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Federal Regulatory Interests in Water

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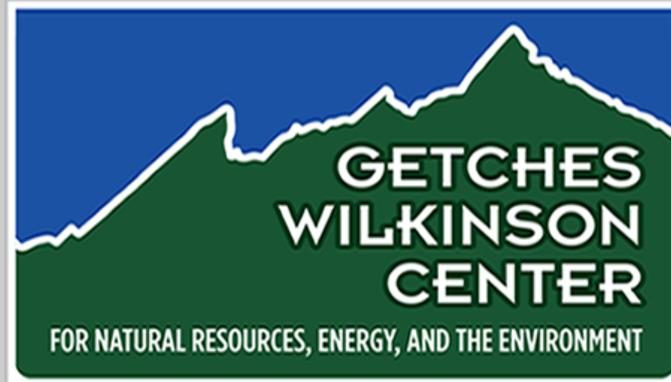
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Federal Regulatory Interests in Water

Patricia Sanderson Port

U.S. Department of the Interior
Office of the Secretary
Office of Environmental Affairs
San Francisco, California

Innovation In Western Water Law and Management

University of Colorado at Boulder
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8

3

3

Federal Regulatory Interests in Water

I. Introduction

A. Summary

Federal regulatory interest in water confines itself to three simple areas: **Who benefits, Who pays, and Who decides.** This discussion will largely confine itself to portions of one Western interstate river, the Lower Colorado, from Glen Canyon Dam to Lake Mead. Our focus will be primarily on the roles of three Federal resource managers and regulators: the Department of the Interior, the Department of Energy, and the Environmental Protection Agency.

Since the waters of the Colorado River were divided up between the states in 1922 the management of the river has focused on meeting the legally defined water delivery requirements and generating electricity. The uses and abuses of the Colorado River took a severe twist in 1982, when the Secretary of the Interior directed that the Glen Canyon Environmental Studies be initiated to determine scientifically what impact the operations of Glen Canyon Dam are having on the natural resources downstream, notably on the Grand Canyon. These studies led to an Environmental Impact Statement, currently under preparation, and to potential intermediate changes in flows from the dam, known as "interim flows".

Herein lies a tale - a work in progress.

B. General References

Colorado River Ecology and Dam Management, Proceedings of a Symposium May 24-25, 1990, Santa Fe, New Mexico. Committee to Review the Glen Canyon Environmental Studies Water Science and Technology Board Commission on Geosciences, Environment, and Resources National Academy Press, Washington, D.C. May, 1991.

Glen Canyon Environmental Studies Final Report, January 1988
United States Department of the Interior

Glen Canyon Environmental Studies Executive Review Committee Final Report, May 1988 United States Department of the Interior, Western Area Power Administration, Fish and Wildlife Service, National Park Service, Bureau of Reclamation

River and Dam Management A Review of the Bureau of Reclamation's Glen Canyon Environmental Studies, Committee to Review the Glen Canyon Environmental Studies Water and Science Technology Board Commission on Physical Sciences, Mathematics, and Resources National Research Council National Academy Press, Washington, D.C. 1987

II. The Colorado River

1. Surface Water

a. The Colorado River winds more than 1400 miles through the States of Colorado, Utah, New Mexico, Wyoming, Arizona, Nevada, and California on its way to Mexico and the Sea of Cortez.

b. The river provides an essential source of water for the states it drains. Irrigation, municipal and industrial, flood control, hydroelectric, recreational, fish, wildlife, cultural and archeologic uses conflict and compete for the limited water.

c. In 1922 the river was allocated (i.e., divided) between the upper and lower basins through the Colorado River Compact. Hoover Dam was authorized in 1928 (45 stat. 1057) in the Boulder Canyon Project Act. Dedicated in 1935, it created Lake Mead.

d. Glen Canyon Dam was one of four major water storage projects for river regulation and power production, in addition to 11 participating projects for irrigation and related uses authorized in 1956 by the Colorado River Storage Act (70 stat. 105). The purpose of the Colorado River Storage Project (CRSP) was to develop the water resources of the upper basin. The priority purposes of Glen Canyon Dam are to 1) Regulate the flow of the Colorado River; 2) Store water for beneficial consumptive use; 3) Provide for the reclamation of arid and semiarid land; 4) Control floods, and 5) Generate hydroelectric power.

e. The Glen Canyon Dam, which began storing water behind it in 1963, is the key regulatory feature on the Colorado River. Lake Powell filled for the first time in 1980, 17 years after storage began. Impacts of the dam are traceable from Lake Powell to Lake Mead.

f. The Lower Colorado River controlled by Glen Canyon Dam, drains Arizona, Nevada and California. The reach of river covered in the Glen Canyon Environmental Studies includes the first 16 miles through Glen Canyon and the next 277 miles through the Grand Canyon, entering Lake Mead.

III. Law of the River

a. The use of the river has been defined over the years by a number of Congressional acts, court decisions, treaties, and compacts known collectively as the "Law of the River".

b. The Law of the River is a study in the law of mass allocation of surface water between the upper and lower basins, the U.S., Mexico, and Native American groups. The operating criteria are not influenced by water quality and environmental legislation. The criteria provide managerial guidance to assure that Lake Powell is filled by July 1 of each year, however the Law of the River has little to do with day to day operations of Glen Canyon Dam.

c. A brief review of the law of mass allocation appears on pp. 20-25 of River and Dam Management A Review of the Bureau of Reclamation's Glen Canyon Environmental Studies, prepared by the

Committee to Review the Glen Canyon Environmental Studies, Water and Science Technology Board, Commission on Physical Sciences, Mathematics, and Resources, National Research Council, National Academy Press, Washington, D. C. 1987. These pages are reprinted as Appendix III.

d. The 1963-64 Supreme Court decision Arizona vs California had the effect of making the Secretary of the Interior the Water Master of the Colorado River.

e. The 1968 Colorado River Basin Act (82 stat. 885) led to development of long-term operating criteria for the Colorado River, including a five year operating review which is still conducted without environmental considerations.

IV. How the Glen Canyon Dam Operates

a. The Bureau of Reclamation operates and manages the dam on behalf of the Secretary of the Interior, in consultation with the seven basin states to annually release a minimum of 8.23 maf from Lake Powell and to equalize storage between Lakes Powell and Mead. Monthly releases are scheduled to: 1) Meet delivery requirements, and 2) Avoid floods. Daily releases are scheduled for meet firm power contracts to provide the ability to maximize power revenues to repay the costs of the dam and other reclamation projects in the upper basin. The dam operates within a wide range of maxima and minima flows, resulting in widely fluctuating flows which follow peak demands for electricity.

b. The Western Area Power Administration (WAPA), an agency of the Department of Energy created in 1977, manages the marketing

and distribution of the electrical power produced by running Colorado River water through the Glen Canyon Dam, and other dams on the river.

c. When asked by Fish and Wildlife Service staff at a technical meeting in Phoenix in April of 1991 who actually controls the flows of the river from Glen Canyon Dam, Reclamation staff responded that annual release of 8.23 maf was predicted by BR, allocated monthly by the Bureau, then turned over to WAPA to be released through the generators to meet its electrical generation requirements.

d. The followup question inquired when does the Bureau ask the Fish and Wildlife Service and the Park Service and the Arizona Game and Fish Department (AZG&F) what their resources need from release of that water? The response was that the Bureau has recently begun asking AZG&F, but that neither FWS nor NPS staff have approached the Bureau to discuss impacts downstream of Glen Canyon Dam, as these staff have done downstream of other Colorado River dams.

V. Initiation of Glen Canyon Environmental Studies

a. When it became technically apparent in 1977 that adding additional generators at Glen Canyon Dam could lead to an increase in the fluctuations of water levels downstream through the Grand Canyon, tour operators, boatmen, and the general public became alarmed about the impacts to river trips, trout, endangered species, recreation, beaches, and other natural resources.

3

b. Prior to this, in 1974, a coalition of groups brought suit against the Director of the National Park Service (Grand Canyon Dorries, Inc., et al. v. Ronald H. Walker, 500 F.2d 588 1974) to try to block fluctuations of the river as being hazardous to recreation. The Court did not order the Department to comply with NEPA regarding fluctuating flows, although it found that NEPA may apply, but that no decision was before it regarding any decision BR or DOI had made on the matter.

c. In 1975, the generators at Glen Canyon Dam were found to be nearing the end of their useful machine lives and that rewinding would be necessary. In addition a proposal was put forth to add generators to Glen Canyon Dam. It was begun in 1976. BR decided to uprate the eight generators and prepared an Environmental Assessment, the first NEPA compliance on any aspect of Glen Canyon Dam. The resulting document led to a Finding of No Significant Impact (FONSI). It was completed in 1982. Uprating began in 1983 and was completed in 1987.

d. To address the environmental concerns which were voiced during the NEPA process, BR and DOI staff took up the question of whether NEPA should be complied with regarding the operations of the dam. Lacking adequate technical data to make this decision, the Glen Canyon Environmental Studies (GCES) were initiated. The Studies began in December of 1982 to address two questions: 1) Are the current operations of the dam, through control of the flows in the Colorado river, adversely affecting the existing

3

river-related environmental and recreational resources of Glen Canyon and Grand Canyon? and 2) Are there ways to operate the dam, consistent with Colorado River Storage Project (CRSP) water delivery requirements, that would protect or enhance the environmental and recreational resources?

e. With completion of the generator uprate process, the powerplant can now release a maximum of 32,200 cfs at full lake elevation of 3,700 ft. An operational cap of 31,500 cfs has been placed on the releases until completion of GCES.

VI. Completion of Phase I of the GCES

a. Between its inception the end of 1982 and when its Final Report was published in 1987, the first phase of GCES was a coordinated effort among several Federal, state and private organizations. Within the Department of the Interior, the NPS, FWS, and USGS all contributed technically to the studies. The AZG&F, WAPA, academic institutions, and private consultants likewise contributed to the interim and final reports. In addition, an Executive Review Committee, comprised of federal managers, functioned to review, criticize and occasionally cheer on. The National Academy of Sciences was asked to form a Review Committee in 1986.

b. The Department requested the Water Science and Technology Board (WSTB) of the National Research Council (NRC) to conduct a review of the GCES of the Lower Colorado River for the Bureau of Reclamation and to provide advice on alternative operation schemes for the Glen Canyon Dam.

c. The GCES Committee was directed to 1) Review and advise on the GCES in progress, and give a general assessment of how well these activities were achieving their intended goals; 2) Advise on interpretation of information for impact analysis from the technical data developed; 3) Provide advice on the process of identifying the environmental elements for ranking operational alternatives for Glen Canyon Dam; and 4) Extrapolate from this case study recommendations to others who may pursue similar environmental studies in the future.

d. The GCES Final Report and the NAS report contained findings that stimulated the Department of the Interior to initiate Phase II. Some of these findings were: 1) Some aspects of the operation of Glen Canyon Dam have substantial adverse effects on downstream environmental and recreational resources; 2) Flood releases cause damage to beaches and terrestrial resources; 3) Under current operations, flood releases will occur in about one of every four years; 4) Fluctuating releases primarily affect recreation and aquatic resources; 5) Modified operations could protect or enhance most resources; and 6) Our understanding of the relationships between dam operations and downstream resources is not complete.

VII. Phase II of Glen Canyon Environmental Studies

a. In May of 1988, the Executive Review Committee issued its final report. This group, chaired by BR, was composed of staff from NPS, FWS, WAPA, and the Office of the Secretary, Regional Environmental Office. The ERC spent 12 months evaluating

the results of the GCES program. Its recommendations concluded that "there are several areas of the GCES study that need to be refined and completed before a recommendation on the operation of Glen Canyon Dam can be made."

b. The two specific areas highlighted by the ERC were: 1) The effects of both low and fluctuating flows on the Grand Canyon ecosystem, especially on endangered fish species, the trout fishery and beach aggradation and degradation were not well documented, and 2) Detailed economic analysis of operational options. The Secretary incorporated these concerns in a memorandum dated June 16, 1988 to FWS, NPS and BR, which initiated Phase II of the Glen Canyon Environmental Studies.

VIII. NEPA Compliance - Department of the Interior

a. On July 27, 1989, the Secretary of the Interior publicly announced preparation of an EIS to analyze the existing operating criteria of Glen Canyon Dam and to develop a set of environmental criteria that would be used by the Department during the development of the Annual Operating Plan for the operation of Glen Canyon Dam. This has since been amplified and modified in two subsequent Federal Register notices.

b. The cooperating agencies on this EIS began with FWS, NPS, WAPA, Regional Environmental Office (DOI), and BIA. Eventually the number grew to include Arizona Game and Fish Department, U.S. Geological Survey, the Navajo Nation, the Hualapai, Hopi, and Havasupai tribes. At this writing, three additional

tribes are also requesting or contemplating cooperator status (Kaibab Paiute, San Juan Southern Paiute and Zuni).

IX. NEPA Compliance - Western Area Power Administration

a. WAPA was formed as part of the Department of Energy Organization Act in August, 1977. WAPA is the power marketing organization responsible for marketing Federal electric power in 15 Western States. WAPA took over the power marketing duties of BR via an administrative determination in 1980. (Reclamation retained the responsibility to regulate and manage the reservoirs and dams of the Colorado River while WAPA took over the marketing, contract development and transmittal of power.)

b. WAPA took several administrative actions on the original power contracts to clarify contract length and identify geographical distribution of power and energy. In December, 1985, WAPA issued an Environmental Assessment (EA) on the Revised Proposed General Power Marketing Criteria and Allocation Criteria for the Salt Lake City Area which covers the hydroelectricity produced at Glen Canyon Dam.

c. WAPA was challenged on the proposed post 1989 power marketing criteria by several power entities. The lead claimant, Utah Power & Light (UP&L) challenged priority of the contracts in court and eventually negotiated a settlement with WAPA in 1988. However, four environmental friends of the court then entered the process to sue on the same issues. After considerable deliberation, Judge Green of the U.S. District Court in Salt Lake City

issued a ruling on September 29, 1989 which directed WAPA to initiate an EIS on the post 1989 power marketing criteria.

d. On April 4, 1990, WAPA announced it would prepare an EIS on its post 1989 marketing criteria for the ten powerplants in the CRSP, including Glen Canyon Dam. Its EIS would be separate from but coordinated with the Glen Canyon Dam EIS.

e. The scope of WAPA's EIS expanded after its scoping meetings produced over 22,000 comments from the public. It was renamed the SLCA/IP Electric Power Marketing EIS (Salt Lake City Area/Integrated Projects) and its scope was broadened from the original scope of assessing the Post-1989 Marketing and Allocation Criteria for firm electric power sales to include other power marketing programs and other power related programs. WAPA's Electric Power Marketing EIS Update for the Salt Lake City Area Integrated Projects (SLCA/IP) newsletter of April, 1991, notes that it "...will assess the impacts of each aspect of its SLCA/IP electric power marketing programs and of the resultant dam operations for hydropower generation (i.e., powerplant operations) in particular those impacts on the affected human environment and the natural environment downstream from all applicable SLCA/IP hydropower generation facilities."

f. WAPA has at this writing tentatively selected three cooperators: BR, FWS and NPS. With expanded scope, others are likely to be included, such as AZG&F, BIA, selected tribes. A group of coordinating agencies may also be established, including EPA, Regional Environmental Office, DOI, and others. Since ten

dams are covered, the geographic scope is considerably broader and the list of cooperators and coordinators is likely to expand exponentially.

X. Relationship Between BR and WAPA EISs

a. WAPA and BR are lead agencies on EISs and cooperators on each other's EIS. As GCES proceeds, changes in dam operations are being made, both for research flows, and at the completion of research flows, in interim flows, to operate the dam until the Department of the Interior's EIS is completed and a Record of Decision is issued.

b. Reclamation determines annual flow release volume from Glen Canyon Dam, defines minimum and maximum flow rates, and maintains the powerplant.

c. WAPA utilizes the water resource provided at Glen Canyon Dam and defines the generation of power within the general boundaries set by Reclamation and by the contracts. WAPA controls the electrical output of the generators and consequently the actual flow release at Glen Canyon Dam. The generator operation is driven by contract requirements and the price of power.

d. The GCES results, which form the technical and scientific data in the Department's EIS, have found that the high ramping rates and low flows associated with WAPA's operation of the dam are causing significant environmental harm downstream, and the dam itself has also caused impacts. The dam's impacts include silt-free water being released downstream, lower temperature water, and a modification of the water quality of the Colorado

River. The initial clearing of water and increased nutrients allowed for a trout fishery to be established.

e. Scientifically based flows have been identified that would reduce the ramping rates and increase minimum flows which would stabilize the damaged environment and allow ecosystem recovery. These flows would reduce the capacity and timing of the power Glen Canyon Dam could generate to meet WAPA's contracts.

f. The marketing criteria WAPA implements is dependent on the amount of power (capacity and energy) it has to sell. Less capacity and modified energy production from Glen Canyon Dam would result in WAPA's perhaps having to either adjust its contracts, and definitely having to renew contracts under different terms, or WAPA would have to purchase power from other sources to meet its contracts.

g. The timing of these two EISs is problematic. The Glen Canyon Dam EIS is proving to be considerably more complex than first expected, and the scope has expanded defacto from the original boundaries of the dam to Lake Mead. The scope has moved to include looking at impacts to both Lake Mead and Lake Powell. Its timeframe has likewise extended.

h. The SLCA/IP Electric Power Marketing EIS has suffered setbacks in timely completion, as changes to operations of the dam are made and the public has shown considerably more interest in it than was anticipated. The schedule released in April, 1991 suggests a Draft EIS will be released in April 1992 and a Record of Decision (ROD) in May 1993.

XI. National Academy of Sciences Role in Glen Canyon Environmental Studies

a. Besides providing comments in its publication River and Dam Management A Review of the Bureau of Reclamation's Glen Canyon Studies in 1987, the Committee also held a Symposium on the Colorado River Ecology and Dam Management in May, 1990 in Santa Fe, NM. At this writing the proceedings are being published.

b. One of the recommendations of the original committee, which finished its work and was succeeded by a second committee to continue oversight of the process, was that a Senior Scientist be hired by the Department to guide Phase II of the GCES. This was partially accomplished, as Dr. Duncan Patten was recommended by the Executive Review Committee and hired on a part time Inter-governmental Personnel Agreement (IPA), through the Bureau of Reclamation.

XII. Federal Regulatory Interests - Department of the Interior

a. The Bureau of Reclamation, on behalf of the Secretary of the Interior, regulates the waters of the Colorado River. While there are many competing demands for the water resource, power generation has assumed a predominant role. Sale of electricity, at subsidized rates, pays for the facilities the taxpayers footed the bills for, and natural resources (beaches, endangered species, recreation safety, cultural artifacts, etc.) are paying a high price.

b. The National Park Service, which manages the resources in the Glen Canyon National Recreation Area and the Grand Canyon National Park, has had little say historically in how the waters

of the Colorado River are used to benefit the recreational, cultural, habitat and other resources they exercise trust responsibility for on behalf of the Secretary of the Interior. NPS serves as a cooperator on both EISs, sits on the Glen Canyon Dam EIS writing team and was a member of the Executive Review Committee. Staff also participate in the GCES.

c. The Fish and Wildlife Service, which oversees the recovery of endangered Humpback Chub has engaged in preparing a Section 7 Biological Opinion on the operations of the dam for the past several years. Since all agencies of the government have a positive responsibility not to further endanger these species, FWS's concerns have helped fuel the Glen Canyon Environmental Studies. FWS serves as a cooperator on both EISs, sits on the Glen Canyon Dam EIS writing team, and was a member of the Executive Review Committee. Staff also participate in the GCES. Fish, wildlife and their habitat are paying. Trout may be benefitting, but the jury is still out.

d. The Bureau of Indian Affairs has been a cooperating agency on the Glen Canyon Dam EIS. They may also become a cooperating or coordinating agency on WAPA's EIS. Tribes who want to participate contact BIA for technical assistance, and are usually referred to the GCES. Since all agencies of the government have a positive responsibility to uphold the Indian trust, BIA's concerns have helped fuel GCES' involvement of tribal interests.

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e. Indian tribes, six at last count, are participating in the GCES, the EIS writing team, and as cooperating agencies, to one degree or another. Their cultural and archeological resources are paying a price as water ramps up and down exposing artifacts that were innundated.

f. U.S. Geological Survey has no management responsibility and its role has been to participate in the GCES. It has recently named staff to sit on the EIS writing team. GS' contribution to the GCES is oriented toward long-term monitoring.

g. Office of Environmental Affairs, Regional Environmental Office has participated in a coordinating role with the GCES, NAS Committees, EIS, Executive Review Committee, Cooperating Agencies Group, and Committee of Five. The Committee of Five is an ad hoc group comprised of the Senior Scientist, the Manager of the GCES, the Bureau's Regional Environmental Officer, BR's Manager of Environmental Services, chaired by the Colorado River Studies Manager. This group is charged with determining the actual interim flows to be recommended to the Secretary of the Interior for implementation in September 1991. The Office of the Solicitor and the Department's Regional Environmental Officer also participate in these deliberations.

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h. The Office of the Solicitor has been brought into the deliberations of the Cooperating Agencies and Committee of Five as legal issues arise and advice is needed.

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XIII. Federal Regulatory Interests - Western Area Power Administration

a. WAPA began its EIS in April, 1990, expanding its scope in April, 1991. Its marketing of power depends upon how much energy and capacity are available, from which sources, and when. How WAPA does its job hinges on how the water is let through the turbines of the dams. WAPA benefits as a power broker to its clients Colorado River Energy Distributors Association (CREDA) and others by contracting for and delivering below cost power. WAPA and its clients benefit from generating maximum power through Glen Canyon Dam.

b. WAPA is a cooperating agency, a member of the EIS writing team, and a participant in the GCES, and was a member of the Executive Review Committee. Any change in the status quo to lessen the generation energy and capacity of Glen Canyon Dam is an economic cost to WAPA and its clients. Already buying power to meet its contracts about 50% of the time now, less power from Glen Canyon Dam will require more and costlier purchases to meet existing contracts.

c. Judge Green stipulated that WAPA should reopen its contracts depending on the outcome of the EIS. WAPA is at this writing reluctant to ask the Judge to open this window of opportunity to renegotiate its contracts based upon interim flows, which the Secretary of the Interior, encouraged by proposed legislation, committed to implement by August, 1991, when the research flows conducted as part of the GCES, were completed.

d. Interim flows would be in effect from August, 1991 to whenever the Glen Canyon Dam EIS and Record of Decision are finalized. Any such flows which result in less generation of power would likely have beneficial impacts to downstream resources, but would reduce WAPA's ability to generate power, reducing its ability to fulfill its contracts, and forcing it to buy power elsewhere. The change in the present balance of economic cost and environmental protection has not as of this writing been struck. Additional NEPA compliance for these proposed interim flows has not yet been decided upon.

XIV. Federal Regulatory Interests - Environmental Protection Agency

a. The EPA has two regions interested in the impacts to the environment of the flows through Glen Canyon Dam. Region VIII, headquartered in Denver, is interested in impacts to Lake Powell, and the precedent being set for NEPA compliance on other dams up and down the Colorado River.

b. Region IX, headquartered in San Francisco, is concerned with impacts occurring downstream, which is geographically in Region IX.

c. EPA has prepared Scoping comments on both EISs and has arranged briefings by BR, WAPA, and some of the cooperating agencies. EPA staff attend cooperating agency meetings, public meetings, etc.

XV. Federal Regulatory Interests - Other

a. The Department of Justice has expressed interest in these EISs opining that the Glen Canyon Dam EIS will be the

occasion for "landmark environmental litigation". As the Federal agency which will defend the Department of the Interior in court when the all but inevitable lawsuits come, DOJ staff are attending meetings, on mailing lists, and trying to keep up.

b. U.S. Army Corps of Engineers works with EPA in granting Section 404 permits. If a dam is constructed (per several alternatives under consideration at this writing in the EIS) or a sand slurry line installed, the Corps would be approached for a Section 404 permit.

c. Congress has also expressed an interest in these issues. Legislation introduced by Cong. George Miller (D-Martinez, CA) as well as bills introduced by Senators Bill Bradley, (D-NY), Dennis DeConcini (D-AZ), John McCain (R-AZ), and Cong. John Rhodes (R-AZ), stimulated the Secretary of the Interior to assert his jurisdiction over flows from Glen Canyon Dam and to commit to interim flows when the research flows were completed. Hearings held by Mr. Miller also induced activity leading to the progress of the studies and the EIS.

XVI. Other Interested Parties

a. The Law of the River mandates coordination between Federal agencies and the seven basin states, and must take into account the treaty requirements with Mexico. Arizona has had the largest role in participating in the GCES and the EIS process of the Bureau. They do not yet participate in WAPA's EIS, nor were they included in the Executive Review Committee nor the NAS Committee liaison. Indeed, it took a visit from General Counsel

of the President's Council on Environmental Quality (CEQ) to persuade Bureau of Reclamation to include Arizona Department of Game and Fish (AZG&F) as cooperators. Despite repeated verbal and written requests, BR was unwilling to include them, notwithstanding they qualified under CEQ's guidelines. Dinah Bear, the General Counsel, expressed to the Bureau and cooperators that she had never in her entire career with CEQ heard of a lead agency turning down a willing cooperator. That AZG&F has specific management responsibility for a blue ribbon trout fishery within the study area downstream of the dam, and had been cooperating in the GCES gave strength to their demands, finally acceded to, that they are legitimate cooperators.

b. Grand Canyon Trust, Sierra Club, Grand Canyon Dorries, Inc., Friends of the River, and several other environmental groups have expressed their concerns to the Congress, the bureaus of the Department of the Interior, EPA, WAPA, and the courts. Without their input, the regulatory interests of these agencies directly running the river would not have changed in the direction favored by those with interests in the resources of the river. So far, the changes have been very temporary research flows and much study, funded by the revenues generated by Glen Canyon Dam. The saga of interim flows is being written in real time.

XVII. Summary: Who Benefits

a. From Bureau of Reclamation's standpoint, the benefits of regulating Glen Canyon Dam lie in complying with the Law of the River, supplying water to various users, running a "cash register"

dam to repay costs, and most particularly working with WAPA to produce inexpensive hydroelectric power, a source of considerable political clout.

b. From WAPA's perspective, they have created a role of Power Master not unlike BR's role as Water Master. They are power brokers for the Western States and have created powerful allies in the utilities and other clients to whom they provide cheap, plentiful power. The status quo, or even more power generation, benefits WAPA and their clients.

c. From the utilities' perspective, low rates for hydroelectric power are a definite benefit. They do not think of it as welfare, or governmental subsidies, just good, cheap, reliable power.

d. From the ratepayers' perspectives, the power doesn't seem cheap. When compared to rates in other parts of the country, it clearly is, but, while seen as a benefit, it is only appreciated when rates begin to climb.

e. From taxpayers' perspectives, there is benefit from Glen Canyon paying back the Treasury for the money they authorized 35 years ago for the dams and other waterworks. Were the power being sold at rates similar to other, nonsubsidized rates, more money would be coming into the Treasury faster, and the benefit would be greater.

f. From AZG&F's perspective, the benefit is cold, clear water that the dam provides that allows them to manage the trout fishery they created.

XVIII. Summary: Who Pays

a. From National Park Service's perspective, the natural and cultural resources they manage are being and have been damaged by the way the water runs through the dam to generate power. GCES findings have shown that beaches are degrading, ecosystems being harmed, archeological resources are being lost, and recreation safety is endangered by large ramping rates used to create hydroelectricity.

b. From Fish and Wildlife Service's perspective, certain native and endangered species have been extirpated and the remaining endangered species are jeopardized by the operations of the dam. Habitat is threatened by fluctuating waters, fish are stranded, and other endangered species, such as golden eagles and peregrine falcons, are disrupted when riparian vegetation is destroyed.

c. From AZG&F's perspective, water ramping strands trout and causes problems managing the fishery.

d. From recreationists' perspectives, both professional and amateur, beaches and camp sites are degraded and boats are stranded and safety is impaired by fluctuating flows. Fishers report water going up and coming down rapidly, interfering with their fishing safety and their access by boat.

e. From Tribes' points of view, cultural and archeological resources are being damaged and destroyed by fluctuating water used to generate hydroelectricity.

f. From environmentalists' points of view, the balance of cost vs benefit is drawn too heavily in the power users' favor. They see environmental damages to irreplaceable resources and have sued and lobbied to force interim flows to stabilize loss of resources, and for the GCES and EIS results to show what flows need to be put in place to reverse the damage, notwithstanding a reduction in power generation.

g. From the perspective of Congressional members who have introduced legislation, the balance of cost vs benefit needs to be shifted to favor the resources of the Grand Canyon and Glen Canyon National Park and National Recreation Area. The resulting cost to power generators and users will reduce their subsidies of the past 35 years.

h. From EPA's perspective, environmental degradation is occurring and needs to be mitigated. The environment is paying the heaviest cost for cheap power.

XIX. Who Decides

a. From the Department of the Interior's perspective, the Bureau of Reclamation has always acted as the Water Master on behalf of the Secretary, making the decisions. It is felt that other bureaus which have traditionally not had any say in how the river is managed are now being heard on behalf of their natural and cultural resources. This is a shift of power in the Department, and is coming neither quickly nor easily. The jury is out on exactly who in the Department of the Interior will decide.

What is new is that FWS, NPS and their constituencies now have a seat at the table and a chance to be dealt some cards.

b. From the Western Area Power Administration's perspective, their monopoly on water releases to generate power no questions asked is shifting. Their former home base and long time ally, BR is being forced to share power within the Department. Any change to benefit the resources is seen by WAPA as a cost. Whether they will bargain in good faith, find a win/win position for themselves and their clients, or will gracefully accept other priorities as equal to theirs, remains to be seen. One indication is their most recent newsletter announcing the change in scope of their EIS. While a broadening of scope is a major step in the right direction, the newsletter was mailed April 26 and announced public meetings to be held May 6, 7 and 9. This attitude toward public involvement is one step back.

c. From National Park Service's and Fish and Wildlife Service's perspectives, their management roles on behalf of natural and cultural resources are finally being given long overdue recognition. With a new Assistant Secretary for Fish, Wildlife and Parks within the Department, these bureaus may finally have a role in who decides.

d. From Bureau of Indian Affairs' standpoint, four of the tribes are finally being offered a voice at the table. Indian trust responsibilities are being looked at in connection with operating the dam for the first time.

e. From the perspective of the Tribes, they for the first time have a say in the impacts of the dam to their resources. How they use this opportunity remains to be seen.

f. From EPA's perspective, who decides appears to be shifting from environmental resources subsidizing cheap power to less power generation to stabilize environmental damage. Management of the flows to create power as an incidental use of the water resource may be in the offing.

g. From those interested Congressmen, they see the roles of the Bureau and WAPA giving way, albeit with all deliberate speed.

h. From the environmental groups' perspective, there is movement pulling toward a balance more favoring natural and cultural resources. They remain skeptical as to how far the pendulum will swing, and in what time frame.

i. From the Western ratepayers' perspectives, rate changes are coming and that is not good news. It will depend on how well they are educated by the media, their representatives in Congress, and environmental groups what their reaction will be to paying slightly more for power so that the resources of the Glen Canyon National Recreation Area and Grand Canyon National Park will not be lost to this and future generations.

j. From the perspective of the NAS Committee, there are both environmental costs and scientific benefits. It sees an opportunity to utilize the science in the adaptive management of the Colorado River. In addition, the Academy sees a larger

potential in using the GCES effort as a prototype for riverine ecosystem management in other national and international river systems.

k. And finally, from the citizens' perspectives, the GCES and the preservation of resources in the Grand Canyon, both from the ravages of ramped water through Glen Canyon Dam to the uncontrolled sulphur dioxide emissions from Navajo Generating Station, are of national and international interest, unfolding in prime time as we speak. The voters ultimately decide.

Appendix I

Bureaus of the United States Department of the Interior

Bureau of Indian Affairs*

Bureau of Land Management

Bureau of Mines

Bureau of Reclamation*

Fish and Wildlife Service*

Geological Survey*

Office of Surface Mining

Minerals Management Service

National Park Service*

*Indicates those actively involved with the Lower Colorado River

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Appendix II

Abbreviations

BIA - Bureau of Indian Affairs
BLM - Bureau of Land Management
BM - Bureau of Mines
BR - Bureau of Reclamation
FWS - Fish and Wildlife Service
GS - Geological Survey
OSM - Office of Surface Mining
MMS - Minerals Management Service
NPS - National Park Service

AZG&F - Arizona Department of Game & Fish
CEQ - Council on Environmental Quality
CREDA - Colorado River Energy Distributors Association
EPA - U.S. Environmental Protection Agency
EIS - Environmental Impact Statement
GCES - Glen Canyon Environmental Studies
NAS - National Academy of Sciences
NEPA - National Environmental Policy Act
UP&L - Utah Power & Light
WAPA - Western Area Power Administration

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Appendix III

River and Dam Management
A Review of the Bureau of Reclamation's
Glen Canyon Environmental Studies
(Pages 20-25 - attached)

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of the dam and Lake Powell, it is necessary to distinguish between short-term and long-term operations. Both are ultimately related, but the failure to distinguish between the two, as exemplified by the Glen Canyon Environmental Study's evaluation of the law and the operation of the dam, may overstate to a significant degree the legal constraints under which the bureau operates.

The classic Law of the River is a law of mass allocations between the upper and lower basins, the United States, and Mexico, and among the seven basin states and Indian tribes, supplemented by national and international water quality and environmental quality legislation. This law has very little to do with the day-to-day operations of the dam. Beyond ensuring that Lake Powell is filled by July 1 of each year, the bureau has not had to operate the dam to allocate water in response to a long-term shortage on which the classic law is premised. Instead, the bureau operates the dam on a daily basis to maximize power revenues to repay the costs of the dam and reclamation projects in the upper basin. The duty to comply with the law of mass allocations could constrain the daily and monthly operations of the dam, but it is important to realize that to date the bureau has been able to operate the dam within the broadest parameters of the common understanding of the Law of the River. A brief review of the law of mass allocation is necessary for the reader to evaluate the constraints to which the bureau is subject and to understand the deficiencies of the component of the GCES report on dam operations.

1. 1922 Colorado River Compact. In 1922 the lower and upper basin states agreed to a mass allocation between the two basins, with a contingency for the satisfaction of Mexican claims. The upper basin states (Wyoming, Utah, Colorado, New Mexico) agreed to the compact to reserve water for their future use that they feared would be lost to the more rapidly developing lower basin states (Nevada, Arizona, California),

especially California. The upper basin states correctly anticipated that the Supreme Court would apply the law of prior appropriation in equitable apportionment actions between states that follow the doctrine. The lower basin states consented to a limitation on their right to continue to appropriate Colorado River water in order to obtain federal construction of Boulder Dam.

2. 1928 Boulder Canyon Project Act. Congress appropriated money to construct Boulder Dam and required California to limit its use to 4.4 million acre feet of the lower basin's allotment, which set a limitation for Arizona since Nevada has consistently claimed only 300,000 acre feet.

3. 1948 Mexican Water Treaty. The United States agreed to provide Mexico with 1.5 million acre feet per year. Questions about the quality of the water were deferred until the 1970s.

4. 1948 Upper Basin Compact. The upper basin states agreed to a percentage allocation among themselves of the amount reserved by the 1922 Compact. They did this because the Bureau of Reclamation told them that it would not recommend any reclamation projects in the upper basin until each state had a firm entitlement.

5. 1963-1964 Supreme Court decision in Arizona v. California. To the surprise of the basin states, the Supreme Court held that (1) the 1928 limitation on California's use was a congressional exercise of its power under the commerce clause to apportionment of the river among Arizona, California, and Nevada, (2) the Secretary of the Interior has the discretion to apportion water in times of shortage incident to administration of reclamation contracts by whatever formula is chosen, and (3) Indian reservations and federal reservations of public lands may claim federal reserved water rights to fulfill the purpose of the reservation. The result was that Arizona got the firm water right it needed to seek federal funding of the Central Arizona Project (CAP), which has now been completed to Phoenix. The net effect of Arizona v. California was to make the Secretary of

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the Interior the River Master and to provide Indian tribes some measure of water parity with agricultural and municipal users.

6. 1968 Colorado River Project Act. This act authorized the Central Arizona Project and partially reversed Arizona v. California because Arizona agreed to subordinate CAP deliveries to 4.4 million acre feet of existing California uses as well as to all present perfected rights in Arizona and Nevada. These are the senior rights around Yuma and the Imperial Valley and the five Colorado River tribes.

7. 1972 and 1977 Clean Water Acts. Reduction of salinity levels became a national commitment.

8. 1973 Endangered Species Act. This federal legislation requires that federal projects be operated to protect listed threatened or endangered species jeopardized by the project. The relationship between flow releases required to comply with the act and prior state and federal allocations is unclear.

There is a potential conflict between use of the dam and reservoir for power generation and use for carryover storage to meet the various mass allocation duties. For example, suppose the upper basin demands that water be stored to meet its future 10-year average delivery obligation but instead the Secretary of the Interior releases water to meet power contracts? A 1964 secretarial decision to release Lake Powell water, while the reservoir was filling, was protested by the upper basin states. The resulting controversy led to the formulation of operating criteria of lakes Mead and Powell that were enacted into law in 1968. The relevant text of the statute provides:

In order to comply with and carry out the provisions of the Colorado River Compact, the Upper Colorado River Basin Compact, and the Mexican Water Treaty, the Secretary shall propose criteria for the coordinated long-range operation of the reservoirs constructed and operated under

the authority of the Colorado River Storage Project Act [43 USCA §620 et seq.], the Boulder Canyon Project Act [43 USCA §617 et seq.], and the Boulder Canyon Project Adjustment Act [43 USCA §618 et seq.]. To effect in part the purposes expressed in this paragraph, the criteria shall make provision for the storage of water in storage units of the Colorado River storage project and releases of water from Lake Powell in the following listed order of priority:

(1) releases to supply one-half the deficiency described in article III(c) of the Colorado River Compact, if any such deficiency exists and is chargeable to the states of the Upper Division, but in any event such releases, if any, shall not be required in any year that the Secretary makes the determination and issues the proclamation specified in section 1512 of this title;

(2) releases to comply with article III(d) of the Colorado River Compact, less such quantities of water delivered into the Colorado River below Lee's Ferry to the credit of the states of the Upper Division from other sources; and

(3) storage of water not required for the releases specified in clauses (1) and (2) of this subsection to the extent that the Secretary, after consultation with the Upper Colorado River Commission and representatives of the three Lower Division States and taking into consideration all relevant factors (including, but not limited to historic streamflows, the most critical period of record, and probabilities of water supply), shall find to be reasonably necessary to assure deliveries under clauses (1) and (2) without impairment of annual consumptive uses in the upper basin pursuant to the Colorado River Compact: provided, that water not so required to be stored shall be released from Lake Powell:

(1) to the extent it can be reasonably applied in the states of the Lower Division to the uses specified in article III(e) of the Colorado River Compact, but no such releases shall be made when the active storage in Lake Powell is less than

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the active storage in Lake Mead, (ii) to maintain, as nearly as practicable, active storage in Lake Mead equal to the active storage in Lake Powell, and (iii) to avoid anticipated spills from Lake Powell.

This statute tracks the Law of the River. The salient portions incorporated into the statute are the two compacts and prior congressional legislation. The 1922 Colorado River Compact divides the basin between upper and lower states and awards each basin 7.5 million acre feet annually and gives the lower basin the right to increase its uses another 1 million acre feet. The 1948 compact apportions the upper basin's 7.5 million acre feet on a percentage basis among the four upper basin states. The 1948 Mexican Water Treaty guarantees Mexico 1.5 million acre feet per year; the burden is to be borne equally by the two basins if surplus water is not available. The Boulder Canyon Project authorized the construction of Hoover Dam, and authorized Arizona, California, and Nevada to enter into a compact to divide the lower basin such that they would receive 2,800,000; 400,000; and 300,000 acre feet, respectively. No such interstate compact was made, but in Arizona v. California, the Supreme Court construed the act to be a congressional apportionment of the lower basin. Article III(c) of the 1922 compact requires that the upper basin states contribute one-half of the Mexican Treaty obligation, but section 1512 recognizes that the Mexican Treaty obligation is a national one and the upper basin states are relieved of their III(c) duties if the Secretary of the Interior finds that augmented supplies of the Colorado system are available to meet the obligation. In 1968 Senator Jackson successfully sponsored an amendment that prohibited the Bureau of Reclamation from studying augmentation plans for any river system outside the seven basin states, e.g., the Columbia, for 10 years. Article III(d) requires the upper basin states not to cause an aggregate depletion in the river at Lee's Ferry

below 75 million acre feet for any 10-year consecutive period "reached in continuing progressive series beginning with the first day of October next succeeding the ratification of this compact." Article III(e) prohibits the upper basin states from withholding water and the lower basin states from requiring the delivery of water that cannot reasonably be applied to domestic and agricultural uses. There is no mention of power generation in the section.

INITIATION OF THE GLEN CANYON ENVIRONMENTAL STUDIES

The physical boundaries of the Glen Canyon Environmental Studies (GCES) extended from Glen Canyon Dam through the Grand Canyon to Lake Mead (Figure 1.2). These boundaries were specified in Commissioner Broadbent's December 6, 1982, memorandum (see Appendix B-2). The study boundary was the Colorado River reach between Lake Powell and Lake Mead, excluding both reservoirs (Figure 1.1).

The Glen Canyon Environmental Studies have their roots in court decisions and public involvement. When it became apparent that operation of the rebuilt turbines in Glen Canyon Dam could increase the fluctuations of water levels downstream in the Grand Canyon, tour operators offering white-water raft trips through the canyon became concerned about the continuing quality and safety of their excursions. Private citizens and environmental preservation organizations were also concerned about the continued vitality of ecosystems in the Grand Canyon that might be subject to alteration by the fluctuations in flow.

In association with several groups, one tour operator, Grand Canyon Dorries, Inc., brought suit against Ronald H. Walker, Director of the National Park Service, and other DOI officials in an attempt to prevent the extreme fluctuations in water levels (Grand Canyon Dorries, Inc., et al. v. Ronald H.

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