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### Glen Canyon Dam: Flood Flows and Adaptive Management in the Lower Colorado River Basin: Response

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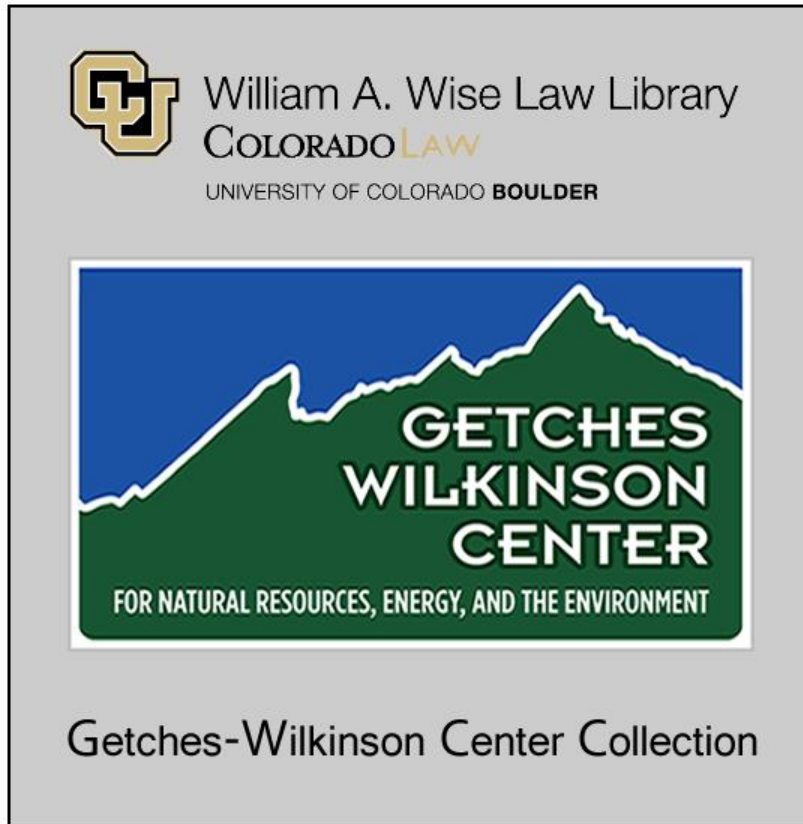
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**Glen Canyon Dam: Flood Flows and Adaptive  
Management in the  
Lower Colorado River Basin  
Response**

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**Dams: Water and Power in the New West**

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**Natural Resources Law Center  
University of Colorado  
School of Law  
Boulder, Colorado**

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# **Glen Canyon Dam: Flood Flows and Adaptive Management in the Lower Colorado River Basin**

## **Response**

by Joe Hunter

### **I. Background**

As the previous presentation has clearly shown, we have learned a great deal in recent years about the impact of various flows, both natural and "managed", on different resources below Glen Canyon Dam. Fifteen years and many millions of dollars after the initiation of Phase I of the Glen Canyon Environmental Studies (GCES), we have accumulated an impressive amount of knowledge regarding sediment, biological, recreational, hydropower and other resources that are, in varying degrees, affected by the operation of Glen Canyon Dam.

Over time, that understanding of impacts has changed. Some hypotheses have been confirmed, some dispelled, and some remain unresolved. After all, while, to many of us, it may seem that we have been studying and observing the impacts of Glen Canyon Dam for a long time, what we really have is a mere snapshot of the long term effects of building and operating the dam.

Nevertheless, in 1989, the Secretary of the Interior, faced with mounting public, political and potential legislative pressure, determined that the issue of moderating flows from Glen Canyon Dam needed to be resolved. The mechanism he chose to find such a resolution was the preparation of an Environmental Impact Statement (EIS) -- with all interested parties to be involved. Upon initiation of the EIS process, it quickly became obvious that such a monumental undertaking would require a great deal of time: More time than many were willing to wait for modifications to the dam's operation.

Thus, beginning with research flows in 1990 and 1991 and interim flows imposed in the latter part of 1991, dam operations were in fact moderated significantly well before the completion of the EIS that was intended to determine the most prudent flows. Additionally, and quite significantly, Congress decided to add suspenders to the belt that was already in place by enacting the Grand Canyon Protection Act in 1992 -- directing the Secretary of the Interior to do that which he was already doing, prepare an EIS on the operation of the dam, and to operate the dam "in accordance" with criteria based upon the "findings, conclusions and recommendations" (PL102-575) made in that EIS, whatever they might be.

Sharing others' impatience, Congress also included in the Grand Canyon Protection Act a requirement that the Secretary continue to operate Glen Canyon Dam according to the interim operating criteria that had been put in place in 1991 until the EIS was completed and a Record of Decision issued.

In short, from 1990 until October of 1996, when Secretary Babbitt signed the Glen Canyon Dam Record of Decision, dam operations were significantly altered, at considerable cost to, among others, federal power contractors, in an effort to protect downstream natural and recreational resources -- even though the process by which to determine the best flow regime had not been completed.

Judging these scenarios or second-guessing the decision-making processes that have governed the operation of what is perhaps the nation's most notorious dam is an interesting, but largely academic endeavor at this point in time. Congress, the Department of the Interior and countless interest groups -- including power contractors, have expended tremendous resources in the process that took place, and today the dam is being operated in a manner that represents our best understanding of how it should be operated in order to protect downstream resources while retaining some semblance of its original economic purposes.

## II. Adaptive Management

A. From an academic or public policy standpoint, however, the past several years of agony regarding the operation of Glen Canyon Dam have provided at least one compelling lesson: The value and merits of adaptive management.

1. While the outcome may be the desired result, it can be argued that the early stages of decision-making with regard to Glen Canyon Dam were driven largely by emotion, politics and impatience. Concerns about the impacts of traditional operations on various resources may have been legitimate; however, the politics of "saving the Grand Canyon" were at least as significant in the actions that were taken as was legitimate, deliberate science.

B. Adaptive management, wherein plans are made, actions taken, results monitored and evaluated, and changes prudently and carefully made, is a model by which political impatience and management by emotion can be avoided.

1. Under successful adaptive management, decision makers are required to be patient in allowing monitoring and evaluation to occur, and to let science and actual results govern future decisions.

2. If allowed to work, adaptive management creates a buffer against whims and short term gratification of the political process. Unknowingly, the participants in the preparation of the Glen Canyon EIS demonstrated this characteristic of adaptive management in the latter years of the EIS process.

a. Once a structured EIS process was in place and underway, various attempts at political "end runs" were unsuccessful.

b. The process and its participants allowed science and legitimate economic and policy issues to lead to a conclusion. Preordination of the outcome was virtually impossible.

C. While the flow regimes and operating criteria adopted by the Secretary in the Record of Decision are important, the true significance and greatest benefit of the EIS process was the conclusion that an adaptive management program, based upon long term monitoring and research, was necessary.

1. This recommendation in the EIS recognized and institutionalized the reality that we don't know all that we need to know and that science and greater understanding over time may lead to different choices regarding the operation of Glen Canyon Dam.

2. By establishing a forum (adaptive management) in which to consider and debate future management decisions, a recurrence of past emotional and political decision making can hopefully be avoided.

3. As the turbulent history of Glen Canyon Dam operations demonstrates, and as has been learned in other environmental controversies across the nation, a structure must be in place through which scientists, economists, policy makers and yes, attorneys are governed by certain rules of legitimacy in decision making. Adaptive management, if allowed to work, provides that structure for Glen Canyon Dam.



### III. Flood Flows

A. The process by which last spring's experimental flood was implemented, and recent discussions of additional flood flows have provided both positive and negative validations of the need for deliberate adaptive management.

1. After spending seven years and close to a hundred million dollars preparing an EIS which examined a variety of potential flows in excruciating detail, it was decided to create a high flow which had not been anticipated in those studies -- with virtually no National Environmental Policy Act (NEPA) documentation nor any significant regard for the Endangered Species Act (ESA).

A. The initial proposal to conduct the flood flow experiment a year earlier flew in the face of the NEPA discipline and the de facto adaptive management that had evolved through the EIS process. Thus, it was met with successful opposition from the Basin States and contractors for Glen Canyon Dam hydropower.

B. Despite what may have been legitimate scientific expectation and curiosity, the idea of intentionally subjecting Grand and Glen Canyon resources to such a dramatic impact was unacceptable to traditional resource users who had become accustomed to having every nuance of fluctuating flows debated and studied ad nauseum.

2. Thus, the system worked -- and the flood was effectively postponed for a year. The cries of "foul" were heard, and the Department of the Interior was forced to step back and allow last year's experimental flood to be a product of a more deliberate and defensible process.

- a. NEPA documentation was prepared, albeit hastily, and ESA concerns about the flood were at least technically addressed.
  - b. Questions of legal authority were resolved with impacted parties through an iterative process that avoided litigation and political interference.
  - c. In short, the flood flow experiment, when first attempted, represented the “old” method of unstructured decision making, and as such, threatened the integrity of the EIS process and the informal adaptive management it had come to be. When forced back into that process, the experiment was carried out successfully.
3. In the category of “lessons not learned”, flood flow euphoria has again, in recent weeks, threatened the adaptive management approach to Glen Canyon Dam operations.
- a. When it became apparent that high runoff conditions would require sustained high flows, within the existing operating criteria, from the dam, the reaction was a flurry of proposals to open the spillways or otherwise take extraordinary actions to “protect” the results of last year’s flood experiment. The scientific community and the Department of the Interior came perilously close to making flow decisions that were not contemplated by the “process” and which could have had dramatic impacts not only on natural resources, but on the physical integrity of the dam itself.
  - b. Again, participants in the adaptive management process found it necessary to raise questions of legality and scientific basis, as well as procedure.

#### **IV. Conclusions**

- A. In the case of Glen Canyon Dam operations, it has been painfully and expensively learned that an effective, disciplined adaptive management process is crucial to both long term and short term decision making.**

**Whether intentionally or not, the ongoing contemplation of future flood flows and how they may fit into existing processes for river management provides both a compelling illustration of need and a significant challenge for adaptive management.**

#### **Suggested References**

**Public Law 102-575, Reclamation Projects Authorization and Adjustment Act of 1992.**

**Bureau of Reclamation, 1995, Operation of Glen Canyon Dam Final Environmental Impact Statement.**

**Bureau of Reclamation, 1990, Glen Canyon Dam EIS Scoping Report**

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