2010).

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make decisions, rather than government agencies ordaining resource management decisions independently.[5] Involving all stakeholders from the beginning is likely to lead to more broadly supported and thus more successful agreements.[6] When combined, these two innovations are sometimes referred to as collaborative adaptive management ("CAM").[7]

One of the most prominent attempts at CAM involves the Department of the Interior's ("DOI") decision to rely on CAM, in principle, to carry out its responsibilities under the Grand Canyon Protection Act of 1992[8] to monitor the operation of the Glen Canyon Dam,[9] operate the Dam in compliance with a range of laws and regulations,[10] and mitigate any significant environmental impacts.[11] The Act stipulates that a variety of stakeholders—including several federal agencies, states, power generators, recreational users, and environmental organizations—must be consulted regarding dam operations.[12] An Environmental Impact Statement ("EIS") released in 1995 recommended "adaptive management" as the best approach to accomplish these tasks.[13] The 1995 EIS recommended using CAM because of the significant uncertainties surrounding the socio-ecological systems involved, as well as the importance of learning from practice and ongoing research to improve operations over time.[14]

Bruce Babbitt, the Secretary of the Interior at the time, responded to the 1995 EIS by creating the Glen Canyon Dam

5. *See, e.g.*, Freeman, *supra* note 2, at 28–29; Camacho, *Can Regulation Evolve?*, *supra* note 3, at 307, 309–10.

6. *See* Thomas C. Beierle & Jerry Cayford, *Dispute Resolution as a Method of Public Participation*, *in* THE PROMISE AND PERFORMANCE OF ENVIRONMENTAL CONFLICT RESOLUTION 53, 63–66 (Rosemary O'Leary & Lisa B. Bingham eds., 2003) [hereinafter ENVIRONMENTAL CONFLICT RESOLUTION] (discussing the instrumental value of public participation).

7. *See* Description of the Collaborative Adaptive Management Network, *supra* note 4.

8. Grand Canyon Protection Act of 1992, Pub. L. No. 102-575, §§ 1801–1809, 106 Stat. 4600 (1992), *available at* http://www.usbr.gov/uc/rm/amp/legal/gcpa1992.html.

9. *Id.* § 1805.

10. *Id.* § 1804.

11. *Id.* § 1802.

12. *Id.* § 1803(b).

13. U.S. BUREAU OF RECLAMATION, U.S. DEP'T OF THE INTERIOR, FINAL ENVTL. IMPACT STATEMENT FOR OPERATION OF GLEN CANYON DAM, COLO. RIVER STORAGE PROJECT, ARIZ. 34–38 (1995) [hereinafter FINAL EIS], *available at* http://www.usbr.gov/uc/envdocs/eis/gc/gcdOpsFEIS.html.

14. *Id.* at 34.

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Adaptive Management Program ("AMP").[15] At the heart of the AMP is the Adaptive Management Working Group ("AMWG"), which is a formal federal advisory committee whose charter was signed in January 1997.[16] In addition to the AMWG, the AMP now includes the Technical Working Group ("TWG"), the Grand Canyon Monitoring and Research Center ("GCMRC"), and Independent Review Panels ("IRP"), and has an annual operating budget of approximately eleven million dollars.[17]

Many of its public and private participants, as well as observers of the decade-old participatory experiment, have described the AMP in glowing terms.[18] Secretary of the Interior Dirk Kempthorne and other key Interior officials identified the AMP as one of the most successful examples of adaptive management in America.[19] Dr. Carl Walters of the University of British Columbia's Fisheries Centre went so far as to suggest that Glen Canyon's AMP, while not perfect, is one of the few successful efforts to implement adaptive management.[20] Dennis Kubly—the Bureau of Reclamation's program manager for the AMP—offers a more tempered analysis, but ultimately points toward the research that has been conducted to date as a sign of success.[21]

We disagree, and the proof is in the results.[22] After thirteen years

15. Glen Canyon Dam Adaptive Management Program, Background, http://www.usbr.gov/uc/rm/amp/background.html (last visited Jan. 22, 2010).

16. *Id.*

17. U.S. BUREAU OF RECLAMATION & U.S. GEOLOGICAL SURVEY, GLEN CANYON DAM ADAPTIVE MGMT. PROGRAM BIENNIAL BUDGET AND WORK PLAN, FISCAL YEARS 2010–11 (2009), *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/09aug12/FY10-11_DraftWorkPlan.pdf.

18. *See, e.g.*, Michael Gabaldon, Secretary's Designee, Adaptive Management Work Group, Address at the Colorado River Ecosystem Science Symposium (Oct. 25–27, 2005) ("[F]rom the perspective of experimentation and reducing uncertainty, the Glen Canyon program is one of the most successful in the world. We have undertaken and accomplished large-scale experiments repeatedly . . . . We must not underestimate the difficulty of moving forward with these tests within the context of a stakeholder process; the fact that they have occurred at all is remarkable.").

19. Secretary of the Interior Order No. 3270, Adaptive Management (2007) ("[Adaptive management] has proved to be a useful approach in cases such as the Bureau of Reclamation's management of Glen Canyon Dam.").

20. Gabaldon, *supra* note 18.

21. Dennis M. Kubly, *Environmental Protection: Using Adaptive Management at Glen Canyon Dam*, HYDRO REV., Oct. 2009, *available at* http://www.hydroworld.com/index/display/article-display/9751553848/articles/hydro-review/volume-28/issue-7/articles/environmental-protection.html.

22. *See infra* Part II.

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and millions of dollars, the AMP has failed to stabilize or otherwise improve the quality of the fragile downstream ecosystem.[23] Furthermore, the AMP has been unable to make substantial progress toward resolving the significant resource conflicts at the heart of the Dam's operations.[24] Kubly notes that for adaptive management to succeed, "knowledge must make its way into policy decisions that promote a balance between the historical primary purposes of Glen Canyon Dam (i.e., water delivery and hydropower production) and the more recently considered protection of natural resources in the Colorado River ecosystem."[25] This fundamentally has not happened, and stakeholders have grown restless.[26]

What has gone wrong? The adoption of a collaborative adaptive management approach is not the problem. In fact, CAM is a technique well suited for managing the Glen Canyon Dam, and the AMP incorporates a number of important innovations, including a well-funded research program that has conducted experiments providing valuable scientific information about the downstream

23. A 2006 USGS study suggested that humpback chub populations are stabilizing, and that the low summer steady flow experiment from June through August 2000 may be one reason. News Release, Grand Canyon Monitoring and Research Center, Endangered Humpback Chub Population in Grand Canyon Stabilizing (Aug. 2006), *available at* http://www.gcmrc.gov/research/humpback_chub/20060802.aspx. Environmental groups counter that it is premature to say that this is a stabilization or recovery, claiming that twice as many chub are needed to make that claim. April Reese, *New Experimental Plan for Glen Canyon Dam Operations Likely to Fall Short, Critics Say*, LAND LETTER, Mar. 8, 2007, *available at* http://www.eenews.net/Landletter/2007/03/08/2. More recent FWS research also disputes that the test flows in 2000 can be given any credit, as recent modeling suggests that the increased recruitment took place at least four years earlier. *See* STEVEN L. SPANGLE, U.S. FISH & WILDLIFE SERV., FINAL BIOLOGICAL OPINION FOR THE OPERATION OF GLEN CANYON DAM 20 (2008) [hereinafter FINAL BIOLOGICAL OPINION], *available at* http://www.usbr.gov/uc/envdocs/bo/FinalGCDBO2-26-08.pdf; Letter from John Weisheit, Conservation Dir., Living Rivers and Colorado Riverkeeper, & Michelle Harrington, Rivers Program Dir., Center for Biological Diversity to the Hon. Dirk Kempthorne, Sec'y, U.S. Dep't of the Interior, on Scoping Comments for the Environmental Impact Statement for the Long-Term Experiment Plan for the Future Operations of Glen Canyon Dam (Feb. 28, 2007), *available at* http://www.livingrivers.org/pdfs/LRletterKempthorneFeb2007.pdf.

24. The fact that environmental groups have filed several lawsuits indicates a breakdown in the AMP as a collaborative instrument for dispute resolution. *See New Suit Filed over Glen Canyon Dam*, ASSOCIATED PRESS, Dec. 9, 2007, *available at* http://www.deseretnews.com/article/1,5143,695234557,00.html; Shaun McKinnon, *Lawsuit Targets Arizona Dam; Says Native Fish Near Extinction*, ARIZ. REPUBLIC, Feb. 17, 2006, at 1A.

25. Kubly, *supra* note 21.

26. *Id.*

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ecosystem.[27] The Glen Canyon Dam offers an ideal opportunity for the systematic application of collaborative adaptive management, especially since scientific uncertainty and disagreements have been central to the ongoing acrimony among stakeholders. If implemented effectively, CAM can lead to more sustainable management of natural resources and increase public support for whatever tradeoffs have to be made among ecological, economic development, and social welfare objectives. By bringing all parties to the table, more information—including a clearer presentation of the risks associated with managing the area's resources—can be obtained. When trust is fostered, parties are more open to searching for ways of meeting the interests of others rather than simply fighting for their personal interests. CAM can encourage careful review of how previous management efforts have and have not worked.[28]

The problem is that the Glen Canyon Dam AMP has implemented CAM ineffectively, largely due to Congress and the DOI's deficient initial design. Congress abdicated its responsibility to provide clear guidance regarding the relative priority of competing resource goals and the importance of various program components. Equally importantly, the DOI failed to follow commonly identified best practices in collaborative and adaptive resource management in structuring the AMP. Without clear direction or a commitment to resolving the ongoing resource management conflicts, the AMP missed multiple opportunities both to foster agency and stakeholder learning and to cultivate constructive engagement of the stakeholders who care the most about the Colorado River and the socio-ecological system it

27. *See infra* notes 135–37 and 217–18 and accompanying text.

28. *See generally* BYRON K. WILLIAMS ET AL., U.S. DEP'T OF THE INTERIOR, ADAPTIVE MANAGEMENT: THE U.S. DEPARTMENT OF THE INTERIOR TECHNICAL GUIDE 2 (2009) [hereinafter TECHNICAL GUIDE], *available at* http://www.doi.gov/initiatives/AdaptiveManagement/TechGuide.pdf; ADAPTIVE ENVIRONMENTAL ASSESSMENT AND MANAGEMENT (C.S. Holling ed., 1978); KAI N. LEE, COMPASS AND GYROSCOPE: INTEGRATING SCIENCE AND POLITICS FOR THE ENVIRONMENT (1993); PANARCHY: UNDERSTANDING TRANSFORMATIONS IN HUMAN AND NATURAL SYSTEMS (Lance H. Gunderson & C.S. Holling eds., 2002); Kai N. Lee, *Appraising Adaptive Management*, 3(2) CONSERVATION ECOLOGY 3 (1999) [hereinafter Lee, *Appraising Adaptive Mangement*], *available at* http://www.consecol.org/vol3/iss2/art3; Per Olsson et al., *Shooting the Rapids: Navigating Transitions to Adaptive Governance of Social-Ecological Systems*, 11(1) ECOLOGY & SOC'Y 18 (2006), *available at* http://www.ecologyandsociety.org/vol11/iss1/art18.

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supports.

Though the Glen Canyon Dam AMP has fallen short of its promise, its experience offers important lessons that can guide future regulatory innovations. When Congress or federal agencies encourage CAM, they can take steps to help harness the full potential of this approach to collaborative governance. Through its shortcomings, the Glen Canyon AMP demonstrates that successful CAM requires careful institutional design at the outset along with continuing systematic assessment and joint reflection among stakeholders throughout the regulatory process.

In Part I of this article, we introduce the resource conflicts on the Colorado River, outline the Glen Canyon Dam's regulatory setting, and explain how the Glen Canyon Dam AMP functions. In Part II, we present persistent problems at Glen Canyon. In Part III, we identify six best practices in collaborative adaptive management that the AMP has failed to follow: (1) identifying appropriate stakeholder representatives; (2) involving stakeholders in developing a collaborative process; (3) using professional neutrals and encouraging consensus building; (4) incorporating joint fact-finding to deal with scientific uncertainty; (5) producing collectively supported written agreements; and (6) committing to build long-term management capabilities. We explain the benefits of utilizing each best practice and analyze the extent to which, based on available evidence, the Glen Canyon Dam AMP appears to fall short in putting the practice to use. Finally, we conclude by suggesting how legislatures and agencies can avoid the Glen Canyon Dam AMP's shortcomings when implementing future collaborative adaptive management programs.

I. THE COLORADO RIVER'S ENDURING RESOURCE CONFLICT AND THE GLEN CANYON DAM

The Colorado River is the lifeblood of much of the western United States, providing water to seven American states and Mexico. What was once a wild river, flowing from the Rocky Mountains through parched deserts and the Grand Canyon into the Gulf of California, is now heavily utilized and highly regulated. The Law of the River[29]—a collection of statutes, agreements,

29. The "Law of the River," a collection of "numerous compacts, federal laws, court decisions and decrees, contracts, and regulatory guidelines," governs the use and

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regulations, and numerous court decisions—dictates how the river will be managed, including how water will be allocated among the various users and territories.

To improve management and storage of water from the river, the Bureau of Reclamation constructed the Glen Canyon Dam above Lee's Ferry, Arizona and created Lake Powell between 1956 and 1963.[30] The total cost of the project was $314 million.[31] This location was chosen because Lee's Ferry marks an important division between the upper and lower basins of the Colorado River—the upper being the States of Colorado, New Mexico, Utah, and Wyoming, and the lower being Arizona, California, and Nevada. Each basin is entitled to 7.5 million acre-feet of water each year under the Colorado River Compact of 1922.[32] That leaves 1.5

management of the Colorado River among the seven basin states and Mexico. U.S. Bureau of Reclamation, Law of the River, http://www.usbr.gov/lc/region/g1000/lawofrvr.html (last visited Jan. 22, 2010). *See, e.g.*, Colorado River Compact, 70 CONG. REC. 324, 324–25 (1928), *available at* http://www.usbr.gov/lc/region/g1000/pdfiles/crcompct.pdf; Boulder Canyon Project Act, ch. 42, 45 Stat. 1057 (1928) (codified as amended at 43 U.S.C. §§ 617–617t (2006)); Boulder Canyon Project, Agreement Requesting Apportionment of California's Share of the Colorado River Among the Applicants in the State (the "Seven Party Agreement"), Aug. 18, 1931, *available at* http://www.usbr.gov/lc/region/g1000/pdfiles/ca7pty.pdf; Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, U.S.-Mex., Nov. 8, 1945, T.S. 994 [hereinafter Water Utilization Treaty], *available at* http://www.usbr.gov/lc/region/g1000/pdfiles/mextrety.pdf; Upper Colorado River Basin Compact of 1948, art. IV, Apr. 16, 1949, 63 Stat. 31, *available at* http://www.usbr.gov/lc/region/g1000/pdfiles/ucbsnact.pdf; Colorado River Storage Project Act, ch. 203, 70 Stat. 105 (1956) (codified as amended at 43 U.S.C. §§ 620–620o (2006)), *available at* http://www.usbr.gov/lc/region/g1000/pdfiles/crspuc.pdf; Arizona v. California, 373 U.S. 546 (1963); Colorado River Basin Project Act (Lower Colorado River Basin Project Act), 82 Stat. 885 (1968) (codified as amended at 43 U.S.C. §§ 1501–1556 (2008)), *available at* http://www.usbr.gov/lc/region/g1000/pdfiles/crbproj.pdf; Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs Pursuant to the Colorado River Basin Project Act of September 30, 1968 (P.L. 90-537), 35 Fed. Reg. 8951 (June 5, 1970), *available at* http://www.usbr.gov/lc/region/g1000/pdfiles/opcriter.pdf; INT'L BOUNDARY & WATER COMMISSION, U.S. & MEX., MINUTE NO. 242, PERMANENT & DEFINITIVE SOLUTION TO THE INTERNATIONAL PROBLEM OF THE SALINITY OF THE COLORADO RIVER (1973), *available at* http://www.usbr.gov/lc/region/g1000/pdfiles/min242.pdf; Colorado River Basin Salinity Control Act, 88 Stat. 266 (1974) (codified as amended at 43 U.S.C. §§1571–1599).

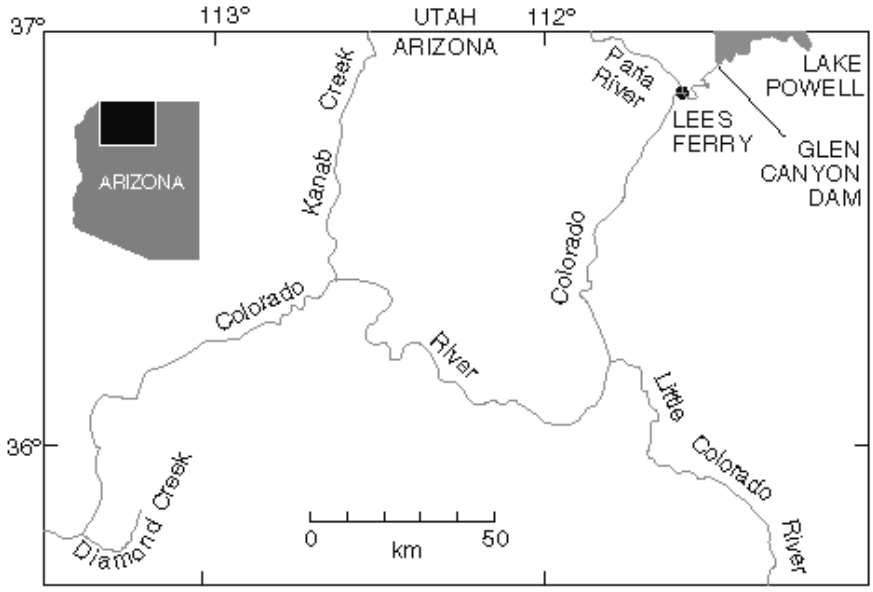
30. U.S. Bureau of Reclamation, Glen Canyon Dam Construction History, http://www.usbr.gov/uc/rm/crsp/gc/history.html (last visited Jan. 22, 2010).

31. This includes the cost of dam and power plant construction, as well as related infrastructure, including the construction of the town of Page, Arizona. U.S. Geological Survey, Statistics About Glen Canyon Dam, http://3dparks.wr.usgs.gov/glca/html/glen1860.htm (last visited Jan. 22, 2010).

32. U.S. Bureau of Reclamation, Lower Colorado Region, Law of the River,

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million acre-feet for Mexico, in accordance with the Mexican Water Treaty of 1944.[33] The Dam allows the upper basin to meet its treaty obligations by releasing nine million acre-feet while holding back its share.[34] The Bureau of Reclamation can store water in Lake Powell—and Lake Mead downstream—and release it when necessary to smooth out the Colorado's significant year-over-year variability in flow and ameliorate the impacts of droughts.[35] As detailed in this Part, in light of the various stakeholders with diverging interests in the Dam's operation, as well as the wide range of often conflicting laws that influence the management of the Dam and the surrounding natural resources, Congress established the Glen Canyon AMP as an innovative experiment in resource management.



http://www.usbr.gov/lc/region/g1000/lawofrvr.html (last visited Jan. 22, 2010).

33. Water Utilization Treaty, *supra* note 29, art. 10, ¶ (a).

34. GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, GLEN CANYON DAM ADAPTIVE MANAGEMENT PROGRAM: AMWG FACA COMMITTEE GUIDANCE (2000), *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/00jan20/Attach_07b.pdf.

35. Glen Canyon Dam Adaptive Management Program, Water Storage and Delivery, http://www.gcdamp.gov/keyresc/waterSD.html (last visited Jan. 22, 2010).

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SOURCE: Map of Glen Canyon Dam, http://walrus.wr.usgs.gov/grandcan/images/map.gif (last visited Jan. 24, 2010).

A. The Stakeholders

In addition to operating the Dam to ensure that obligations under the Law of the River are met, other competing considerations influence how the Dam is operated. First, while the primary purpose of constructing the Glen Canyon Dam was to regulate the flow of the river, a secondary objective has always been to generate hydroelectric power.[36] Revenue from power sales is paying off the Dam's construction debt, albeit slowly.[37] Operating the Dam optimally for hydroelectric power generation requires fluctuating water releases throughout the course of each day, depending on demand.[38] Second, some advocate for operating the Dam in a manner that alleviates environmental impacts. Over time, concerns arose regarding the Dam's impacts on the environment and endangered species such as the humpback chub. Traditionally, the Colorado swelled in the spring with sediment-laden snowmelt, then receded in the summer, depositing the sediment and replenishing sandbars in the process.[39] Species indigenous to the area, including the humpback chub, adapted to these conditions over time.[40] The operations regime favored by hydroelectric interests and used in practice disrupts these natural conditions: water is impounded, making it cooler and allowing the sediment to settle, then released through turbines in fluctuations defined by electricity needs.[41] Conservationists have, therefore,

36. 43 U.S.C. § 620 (2006).

37. Glen Canyon Dam Adaptive Management Program, Frequently Asked Questions, http://www.gcdamp.gov/faq.html (last visited Jan. 22, 2010); Glen Canyon Institute, Frequently Asked Questions About Restoring Glen Canyon, http://www.glencanyon.org/aboutgci/faq.php (last visited Jan. 22, 2010).

38. Glen Canyon Dam Adaptive Management Program, Hydropower, http://www.gcdamp.gov/keyresc/hydropower.html (last visited Jan. 22, 2010) [hereinafter Hydropower].

39. MARK T. ANDERSON ET AL., U.S. GEOLOGICAL SURVEY, CONTROLLED FLOODING OF THE COLORADO RIVER IN GRAND CANYON: THE RATIONALE AND DATA-COLLECTION PLANNED (1996), *available at* http://water.usgs.gov/wid/FS_089-96/FS_089-96.pdf.

40. GLEN CANYON DAM ADAPTIVE MGMT. PROGRAM, HISTORICAL NATIVE FISHES OF GLEN AND GRAND CANYONS 1 (2006), *available at* http://www.gcdamp.gov/fs/histNF.pdf.

41. Glen Canyon Dam Adaptive Management Program, Sediment and River Sand Bars in the Grand Canyon, http://www.gcdamp.gov/keyresc/sediment.html (last visited Jan. 22, 2010); Hydropower, *supra* note 38.

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called for changes in water releases aimed at ameliorating these impacts, including slower ramping rates and high-flow releases in spring.[42] Finally, groups with other interests—such as sport fishing, whitewater rafting, other recreational interests, and protecting cultural sites—influence how the Dam should be operated.

The Bureau of Reclamation and the states are interested primarily in the water storage services the Dam provides.[43] Their overriding objectives are to meet the demand for water in the arid southwest and fulfill their obligations under the Law of the River.[44] Lake Powell, the reservoir behind Glen Canyon Dam, stores more than 26.2 million acre-feet of water and provides consistent flows to downstream withdrawers even in times of drought.[45] Lowering the reservoir or removing the Dam altogether for environmental reasons could negatively impact storage and usage capabilities, particularly for the upper basin states.[46] The water stored in Lake Powell created by Glen Canyon Dam "serves as a 'bank account'

42. April Reese, *Colorado River Adaptive Management Program Needs Overhaul, Critics Say*, LAND LETTER, May 7, 2009, *available at* http://www.eenews.net/public/Landletter/2009/05/07/1.

43. *See generally* GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, MEETING MINUTES 1997–PRESENT [hereinafter MEETING MINUTES], *available at* http://www.usbr.gov/uc/rm/amp/mtgmin.html (select desired meeting date from either "Select 2006–2010 Meeting Date" or "Archive: 1997–2005" drop-down menus; then follow "Draft Meeting Minutes" hyperlink). For example, at the August 9–11, 2004 AMWG meeting, Tom Ryan, a Bureau of Reclamation employee, reported that "the big concern in the basin continues to be the drought," but that they were working with basin states to analyze options and develop contingency plans. *See* GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, MINUTES OF AUG. 9–11, 2004 MEETING 15 (2004) [hereinafter FINAL MEETING MINUTES AUGUST 2004], *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/04aug09/Final_Mins.pdf. At the same meeting, representatives of Colorado and Nevada voiced opposition to the implementation of experimental floods in Water Year 2005 because of the drought conditions. *See id.* at 17.

44. *See, e.g.*, FINAL MEETING MINUTES AUGUST 2004, *supra* note 43, at 17.

45. *See* U.S. Bureau of Reclamation, Upper Colorado Region: Colorado River Storage Project, http://www.usbr.gov/uc/rm/crsp/gc/index.html (last visited Jan. 22, 2010); COMMITTEE ON THE SCIENTIFIC BASES OF COLORADO RIVER BASIN WATER MGMT. ET AL., COLORADO RIVER BASIN WATER MANAGEMENT: EVALUATING AND ADJUSTING TO HYDROCLIMATIC VARIABILITY 36 (2007) [hereinafter COLORADO RIVER BASIN WATER MGMT. ET AL.], *available at* http://www.nap.edu/catalog.php?record_id=11857 ("With a reservoir comparable in size to Lake Mead, storage provided by Lake Powell helps ensure that the upper basin states meet their water delivery obligations to the lower basin.").

46. Ronald K. Christensen, The Proposed Draining of Lake Powell: An Inequitable Taking of Upper Colorado River Basin States Rights 39–42 (2000), *available at* http://www.riversimulator.org/Resources/Controversy/DrainingPowellInequitableChristensen2000.pdf.

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that can be drawn on in times of drought."[47] This stored water has made it possible to meet the needs of cities, industries, and agriculture throughout the West during dry periods.[48]

The Bureau of Reclamation, the states, the Western Area Power Administration, and the contractors that purchase power are also concerned about maximizing power generation.[49] The Dam is an important source of power for the region, producing approximately 4.5 billion kilowatt-hours annually, which offsets about 2.5 million tons of coal or eleven million barrels of oil.[50] The "controlled floods" advocated by some conservation and recreation interests lower the Dam's power generating potential.[51] Any changes to the permitted ramping rate (i.e., the speed at which releases change) or seasonal and/or daily restrictions also undercut power generation.[52]

Environmental organizations, including the Sierra Club, opposed

47. U.S. Bureau of Reclamation, *supra* note 45.

48. *Id.*

49. *See* Hydropower, *supra* note 38; FINAL MEETING MINUTES AUGUST 2004, *supra* note 43. For example, at the August 9–11, 2004 meeting, the issue of maintaining a healthy basin fund—the pool of funds generated by hydroelectric generation used to pay for the AMP—was raised in defense of forgoing experimental high flow releases. *Id.*

50. U.S. Bureau of Reclamation, Colorado River Storage Project, Frequently Asked Questions About Glen Canyon Dam, http://www.usbr.gov/uc/rm/crsp/gc/faq.html (last visited Jan. 22, 2010).

51. Controlled flows undercut power generation. Flows can be managed to maximize profit by responding to shifting changes in electricity prices, but the flows required to achieve these goals are not necessarily the flows that ensure maximum environmental protection. Furthermore, during controlled high flows, water is released via bypass tubes, representing lost generation capacity. Hydropower, *supra* note 38. According to Western Area Power Administration projections, the total cost of purchasing power elsewhere to compensate for reduced generation during the 2008 high flow test year was estimated to be $4.1 million. U.S. BUREAU OF RECLAMATION, U.S. DEP'T OF THE INTERIOR, FINAL ENVIRONMENTAL ASSESSMENT FOR EXPERIMENTAL RELEASES FROM GLEN CANYON DAM, ARIZ., 2008 THROUGH 2012 6 (2008) [hereinafter FINAL ENVIRONMENTAL ASSESSMENT], *available at* http://www.usbr.gov/uc/envdocs/ea/gc/2008hfe/GCD-finalEA2-29-08.pdf. This represented a 9.4% increase in the amount required to purchase power. *Id.* at 37.

52. Hydropower *supra* note 38; GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, FINAL MINUTES OF APRIL 29–30, 2009 MEETING 14 (2009) [hereinafter FINAL MEETING MINUTES APRIL 2009], *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/09apr29/Final_Minutes.pdf ("If you equalize the months, it causes us to be short of power to meet our contracts during those peak months and it will cause us to be long on power in the off-peak months. [We] would have to buy from the market in order to meet the contracts and peak months our prices tend to be higher and in the off-peak months we will be long on power. We will be selling the excess off in times when prices are down because they are off-peak months. So this would have a definite financial impact to power.").

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the initial plan for what was to become the Colorado River Storage Project Act of 1956, which called for a series of dams along the Colorado River, including two in Dinosaur National Monument.[53] The Sierra Club's primary concern at the time was that "no major scenic resource should be sacrificed for a power project."[54] The Sierra Club eventually dropped its opposition to the Colorado River Storage Project Act, including the Glen Canyon Dam, in exchange for project modifications that canceled the two upstream dams at Echo Park and Split Mountain in Dinosaur National Monument.[55] Many environmentalists came to regret this acquiescence.[56] Indeed, in light of concerns about the impact of the Dam on the environment and endangered species, environmental groups have challenged the Dam's existence and management ever since.[57]

There are eight endangered and three threatened species in the area: four of the endangered species—the southwestern willow flycatcher, humpback chub, razorback sucker, and Kanab ambersnail—have been adversely affected by dam operations.[58]

53. 43 U.S.C. §§ 620–620o (2006); David R. Brower, *Let the River Run Through It*, 82 SIERRA MAG. 42 (1997), *available at* http://www.sierraclub.org/sierra/199703/brower.asp.

54. Brower, *supra* note 53.

55. Echo Park and Split Mountain would have inundated Dinosaur National Monument, a protected area and natural treasure already being visited by thousands annually in the 1950s. Glen Canyon was less appreciated because it was not well known. *See, e.g.*, Mark W.T. Harvey, *Echo Park, Glen Canyon, and the Postwar Wilderness Movement*, 60 PAC. HIST. REV. 43, 44 (Feb. 1991) ("There had been relatively little concern about the beauties of Glen Canyon during the debate over the [Colorado River Storage Project], in part because only a handful of people had seen the canyon."); MARK W.T. HARVEY, A SYMBOL OF WILDERNESS: ECHO PARK AND THE AMERICAN CONSERVATION MOVEMENT 222 (1994) ("A generation of environmentalists became so enchanted with Glen Canyon and the surrounding landscape of the Colorado Plateau [in the aftermath of the Echo Park controversy] that much has been forgotten about its obscurity in the early 1950s. At the time of the controversy over Echo Park, Glen Canyon remained largely unknown but for a handful of river runners in Utah.").

56. For example, Sierra Club executive director and Friends of the Earth founder David Brower later stated, "Glen Canyon died in 1963 and I was partly responsible for its needless death . . . . Neither you nor I, nor anyone else, knew it well enough to insist that at all costs it should endure. When we began to find out it was too late." David R. Brower, *Foreword* to ELIOT PORTER, THE PLACE NO ONE KNEW: GLEN CANYON ON THE COLORADO 8 (David R. Brower ed., commemorative ed., Peregrine Smith Books 1988) (1963).

57. National Wildlife Fed'n v. W. Area Power Admin., No. 88-C-11750 (C.D. Utah Sept. 29, 1989) (order granting injunction), *available at* http://www.riversimulator.org/Resources/Legal/GCD/NWFinjuntion1989.pdf, which led to the creation of the AMP in the first place, is one of the lawsuits filed by environmental organizations challenging the operation of the Glen Canyon Dam.

58. Glen Canyon Dam Adaptive Management Program, Endangered Species,

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The humpback chub and razorback sucker are of particular interest because they are found only in the Colorado River Basin.[59] Despite a recent stabilization in the estimated chub population,[60] their current numbers are much lower than they were before the river was heavily modified.[61] According to conservationists, a number of changes caused by building the Dam present challenges to these endangered species, including decreased sediment load, cooler and more constant temperatures, more constant flows rather than natural seasonal variation, beach and bar erosion, and the arrival of invasive species.[62]

Environmentalists also argue that the water storage services the dam provides are not particularly valuable, given that sufficient storage capacity exists elsewhere in the system and that a staggering volume is lost to evaporation from Lake Powell annually.[63] Recognizing that outright removal of the Dam is unlikely, environmental organizations and other conservation interests, including the U.S. Fish and Wildlife Service, advocate flow modifications, like controlled flood releases and restricted ramping rates.[64] Such modified flow regimes would be designed to restore and maintain the habitat and other conditions essential for species like the humpback chub.[65] Modified flow regimes, however, often conflict with water supply and power interests.[66]

The area around Glen Canyon remains only sparsely populated;

http://www.gcdamp.gov/keyresc/es.html (last visited Jan. 22, 2010) [hereinafter Endangered Species].

59. *Id.*

60. MATTHEW E. ANDERSEN, U.S. GEOLOGICAL SURVEY, FACT SHEET 2009-3035: STATUS AND TRENDS OF THE GRAND CANYON POPULATION OF HUMPBACK CHUB 2 (2009), *available at* http://pubs.usgs.gov/fs/2009/3035/fs2009-3035.pdf.

61. *Id.*; Upper Colorado River Endangered Fish Recovery Program, http://www.fws.gov/coloradoriverrecovery/Index.htm (last visited Jan. 22, 2010).

62. Endangered Species, *supra* note 58.

63. Scott K. Miller, *Undamming Glen Canyon: Lunacy, Rationality, or Prophecy?*, 19 STAN. ENVTL. L.J. 121, 174–75 (2000).

64. For example, during the August 2007 AMWG meeting, an environmental group representative with the support of the Fish and Wildlife Service and the National Park Service recommended that the Secretary implement seasonally-adjusted steady flows in 2008. However, few other members agreed. GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, MINUTES OF AUG. 29–30, 2007 MEETING 10–11 (2007) [hereinafter FINAL MEETING MINUTES AUGUST 2007], *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/07aug29/Final_Mins.pdf.

65. *See* Recovery of Upper Colorado River Basin Fish: Protecting Stream Flows, Part 1, http://www.fws.gov/coloradoriverrecovery/Crrpflo1.htm (last visited Jan. 22, 2010).

66. Hydropower, *supra* note 38; FINAL MEETING MINUTES APRIL 2009, *supra* note 52.

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with no roads and a harsh landscape, the area contained even fewer residents when the Dam was proposed.[67] It is the traditional territory of the Havasupi, Hopi, Hualapi, Navajo, Pueblo, and Southern Paiute tribes, who attach great religious and cultural significance to sites within the canyons and along the river.[68] It appears, however, that there was little opposition from the tribes at the time of construction, perhaps because the Dam brought tangible economic benefits in the form of employment opportunities, and the Navajo Nation was compensated for the land it lost.[69]

Overall, the impacts of the Dam on tribes have been mixed. The Dam and associated tourism are a major source of income for the Navajo Nation and other tribes;[70] however, the flooding of the canyon,[71] the erosion resulting from the modified downstream flow,[72] and tourism[73] have harmed important sacred and historical sites.[74] Beyond specific places of historical and cultural significance that have been impacted, various zones, vistas, and the general

67. Shaun McKinnon, *At Age 50, Dam Still Generates Love, Hate*, ARIZ. REPUBLIC, May 28, 2007, *available at* http://www.azcentral.com/arizonarepublic/news/articles/0528dam-anniversary0528.html.

68. GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, CULTURAL RESOURCES FACT SHEET 2 (2006) [hereinafter CULTURAL RESOURCES FACT SHEET], *available at* http://www.gcdamp.gov/fs/cultResc.pdf.

69. *See* H.R. REP. No. 2789 (1956), *available at* http://water.library.arizona.edu/body.1_div.18.html.

70. *See* Senate Concurrent Memorial 1002, 43d Leg., 1st Reg. Sess. (Ariz. 2001) ("Whereas, the Navajo Nation is concerned that the breaching of Glen Canyon Dam and the draining of Lake Powell would wreak disaster on the economic and social welfare of the Navajo Nation and would detrimentally and fundamentally alter the water preservation, delivery and supply system crafted by many decades of planning . . . ."), *available at* http://www.azleg.state.az.us/legtext/45leg/1r/bills/scm1002p.pdf.

71. *See* Richard Ingebretsen, History of Glen Canyon and the Glen Canyon Institute, http://www.glencanyon.org/library/articles/presaccount.php (last visited Jan. 22, 2010).

72. Jeffrey W. Jacobs & James L. Wescoat, Jr., *Managing River Resources: Lessons from Glen Canyon Dam*, 44(2) ENV'T 8, 11 (2002).

73. *See* Amy Corbin, Sacred Land Film Project: Rainbow Bridge, http://www.sacredland.org/index.php/rainbow-bridge/ (last visited Jan. 22, 2010) (explaining the damaging effects of tourism on Lake Powell); *Group's Challenge to Sacred Site Policy Rejected*, INDIANZ.COM, Mar. 31, 2004, http://indianz.com/News/archive/000949.asp ("Several tribes, including the Navajo Nation and the Hopi Tribe, consider Rainbow Bridge to be an important religious site that people should not approach for fear of upsetting the balance of life.").

74. COMMITTEE ON GRAND CANYON MONITORING AND RESEARCH & NATIONAL RESEARCH COUNCIL, DOWNSTREAM: ADAPTIVE MANAGEMENT OF GLEN CANYON DAM AND THE COLORADO RIVER ECOSYSTEM 23 (1999) [hereinafter DOWNSTREAM], *available at* http://books.nap.edu/catalog.php?record_id=9590.

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attributes of the region are considered culturally important, and even sacred, by both Native American groups and non-native groups in the area, and these vistas and attributes have been altered as a result of the Dam's construction.[75]

Over the years, other groups, such as anglers and rafters, have taken interest in the River, the Dam, and water resource management. A vibrant sport fishery has grown out of the trout that thrive in the cool, clear waters released from the Dam.[76] Anglers from around the world come to the Lee's Ferry area to fish for rainbow trout in the fast-flowing river.[77] While initially stocked, this fishery is now self-sustaining.[78] It is, however, managed as a "blue ribbon" fishing experience.[79] Anglers benefit from the Dam's operations because the conditions are conducive to the trout fishery.[80] Rafting brings an estimated $83 million into the local economy annually, generating approximately 600 jobs.[81] While rafters generally benefit from the constant flow the Dam releases year-round, this flow and the Dam's trapping of sediment are eroding the beaches that serve as important launch and rest points for the rafting industry.[82] Boating and recreation in and around Lake Powell are also important tourism draws; the Glen Canyon National Recreation Area receives approximately two million visitors annually.[83]

The animosity among these stakeholders has increased over time, as their positions regarding releases have hardened and each has felt increasingly threatened by the demands of others. Though perhaps popular when approved, large dams like the Glen Canyon Dam have become controversial and politically unattractive.

75. CULTURAL RESOURCES FACT SHEET, *supra* note 68, at 2.

76. Glen Canyon Dam Adaptive Management Program, Lees [sic] Ferry Trout Fishery, http://www.gcdamp.gov/keyresc/tf.html (last visited Jan. 22, 2010).

77. *Id.*

78. *Id.*

79. A "blue ribbon" fishery is managed to provide a high quality experience for anglers, including larger fish and a high catch rate; such fisheries promote tourism. *Id.*

80. *Id.*

81. Glen Canyon Dam Adaptive Management Program, Whitewater Recreation—Colorado River in Grand Canyon, http://www.gcdamp.gov/keyresc/wr.html (last visited Jan. 22, 2010).

82. *Id.*

83. Press Release, Glen Canyon National Recreation Area, 2007 Budget and Annual Performance Plan for Glen Canyon and Rainbow Bridge Available for Public Review (June 20, 2007), *available at* http://www.nps.gov/glca/parknews/upload/07-16%20budget.pdf.

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Senator Barry Goldwater of Arizona, once a strong supporter of the Glen Canyon Dam, later reflected: "I have to be honest with you. I'd be happier if we didn't have the lake. I'd vote against it. I've become convinced that, while water is important, particularly for those of us who live in the desert, it's not that important."[84] Additionally, serious conflicts have arisen regarding management of the Colorado River more generally as population growth, economic development, and climate change have exacerbated water scarcity, increased electricity demand, and compounded environmental impacts.[85] Climate change threatens to magnify the problem in the longer term if it reduces stream flow as predicted.[86]

The following table summarizes the primary interests of the stakeholder groups involved in the AMP as reflected in their legal mandates and stated interests.[87] Each stakeholder group or agency gets one vote unless otherwise noted (i.e., each of the seven states

84. McKinnon, *supra* note 67.

85. COLORADO RIVER BASIN WATER MGMT. ET AL., *supra* note 45, at 17 ("The legal and physical infrastructure for managing Colorado River water resources was designed to help address or ameliorate conflicts [among different water users], in part by creating systems to store water during wet periods so that demands during drought can be reliably met.").

86. *Id.* at 19 ("Global climate models that project warmer future temperatures—and, in turn, increased rates of evapotranspiration—have important implications for runoff, water storage, and water planning decisions.").

87. *See generally* U.S. Bureau of Reclamation, About Us, http://www.usbr.gov/main/about/ (last visited Jan. 22, 2010); U.S. Dep't of the Interior, Indian Affairs, What We Do, http://www.bia.gov/WhatWeDo/index.htm (last visited Jan. 22, 2010); U.S. Fish & Wildlife Service, FWS at a Glance, http://www.fws.gov/fwsataglance.html (last visited Jan. 22, 2010); National Park Service, About Us, http://www.nps.gov/aboutus/index.htm (last visited Jan. 22, 2010); U.S. Dep't of the Interior, Western Area Power Administration, About Western, http://www.wapa.gov/about/default.htm (last visited Jan. 22, 2010); Arizona Game & Fish Dep't, Inside AZGFD, http://www.azgfd.gov/inside_azgfd/inside_azgfd.shtml (last visited Jan. 22, 2010); Inter Tribal Council of Arizona, Hopi Tribe, Introductory Information, http://www.itcaonline.com/tribes_hopi.html (last visited Jan. 22, 2010); Inter Tribal Council of Arizona, Haulapai Tribe, Introductory Information, http://www.itcaonline.com/tribes_hualapai.html (last visited Jan. 22, 2010); Official Site of the Navajo Nation, Introduction, http://www.navajo.org/history.htm (last visited Jan. 22, 2010); Inside the Wildlands Council, Our Mission, Goals, & Strategy, http://www.grandcanyonwildlands.org/insideMission.html (last visited Jan. 22, 2010); Grand Canyon Trust, About Us, http://www.grandcanyontrust.org/about.php (last visited Jan. 22, 2010); Grand Canyon River Guides, About Us, http://www.gcrg.org/aboutus.php (last visited Jan. 22, 2010); Federation of Fly Fishers, Our History & Mission, http://www.fedflyfishers.org/ (last visited Jan. 22, 2010); Colorado River Energy Distributors Association, About Us, http://www.creda.org/Pages/Who.html (last visited Jan. 22, 2010); Utah Associated Municipal Power Systems, About UAMPS, http://www.uamps.com/index.php/about-uamps (last visited Jan. 22, 2010).

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gets a vote, as do each of the environmental groups). These general views may vary from issue to issue, and certain stakeholder groups may split internally on a specific issue (e.g., though the states often agree, their interests on a particular matter may conflict in important respects).

Stakeholder group/agency	Mandate
U.S. Bureau of Reclamation	Hydroelectric power generation and water extraction
U.S. Bureau of Indian Affairs	Provide services to and manage land in trust for American Indian tribes
U.S. Fish and Wildlife Service	Natural resource management
U.S. National Park Service	Natural resource management
Western Area Power Administration	Hydroelectric power generation
Arizona Game and Fish Department	Natural resource management
Tribes (X 6)	Protect the interests and enhance the wellbeing of tribe members, including fostering economic opportunities, protecting cultural tradition, and maintaining a healthy environment
States (X 7)	Water extraction and hydroelectric power generation
Environmental groups (X 2)	Nature conservation
Recreation groups (X 2)	Recreation
Power purchasers (X 2)	Hydroelectric power generation

B. The Regulatory Setting

The Bureau of Reclamation operates the Glen Canyon Dam in accordance with the Colorado River Storage Project Act of 1956. This law authorized construction of the Glen Canyon Dam—along with other dams, reservoirs, power plants, and transmission infrastructure in the upper Colorado basin—and enumerates the

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Dam's water management and power generation goals.[88] The Bureau of Reclamation, a division of the DOI, was created in 1902 to promote settlement and economic development in the West by facilitating the capture and delivery of water to meet the needs of farmers and communities.[89] Today, it is the largest water wholesaler in the country, and the second largest producer of hydroelectric power in the Western states.[90] The Bureau's mission has evolved to recognize the various benefits and costs associated with its work of regulating rivers. Today, its declared goal is "to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public."[91] Fulfilling this mission involves making difficult choices regarding how dams like Glen Canyon Dam should be operated to balance a variety of interests and comply with numerous regulations.

The regulations governing the Dam's management have changed over time, reflecting both shifting interests among stakeholders and increased scientific understanding. Perhaps as a result, the multiple, and often conflicting, laws and directives governing the operation of the Dam establish no clear prioritization among the various competing usage demands.[92] The only cultural or environmental stipulation in the Colorado River Storage Project Act of 1956 is that the Secretary of the Interior must "take adequate protective measures to preclude impairment of the Rainbow Bridge National Monument."[93] Various environmental and cultural preservation acts passed in subsequent years—particularly the National Historic Preservation Act (1966), the National

88. 43 U.S.C. § 620 (2006).

89. U.S. Bureau of Reclamation, About Us, http://www.usbr.gov/main/about (last visited Jan. 22, 2010).

90. *Id.*

91. U.S. Bureau of Reclamation, Mission Statement, http://www.usbr.gov/main/about/mission.html (last visited Jan. 22, 2010).

92. Alejandro E. Camacho, *Beyond Conjecture: Learning About Ecosystem Management from the Glen Canyon Dam Experiment*, 8 NEV. L.J. 942, 947–49 (2008) [hereinafter Camacho, *Beyond Conjecture*] (explaining how the circular and confusing requirements of the Grand Canyon Protection Act of 1992 have led to conflicting and ineffective regulations governing the operation of the dam).

93. 43 U.S.C. § 620 (2006). In 1974, Navajo tribe members filed a lawsuit alleging that Lake Powell's rising waters were impacting the site of Rainbow Bridge, but the court ruled against the tribe, stating that water storage needs outweighed their concerns. National Park Service, History & Culture of Rainbow Bridge National Monument, http://www.nps.gov/rabr/historyculture (last visited Jan. 22, 2010).

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Environmental Policy Act (1969), and the Endangered Species Act (1973)—have had major implications for the Dam's operation. For example, the Endangered Species Act explicitly protects the humpback chub, which the Dam has impacted adversely.[94] This statutory protection has been the foundation of numerous lawsuits and biological opinions filed over the past few decades.[95]

In 1992, Congress enacted the Grand Canyon Protection Act ("GCPA") in an effort to consolidate the body of regulations governing the Dam's operations.[96] Rather than clarifying priorities and sorting out conflicting regulations, the GCPA confused matters. While allowing for a decrease in power generation, the GCPA reinforced the water management and hydroelectric priorities the Dam was initially meant to serve.[97] At the same time, it stated that the dam and water resources should be managed 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 natural and cultural resources and visitor use."[98] Thus, the GCPA does not set priorities among cultural, environmental, and recreational interests; nor does it mandate how they should be reconciled with water management objectives when the interests conflict. In fact, the GCPA seems to suggest that all demands can be met, and that the GCPA should in no way affect water allocations or conflict with any federal environmental laws.

The GCPA did call upon the Secretary of the Interior to prepare an EIS evaluating the Dam's operations; given the uncertainties, the GCPA asked the Secretary to take responsibility for long-term monitoring of the Dam's impact so that operations could be adjusted over time to account for new information or changed

94. Robert W. Adler, *Restoring the Environment and Restoring Democracy: Lessons from the Colorado River*, 25 VA. ENVTL. L.J. 55, 76 (2007).

95. *See, e.g.*, *id.* at 84–85.

96. Grand Canyon Protection Act of 1992, Pub. L. No. 102-575, § 1805, 106 Stat. 4600 (1992), *available at* http://www.usbr.gov/uc/rm/amp/legal/gcpa1992.html.

97. *Id.* ("The Secretary shall implement this section in a manner fully consistent with and subject to the Colorado River Compact, the Upper Colorado River Basin Compact, the Water Treaty of 1944 with Mexico, the decree of the Supreme Court in Arizona v. California, and the provisions of the Colorado River Storage Project Act of 1956 and the Colorado River Basin Project Act of 1968 that govern allocation, appropriation, development, and exportation of the waters of the Colorado River basin.").

98. *Id.*

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circumstances.[99] Presumably, long-term monitoring would determine the impacts that management has on "the natural, recreational, and cultural resources of Grand Canyon National Park and Glen Canyon National Recreation Area."[100] Furthermore, the GCPA requires that such monitoring be conducted in consultation with various stakeholders, ranging from the governors of the affected states to the recreation industry.

In 1996, Interior Secretary Bruce Babbitt signed the Record of Decision ("ROD") for the EIS.[101] More than forty assessments, undertaken by fifteen different agencies, were incorporated into it.[102] Among other things, the ROD mandated the creation of an Adaptive Management Working Group ("AMWG"), with various stakeholder representatives empowered to make recommendations regarding the Dam's management to the Secretary of the Interior in light of changing data and within the boundaries set by the relevant rules, regulations, and decisions.[103]

C. The Adaptive Management Program

The 1996 Record of Decision mandated the creation of the AMWG, but did not specify requirements beyond stating that it should be chartered in accordance with the Federal Advisory Committee Act ("FACA") to conduct experiments and undertake monitoring that might lead to operational changes, provided they comply with the National Environmental Policy Act ("NEPA").[104]

In January 1997, Secretary of the Interior Bruce Babbitt signed a Charter for the AMWG, which prescribes the following duties for the group: establish operating procedures; advise the Secretary of the Interior in meeting the environmental and cultural commitments in the EIS Record of Decision; recommend a framework for AMP policy, goals, and direction; recommend resource management objectives for the long-term monitoring plan and any other research required to assess the impact of the Dam's

99. *Id.*

100. *Id.*

101. GLEN CANYON DAM ADAPTIVE MGMT. PROGRAM, U.S. DEP'T OF THE INTERIOR, ADAPTIVE MANAGEMENT PROGRAM ORIGINS 1 (2005) [hereinafter AMP ORIGINS], *available at* http://www.gcdamp.gov/fs/amp_orig.pdf.

102. *Id.*; *see generally* FINAL EIS, *supra* note 13.

103. *Id.*

104. U.S. BUREAU OF RECLAMATION, RECORD OF DECISION: OPERATION OF GLEN CANYON DAM (1996), *available at* http://www.usbr.gov/uc/rm/amp/pdfs/sp_appndxG_ROD.pdf.

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operations; contribute to and review the mandated yearly report to Congress and relevant state governors; review long-term monitoring data to assess whether or not goals are being met and make operations and resource management recommendations accordingly; and monitor and report on all program activities undertaken to confirm that they are in compliance.[105]

The Charter also stipulates that the AMWG will report to the Secretary of the Interior via his or her designee, who will act as the chairperson; that the group is expected to meet biannually; and that membership, which is appointed by the Secretary, should include, but not be limited to:[106]

- The Secretary's Designee;
- A representative from each of the twelve government authorities associated with the EIS:
    - U.S. Bureau of Reclamation,
    - U.S. Bureau of Indian Affairs,
    - U.S. Fish and Wildlife Service,
    - U.S. National Park Service,
    - Western Area Power Administration,
    - Arizona Game and Fish Department,
    - Hopi Tribe,
    - Hualapai Tribe,
    - Navajo Nation,
    - San Juan Southern Paiute Tribe,
    - Southern Paiute Consortium, and
    - Pueblo of Zuni;
- A representative from each of the seven Colorado River Basin States; and
- Two representatives each from environmental groups, recreation groups, and contractors that purchase power generated by the Dam.

The AMWG first met in September of 1997, and spent the next few months establishing itself and proposing operating procedures that outline how the group functions.[107] Most significantly, these

105. GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, GLEN CANYON DAM ADAPTIVE MANAGEMENT WORK GROUP CHARTER (1997) [hereinafter WORK GROUP CHARTER], *available at* www.usbr.gov/uc/rm/amp/amwg/mtgs/97sep10/Attach_01.pdf.

106. *Id.*

107. *See* GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, MINUTES OF SEPT. 10–11, 1997 MEETING (1997) [hereinafter MEETING MINUTES SEPTEMBER 1997], *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/97sep10/Meeting_Minutes.pdf; GLEN

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procedures mandate: Robert's Rules of Order as the default operating manual; the approval of motions through consensus, with recourse to passing motions by a two-thirds majority when the chair deems consensus impossible; and the confirmation of the standing Technical Work Group ("TWG") as a sub-committee.[108]

The TWG, which is comprised of technical representatives from each of the groups on the AMWG, is to perform tasks assigned to it by the main group. Tasks include developing "criteria and standards for monitoring and research programs," providing "periodic reviews and updates," "developing resource management questions for the design of monitoring and research" by the GCMRC, and providing information for "preparing annual resource reports and other reports" for the AMWG.[109]

The GCMRC was created "to provide credible, objective scientific information to the Glen Canyon Dam AMP on the effects of operating Glen Canyon Dam under the Record of Decision and other management actions on the downstream resources of the Colorado River ecosystem, utilizing an ecosystem science approach."[110] The GCMRC is part of the U.S. Geological Survey, but responds to research questions posed by the AMWG, typically through the TWG.[111] Independent Review Panels, including the Science Advisory Board, independently assess program proposals

CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, MINUTES OF JAN. 15–16, 1998 MEETING (1998), *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/98jan15/Final_Minutes.pdf.

108. GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, FINAL OPERATING PROCEDURES 1, 2, 4 (1998) [hereinafter FINAL OPERATING PROCEDURES], *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/98jul21/Attach_11.pdf. Robert's Rules of Order "were designed to 'assist an assembly to accomplish in the best possible manner the work for which it was designed.'" LAWRENCE E. SUSSKIND & JEFFREY L. CRUIKSHANK, BREAKING ROBERT'S RULES 8 (2006). "Most versions of the *Rules* begin with an 'Order of Precedence of Motions,' which defines which kind of motion is more important than another, and a 'Table of Rules Relating to Motions,' which claims to answer three hundred questions about parliamentary practice." *Id. See, e.g.*, HENRY M. ROBERT, ROBERT'S RULES OF ORDER (BiblioBazaar 2008).

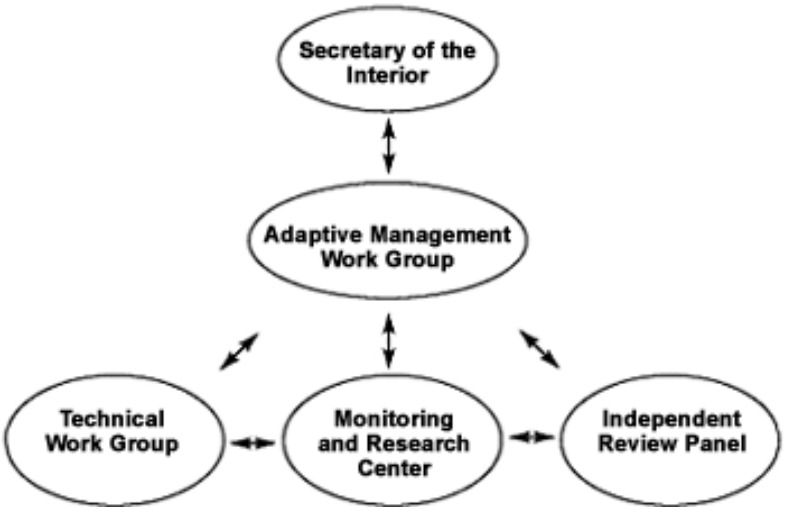
109. U.S. Bureau of Reclamation, Glen Canyon Dam Adaptive Management Program Technical Work Group, http://www.usbr.gov/uc/rm/amp/twg/twg_index.html (last visited Jan. 22, 2010).

110. U.S. GEOLOGICAL SURVEY, THE ROLE OF THE U.S. GEOLOGICAL SURVEY, GRAND CANYON MONITORING AND RESEARCH CENTER IN THE GLEN CANYON DAM ADAPTIVE MANAGEMENT PROGRAM 1, *available at* http://www.gcmrc.gov/files/pdf/gcmrc_roles_amp.pdf.

111. *Id.*

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and outcomes to ensure scientific objectivity and credibility.[112]



SOURCE: Glen Canyon Dam Adaptive Management Program, AMWG Membership, http://www.gcdamp.gov/aboutamp/member.html (last visited Jan. 22, 2010).

II. THE PERSISTENCE OF PROBLEMS AT GLEN CANYON

Since its creation a decade ago, the AMP has received praise from various agency officials and scholars who maintain that the Glen Canyon Dam AMP is a successful model of collaborative, adaptive regulation and management.[113] Despite these accolades and considerable funding, a growing number of observers have concluded that the Glen Canyon Dam AMP has been far from successful.[114]

The Glen Canyon Dam AMP should not be considered a success

112. *Id.* at 1–2.

113. *See, e.g.*, TECHNICAL GUIDE, *supra* note 28, at 1; Vicky J. Meretsky et al., *Balancing Endangered Species and Ecosystems: A Case Study of Adaptive Management in Grand Canyon*, 25 ENVTL. MGMT. 579 (2000), *available at* http://www.springerlink.com/content/axdga0cfuqfwhh4u/fulltext.pdf; Holly Doremus, *Adaptive Management, the Endangered Species Act, and the Institutional Challenges of "New Age" Environmental Protection*, 41 WASHBURN L.J. 50, 78–79 (2001). *See also supra* notes 18–21 and accompanying text.

114. *See, e.g.*, Adler, *supra* note 94; Joseph M. Feller, *Collaborative Management of Glen Canyon Dam: The Elevation of Social Engineering Over Law*, 8 NEV. L.J. 896 (2008); Camacho, *Beyond Conjecture*, *supra* note 92.

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because it has failed to address effectively the concerns that led to its creation in the first place, including: (1) developing a stakeholder-supported operating plan responsive to increased understanding; (2) averting litigation and other attempts to resolve conflict outside of the AMP context; and (3) protecting the downstream ecology, including endangered species.[115] This Part of the article outlines the AMP's failure to achieve these objectives and explains how these failures translate into the persistent problems at the Dam.

A. There Has Been Little Progress on Formulating a Long-Term Plan to Operate the Dam

Despite more than fifteen years of research and negotiations, the Dam operates under the same "modified low fluctuating flows" regime as it did in 1996.[116] This lack of progress is discouraging given the commitment of the AMP and its stakeholders to ongoing adaptive management. Neither Congress nor the AMWG has identified measurable goals for the AMP; nor has the AMWG made the hard choices needed to prioritize competing uses of the Colorado River. In particular, the Glen Canyon Dam AMP has yet to resolve how power generation should be reconciled with ecological and other uses that compete for the Dam's resources. For example, evidence from three, well-publicized controlled flood experiments indicates that vulnerable species, particularly the humpback chub, greatly benefit from seasonal flow changes, yet no subsequent changes have been made to long-term operations to incorporate such information.[117]

The strongest opposition to flow regime change has come from power generation interests. The Colorado River Storage Project Act of 1956 mandates the maximization of power generation revenues, provided that operations do not impinge on the Colorado River Compact or other relevant compacts.[118] This mandate gives power interests authorization to operate the Dam in

115. These goals for the AMP are embodied in the Vision and Mission Statement approved by the group. GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, VISION AND MISSION STATEMENT (1999), *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/99oct21/Attach_02.pdf.

116. Feller, *supra* note 114, at 916.

117. Reese, *supra* note 42; Kubly, *supra* note 21.

118. The Colorado River Storage Project Act of 1956, ch. 203 § 7, 43 U.S.C. § 620f (2008).

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a manner most beneficial to them, subject to other laws.[119] Controlled floods represent lost revenues to the power industry—an estimated four million dollars in the case of the 2008 experiment.[120] It is still not clear whether power interests will be compensated for this loss. It is unsurprising, given these losses, that power interests are opposed to changes in the Dam's operation.

The group seems incapable of fashioning creative solutions that meet multiple interests.[121] By this time, relatively stable voting blocks have formed. Our review of motions voted on since the AMWG was created confirms that factions are entrenched: environmental organizations, paddlers, the Fish and Wildlife Service, and the National Park Service regularly find themselves on one side, while the states and power generators are often on the other.[122]

B. The AMP Has Been Unable to Avert Unproductive Extra-Programmatic Conflict

Lawsuits filed as early as 1973, only ten years after the Dam was completed, challenged various resource management decisions.[123] Indeed, it was a legal victory won by environmental groups—*National Wildlife Federation v. Western Area Power Administration*[124]—

119. *Id.* at ch. 203 § 1, 43 U.S.C. § 620.

120. Reese, *supra* note 42.

121. *Id.*

122. Other interest groups, including the tribes, are less predictable, allying with different partners depending on the issue. *See, e.g.*, GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, MINUTES OF SEPT. 9–10, 2008 MEETING (2008), *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/08sep09/Final_Mins_08sep09.pdf (documenting that environmental and recreation interests, the National Park Service, and two tribes opposed a motion to "direct the Technical Work Group to review the flow levels . . . associated with each of the 158 archaeological sites that have been identified" while other parties either supported or abstained from acting upon the motion); GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, MINUTES OF AUG. 29–30, 2007 MEETING (2007), *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/07aug29/Final_Mins.pdf (documenting that environment and rafting interests, the Park Service and the Fish and Wildlife Service supported a motion to "[recommend] that the Secretary of the Interior implement Seasonally-Adjusted Steady Flows in WY 2008" while other parties either opposed or abstained from acting upon the motion).

123. The first lawsuit was Friends of the Earth v. Armstrong, 360 F. Supp. 165 (C.D. Utah 1973), which sought to force the U.S. Bureau of Interior to keep Lake Powell's water out of Rainbow Bridge National Monument.

124. *See* National Wildlife Fed'n v. W. Area Power Admin., No. 88-C-11750 (C.D. Utah Sept. 29, 1989) (order granting injunction).

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that led to the creation of the AMP in the first place. The AMP was created to facilitate conflict resolution without resorting to litigation. Under an effective collaborative adaptive management program, stakeholders would reflect jointly on what they had learned and engage in collaborative problem solving to improve the Dam's operations. Unfortunately, under the Glen Canyon AMP, stakeholders hold fast to their positions and continue to spend time and resources challenging each other. As a result of the lack of progress, AMWG members have turned to litigation rather than reliance on the AMWG to resolve disputes over dam operations.

In 2006, five environmental organizations sued the Bureau of Reclamation over the impacts the Dam continues to have on endangered species like the humpback chub. This suit was settled when the Bureau of Reclamation agreed to conduct a new study of native fish and habitats in concert with the Fish and Wildlife Service.[125] The Grand Canyon Trust, an environmental group and member of the AMWG, filed a lawsuit against the Bureau of Reclamation in December 2007 accusing the agency of managing water releases to benefit power generators at the expense of the downstream fish habitat.[126] In March 2008, the Grand Canyon Trust and Earthjustice filed a complaint against the Bureau of Reclamation and the Fish and Wildlife Service, alleging Endangered Species Act violations.[127] United States District Judge David Campbell ruled against the Fish and Wildlife Service in May 2009, requiring the agency to reconsider its approach to evaluating the Dam's impacts on humpback chub.[128]

125. Press Release, Western Environmental Law Center, New Environmental Study on Grand Canyon's Native Fishes and Habitat—Impacts of Glen Canyon Dam (Sept. 5, 2006), *available at* http://www.westernlaw.org/pressroom/press-releases/new-environmental-study-on-grand-canyons-native-fishes-and-habitat-impacts-of-glen-canyon-dam.

126. *New Suit Filed Over Glen Canyon Dam*, DESERET NEWS, Dec. 9, 2007, at B12, *available at* http://www.deseretnews.com/article/1,5143,695234557,00.html.

127. Supplemental Complaint for Declaratory and Injunctive Relief, Grand Canyon Trust v. U.S. Bureau of Reclamation and U.S. Fish & Wildlife Serv., No. CV-07-8164-DGC (D. Ariz. Mar. 17, 2008); Grand Canyon Trust, The Grand Canyon Trust Sues Reclamation Over ESA, NEPA, and GCPA Claims, http://www.grandcanyontrust.org/grand-canyon/river_actions_litigation.php (last visited Jan. 22, 2010).

128. Grand Canyon Trust v. U.S. Bureau of Reclamation, 623 F. Supp. 2d 1015, 1043 (D. Ariz. 2009); April Reese, *FWS Must Reconsider Dam's Effects on Grand Canyon Chub*, LAND LETTER, May 28, 2009.

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C. The Downriver Ecology is Still in Jeopardy

In 2008, the Fish and Wildlife Service reiterated that the ecosystem below the Dam has been heavily modified from its pre-dam state.[129] Federal agencies are attempting to ameliorate the situation by making further flow modifications and removing nonnative species, but the changing stream flow (particularly coldwater releases and unnatural flow regimes caused by the Dam) and land use changes have greatly diminished the species' habitat.[130] The humpback chub thrive in warm, sediment-rich flows that create fast moving currents, eddies, and associated beach formations.[131] The Fish and Wildlife Service postulates that, historically, humpback chub were found throughout the Grand Canyon, while today they are largely confined to a few sections and tributaries that remain largely undisturbed by human intervention. According to the Fish and Wildlife Service, "[m]any of the physical changes in the post-dam Colorado River are believed to have contributed to eliminating spawning and recruitment of humpback chub in the mainstem river."[132]

The precarious state of the downriver ecology is particularly disconcerting because anticipated stressors, such as climate change, are likely to strain the ecosystem even further. Fish and Wildlife acknowledges that the effects of climate change should factor into how the Dam is operated, as the low reservoir levels associated with droughts from 2004 to 2006 demonstrate the potential for climate change to impact humpback chub.[133] Perhaps more disturbingly, recent findings by University of Colorado researchers suggest that climate change and population growth could dry up the Colorado River's reservoir by 2057.[134] This would profoundly impact human settlements, agriculture, and the riverine environment.

Recent evidence suggests that the humpback chub may have temporarily benefitted from recent temporary high-flow releases. These releases are byproducts of AMP experiments with various

129. FINAL BIOLOGICAL OPINION, *supra* note 23, at 21.
130. *Id.* at 16.
131. *Id.* at 13–15.
132. *Id.* at 22.
133. *Id.* at 34.
134. Lauren Morello, *Climate, Population Growth Could Dry Up Colorado River by 2057*, CLIMATEWIRE, June 21, 2009, *available at* http://www.eenews.net/public/climatewire/2009/07/21/2.

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flow regimes used to assess the impacts on species populations and ecosystem health starting in 1996.[135] The U.S. Geological Survey ("USGS") reported in April 2009 that humpback chub populations increased by fifty percent between 2001 and 2008, a significant recovery after steady declines in the 1990s.[136] The USGS acknowledges the difficulty of determining why the population rebounded, but argues that the experimental water releases are probably one factor.[137]

One might consider the humpback chub's recovery to be evidence that the AMP is doing its job. After years of research, however, debates continue regarding whether or not flow regimes should be permanently modified to protect the health of the chub population.[138] Furthermore, the AMP's reluctance to adopt a modified flow regime or even to continue with high flow tests[139] suggests that any successes attributable to the experimental water releases are only temporary and could be erased by the cessation of controlled flooding. Though the DOI recently directed the development of a protocol for conducting even more high-flow experiments,[140] the fact that ongoing dam operations have never been formally changed to incorporate the apparent benefits of the experimental releases on downriver ecosystems indicates the AMP's limited commitment to adaptive management and jeopardizes the ancillary ecological benefits obtained through experimentation.

III. THE SHORTCOMINGS OF THE AMP AS A COLLABORATIVE ADAPTIVE MANAGEMENT PROGRAM

The AMP has failed to achieve its potential because it has not addressed significant process management questions. Evidence from a diverse range of complex, multi-party regulatory conflicts has led scholars and dispute resolution professionals to

135. U.S. BUREAU OF RECLAMATION, U.S. DEP'T OF THE INTERIOR, BIOLOGICAL ASSESSMENT ON THE OPERATION OF GLEN CANYON DAM AND PROPOSED EXPERIMENTAL FLOWS FOR THE COLORADO RIVER BELOW GLEN CANYON DAM DURING THE YEARS 2008–2012 14–15 (2007), *available at* http://www.usbr.gov/uc/envdocs/ba/gc-ExpFlow/2007BA.pdf.

136. ANDERSEN, *supra* note 60, at 2.

137. *Id.*

138. Reese, *supra* note 42.

139. *Id.*

140. *See* News Release, U.S. Dep't of the Interior, Secretary Salazar Announces Initiative to Protect Grand Canyon Resources While Meeting Water Needs (Dec. 10, 2009), http://www.doi.gov/news/09_News_Releases/121009c.html.

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recommend a set of "best practices" for managing environmental and land use disputes.[141] *The Consensus Building Handbook*, the product of a five-year effort by four dozen of America's leading dispute resolution professionals, reviews these best practices in great detail, indicating how properly managed and structured group decision-making and joint fact-finding efforts can lead to workable agreements.[142] Although incorporating the *Handbook*'s practices into a regulatory program does not guarantee full resolution of very contentious resource disputes, there is considerable evidence that doing so helps foster scientifically credible agreements and creative long-term solutions to complex resource problems.[143] Moreover, mounting evidence suggests that both participants and outside observers are more satisfied when these practices are followed, even if no final agreement is reached.[144]

In *The Consensus Building Handbook*, Susskind and Thomas-Larmer outline how conflict assessment procedures should be used to identify both the relevant stakeholders in a resource management dispute and what issues ought to be addressed in order to maximize the chance of reaching an informed

141. *See generally* THE CONSENSUS BUILDING HANDBOOK (Lawrence Susskind et al. eds., 1999) [hereinafter Susskind, CONSENSUS BUILDING HANDBOOK] (discussing strategies for building consensus); LAWRENCE SUSSKIND ET AL., USING ASSISTED NEGOTIATION TO SETTLE LAND USE DISPUTES: A GUIDEBOOK FOR PUBLIC OFFICIALS (1999) (summarizing beneficial practices regarding undertaking conflict assessment, selecting stakeholders, training participants, setting an agenda, and establishing an advisory committee based on five case studies involving the settlement of land use disputes); PATRICK FIELD ET AL., CONSENSUS BUILDING INSTITUTE, INTEGRATING MEDIATION IN LAND USE DECISION MAKING (1999) [hereinafter MEDIATION OF LAND USE DISPUTES], *available at* http://emcenter.org/wp-content/uploads/2009/10/Integrating%20Mediation%20in%20Land%20Use%20Decision%20Making_FINAL2.pdf; Judith Innes & David Booher, *Stories from the Field*, *in* BEYOND COLLABORATION: PLANNING AND PUBLIC POLICY FOR THE 21ST CENTURY (forthcoming) (on file with authors); Judith Innes & David Booher, *Collaborative Policymaking: Governance Through Dialogue*, *in* DELIBERATIVE POLICY ANALYSIS 33 (Maarten Hajer & Hendrik Wagenaar eds., 2003); DAVID STRAUS, HOW TO MAKE COLLABORATION WORK (2002); DAVID D. CHRISLIP, THE COLLABORATIVE LEADERSHIP FIELDBOOK (2002).

142. *See generally* Susskind, CONSENSUS BUILDING HANDBOOK, *supra* note 141.

143. Kirk Emerson et al., *Environmental Conflict Resolution: Evaluating Performance Outcomes and Contributing Factors*, 27 CONFLICT RESOL. Q. 27, 57 (2009), *available at* http://www3.interscience.wiley.com/cgi-bin/fulltext/122614996/PDFSTART.

144. *See* Camacho, *Mustering the Missing Voices*, *supra* note 3, at 304–11; Laura I. Langbein & Cornelius M. Kerwin, *Regulatory Negotiation Versus Conventional Rulemaking: Claims, Counter-Claims and Empirical Evidence*, 10 J. PUB. ADMIN. RES. & THEORY 599, 625 (2000); Susskind, CONSENSUS BUILDING HANDBOOK, *supra* note 141, at 4; MEDIATION OF LAND USE DISPUTES, *supra* note 141, at 20–22.

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agreement.[145] Straus enumerates how to facilitate collaborative efforts in order to ensure that all participants feel like they have had a say in the design of the decision-making process.[146] Poirier Elliott explains why professional neutrals regularly improve the effective management of collaborative decision-making bodies.[147] Potapchuk and Crocker stress the importance of formulating agreements that have a clear and accountable pathway to implementation.[148] Ehrmann and Stinson describe how stakeholders ought to engage with technical experts in joint fact-finding.[149]

Prescribing many of the same practices as *The Consensus Building Handbook*, the DOI's *Adaptive Management Technical Guide* emphasizes the need for group learning and ongoing improvement in how to manage collaborative decision-making.[150] Unfortunately, as detailed below, the DOI has failed to incorporate at least six vital practices for achieving truly collaborative and adaptive management into the AMP's design and operation. As a result, the AMP has failed to cultivate meaningful relationships among the stakeholders and has failed to develop the multilateral AMWG into an effective, deliberative decision-making body.

The remainder of this article focuses on six best practices that, according to our research, the AMP does not utilize: (1) identifying appropriate stakeholder representatives; (2) setting clear goals and involving stakeholders in developing a collaborative process; (3) using professional neutrals when appropriate and committing to building common ground; (4) incorporating joint fact-finding to deal with scientific uncertainty; (5) producing collectively supported written agreements; and (6) building long-term adaptive management capabilities. For each best practice, we explain why it is central to collaborative adaptive management and

145. Lawrence Susskind & Jennifer Thomas-Larmer, *Conducting a Conflict Assessment*, *in* Susskind, CONSENSUS BUILDING HANDBOOK, *supra* note 141, at 99, 107–30.

146. David A. Straus, *Managing Meetings to Build Consensus*, *in* Susskind, CONSENSUS BUILDING HANDBOOK, *supra* note 141, at 287, 292–321.

147. Michael L. Poirier Elliott, *The Role of Facilitators, Mediators, and Other Consensus Building Practitioners*, *in* Susskind, CONSENSUS BUILDING HANDBOOK, *supra* note 141, at 199, 212–18.

148. William R. Potapchuck & Jarle Crocker, *Implementing Consensus-Based Agreements*, *in* Susskind, CONSENSUS BUILDING HANDBOOK, *supra* note 141, at 527, 548–51.

149. John R. Ehrmann & Barbara L. Stinson, *Joint Fact-Finding and the Use of Technical Experts*, *in* Susskind, CONSENSUS BUILDING HANDBOOK, *supra* note 141, at 375, 380–91.

150. TECHNICAL GUIDE, *supra* note 28.

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how, in our view, the AMP has failed to implement it successfully.

A. Identifying Appropriate Stakeholder Representatives

Ensuring that all influential and substantially affected parties are at the table is critical to the success of any collaborative process.[151] If such a party is not included, the party will likely feel unrepresented and might resort to other means to undermine what the collaborative process has achieved.[152] Furthermore, if such a party is not included, the collaborative body might miss out on important input that could have contributed to reaching an even better agreement.[153]

The literature suggests that the best way to identify appropriate stakeholder representatives is by commissioning a "conflict assessment" in which a professional "neutral" conducts informal, not-for-attribution interviews with a first group of stakeholders recommended by the convener of the collaborative process.[154] As part of these interviews, the professional neutral asks the stakeholders with whom else he should speak. The process is repeated until all relevant players have been included. Based on these interviews, the neutral then suggests to the convener the categories of relevant stakeholder groups and suggests who might represent each stakeholder category in a collaborative process.[155] Often, a draft of the neutral's proposal is circulated to everyone who was interviewed before it is submitted to the convener.[156]

In the case of the Glen Canyon Dam AMWG, the charter dictates certain stakeholder groups who must be at the table and allows the Secretary of the Interior to add parties at his or her discretion.[157] Where the charter does not stipulate specific representatives or representative organizations for a given stakeholder group, the Secretary of the Interior chooses the representative.[158] This allows

151. *See* Susskind & Thomas-Larmer, *supra* note 145, at 105.

152. *See id.*

153. *Id.*

154. *Id.* at 100. A "professional neutral" is one that has expertise and experience in helping stakeholders work through a process to resolve an issue, but does not have a direct stake in the issue at hand. The "neutral" should be trusted and ideally chosen by all stakeholders. *Id.* at 181–84.

155. *Id.* at 100–01.

156. *Id.* at 130.

157. WORK GROUP CHARTER, *supra* note 105, at 3.

158. *Id.*

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the Secretary to choose parties with whom it might be easiest to work and exclude significant critics who might later challenge the group's decisions.

Ultimately, the AMP's process for determining representation was neither complete nor transparent, and likely the unfortunate result of lobbying behind closed doors.[159] Meeting minutes from the initial "Transition Work Group," which was formed to operate until the formal AMWG was constituted, provide surprisingly little documentation of discussions about membership.[160] Transition Work Group members expressed the need for diverse membership and for an information-and-training session on membership requirements.[161] There appears to be no indication in the record, however, of how the Secretary of the Interior chose stakeholder representatives.[162] This lack of transparency raises substantial questions regarding the adequacy of AMWG representation and ultimately the legitimacy of subsequent AMWG decisions.

The number or fraction of representatives from various categories of stakeholder groups has also been criticized.[163] While not of critical importance when a group operates by consensus, group composition is very important when decisions are made by majority or super-majority voting, because such dynamics may lead to formation of coalitions that force issues through while ignoring minority objections, as has happened with the AMP. Almost half of

159. Camacho, *Beyond Conjecture*, *supra* note 92, at 959.

160. GLEN CANYON DAM TRANSITION WORK GROUP, U.S. DEP'T OF THE INTERIOR, SUMMARY OF TRANSITION WORK GROUP MEETING, MINUTES OF FEB. 3–4, 1997 MEETING (1997) [hereinafter TRANSITION WORK GROUP MEETING FEBRUARY 1997], *available at* http://www.riversimulator.org/Resources/GCDAMP/TWG1997to1999/97.02/Minutes.pdf.

161. *Id.* at 5.

162. *Id.* at 3–4.

163. Camacho, *Beyond Conjecture*, *supra* note 92, at 958–59 ("Though the [AMWG] is reasonably diverse, there is still a question regarding whether the group is sufficiently representative. This is in large part because of the operative rule chosen for voting on AMWG decisions. The AMWG's operating procedures dictate that '[t]he group should attempt to seek consensus but, in the event that consensus is not possible, a vote should be taken. . . . Approval of a motion requires a two-thirds majority of members present and voting . . . . [The] AMWG demonstrates that decisions as to the structure of the regulatory program—stakeholder group composition, the adopted decision rule, the convenor's role in decision-making—can function to allow a stakeholder group to suppress meaningful participation and collaboration rather than cultivate it . . . . [W]hen the decision rule is less than consensus, the exact composition becomes crucial, and the probative value of decisions made by such a group is less clear. There is no clear, objective formula for deciding what proportion of votes should be allocated to recreational, hydropower, and environmental values and interests, let alone federal agencies, states, and tribes.").

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the motions put forward at AMWG meetings between March 2004 and May 2008 went to a vote.[164] Power generation interests have been able to garner a majority, and often a two-thirds majority, frequently by obtaining the support of the states and sometimes the tribes. For example, a motion to conduct no "Beach/Habitat-Building Flows" in fiscal year 2005 was narrowly approved by a margin of thirteen "yes" votes to six "no" votes and one abstention; the meeting minutes suggest that the states teamed up with power interests because of their desire to maximize power production.[165] Frustrated with this perceived imbalance against them, environmental groups have turned to litigation, which clearly undermines the consensus-oriented intention of the AMP process.[166] In part because the Secretary never invited open discussion of which stakeholders should participate and how many votes each interest group has,[167] the AMWG has fallen short of functioning as a collaborative decision-making body for addressing the resource conflicts surrounding the Glen Canyon Dam.[168] Instead, as evidenced by a majority of motions bypassing consensus in favor of a vote, unbalanced representation has seemingly led some parties to conclude that they are better off forcing a vote that they can consistently win.[169]

B. Providing Clear Goals and Involving Stakeholders in Developing Operating Procedures that Guide the Collaborative Process

Best practices suggest that all stakeholders ought to have a

164. *See* GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, MINUTES OF MAR. 2004–MAY 2008 MEETINGS [hereinafter MEETING MINUTES MAR. 2004–MAY 2008], *available at* http://www.usbr.gov/uc/rm/amp/mtgmin.html (select desired meeting date from "Select 2006–2010 Meeting Date"; then follow "Draft Meeting Minutes" hyperlink) (indicating that thirty-three of sixty-four motions went to a vote during this time period).

165. *See* GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, MINUTES OF AUG. 9–11, 2004 MEETING 18 (2004), *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/04aug09/Final_Mins.pdf.

166. Camacho, *Beyond Conjecture*, *supra* note 92, at 959–60.

167. TRANSITION WORK GROUP MEETING FEBRUARY 1997, *supra* note 160.

168. ROLES AD HOC GROUP, GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, DRAFT REPORT AND RECOMMENDATIONS TO THE SECRETARY'S DESIGNEE 3 (2007) [hereinafter REPORT AND RECOMMENDATIONS], *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/07aug29/Attach_13a.pdf.

169. *See id.* *See generally* MEETING MINUTES MAR. 2004–MAY 2008, *supra* note 164 (indicating, for example, that of the five motions calling for modified flow releases during this time, four went to a vote with the support of environmental groups but lost by substantial margins).

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chance, before they come to the table, to participate in the design of a collaborative process, including setting an agenda, drawing up a timetable, deciding how data gathering or fact finding should proceed, choosing technical advisors, setting a budget, and, most importantly, selecting a neutral facilitator to manage meetings and decision-making.[170] Existing evidence suggests that active stakeholder involvement at an early stage is crucial to fostering a workable and productive collaborative process; active stakeholders typically take greater ownership of decision making and are more likely to craft a process that pleases all affected parties.[171] Accordingly, to establish effective collaborative management, Congress must provide clear guidance as to the program's purposes and make stakeholders responsible for effectuating these objectives.

Unfortunately, Congress neither mandated meaningful opportunities for stakeholder involvement nor provided clear direction as to the goals and structure of the AMP. Even though Congress retains the ultimate authority (and thus responsibility) for specifying the AMP's goals and design, Congress delegated the responsibility to the Secretary of the Interior.[172] In doing so, Congress failed both to set forth clear objectives for the new program and to require ample opportunities for active stakeholder involvement in refining the goals and crafting the decision-making ground rules. Neither Congress nor the DOI provided participants a significant role in establishing the AMP's mandate or specifying its operating procedures. For example, while members of the Transition Work Group were given an opportunity to comment on the draft charter introduced by a Bureau of Reclamation

170. *See, e.g.*, Lawrence Susskind, *An Alternative to Robert's Rules of Order for Groups, Organizations, and Ad Hoc Assemblies That Want to Operate by Consensus*, *in* Susskind, CONSENSUS BUILDING HANDBOOK, *supra* note 141, at 3, 39–42, 46 [hereinafter Susskind, *An Alternative*].

171. *See* SUSSKIND & CRUIKSHANK, *supra* note 108, at 62–63 ("In [the Consensus Building Approach], many more people are called upon to take an active problem-solving role—doing work that engages them in what's happening, learning about the problem, and working to craft a solution. . . . Involving more people increases the chances that good ideas will see the light of day and be dealt with in ways that build consensus.").

172. Grand Canyon Protection Act of 1992, Pub. L. No. 102-575, §§ 1801–1809, 106 Stat. 4600 (1992), *available at* http://www.usbr.gov/uc/rm/amp/legal/gcpa1992.html. The Secretary was responsible for interpreting the Act and Environmental Impact Assessment that followed, and subsequently for the creation of the AMP. *See* Glen Canyon Dam Adaptive Management Program, Background, http://www.usbr.gov/uc/rm/amp/background.html (last visited Jan. 22, 2010).

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representative, the draft was submitted to the Secretary of the Interior in short order with few changes.[173] Had Congress and DOI followed best practices, stakeholders would have been intimately involved in defining operating procedures from the beginning rather than simply having the perfunctory opportunity to comment. After the AMWG's formation, the staff of the Secretary's Designee drafted the AMWG's operating procedures at the group's behest.[174]

The poor manner in which the AMP was designed was partly the product of DOI officials' interpretation of the FACA of 1972. Congress passed FACA to enhance the accountability and credibility of the various advisory committees created by federal agencies.[175] While its intentions are laudable and the mechanisms it mandates to guide the creation and operation of advisory committees foster transparency, its requirements can be restrictive, limiting opportunities for committees to craft the most contextually appropriate solutions. Nonetheless, some collaborative processes in America governed by FACA have incorporated the aforementioned best practices.[176]

The design of the AMP further failed to utilize best practices because of stipulations that the Secretary of the Interior imposed on its design. Under these stipulations, the Secretary's designee serves as AMP chair and is responsible for establishing agendas, finalizing meeting minutes, and defining the outcomes the group will seek.[177] Extant procedures allow stakeholders to add items to the agenda and to speak on them at meetings; permit members of the general public to speak; assure that dissenting opinions are conveyed to the Secretary in the minutes; and mandate a response from the Secretary regarding how recommendations are being

173. GLEN CANYON DAM TRANSITION WORK GROUP, U.S. DEP'T OF THE INTERIOR, SUMMARY OF TRANSITION WORK GROUP MEETING, MINUTES OF MAY 21, 1996 MEETING (1996) (on file with authors).

174. MEETING MINUTES SEPTEMBER 1997, *supra* note 107, at 3.

175. *See* U.S. General Services Administration, Federal Advisory Committee Act, Management Overview, http://www.gsa.gov/Portal/gsa/ep/contentView.do?contentType=GSA_OVERVIEW&contentId=9673 (last visited Jan. 22, 2010).

176. *See generally* Philip J. Harter, *Assessing the Assessors: The Actual Performance of Negotiated Rulemaking*, 9 N.Y.U. ENVTL. L.J. 32 (2000); Lawrence Susskind & G. McMahon, *The Theory and Practice of Negotiated Rulemaking*, 3 YALE J. ON REG. 133 (1985).

177. FINAL OPERATING PROCEDURES, *supra* note 108, at 1–4; REPORT AND RECOMMENDATIONS, *supra* note 168, at 11.

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used.[178] Even though these procedures provide stakeholders some opportunity to participate, they ultimately confine stakeholders to the conventional lobbying role and do not constitute a real system of power-sharing.

Consequently, the DOI gives little consideration to the views of AMWG members when making important management decisions regarding the Glen Canyon Dam. For example, in January 2008 the Secretary's Designee moved forward with a proposed experimental test at the Dam without soliciting the AMWG's recommendations.[179] Similarly, AMWG members complained there was little discussion of the AMP's fiscal year 2001 budgetary allocation (H.R. 4733 of the Energy and Water Development Appropriations Bill). Members claimed, "stakeholders received no advance notice from Interior/Reclamation on HR 4733"; there was "no AMWG meeting called to discuss and consequently no AMWG consensus or recommendation on the proposed bill"; "one stakeholder [went] outside the AMP process"; despite being within the "institutional home" for the GCMRC, AMWG was "entirely omitted" from the Appropriations Bill; and the "Secretary did not respond to stakeholders who wrote letters . . . opposing the funding cap."[180]

The absence of a clear regulatory mandate and stakeholder responsibility for implementing this charge has led to further problems. Beyond stakeholders having little say in how the AMP is structured, uncertainty persists around how the AMWG, TWG, GCMRC, and the IRP interact as well as what roles and responsibilities these AMP components have.[181] For example, AMWG members have asserted that they should have greater influence over the technical work of the GCMRC, while the GCMRC counters that it is not accountable to the AMWG.[182]

178. FINAL OPERATING PROCEDURES, *supra* note 108, at 1–4; REPORT AND RECOMMENDATIONS, *supra* note 168, at 11.

179. *See* Camacho, *Beyond Conjecture*, *supra* note 92, at 960 n.102.

180. GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, MINUTES OF JAN. 11–12, 2001 MEETING 2 (2001), *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/01jan11/Final_Mins.pdf.

181. *See* GLEN CANYON DAM ADAPTIVE MGMT. PROGRAM, U.S. DEP'T OF THE INTERIOR, STRATEGIC PLAN (2001) [hereinafter STRATEGIC PLAN], *available at* http://www.usbr.gov/uc/rm/amp/pdfs/sp_final.pdf.

182. *See* REPORT AND RECOMMENDATIONS, *supra* note 168, at 11. *See also* DOWNSTREAM, *supra* note 74, at 6 ("The 1997 Strategic Plan defined adaptive management . . . [but] it is not clear whether this definition is widely shared or whether stakeholders and scientists have

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Procedural confusion has sometimes been accompanied by substantive disagreement. The AMP has failed, for example, to agree on targets and priorities.[183] By failing to delineate clearly the functions and duties of different program components, Congress and the Secretary of the Interior have not only detached stakeholders from management, but have also unwittingly created a muddled regulatory structure.

C. Committing to Identifying Common Ground and Cultivating Consensus

Collaborative adaptive management is premised on a commitment to promoting better understanding among stakeholders and seeking to develop shared decision making. To help accomplish this goal, best practices suggest that professional neutrals (or neutral teams) often provide value by facilitating or mediating the work of multiparty, ad hoc advisory, or collaborative planning groups and by identifying and fostering common ground.[184] Effective facilitation or mediation extends beyond the management of face-to-face meetings. Professional neutrals know how to work with parties "away from the table" to help them prepare for meetings and to present and defend their views effectively.[185] Aside from the skill professional neutrals bring to the management of group decision-making, evidence suggests that their involvement increases the chances that the process will be fair.[186] Ideally, professional neutrals also have relevant expertise

similar interpretations, particularly as it applies to Glen Canyon Dam operations and Grand Canyon ecosystem management . . . . The operational roles of scientific monitoring and research, and of the Center itself, remain unclear. A balance has not yet been reached among the Center's roles in conducting science programs, managing contracts, managing information systems, responding to stakeholder requests, and synthesizing and communicating monitoring and research results.").

183. *See* Camacho, *Beyond Conjecture*, *supra* note 92, at 949–50 ("Tellingly, after a decade of being in existence, 'quantifiable targets have not been established for AMP goals including the AMWG's priority resources (humpback chub, sediment, and cultural resources)' . . . . Even supporters of the AMWG process concede that there has been and still is substantial uncertainty regarding what the function of the AMWG should be in addressing this regulatory dispute.").

184. *See* Kirk Emerson et al., *The Challenges of Environmental Conflict Resolution*, *in* ENVIRONMENTAL CONFLICT RESOLUTION, *supra* note 6, at 3, 11.

185. *See generally* Lawrence E. Susskind, *Environmental Mediation and the Accountability Problem*, 6 VT. L. REV. 1 (1981) (discussing growing importance of mediation in environmental disputes).

186. *See* Lawrence E. Susskind, *Keynote Address: Consensus Building, Public Dispute*

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that enables them to identify creative options that might meet each party's interests. Though an outside professional neutral is not always needed for a group to work collaboratively,[187] in many situations outside mediators are more effective, as they are likely to be more objective, have the greatest degree of impartiality, and the greatest motivation to maintain confidentiality.[188]

In its April 2007 *Report and Recommendations to the Secretary's Designee*, the Roles Ad Hoc Group—an AMWG committee formed to review the AMWG's progress—suggested that the level of collaboration between Glen Canyon Dam stakeholders had actually fallen since the inception of the AMP process.[189] This represents a significant failure to bring parties together to develop outcomes that are viewed as mutually beneficial, and raises a question about how and whether the AMP leadership expected consensus to emerge on key questions facing the group.

As mentioned previously, the Secretary's designee chairs the AMWG. As a government employee and the Secretary's representative, the designee is not a "neutral." Furthermore, no designees thus far have been professional mediators, so they might lack the skills needed to facilitate the work of a complex and politically charged group like the Glen Canyon Dam AMP. The designees, and their positions, have been:

- Stephen Magnussen, Director, Operations for Reclamation (July 1997–February 2002);
- Michael Gabaldon, Director, Policy, Management, and Technical Services (February 2002–March 2006);

Resolution, and Social Justice, 35 FORDHAM URB. L.J. 185, 185–203 (2008) (discussing nexus between public dispute resolution and environmental justice concerns).

187. *See* Poirier Elliott, *supra* note 147, at 231 ("Facilitators may more often be drawn from within an organization. This is particularly true when disputes spring from within a single organization, the issues are relatively clear and demarcated, the facilitator has no interest in the outcome of a decision, and the roles and responsibilities of the facilitator are clear and well understood by participants.") (internal citations omitted). *Id.* at 233 ("[Complex substantive issues, relationships, and process], in and of themselves, may not require an independent, professional practitioner."); Susskind, *An Alternative*, *supra* note 170, at 3, 7–8, 24, 40.

188. Poirier Elliott, *supra* note 147, at 231–32.

189. REPORT AND RECOMMENDATIONS, *supra* note 168, at 3 ("There are several indications that the level of collaboration among AMP participants have decreased since the inception of the AMP in 1996, including failure of the various AMP groups to reach consensus/agreement . . . . The Roles Ad Hoc Group believes that ineffective and possibly insufficient collaboration is an underlying cause of contention, litigation threat, diminished efficiency, and confused roles within the AMP.").

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- Mark Limbaugh, Assistant Secretary, Water and Science (March 2006–July 2007);
- Brenda Burman, Deputy Assistant Secretary, Water and Science (July 2007–July 2008);
- Kameran Onley, Assistant Secretary, Water and Science (July 2008–August 2009); and
- Anne Castle, Assistant Secretary, Water and Science (August 2009–present).

A review of the designees' biographies confirms that all were either career civil servants with technical backgrounds and managerial experience or political appointees.[190] There is no indication that any designee received significant training in dispute resolution. Unsurprisingly, the Roles Ad Hoc Group reported that AMWG members perceive a lack of clear communication between the designees and the rest of the AMWG.[191] The AMP lacked facilitation aimed at generating informed consensus.

Starting in 1999, the AMP used a trained dispute resolution professional to help facilitate some of its meetings and to assist the AMWG and TWG with strategic planning; however, because the individual was a former stakeholder group member, it leaves the AMWG vulnerable to claims that the individual was not sufficiently neutral.[192] While she helped the Secretary's designee organize,

190. *See* U.S. Bureau of Reclamation, Biography of Stephen V. Magnussen, Acting Commissioner, http://www.usbr.gov/history/CommissBios/magnussen.html (last visited Jan. 22, 2010); U.S. Bureau of Reclamation: Biography of Michael Gabaldon, Director, Technical Resources, http://www.usbr.gov/newsroom/presskit/bios/biosdetail.cfm?recordid=50 (last visited Jan. 22, 2010); Ferguson Group, Biography of Mark Limbaugh, http://www.fergusongroup.us/team_biographies.htm#MarkLimbaugh (last visited Jan. 22, 2010); Press Release, U.S. Bureau of Reclamation, Brenda W. Burman Named Reclamation's Deputy Commissioner for External and Intergovernmental Affairs (June 7, 2006), *available at* http://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=12222; Press Release, U.S. Dep't of Interior, Secretary Kempthorne Names Kameran Onley to Assume Responsibilities of Assistant Secretary for Water and Science (July 13, 2007), *available at* http://www.doi.gov/news/07_News_Releases/070713a.html; Memorandum from Ken Salazar, Secretarial Designee for the Glen Canyon Dam Adaptive Management Working Group, *available at* http://www.usbr.gov/uc/rm/amp/amwg/pdfs/SecDesigneeApptmt.PDF; National Journal, Profiles of Decision Makers in the Obama Administration—Anne Castle, http://www.nationaljournal.com/decisionmakers/dm/310/ (last visited Jan. 22, 2010).

191. REPORT AND RECOMMENDATIONS, *supra* note 168.

192. *See* GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, MINUTES OF JULY 21–22, 1999 MEETING (1999), *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/99jul21/Final_Minutes.pdf; American Rivers, About Us, http://www.americanrivers.org/about-us/ (last visited Jan. 22, 2010)

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plan, and run AMWG meetings, the dispute resolution professional's role in building consensus has also been somewhat limited.[193] Rather than empowering a professional neutral to devise a consensus-based approach to move the stakeholders towards outcomes based on "joint gains," the AMP lodges decision-making authority with the Secretary's designee and grants this individual the authority to move a motion to a vote at his or her discretion.[194] Furthermore, the dispute resolution specialist has had almost no engagement with stakeholders outside of formal meetings, nor has she dealt with other actors as an AMP representative, despite the Role Ad Hoc Group's recognition that such help is needed.[195] No record in the AMWG minutes suggests that stakeholders played a role in reviewing candidates for the facilitator's job, or in preparing the contract that spelled out the terms and conditions of her hiring.[196] All of these deficiencies suggest that little or no attention was given to involving professional neutrals in group decision-making or more generally to promoting collaborative decision-making.

In fact, as structured, the AMWG provides little opportunity for, or encouragement of, consensus building.[197] For example,

(stating American Rivers, which the facilitator represented at the July 1999 meeting, is "the leading conservation organization standing up for healthy rivers so communities can thrive. American Rivers protects and restores America's rivers for the benefit of people, wildlife, and nature."); *see also* GLEN CANYON DAM ADAPTIVE MGMT. WORK GROUP, U.S. DEP'T OF THE INTERIOR, FINAL MINUTES OF JANUARY 11–12, 2001 MEETING 9 (2001), *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/01jan11/Final_Mins.pdf (detailing perceived concerns of bias raised in a performance evaluation survey the facilitator conducted in 2000).

193. REPORT AND RECOMMENDATIONS, *supra* note 168, at 6 (stating that "facilitation and mediation expertise [should be used] more broadly throughout the AMP," including within the TWG and outside of the formal process via trips and exercises to build trust and foster collaboration).

194. Camacho, *Beyond Conjecture*, *supra* note 92, at 958–59 ("The exact point in time when consensus may be established to be impossible—thus paving the way for a super-majority vote—is never delineated in the AMWG's operating procedures. The Secretary's Designee, not the mediator-facilitator, decides on his or her own option when to switch to a two-thirds vote . . . . As there are no time constraints or other detailed protocols governing when to seek consensus and when to follow a two-thirds decision rule, the convenor's discretion becomes of critical importance in determining how the AMWG actually functions.").

195. REPORT AND RECOMMENDATIONS, *supra* note 168, at 6 (suggesting the need to "[u]pdate or develop a charter and operating procedures for all the elements of the AMP (AMWG, TWG, GCMRC, and Secretary's Designee) to reflect a more collaborative approach.").

196. *See generally* MEETING MINUTES, *supra* note 43.

197. Consensus building can be understood as the longer-term process of building trust

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participants reached consensus on only half of the motions put before the AMWG between March 2004 and May 2008.[198] Even though consensus is a stated goal of AMWG meetings, the Secretary's designee can simply choose to take a vote at any time, meaning that one side can force the motion to a vote when it senses it can prevail.[199] Since building consensus requires significant time and resources,[200] quick voting undercuts the commitment to consensus and encourages each party to focus on building a "winning coalition" rather than searching for a creative solution that meets everyone's interests.[201] As the Roles Ad Hoc Group recommends, parties need to "establish and agree to a common mission/goal for the AMP";[202] the AMP should "create incentives for participants to work collaboratively to achieve common goals and desired future resources conditions";[203] the AMP should "create incentives for participants to work collaboratively to achieve common goals and desired future resources conditions";[204] and the group should "update or develop a charter and operating procedures for all the elements of the AMP (AMWG, TWG, GCMRC, and Secretary's Designee) to reflect a more collaborative approach."[205]

The rigidity of the AMWG's procedure for developing agendas and structuring meetings—some of which FACA mandates—inhibits the creativity and flexibility consensus building requires.[206]

and understanding between parties so that they start to look for creative mutual gains rather than approaching all issues from their narrow entrenched interests. Consensus does not require unanimity, although it usually involves seeking unanimity but settling for overwhelming agreement after all parties have had a chance to present their views and suggestions. *See generally* Susskind, CONSENSUS BUILDING HANDBOOK, *supra* note 141; SUSSKIND & CRUIKSHANK, *supra* note 108, at 5.

198. *See* MEETING MINUTES MAR. 2004–MAY 2008, *supra* note 164.

199. FINAL OPERATING PROCEDURES, *supra* note 108, at 3.

200. REPORT AND RECOMMENDATIONS, *supra* note 168, at 3 ("[C]ollaborative processes are frequently expensive and time consuming, especially in resolving issues where conflict is extensive.").

201. Lawrence E. Susskind & Larry Crump, *Introduction—Multiparty Negotiation: Theory and Practice of Public Dispute Resolution*, *in* 2 MULTIPARTY NEGOTIATION: THEORY AND PRACTICE OF PUBLIC DISPUTES RESOLUTION vii–xii (2008).

202. REPORT AND RECOMMENDATIONS, *supra* note 168, at 4.

203. *Id.* at 5.

204. *Id.*

205. *Id.* at 6.

206. *See* FINAL OPERATING PROCEDURES, *supra* note 108, at 2–3 ("The maker of a motion must clearly and concisely state and explain his or her motion. Motions may be made verbally or submitted in writing in advance of the meeting . . . . After a motion there should

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The AMWG's procedures more closely resemble those of a formal body following Robert's Rules of Order than those of a more informal, problem-solving group following a consensus-based approach.[207] In fact, the group explicitly agreed early on to follow Robert's Rules, while allowing for some flexibility.[208]

Frustration caused by some groups' ability to get their way without having to seek broad consensus has inevitably led to a loss of faith in the process among those who regularly find themselves on the losing side.[209] We attribute this in part to a failure to commit to the best practices associated with consensus building, particularly the appointment of a professional neutral selected by the full group. As noted previously, in the absence of a commitment to consensus building, the parties have turned to other tactics, primarily litigation.

D. Establishing and Following Clear Joint Fact-Finding Procedures

Disagreements about "the facts" are critical to many disputes. Each party has its own understanding of what is happening on the ground and typically amasses evidence to substantiate and reinforce its own perceptions. In many situations, one side hires technical experts to prove they are right. Of course, other parties view such findings with skepticism, and, when they can afford to, hire their own technical experts to contradict the other side's experts.

Joint fact-finding ("JFF")—a best practice that suggests data

be presentations by staff followed by a discussion and a call for questions. The public will be given opportunity to comment during the question period as allowed by the Chairperson . . . . The group should attempt to seek consensus but, in the event that consensus is not possible, a vote should be taken. Voting shall be by verbal indication or by raised hand. Approval of a motion requires a two-thirds majority of members present and voting.").

207. The AMWG generally adheres to Robert's Rules of Order. *See* FINAL OPERATING PROCEDURES, *supra* note 108, at 1. For a contrast between Robert's Rules and a consensus-based approach, see SUSSKIND & CRUIKSHANK, *supra* note 108.

208. MEETING MINUTES SEPTEMBER 1997, *supra* note 107, at 4–5.

209. Camacho, *Beyond Conjecture*, *supra* note 92, at 959–60 ("[A]n AMWG's ad hoc committee concluded that 'some stakeholders feel disenfranchised because some interests have more representation on the group; this is especially significant when consensus is not achieved and issues get resolved by a vote.' . . . [S]takeholders consistently in the minority are increasingly seeing little incentive to expend their limited resources in a process that consistently ignores them, turning instead to costly litigation to address issues the AMWG has not confronted.").

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ought to be gathered jointly—provides a way to move beyond such stalemates.[210] When engaged in JFF, parties work together to identify what they need to know and to select independent experts that they all agree are credible.[211] After working together with the experts to design the relevant research and reviewing the preliminary findings together, the parties might interpret the expert's findings differently, but they will have little reason to reject the legitimacy of the data that has been collected.[212] By moving beyond disagreements about data, the parties can address more substantive issues, like the significance of the data and the appropriate responses to it.[213]

Of course, uncertainty may persist under JFF, and new data will affect the parties' understandings of the issue; however, the aim of JFF is not to develop an absolutely conclusive set of facts, but rather to reach tentative agreement on the facts at a given time in the process and to allow for collaborative research and subsequent evolution in management as more is learned.[214] Indeed, adaptive management is premised on the notion of recurring monitoring and research, and adaptation to new information.[215] Effective adaptive management programs do not pretend to have all of the answers, nor do they allow uncertainty to cripple decision-making; rather, they facilitate agreement on what is known and unknown at a given point, what decisions should be made in light of this information, and what information should be collected moving forward.[216]

To the AMP's credit, the parties do have the ability to craft research questions through the TWG, and unlike other experimental initiatives like the U.S. Fish and Wildlife Service's Habitat Conservation Plan program,[217] the AMP includes a well-

210. Ehrmann & Stinson, *supra* note 149, at 375–99; Lawrence Susskind et al., *Integrating Scientific Information, Stakeholder Interests, and Political Concerns*, *in* INTEGRATED RESOURCE AND ENVIRONMENTAL MANAGEMENT: CONCEPTS AND PRACTICE 181 (D. Scott Slocombe & Kevin S. Hanna eds., 2007).

211. Ehrmann & Stinson, *supra* note 149, at 375–99.

212. *Id.*

213. *Id.*

214. *Id.*

215. TECHNICAL GUIDE, *supra* note 28, at v.

216. *See generally* Lee, *Appraising Adaptive Management*, *supra* note 28, at 3; ADAPTIVE ENVIRONMENTAL MANAGEMENT: A PRACTITIONER'S GUIDE (Catherine Allen & George Henry Stankey eds., 2009).

217. *See* Camacho, *Can Regulation Evolve?*, *supra* note 3, at 337.

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funded scientific monitoring and research apparatus—the GCMRC. The GCMRC is responsible for most of the research used by the AMWG, either directly or indirectly. Its mission is "[t]o provide credible, objective scientific information to the Glen Canyon Dam Adaptive Management Program on the effects of operating Glen Canyon Dam on the downstream resources of the Colorado River ecosystem, utilizing an ecosystem science approach."[218]

If the AMP were to provide clear guidance establishing the GCMRC's scientific neutrality while giving the AMWG the authority and responsibility to identify research priorities, this would enable the GCMRC to have the rare capacity to assist the AMWG in making long-term resource management decisions; however, such guidance has not been forthcoming. Neither Congress nor the DOI has provided clear direction regarding the goals of the AMP or the "chain of command" between the AMWG and the GCMRC.[219] As a result, GCMRC officials claim that the AMWG has failed to provide clear guidance to the GCMRC on the scientific questions that the GCMRC should investigate.[220] On the other hand, some AMWG members have claimed that the GCMRC remains purposefully ignorant of their needs.[221] As an arms-length government body, the GCMRC is responsible for providing data to the AMWG and TWG, but is not under the AMWG and TWG's direction.[222] Since all GCMRC staff are government employees or contractors, AMWG and TWG members have little or no say about whom the GCMRC hires on contract or what their work shall entail.[223]

The AMP has used Independent Review Panels to make fact-finding efforts more objective and credible, but like the GCMRC, these panels are not directly associated with the AMWG. The

218. Glen Canyon Monitoring and Research Center, About GCMRC, http://www.gcmrc.gov/about/ (last visited Jan. 22, 2010).

219. Camacho, *Beyond Conjecture*, *supra* note 92, at 949–53.

220. *Id.* at 955 n.77.

221. REPORT AND RECOMMENDATIONS, *supra* note 168, at 18 ("Some feel the GCMRC does not want to be responsive to the needs of the AMP. . . . Some AMP members feel that GCMRC appears to have made unilateral changes in approved documents, work plans, and budgets without communicating with AMWG, which has reduced the level of trust between AMP members and GCMRC.").

222. REPORT AND RECOMMENDATIONS, *supra* note 168, at 9.

223. *Id.* at 17–22.

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panels, which include a Science Advisory Board comprised of respected academic experts, assess and monitor the credibility of GCMRC program proposals and outputs.[224] Yet, because the panels are set up by and report to the GCMRC, their reviews are not responsive to the interests and concerns of the AMP's stakeholders. Furthermore, some AMWG members argue that advisory board members are not forthright in their criticism out of fear of offending the research center and their contract staff, thereby putting them at risk of losing future work.[225]

The panels and the GCMRC are convened on the premise that distinguished experts can add legitimacy to the regulatory process at Glen Canyon Dam because these experts stand above the political fray. Even so, though scientists regularly provide crucial information that can help resolve natural resource disputes—including assessments of the potential tradeoffs of alternative strategies—technical analysis should only inform, and not dictate, political decision-making.[226] By allowing the GCMRC and independent review panels to operate without being responsive or accountable to the AMWG, Congress and the Department of the Interior severely crippled the AMWG's ability to manage uncertainty regarding the questions central to the Dam's management. Because scientists alone cannot provide definitive and objective answers on the priorities for management or an optimal resolution of policy tradeoffs, stakeholders must be engaged in defining researchable questions and analyzing the results of any technical studies undertaken.

The dispute surrounding the AMP's much-publicized experimental flood releases exemplifies the prolonged and unproductive conflicts that result from the AMP's inadequate fact-finding procedures. The GCMRC has conducted a variety of experiments to understand the Dam's impacts on the downstream

224. U.S. GEOLOGICAL SURVEY, *supra* note 110.

225. REPORT AND RECOMMENDATIONS, *supra* note 168, at 25 ("Some believe that the Science Advisors (SAs) do not always forward clear critiques, . . . comments, and recommendations because they may not want to offend GCMRC and contract scientists. However, the lack of clarity causes difficulty among managers in resolving a course of action.").

226. N. LeRoy Poff et al., *River Flows and Water Wars: Emerging Science for Environmental Decision-Making*, 1(6) FRONTIERS IN ECOLOGY & ENVT. 298, 301–02 (2003), *available at* http://www.esajournals.org/doi/pdf/10.1890/1540-295(2003)001%5B0298:RFAWWE%5D2.0.CO%3B2?cookieSet=1.

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ecosystem as well as to test out various flow regimes.[227] Many of these experiments have involved releasing different volumes of water over different time periods and evaluating the results.[228]

Because AMWG members have had less input in crafting the research program than they would in a true joint fact-finding process, stakeholder criticism of how research has been conducted is inevitable. The most controversial issues during these tests have included: interpreting the impacts of high-flow releases on the river, beach development, and conditions for indigenous species and the trout fishery; deciding what experiments should be conducted and when; deciding how such impacts should be measured; and agreeing on what the ideal outcome should be.[229] For example, at the August 2007 AMWG meeting, an environmental representative voiced concern that the monitoring and research plan did not represent a true ecosystem approach.[230] At the April 29–30, 2009 meeting, the states and power interests voted against a motion to conduct high flow experiments in fiscal year 2010–11, ostensibly because they felt that the results of the 2008 high flow experiment should be interpreted first.[231] Though stakeholders might criticize research even under a joint fact-finding process, the failure to include stakeholders in shaping the research agenda unnecessarily increased the potential for conflict and delegitimized the data-gathering process.

Because they were peripheral to the research program's design, stakeholders also have not treated the research findings as tools for facilitating joint problem solving, but rather used them as ammunition to advance their own positions. For example, at the

227. FINAL ENVIRONMENTAL ASSESSMENT, *supra* note 51, at 3–6.

228. *Id.*

229. *See generally* MEETING MINUTES, *supra* note 43.

230. FINAL MEETING MINUTES AUGUST 2007, *supra* note 64, at 4.

231. FINAL MEETING MINUTES APRIL 2009, *supra* note 52, at 12–13. "[T]he [Environmental Assessment] and the [Biological Assessment] both are pretty specific about what additional work needs to be done before more . . . High Flow Experiments or Beach/Habitat-Building Flows, are to be conducted and there is a requirement in the EA that full scientific and public analysis of the 2008 experiment be completed. There is language to that effect in the BA that says there will be the development of predictive and other analytic tools to inform future tests before they're done and that there will not be a proposal to do additional high flow tests until the information from the 2008 HFE is fully analyzed . . . . And as we know from the presentations yesterday . . . some of that won't be completed until the end of fiscal year 2010." *Id.* at 12. Despite this opposition, the Secretary of the Interior recently directed the development of a protocol for conducting further experimental high flows. *See* News Release, U.S. Dep't of the Interior, *supra* note 140.

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April 2009 meeting, rafting and endangered species advocates cited the success that modified flow regimes had in restoring sandbars as reason to lobby for their long-term use.[232] Since high-flow releases appear to provide habitats for endangered species, the AMP may continue to use such releases to comply with the Endangered Species Act.[233] Hydropower interests, on the other hand, cite significant revenue losses and problems with meeting electricity demand when flows are not regulated based on power needs.[234] Thus, they advocate maintaining the status quo of traditional release patterns, which maximize power generation revenues.[235]

A well-designed JFF process would not eliminate such arguments. It would, however, require each stakeholder to acknowledge those aspects of its policy advice that are based on fact and those that reflect subjective judgments or wishful thinking. As each group advocates a particular policy choice, the factual bases for its prescriptions would be clear to all sides.

AMP stakeholders have also used the absence of a clearly delineated fact-finding process as a delay tactic.[236] Uncertainty can never be fully eliminated, but parties who benefit from the status quo demand that changes be made based only on selective information and perpetuate claims of uncertainty by challenging the results of experiments.[237] A clear joint fact-finding process could help limit opportunities for delay and other adversarial, self-seeking behavior on the part of stakeholders by managing uncertainty, moving the process toward agreement on the

232. FINAL MEETING MINUTES APRIL 2009, *supra* note 52, at 12–13.

233. FINAL BIOLOGICAL OPINION, *supra* note 23, at 23.

234. FINAL MEETING MINUTES APRIL 2009, *supra* note 52, at 14.

235. *See generally* MEETING MINUTES, *supra* note 43. For example, during the August 2004 meeting, the following was raised: "Anything that can be done to lessen the impact to the basin fund would be good. Given the drought conditions, it may be better to go to existing powerplant conditions and provide a bridge so as to not impact the basin fund. He added that they may be putting the AMP in jeopardy if they ask for money from Congress and then let money out of the fund when money could be generated by the power revenues." FINAL MEETING MINUTES AUGUST 2004, *supra* note 43, at 17. Similarly, challenges from stakeholders who claim the tests are not worth their environmental impacts and that the tests may contravene the Law of the River undermine the usefulness of these experiments. For example, a motion to implement seasonally-adjusted steady flows in 2008 was opposed by an AMWG member on the grounds that reduced power generation might lead to more greenhouse gas emitting coal-fired power generation. FINAL MEETING MINUTES AUGUST 2007, *supra* note 64.

236. *See* Reese, *supra* note 42.

237. *Id.*

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legitimacy of the underlying data, and providing a framework for constantly improving that data.[238]

In short, the AMP can and should implement a joint fact-finding process. The stakeholder-comprised TWG has the capacity to formulate researchable questions, and the GCMRC has the resources and objectivity to play a major role in conducting and managing the research process. Effective joint fact-finding remains elusive, however, due to the lack of stakeholder support and the absence of a clear relationship between the AMWG and the GCMRC. As a result, factual conflict is often the main issue between stakeholders, preventing the AMP from focusing its energy on collaborative decision making.

E. Producing Collectively Supported and Functional Written Agreements

Best practices suggest that a collaborative process, especially one that is explicitly designed to generate decisions, should produce a text used for negotiation that all parties can ultimately sign and that spells out agreements that have been reached along with commitments the parties have made.[239] Preparing minutes or summaries of meetings does not suffice. Rather, drafting possible terms of a written agreement in the process of negotiating "provides a record of discussions" and "reduc[es] the chance of later misunderstanding."[240] A written record of discussions should also include places for the parties to indicate their personal commitments to help implement what has been worked out, regardless of whether they have the legal authority to enter into enforceable contracts.[241]

In the case of Glen Canyon Dam, the stakeholders have not developed written agreements that address the core issues before

238. Ehrmann & Stinson, *supra* note 149, at 376 ("Joint fact-finding is a central component of many consensus building processes; it extends the interest-based, cooperative efforts of parties engaged in consensus building into the realm of information gathering and scientific analysis. In joint fact-finding, stakeholders with differing viewpoints and interests work together to develop data and information, analyze facts and forecasts, develop common assumptions and informed opinion, and . . . reach decisions together.").

239. LAWRENCE SUSSKIND & JEFFREY CRUIKSHANK, BREAKING THE IMPASSE: CONSENSUAL APPROACHES TO RESOLVING PUBLIC DISPUTES 14–34 (1987).

240. ROGER FISHER ET AL., GETTING TO YES: NEGOTIATING AGREEMENT WITHOUT GIVING IN 172 (2d ed. 1991).

241. SUSSKIND & CRUIKSHANK, *supra* note 108, at 134.

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the AMP. The AMP has adopted a strategic plan that includes a mission statement and lists a range of goals for the Colorado River ecosystem.[242] Despite this, many of the "desired resource conditions" stated in the strategic plan are not necessarily compatible. For example, it is far from clear that the goals (1) "[to] maintain or attain viable populations of existing native fish, remove jeopardy from humpback chub and razorback sucker, and prevent adverse modification to their critical habitat" and (2) "[to] [m]aintain power production capacity and energy generation, and increase where feasible and advisable, within the framework of the Adaptive Management ecosystem goals" can be achieved simultaneously.[243] The strategic plan outlines the positions and roles of the various stakeholders and program components, introduces the boundaries set by relevant legislation, and notes that conflicts may emerge between efforts to meet the various goals.[244] However, the strategic plan offers no guidance as to how to reconcile these conflicts. Because of its focus on integrating research findings into management decisions, the strategic plan seems to expect that conflicts can be overcome with more and better information.[245]

While accurate and generally-accepted facts are needed, even the best joint fact-finding cannot overcome inherently conflicting uses of the same limited resource. As a result of these limitations, the Roles Ad Hoc Group found that the underlying conflicts among the listed goals have not been resolved, that no quantifiable targets had been established for any of the AMP's goals, and that many stakeholders had "never committed to defining or achieving specific resources objectives or desired future resource conditions."[246] Rather than spending time on these fundamental issues, the AMWG has focused instead on "the details of the AMP, sometimes duplicating TWG efforts."[247] Again, this failure can at least in part be attributed to Congress's failure to clarify program goals and the relative status of resource uses under the GCPA.[248]

The AMWG has also been ineffective because the parties have

242. *See* STRATEGIC PLAN, *supra* note 181, at 10–11.
243. *Id.* at 11.
244. *Id.* at 2–7.
245. *Id.* at 44.
246. REPORT AND RECOMMENDATIONS, *supra* note 168, at 5.
247. *Id.* at 8.
248. *See supra* Part III.B.

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never agreed on how AMWG recommendations will be factored into decision-making by the Secretary of the Interior. After each AMWG meeting, the Secretary's designee unilaterally prepares a "formal summary report" for the Secretary and sends copies to participants without providing any opportunity for participants to comment.[249] Although the designee must represent dissenting opinions to the Secretary when consensus is not reached, the designee remains free to interpret the outcomes and report in the manner he or she wishes. The Secretary, in consultation with agency management, is the sole decision maker on how AMWG recommendations are incorporated into formal actions;[250] the only stipulation is that the Secretary's decisions be reported back to AMWG members.[251] Members have expressed concern regarding the lack of communication and the opaque manner in which decisions are made.[252] Responses from the Secretary are rare and vary widely in their substantive detail.[253] Because AMWG members have no ownership of and make no commitment to the agreements reached, and the Secretary is completely free to make decisions with no accountability to the group, stakeholders have incentives to circumvent the collaborative process and lobby the Secretary or others directly.[254]

F. Managing the AMP Adaptively and Cultivating Long-Term Capacity Building

Best practice suggests that adaptive resource management is a long-term task that requires the building of ongoing institutional

249. FINAL OPERATING PROCEDURES, *supra* note 108, at 2.

250. *See* STRATEGIC PLAN, *supra* note 181, at 44.

251. *Id.*

252. REPORT AND RECOMMENDATIONS, *supra* note 168, at 11.

253. *Compare* Memorandum from Deputy Secretary of the Interior Lynn Scarlett to Glen Canyon Dam Adaptive Management Work Group (May 21, 2007), *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/07may22CC/Attach_07.pdf (containing itemized responses to each recommendation the AMWG submitted), *with* Memorandum from Secretary of the Interior Gale Norton to Glen Canyon Dam Adaptive Management Work Group (Mar. 3, 2006), *available at* http://www.usbr.gov/uc/rm/amp/amwg/mtgs/06mar07/Attach_02b.pdf (introducing restructuring within the Department as it relates to the AMP, but providing neither explanations as to how this will impact AMWG members, nor responses to recent recommendations).

254. *See* Camacho, *Beyond Conjecture*, *supra* note 92, at 950–52.

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and organizational capacity.[255] Adaptive management should include not only systematic monitoring, assessment, and adaptation in response to individual regulatory decisions made by the stakeholder group, but also reconsideration of the regulatory program itself.[256] This approach allows the convener, the stakeholders, and the broader public to evaluate a program's progress toward meeting public goals, and enhances the institutional capacity to follow through on commitments that have been made. Further, a long-term oriented approach helps ensure that the group learns from mistakes and gets better at dealing with each successive round of adjustments required in an on-going adaptive management process.

Despite the AMP's asserted emphasis on adaptation, the program has failed to engage in genuine adaptive natural resource management—both in its concrete decisions concerning resource allocation and in how it manages the AMP itself. For example, though the AMP's highly publicized experimental flood releases from the Glen Canyon Dam have been much celebrated, they are, in fact, examples of missed opportunities to engage in adaptive natural resource management. The floods certainly provided the AMP with important scientific data about the Colorado River's downstream hydrology and ecosystems, but the information gained did not modify operations at Glen Canyon Dam. In other words, there was no adaptive management. To date, a decade after the establishment of the AMP, no adjustments to long-term management operations of the Dam have been made.[257]

The Secretary of the Interior recently directed the development of a protocol for conducting additional experimental high flows.[258] Unfortunately, this new release regime seems to signal that the program will not be relying on the short-term releases primarily as iterative experiments for making long-term management decisions about Dam operating criteria but rather as tools for engaging in stop-gap natural resource management. While perhaps more favorable for the downriver ecosystem than the current low flow regime, such an approach does not demonstrate a rigorous

255. *See* Christopher W. Moore & Peter J. Woodrow, *Collaborative Problem Solving within Organizations*, *in* Susskind, CONSENSUS BUILDING HANDBOOK, *supra* note 141, at 591, 591–630.

256. Camacho, *Can Regulation Evolve?*, *supra* note 3, at 342–44.

257. Reese, *supra* note 42; Camacho, *Beyond Conjecture*, *supra* note 92, at 957.

258. *See* News Release, U.S. Dep't of the Interior, *supra* note 140.

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commitment to adaptive management.

In addition to failing to commit to using the information gleaned from regulatory experiments to adjust long-term management protocols at Glen Canyon Dam, little or no attention is being paid to building the AMWG's and AMP's long-term capacity. The only attempt to assess the AMP's progress was to form the Roles Ad Hoc Group. However, the Roles Ad Hoc Group's recommendations for improving the AMP have been neither adopted nor formally rejected by either the AMWG or the DOI.[259] Furthermore, stakeholder representatives have identified technical weaknesses and difficulties in meeting the AMP's participatory requirements, but the DOI has provided no training or organizational development investments in response.[260]

Programmatic evaluations are necessary to foster ongoing improvements, but the AMP has failed to commit the resources needed. While some efforts have been made to enhance meeting management, there has been no effort to systematically evaluate the process or to even monitor it on a regular basis.[261] The National Research Council has suggested that an adaptive management specialist—someone who can help parties deal with the tension between research and policy decisions—is sorely lacking and would be invaluable.[262] Without incorporating a systematic approach to monitoring and adapting the program, the agency, stakeholders, Congress, and the public are crippled in their

259. Camacho, *Beyond Conjecture*, *supra* note 92, at 950 n.50.

260. REPORT AND RECOMMENDATIONS, *supra* note 168, at 13. "Some TWG members appear to lack technical training that would enhance their contribution toward success of the group." *Id.* "Many TWG members are unwilling or unable to fully participate in work efforts required to meet deadlines and commitments." *Id.* at 15.

261. Camacho, *Beyond Conjecture*, *supra* note 92, at 955–56 ("[While] the AMP does incorporate an experimentalist approach to resource management that attempts to monitor, evaluate, and adjust regulatory decisions during implementation, Congress, the Secretary, and the AMWG have not developed a similar feedback mechanism at a more macroscopic, programmatic level: to monitor, evaluate, and adjust the regulatory program in response to information gleaned as the AMP has aged over the past decade . . . . The AMP does not systematically monitor and evaluate whether the regulatory program's processes are being effective at achieving program goals. Straightforward but valuable information about the activities of the AMWG are simply not compiled. How often are AMWG recommendations based on a consensus? On a super-majority vote? How often are AMWG recommendations adopted by the Secretary? This and more information would undoubtedly be useful in assessing the effectiveness of the AMP's regulatory framework in achieving meaningful participation and resource management, and even perhaps reinforcing the accountability of the regulatory actors to Congress and the public.").

262. DOWNSTREAM, *supra* note 74, at 59–61.

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ability to assess and improve the AMP as the program matures.

CONCLUSION

Despite the best of intentions and the availability of considerable resources, the Glen Canyon Dam AMP has failed to bring stakeholders together to jointly increase their understanding of the Colorado River and make useful, broadly supported resource management recommendations. The management of the Dam has not reflected an informed consensus on either scientific or non-technical questions, and has left the humpback chub and other species and habitats at risk. The AMP has not evolved into an increasingly competent joint management body; rather, it still plays an uncertain advisory role to the Secretary of the Interior. Fundamentally, the failure of the AMP stems from questionable decisions by Congress and the Secretary of Interior regarding the AMP's design and operation.

A better CAM process requires government authorities to adopt clear enabling authority that establishes the goals of the program and makes stakeholders responsible for progressing toward these objectives. Had Congress and the DOI focused on developing a successful dispute resolution process, the AMP would have been better positioned to:

1) Identify the various interest groups that should be involved and their interests;[263]
2) Ensure that the relevant federal and state agencies understand and respect the interests of the non-governmental stakeholders involved;
3) Understand and clarify the priorities that ought to be attached to the competing national interests at stake in the management of the Colorado River, the Dam, and the surrounding area and determine how to reconcile these interests; and
4) Encourage joint fact finding and, based on the findings of its scientific advisory groups, agree on a set of adaptive management experiments that would help the AMP gain better information, manage uncertainty, and learn over time how to improve at resource management.

The Glen Canyon Dam AMP shows that a stated commitment to collaboration and adaptive management is insufficient. Effective joint management of natural resources can only be realized

263. Susskind & Thomas-Larmer, *supra* note 145.

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through careful attention to the design and implementation of appropriate problem-solving and adaptive-management procedures. It also requires the development of an appropriate organizational infrastructure that promotes stakeholder dialogue and agency learning. Though the experimental Glen Canyon Dam AMP is far from a success of collaborative adaptive management, the lessons from its shortcomings can foster more effective CAM in the future by Congress, federal agencies, and local and state authorities. Should legislators and regulators learn to build more robust collaborative and adaptive institutions from the Glen Canyon Dam experience, the legacy of the Glen Canyon Dam AMP, which has been underwhelming thus far, might be well worth the wait.

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