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

GLEN CANYON ENVIRONMENTAL STUDIES:

EXECUTIVE REVIEW COMMITTEE FINAL REPORT

Submitted to the Department of the Interior

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This report was prepared by individuals representing the following:

United States Department of the Interior
Fish and Wildlife Service
National Park Service
Bureau of Reclamation
Western Area Power Administration

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GLEN CANYON ENVIRONMENTAL STUDIES: EXECUTIVE REVIEW COMMITTEE FINAL REPORT

I. INTRODUCTION

A. The Glen Canyon Environmental Studies

This report contains recommendations of the Executive Review Committee (ERC) (a management and policy level group representing the Bureau of Reclamation (BOR), National Park Service (NPS), Fish & Wildlife Service (FWS), the Department of the Interior (USDI), and the Western Area Power Administration (Western)) to the Department of the Interior regarding future actions to be taken based on the results of the Glen Canyon Environmental Studies.

This document was developed over a 12 month period and represents those areas where agreement could be reached and those areas where diverse opinion and management objectives dictate disagreement. The information presented in this report outlines the major areas of concern and the categories of recommendations that are necessary for evaluation of future actions. The primary areas of concurrence and nonconcurrence are presented in this initial section. Specific BOR, NPS, FWS, and Western concerns, recommendations, and positions are presented in Appendices A and B.

The Glen Canyon Environmental Studies (GCES) were initiated by the Department of the Interior on December 8, 1982, following considerable public controversy which resulted from the proposed peaking power plan and from the Environmental Assessment developed for the uprating and rewinding of the generators at Glen Canyon Dam. An analysis of the public comments received during that period suggests that the controversy was less about the uprating and rewinding than it was an expression of concern about the long- and short-term environmental and recreational impacts associated with the operations of Glen Canyon Dam.

The GCES program is a series of environmental and technical studies designed to clarify whether the operations of Glen Canyon Dam do indeed impact the downstream natural and recreational resources of the Glen Canyon National Recreation Area and Grand Canyon National Park. A second objective of the GCES program was to determine whether, within existing legal and operational mandates that define the management and operation of Glen Canyon Dam, alternative operations could be identified that would minimize the defined impacts.

The technical results of the GCES program are contained in the Glen Canyon Environmental Studies Final Report, which accompanies this document. The results in the GCES Final Report are drawn from a series of technical reports which are available through the GCES project office and the National Technical Information Service. The GCES Final Report is not a National Environmental Policy (NEPA) document, but a technical information document. The report does not address the potential economic benefits or costs associated with changes in operations nor does it include a full public review.

The technical adequacy of the individual research reports was reviewed by a wide range of academic and management staff. The individual reports and the GCES Final Report

were also reviewed by the National Academy of Sciences, Glen Canyon Environmental Studies Review Committee.

B. The Purpose and Composition of the Executive Review Committee

In 1987, as the technical studies were being concluded and the summary reports were being prepared, it became clear that while the technical studies resolved some issues, there were still many basic management and policy decisions that could not be resolved by the technical studies. Given the different mandates of the affected Federal and State agencies, it was clear that no one office could make management and policy decisions which would be acceptable to all. The GCES Executive Review Committee (ERC) was established to take the technical study results and findings of the GCES program and translate them into a series of policy options upon which the Department of the Interior could act.

The ERC has as its objective:

> **To review the GCES Final Report and determine if impacts of the operations of Glen Canyon Dam to the Glen and Grand Canyon environments are significant and whether changes in the operation of Glen Canyon Dam can be supported.**

The ERC was charged by the Regional Director of the Upper Colorado Region of the Bureau of Reclamation with the completion of four products:

1. Definition of the management objectives of each of the Department of the Interior bureaus and Western in the management of the Colorado River through Glen and Grand Canyons.

2. Development of a matrix of management areas of concurrence and non-concurrence.

3. Determination of the need for additional monitoring and/or study.

4. Development of a report to the Department of the Interior with recommendations for Secretarial consideration.

The composition of the ERC includes those bureaus within the Department of the Interior (DOI) which have water and power management responsibilities for the Colorado River; those which manage the natural and recreational resources of the Colorado River, Glen Canyon National Recreation Area, and Grand Canyon National Park; and the agency within the Department of Energy (DOE) that has an institutional focus on the power resources. The ERC is composed of representatives from:

Bureau of Reclamation (Upper Colorado Region)
National Park Service (Western Region)
Fish and Wildlife Service (Region 2)
Department of the Interior (Office of Environmental Project Review)
Western Area Power Administration (Salt Lake City Area Office)

In addition to participating in the policy discussions of the ERC, each representative also accepted responsibility for communicating with the other agencies, public groups, and private individuals concerned with the specific missions and management objectives of the individual bureaus within the DOI and Western.

C. Why Further Action Is Being Considered

The Department of the Interior directive letter initiating the GCES states that, "Should alternatives that meet the above criteria be identified (i.e., that it has been demonstrated that the operations of Glen Canyon Dam do have an impact on downstream resources, and that the dam can be operated in ways that could reduce those impacts), an environmental assessment should be prepared. This would lead to a decision process to determine appropriate long-term operating criteria for Glen Canyon Powerplant."

The bureaus/agency represented on the ERC concur that the GCES have shown that the operations of Glen Canyon Dam do affect the natural and recreational resources downstream from the dam, and that some ways of operating the dam have more negative impact than others.

The GCES also identified operational options, within existing legal and operational mandates, that could reduce impacts as related to selected resources.

There is not unanimous agreement that the negative impacts are sufficient to justify a decision to adopt these changes at this time. There is agreement that further studies need to be undertaken to assess the significance of these impacts.

This report contains recommendations of the ERC for additional studies, interim flow levels for study purposes, and mechanisms for coordination and decision-making among the affected bureaus and Western during the period of the studies. The result of the studies would be a decision regarding more significant recommendations for changes in operations. This report defines alternative courses of action which DOI may choose to take, and provides information about the position of each office regarding the alternative courses of action.

II. EXECUTIVE REVIEW COMMITTEE DECISION MAKING PROCESS

The ERC pursued the following processes in arriving at its recommendations:

A. Review of Technical Reports by Constituent Groups

Recognizing the political sensitivity of the GCES issues, each member of the ERC accepted the responsibility to meet with those groups and interests (constituents) most concerned with the mandates of management. Responsibility was assumed as follows:

Bureau of Reclamation: Upper Colorado River Commission
Upper Colorado River Basin States
Lower Colorado River Basin States

National Park Service:	Environmental Groups Conservation Organizations River Concessionaires
Fish & Wildlife Service:	Arizona Game & Fish Department Conservation Groups Fishing Organizations
Department of the Interior:	Additional Conservation Groups Indian Tribes
Western Area Power Administration:	Electric Power Organizations

Each constituent group identified by the ERC was provided a briefing on the major findings of the GCES Technical Reports and GCES Final Report and was encouraged to ask questions or request clarifications. Initially, four meetings were scheduled for the constituent groups. They were:

Western	October 20, 1987	Salt Lake City, UT
FWS	October 20, 1987	Phoenix, AZ
BOR	October 22, 1987	Denver, CO
NPS	October 28, 1987	Flagstaff, AZ

It also became clear that constituents in the lower basin states were interested in the studies, so an additional BOR constituent meeting was held for the Lower Colorado River Basin States on December 9, 1987 in Las Vegas, NV. A summary of the written comments from the constituent groups is shown in Appendix E.

B. Definition of Individual Bureau and Agency **Objectives**

Each member of the ERC developed a statement of objectives reflecting its specific management responsibilities along the Colorado River, or in the Glen Canyon National Recreation Area or Grand Canyon National Park. A full statement of these objectives is shown in Appendix D and summarized in Figure 1.

As can be seen in Figure 1, some element of conflict is inherent between the missions of the entities. Western is essentially a single purpose agency, with operations and power marketing as its primary focus. In this geographic area, the missions of the NPS and FWS overlap, although the NPS has a recreational mission not shared by FWS.

However, there is competition even within environmental missions. For example, operations which are beneficial for the humpback chub and other native fish species are not beneficial for trout fisheries and vice versa. The mission of BOR overlaps with all other bureaus, although the BOR qualified its mission responsibilities as being contingent upon its primary mission.

Figure 1

SUMMARY OF AGENCY OBJECTIVES

OBJECTIVES	EXECUTIVE REVIEW COMMITTEE			
	BOR	NPS	FWS	WESTERN
Store water for beneficial use.	X			
Provide flood control.	X			
Operate dams to generate hydroelectric power.	X			
Market hydroelectric power.				
Comply with Endangered Species Act.	X			X
Protect humpback chub.	O			X
Maintain alluvial deposits.	O			X
Perpetuate and enhance white-water boating.	O			X
Protect other native fish species.	O			X
Perpetuate recreational trout fishery.	O			X
Maintain and enhance habitat for fish and wildlife.	O			X

X Primary missions.

O To the extent possible, consistent with primary missions.

C. Identification of Separate Findings

Each member of the ERC reviewed the GCES Final Report and the comments received from the constituent groups and identified specific findings from his/her perspective. These findings are listed in Appendix C.

None of the ERC members contest the basic findings that the operation of Glen Canyon Dam has an impact on the downstream resources and could be changed in ways which provide greater protection for the resources. However, these changes would impact on other missions and management responsibilities. Therefore, the discussion now centers around (1) whether or not the impacts are sufficiently significant to justify changes in operations, and (2) whether or not the studies were sufficiently complete so that it is possible to accurately determine the significance of impacts.

D. Development of Specific Recommendations

As a first step in developing group recommendations, each member of the ERC developed recommendations specific to his/her bureau or agency. These recommendations are shown in Appendix B.

E. Development of Executive Review Committee Recommendations

Finally, the ERC developed group recommendations, based on extensive discussion and negotiation. These recommendations are described in the following section.

III. EXECUTIVE REVIEW COMMITTEE RECOMMENDATIONS

The recommendations of the ERC fall into four general areas:

* Recommendations for future studies.

* Recommendations for interim operations plan designed to reduce impacts upon downstream resources while further studies are being conducted.

• Recommended mechanisms for coordination and decision-making among affected groups during the period of study.

* Recommendations regarding NEPA compliance.

The members of the ERC Committee concur in most of the recommendations shown. In those cases where there is not complete concurrence, the conflicting positions are identified.

A. Recommendations for Future Studies

It was agreed that additional studies are needed. The topics which require the most immediate research attention are the impact of fluctuating flows upon the aquatic habitat and beach building and degradation. Specifically, the ERC recommends that the Department of the Interior authorize the following:

(1) Immediate fluctuating flow research and monitoring studies for the purpose of determining impacts on the aquatic habitat, including endangered species.

(2) Immediate fluctuating flow research and monitoring studies for the purpose of determining the relationship between fluctuating flows and beach building and degradation.

(3) Implementation of Conservation Measures and studies for the endangered humpback chub (Gila cypha).

A major topic of discussion within the ERC was the source of funding for these studies. After extended discussion the members of the ERC concurred that:

(4) Studies necessary to monitor the effects of the operations of Glen Canyon Dam should be a normal part of the operating costs associated with the management of Glen Canyon Dam.

However, the specific funding levels and associated changes would have to be approved annually as appropriate and within the context of management needs.

B. Interim Operating Recommendations

The operations of Glen Canyon Dam will continue to have impacts during the period that the studies are being conducted. During this interim period, specific flow levels will be studied. The specific test periods and levels will be determined by the technical research group which coordinates the research effort. The test period of flows will be coordinated with the operations of Western and BOR.

The ERC agrees that some actions are prudent to protect downstream resources during the test period when the studies are being conducted. Those recommendations agreed upon by all members of the ERC include:

During the study test period, Glen Canyon Dam should be operated so as to:

(1) Maintain the 31,500 cubic feet per second (cfs) powerplant limit until NEPA compliance for the Uprating Program can be reevaluated.

(2) Restrict future use of the powerplant capacity to 31,500 cfs or less except under the following circumstances:

(a) If used to reduce the use of bypasses (greater than 31,500 cfs),

(b) If used only for power emergency purposes (time periods of less than six hours), and

(c) If used for emergencies in the power grid.

(3) Ensure that flood frequency is less than one-in-twenty years with formalized operating criteria that are distributed and reviewed by the other members of the ERC.

The ERC could not come to concurrence on several issues regarding interim operations at Glen Canyon Dam. Those issues are:

(4) Establishment of a minimum flow release.

(5) Establishment of an acceptable load following (fluctuating flow) schedule.

A decision to adopt these two changes in current operations has sufficient impact on the existing programs of Western and BOR that no agreement is possible without Departmental direction or further studies to quantify the significance of fluctuating flow impacts. A summary of the positions of the individual bureaus and Western regarding this issue follows, with a full discussion included in Appendix A.

B.1 Minimum Flows

The Interior members of the ERC recommend that an INTERIM minimum flow level be established at Glen Canyon Dam. The interim level, which will be studied over a range of low flow levels and will be studied on a test basis, are as follows:

April 15 through October 30:

(1) All weekends with a minimum flow of 5,000 cfs.

(2) Weekdays with a minimum flow of 3,000 cfs and a daily average of 8,000 cfs or greater and a requirement to match historic load following (fluctuating flows).

October 30 through April 15:

(1) An actual minimum flow of 5,000 cfs.

During the time of interim flow levels, specific studies would be conducted to verify the actual level and rate of change necessary to specifically identify actual operational and environmental needs. Additionally, Western would conduct a complete analysis of the impacts associated with the actual customer markets.

These minimum flows would be adhered to except under the following conditions: When Lake Powell meets the January 1 storage target of 22.6 million acre-feet and a large snowpack is expected in the Upper Colorado River Basin, operations are oriented to expectation of high runoff. Consequently, high releases are made in anticipation of excess water flowing into Lake Powell.

However, if the forecast runoff is less than expected due to lack of snow or miscalculated snowpack, the actual runoff is less than anticipated. Releases would then be curtailed to ensure the filling of Glen Canyon Dam and the 5,000 cfs minimum flow level

would be violated to achieve the filling target. This situation is anticipated to occur once out of every ten years and only when Lake Powell is scheduled to fill.

B.2 Fluctuating Flows

The Interior members of the ERC recommend on an INTERIM basis that specific fluctuating flow studies be initiated to determine the positive and negative impacts associated with set boundaries of operation. The ERC further recommends that specific flow boundaries be determined by the technical support staff and that, concurrently, impacts associated with power, recreation, and other environmental aspects be determined. The studies will focus on the two key areas of aquatic resources and beach dynamics.

C. Interim Coordination and Management

One outgrowth of the work of the ERC is the recognition that **all members** have a vested interest in the management of the Colorado River, Glen Canyon National Recreation Area, and Grand Canyon National Park, and that they need to work together in a coordinated manner to protect these resources. The ERC recommends the following aspects be addressed during the completion of the defined studies:

(1) The NPS and FWS review the Secretary of the Interior's Annual Operating Plan for Glen Canyon Dam to determine the impact on e Upper Colorado endangered species, the riparian zone, fish and wildlife esources, and recreational components.

(2) A steering/coordinating committee be established to set research goals and conduct an annual assessment for these research and monitoring goals.

(3) A cooperative effort to provide an explanation to the constituent groups of the relationship of operating criteria and power benefits be undertaken.

D. National Environmental Policy Act Compliance

The GCES program is a technically oriented effort to determine if the operation of Glen Canyon Dam is having a quantifiable impact on the downstream resources. The original directive was to collect and analyze the information to determine whether specific operational changes could be made at Glen Canyon Dam.

The decision options that now exist for the Department of the Interior include: (1) no change, (2) completion of additional interim studies, and/or (3) initiation of NEPA compliance. The first option (no change) would be indicated if no quantifiable impacts could be identified and/or no changes in the operations of Glen Canyon Dam could reduce those impacts.

The second option (interim studies) would be indicated if critical decision-making information were still lacking. The third option (initiate NEPA compliance) would necessitate the identification of specific operational changes, including a no change option, and would require that additional studies of the economic relationships be

initiated. Further, under NEPA compliance, a full public involvement program would be required.

The ERC could not come to concurrence on the need to initiate the third option (NEPA compliance). They were in full agreement however, that Glen Canyon Dam does have an impact on the downstream resources. Several areas of concern must be resolved prior to a decision on the initiation of NEPA compliance:

1. Should NEPA be initiated in a piecemeal approach or should it include all operational options?

2. Which priorities drive the decision process (endangered fish, downstream water requirements, implicit water rights, and/or power contracts)?

3. Does any change in operations dictate the necessity for NEPA compliance or does enough flexibility exist within present Colorado River operational mandates to allow for changes internally?

4. Should NEPA be initiated for the interim studies and used in the scoping process or should the decision be delayed until the additional studies are completed?

The ERC has determined that it cannot develop a recommendation until additional review is made of the legal requirements defined for the Department of the Interior. The Solicitors for the Department of the Interior and general legal counsel for Western have made initial rulings which are included in Appendix A.

APPENDIX A

Individual Position Statements

GLEN CANYON ENVIRONMENTAL STUDIES

EXECUTIVE REVIEW COMMITTEE REPORT

BUREAU OF RECLAMATION POSITION STATEMENT

The members of the Glen Canyon Environmental Studies, (GCES) Executive Review Committee have agreed to and recommended further studies. These additional studies would be directed towards two aspects of operational impacts;

(1) The impacts of both minimum and fluctuating flows (load following) on the Endangered species habitat in the Grand Canyon,

(2) The impacts of load following on beach development and erosion, and

(3) The impacts associated with minimum flows on the recreational use and sport fishery.

Continued studies on fluctuating flow impacts would not require changes in present operational criteria. The impacts of these flows would be studied in the Lower Colorado River habitat and on the beaches as these flows occur under the present operational criteria.

The National Park Service and the Fish & Wildlife Service recommend that minimum flow studies be accomplished by establishing an interim change in minimum flow criteria to 5,000 cubic feet per second (cfs).

Present criteria require 1,000 cfs during the non recreation season (September 1 to June 1) and 3,000 cfs during the recreation season. The analysis of benefits of this change over existing criteria and historical operations would be completed prior to the recommendations for long-term changes. Also to be analyzed would be the losses to the Colorado River Storage Project (CRSP) system power customers either in meeting peak demand or the increased cost of CRSP energy.

Reclamation supports the need to do additional analysis on these aspects of Glen Canyon Dam operations. It is important to remember that a significant part of the proposed work must be completed to comply with the Section 7 of the Endangered Species Act of 1973 (16 U.S.C. $$ 1531-1543) and would be done independently of the additional GCES studies if necessary. We are concerned that impacts of these studies be

minimized to the extent possible from the standpoint of the CRSP system users. In order to do this, we beleive that:

1. **The minimum flows must be provided within the flexibility of the existing operating criteria, in consultation with representatives from the seven Colorado River Basin States, and that the interem minimums not be established.**

   The required flows can be provided under properly designed studies that will verify the hoped for benefits that enhanced long-term minimum flows could provide.

2. **The risk of these study flows causing signficant loss in power benefits or excessive costs of purchasing by Western Area Power Administration (Western) to meet contractual committments nees to be carefully evaluated. The tests would need to be discontinued if river system hydraulic conditions warrant. (ie. extremely high or low water years)**

3. **If conditions as discussed in (2) occur, the tests would be postponed to a more favorable time.**

4. **A specific design and length of study must be identified and agreed to in order to limit the use of the power system revenues. Support will be limited to an appropriate and supportable level.**

5. **By conducting the test within existing operating criteria and in consultation with the seven Colorado River Basin states, no additional National Environmental Policy Act (NEPA) would be necessary to conduct the tests.**

We believe the opportunity to conduct these additional GCES studies concurrently with our Section 7 consultation committments at Glen Canyon Dam will minimize the cost of any additional work required before final recommendations can be provided to the Secretary of the Interior regarding future operational strategies and criteria.

BORERCPS - DLWegner 04/29/88

United States Department of the Interior

FISH AND WILDLIFE SERVICE
POST OFFICE BOX 1306
ALBUQUERQUE, N.M. 87103

In Reply Refer To:
Region 2, FWE/HC

MAY - 4 1988

MEMORANDUM

TO: Regional Director, Bureau of Reclamation, Salt Lake City, Utah

FROM: Regional Director, Region 2

SUBJECT: Agency Position on Draft Executive Review Committee Report--Glen Canyon Environmental Studies

This memorandum presents the position of the Fish and Wildlife Service (Service) with regard to the Glen Canyon Executive Review Committee's report on the operation of Glen Canyon Dam. It is provided In accordance with agreements made during the April 11, 1988, meeting to brief the Assistant Secretaries of Interior on the Glen Canyon Environmental Studies and Executive Review Committee reports.

The Service fully supports the recommendations presented in the draft Executive Review Committee Report. Due to conditions beyond the control of those responsible for operation of Glen Canyon and those carrying out the Glen Canyon Dam Environmental Studies, (high water) study results were, In several cases, inconclusive. However, the studies do bring out several adverse effects resulting from flooding and minimum flows below 5,000 cfs. Such impacts include impaired access to tributary streams for fish spawning purposes, reduced backwaters for rearing humpback chubs and other native fishes, severe dewatering and desiccation of Cladophora beds from the darn to the Little Colorado River, dewatering of trout spawning beds, reduced fisherman access, destruction of riparian habitat, and beach reduction.

Additional studies as recommended in the Committee's report are necessary to more clearly define impacts and to establish a fluctuating flows regime which minimizes impacts to the greatest extent possible while meeting the primary purpose of the dam. These studies should be designed to determine the impacts of various increased/decreased flow patterns with the agreed-upon flow patterns provided for study purposes as part of project operations. It will also be necessary to determine the impacts of modified operation of Glen Canyon Dam on upper basin project operations and related fish, wildlife, and recreational resources including endangered species. These studies should be a normal part of the operating costs associated with the management of Glen Canyon Dam.

The Service supports the interim operating recommendations as presented in the April 1988 draft committee report. The Glen Canyon Environmental Studies documents the impact of flooding on bottom sediment and beaches within the canyon. Stream sediments are essential to the well-being of the riparian and aquatic resources of the system and must be maintained if these resources are to exist at acceptable levels.

The interim minimum flows as recommended by the Interior members of the Committee would serve to reduce dam operational impacts on aquatic and recreational resources. An estimated 70 percent of the trout spawning beds would be functional under these flows. Recommended flow would help provide a stable aquatic habitat base, improve tributary access and backwater maintenance, and provide stable Cladophora beds. These flows would also improve fisherman access at the low end of the flow pattern providing safe passage over 3-mile bar. The Service believes that there is sufficient data to support using the recommended flows as the base study flow for the next 2 years. During this period, specific studies should be conducted to verify the long-term effects on the aquatic environment including endangered species.

Coordination is essential in carrying out the additional studies recommended by the Committee. Establishment of the interagency steering/coordinating committee should be the first step in achieving an acceptable coordinated effort. This coordinating committee should establish basic research goals and study design and access research progress.

National Environmental Policy Act Act compliance must be met for proposed operational changes. The public interest in this segment of the Colorado River and its associated resources were brought to the forefront with the proposals to increase generation at Glen Canyon Dam. This process is essential to provide full consideration of all impacts and to allow full public considerations of the trade-off which must be made. Compliance with the Act should be carried out when final operational changes are proposed.

In summary, the Service is in full support of the recommended interim operational guidelines and continued studies to further refine the impacts of minimum and fluctuating flows on resources within the canyon.

Russell

cc:
Mr. Dick Marks, National Park Service, Grand Canyon National Park. Grand Canyon, AZ 86023
Ms. Patricia Port, Office of Environmental Project Review. USDI, San Francisco, CA 94102
Ms. Marlene A. Moody, Western Area Power Administration, DOE, Salt Lake City, UT 84147
Director, Arizona Game and Fish Department, Phoenix, AZ
Assistant Regional Director, Fish and Wildlife Service, Albuquerque, NM FWE
Regional Director, Fish and Wildlife Service, Denver, CO FWE
Field Supervisor, Ecological Services, Fish and Wildlife Service, Phoenix, AZ

NATIONAL PARK SERVICE POSITION STATEMENT

GCES EXECUTIVE REVIEW COMMITTEE REPORT

During meetings with Assistant Secretary of Interior's office we learned that WAPA and USBR intend to attach minority opinions to the ERC report. Though NPS is satisfied with the consensus recommendations that were forged during several ERC meetings, we [illegible] is necessary to clarify the NPS [illegible] several issues in response [illegible] USBR and WAPA.

We [illegible] concerns:

1. No changes will be made to the April 3.988 draft of the ERC report without agreement by the ERC members.

2. NPS must have an opportunity to review and respond to written opinions by other agencies.

3. NPS must be directly involved in the preparation of Guidance Documents for the Secretary of Interior's Office

4. ERC report review and interim research must follow a well-defined schedule and process that are coordinated with and agreed to by ERC members.

5. NPS feels that [illegible] generation over the other legally defined "incidental objectives" of Glen Canyon Dam (including flood control, river regulation, water quality control, recreation, enhancement of fish and wildlife resources, and enhancement [illegible] environmental factors). The [illegible] of incidental objectives of Glen Canyon Dam need [illegible] evaluated.

O[illegible] significant [illegible] relate to Section III regarding ERC recommendations:

A. Recommendations for Future Studies.

1. NPS supports the need for immediate fluctuating flow research on the aquatic habitat and beach building and degradation, and the implementation of Conservation Measures [illegible] 7 legislation for the endangered humpback [illegible] and other species of concern including the bald eagle and peregrine falcon.

2. The modified operating criteria to reduce flooding need to be evaluated by NPS with regard to the effects of [illegible] lake [illegible] * recreation and natural resources at Glen Canyon National Recreation Area. To this end, NPS needs written documentation of the USBR modified operating plan to [illegible]. Should [illegible] be determined [illegible] the impacts will [illegible] and documented through USBR authorization [illegible] fanding.

3. NPS supports the ERC recommendation that !studies [illegible] monitor [illegible] of the operations [illegible] Glen Canyon Dam [illegible] normal [illegible] operating costs associated with the management of Glen Canyon Dam" until mitigating actions [illegible] implemented.

4. Specific research projects [illegible] integrated [illegible] the involvement of NPS, WAS, researchers, and other concerned agencies.

5. Specific flow regimes identified in the research plan must be provided by USBR and agreed to by WAPA. Seasonally specific flow regimes based on research needs must be set, and adhered to by an interagency coordination group. A letter of agreement specifying [illegible] timing and duration of [illegible] between MPS, US, [illegible] FWS.

B. Interim Operating Recommendations.

1 NPS supports the interim flow [illegible] recommended by the Interior members of the ERC, including the minimum [illegible] levels described in the ERC April 1988 draft. However, the interim flow levels should not limit seasonal flow regimes established for research purposes. In addition, during the test period for interim operations, seasonally specific flow levels must be provided by USBR and WAPA to complete studies of flow impacts on resources. The test period must extend over at least two life cycles of species of [illegible] adequately assess operational impacts. An— extension of research may be required if specific flow regimes are not provided.

2. Economic analysis of impacts of minimum flows on customer markets should be conducted by recognized outside experts. In additional, current WAPA and USBR estimates of revenue losses due to minimum flows need to be documented and reviewed by experts.

NPS feels that the criteria that allow use of powerplant capacity above 31,500 cfs are [illegible] restrictive enough. Exception 2a that allows an increase in capacity "if used for emergencies in the power ..grid should be deleted In addition, the "power emergency purposes" referred to in section 2b need to be clarified and limited.

C. Interim Coordination and Management.

1. NPS supports the ERC recommendations [illegible] interim coordination and management. In [illegible], research plans and the research coordination should be well-defined [illegible] should [illegible] the managing agencies. Plans to inform constituent groups should also be well-defined and follow NEPA process.

D. NEPA Compliance

1. NPS [illegible] Glen Canyon Dam has [illegible] adverse effects on resources below the dam. For these reasons NPS [illegible] need for [illegible] NEPA compliance process in current and future planning of research and modifications to operations at Glen Canyon Dam.

Western Area Power Administration

Minority Opinion on the Glen Canyon Environmental Studies
and Executive Review Committee Report

May 4, 1988

The Executive Review Committee (ERC) Final (draft) Report dated April 1988 contains recommendations by the Interior members of the ERC (1) that additional studies be made, (2) that new minimum flow levels below Glen Canyon Dam be instituted for recreational purposes, and (3) that a mechanism be developed for coordination and decision making among affected bureaus and Western during the period of the studies.

Western Area Power Administration (Western) concurs with the Interior members of the ERC on the need for additional studies on the effects of fluctuating flows, with the qualification that such additional studies be focused on data collection and monitoring of existing conditions. Western also agrees that Reclamation should continue to operate Glen Canyon Dam so as to reduce the likelihood of flood control releases that result in spills, and that a mechanism should be established for coordination and decision making among the affected agencies and Western during these additional studies.

However, Western strongly objects to the recommendation for interim changes to the existing operation criteria for Glen Canyon Dam and the implementation of proposed new minimum flow levels for additional studies. Western's objections to these proposed new minimum levels are based upon the following reasons:

1. The proposed new minimum flow levels violate the provisions of the Colorado River Storage Project (CRSP) Act, 43 U.S.C. Sections 620-620o.

The three primary purposes of the CRSP Act are (1) storage of water to meet terms of the compacts, (2) use of the water for agricultural and domestic purposes, and (3) for the generation of power. The language in Section 7 of the CRSP Act (43 U.S.C. Section 620f) prioritizes the three primary project purposes; the first priority is compliance with provisions of the Law of the River and related legislation, the second priority is to the appropriation of water for domestic or agricultural purposes, and the third priority is the production of the maximum "practicable" firm hydroelectric power and energy. Conservation of the nature and wildlife on project lands, and recreational uses of the water areas created as a result of the CRSP Act is authorized in Section 8 (43 U.S.C. Section 620g) which requires that these purposes be consistent with, i.e. subservient to, the primary purposes of the Act.

Equally important, the language of Section 7 of the CRSP Act requires that the CRSP powerplants be operated so as to produce the maximum possible firm capacity and energy. This requirement is limited only insofar as necessary to comply with the Law of the River, and with the appropriation of water for domestic or agricultural purposes. The reasons for this requirement were (1) the importance of power to repay most of the project costs, and (2) to reassure the Upper Basin States that sufficient revenues would accrue to allow for repayment of construction costs of participating projects within these states.

Therefore, implementation of proposed minimum flow levels for recreational purposes, which would cause significant reductions in the amounts of short-term and long-term firm capacity and energy that would otherwise be produced by the CRSP powerplants, would violate both the established priority of power over recreation and the requirement to maximize hydroelectric firm power and energy.

Further, it was intended by Congress that after repayment of project costs, power revenues would flow into the Treasury as an additional benefit to the United States. This intended benefit would also be impaired because, to the extent that power operations are reduced, the net revenues returned to the Treasury after repayment would also be reduced. The economic benefit that Congress intended power consumers in the Colorado River Basin states to receive from the project power operations would likewise be reduced.

A more detailed discussion of Western's legal opinion on the priorities of project purposes, dated April 26, 1988, is attached and is incorporated in this minority opinion by reference.

Moreover, it should be noted that historically, a significant portion of Western's nighttime or offpeak electric load has been served through economic purchases of thermal or coal-fired generation from other sources. Such purchases have a dual benefit (1) by allowing the storing of water in Lake Powell for later release during daytime or peak hours when the resultant hydroelectricity has greatest value, and (2) by allowing more efficient operation of coal-fired generators by avoidance of costly variations in generation levels. With increased offpeak minimum release requirements in the winter, Reclamation would generate greater amounts of

hydroelectricity during offpeak hours. Thermal power producers would then be required to vary their coal-fired generation levels to account for this loss of offpeak load, thereby resulting in less efficient or economic operation for both parties.

2. The implementation of interim operating requirements, specifically "test" minimum releases at Glen Canyon, are unsupported by the conclusions of the GCES Integration Report.

Western's detailed comments to Reclamation on the final GCES Integrated Report, dated December 11, 1987, reiterated serious concerns with the findings of the GCES. These concerns focused on the use of an idealized optimum as the assumed baseline condition, and the so-called "impacts" identified when this ideal baseline was compared to alternative operational scenarios. Western's position was, and remains, that present operations should have been considered as part of the existing baseline conditions, and that the use of the term "impacts", which has significant NEPA connotations, is inappropriate. It is Western's belief that the GCES have failed to properly identify true impacts. Further, since effects on water regulation to meet compact terms, water deliveries for irrigation and domestic purposes, and power generation were not addressed in the technical studies, the GCES are incomplete.

Western therefore contends that the unresolved question regarding the significance of the "impacts" identified by the GCES can not be answered until additional baseline data has been collected on existing conditions and effects have been appropriately quantified, including the impacts to water regulation and deliveries and power generation. Further, Western maintains

that these "impacts" are not sufficient to justify a decision to adopt a change in existing operations on an interim basis.

The ERC Final Report also has not adequately addressed the significant potential loss in power benefits due to the proposed changes in minimum flow releases for this study period. The annual reduction in revenues due to implementing proposed new interim minimum releases for an assumed two-year period are estimated by Western to be roughly $10 million, based upon simulation of historic monthly pattern of water releases from Glen Canyon under the proposed higher minimum release rates and median hydrologic conditions. At this time, it is unknown what impact such a decrease in available capacity and shift in available energy due to changes in minimum flow requirements might have on the short-term to firm power customers. Also unknown is what additional economic impact would occur given the assumption of drier-than-median hydrologic conditions, as is currently the case in the Upper Colorado River Basin. However, should the operating criteria be revised to continue these release restrictions indefinitely, the estimated lost power benefits to Western's firm power customers would be an estimated $21.8 million per year beyond 1999. These estimates represent a significant and widespread financial loss to the firm power customers throughout Western's seven-state market area. This real economic impact further erodes any justification for changes to existing operations at this time.

Further, since the GCES are incomplete, it can only be speculated as to whether the proposed new minimum release levels which would result in additional benefit to recreational resources (sport fisheries and white water rafting) might possibly result in adverse impacts to aquatic habitat for endangered fish species and beach building and degradation.

3. Before any proposal to alter the present operating pattern of Glen Canyon Dam is implemented, NEPA compliance at an appropriate level must be completed. This includes the proposal to change minimum flows, as well as any proposed change to the long-term operating criteria.

The Executive Review Committee report recommends a change in operations by increasing minimum flows to 5,000 cfs for most winter months, without supporting the recommendation with an analysis of the pluses and minuses of this action, and other possible alternatives. Such options would be brought out in a NEPA analysis, which should include a rigorous investigation of the comparative costs and benefits of the proposed action and alternatives, and provide a framework for informed decision-making.

Presently, the recommended proposed action is advanced with little measure of benefit while very real negative impacts and legal requirements, within which the agencies' actions are bounded, are essentially ignored. Many more hard facts are needed before an informed and legally sound decision can be made. The suggestion that changes should be made first, and then the results studied, is contrary to the provisions of NEPA and CEQ regulations. Failure to incorporate a NEPA process at the earliest possible moment in the planning of a proposed action is also contrary to CEQ regulations.

The implementation of interim flow requirements would clearly prejudice the collection of data on fluctuating flows and any future NEPA compliance documentation. By imposing interim flow releases in advance of the definition of current conditions, consideration of a modified baseline condition, and alternatives would most definitely be biased.

Western is not promoting a Colorado River Upper Basin Environmental Impact Statement. We are, however, noting that a properly scoped NEPA process must be completed before any new minimum flow proposals or before any proposed modification to the long-term operating criteria are implemented.

As stated before, Western supports additional data collection and monitoring of all critical resources below Glen Canyon dam based upon current operations so that baseline effects of operations under a reasonable spectrum of water conditions can be evaluated. The collection of data on fluctuating flows and on varying alternative minimum releases could still be accomplished without modification of existing release restrictions. Such additional studies should be focused and over a sufficient length of time to assure that the financial burden of such studies would be held to a reasonable level.

The ERC Final (draft) Report states that Western ". . . would conduct a complete analysis of the impacts associated with the actual impacted customer markets . . ." as a result of implementation of interim minimum flow releases. Western maintains that possible impacts to existing conditions should be identified prior to decision making, rather than the contrary, as proposed.

A summary of Western's position and recommendations regarding the ERC Final (draft) Report is then:

1. The proposed minimum-flow changes in operation of the Glen Canyon Dam are intended to further improve the quality of two already outstanding recreational resources. To the extent that the change in operation reduces

the firm capacity and energy that could be produced by the Glen Canyon powerplant, it conflicts with the provisions of the CRSP Act and the intent of Congress concerning powerplant operations as reflected in the CRSP Act and its legislative history.

2. Western does not support the implementation of proposed interim or "test" minimum flow levels. However, Western does support additional data collection and monitoring of existing baseline operations at Glen Canyon, though such studies should be clearly defined and focused with due consideration of annual hydrologic conditions. Such additional studies should also include determination of possible effects of fluctuating flows on all critical resources, including water and power.

3. A properly scoped NEPA process must be completed before any interim minimum release proposals or proposed modifications to the long-term operating criteria for Glen Canyon are implemented. Moreover, the implementation of interim minimum flows would bias the collection of data on any alternative considered in a future NEPA document.

Office of State Government

Department of Energy

memorandum

western Area Power Administration

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DATE: April 26, 1988

REPLY TO ATM OF: A0207, S. Earley

1007

SUBJECT: Priorities of Project Purposes in the Operation of Glen Canyon Dam and Powerplant

Lloyd Greiner, L0000, Salt Lake City, UT

The Bureau of Reclamation proposes to change the operation of Glen Canyon dam and powerplant to establish minimum flows of 5,000 cfs every day from October 30 through April 15 and on weekends from April 15 through October 30, and minimum flows of 3,000 cfs from April 15 through October 30, to further improve already outstanding recreational activities, such as the blue-ribbon trout fishery and white-water rafting. You have asked for my legal opinion concerning this proposal which will significantly reduce the amount of firm power and energy that can be produced by the powerplant, decrease the value of the power resource, increase the costs to power consumers in the region, and, after repayment, reduce the profit returned to the Treasury. As a part of the legal opinion, you have inquired about the priorities to be given the various authorized purposes of the Colorado River Storage Project (CRSP) of which Glen Canyon dam and powerplant are features. You have also asked about the accuracy of a statement in the Glen Canyon Environmental Studies Draft Technical Report (GCES) that suggests that power is to be treated on a par equal to such other purposes as recreation and conservation. Finally, you have asked that I address the accuracy of certain remarks in the legal analysis of the GCES prepared by the National Academy of Sciences. My conclusion is that the proposal of the Bureau's Salt Lake City Region fails to comply with the directives of the CRSP, the law of the Colorado River, and NEPA.

Background

On December 14, 1982, Mr. Clifford I. Barrett, Regional Director of the Upper Colorado River Regional Office of the Bureau of Reclamation (Bureau), sent a letter notifying other Federal agencies of his decision to initiate studies to determine the environmental effects of the present and historic operation of Glen Canyon Dam on the resources of the Grand Canyon. The result, in August 1987, was publication of the GCES. The tudies concentrated on the effect of dam operations on the humpback chub, other native fish, rainbow trout, camping beaches, riparian vegetation and wildlife, white-water boating and trout fishing. The studies were commenced in 1983[2] during a year in which water was spilled due to flood conditions. The water flows into the reservoir during the study continued to be high and, thus, the studies are deficient regarding impacts of operations during low-water years. The studies were not intended nor designed to lead directly to changes in dam operations.[3] Nevertheless, the Bureau proposes to change the operation of the dam.

The apparent but unstated purposes of the proposed minimum flows are to benefit trout and native fishes, trout fishermen and white-water rafters.[4] This proposed change in operations has not been preceded by any study of the

effect of such changes on the primary purposes of the CRSP. The proposal has not been subjected to any documentation or studies consistent with the National Environmental Policy Act of 1978 (NEPA), 42 U.S.C. §§ 4321-4347.

Legal Analysis of Priorities of CRSP Purposes

The legislative history of the CRSP Act reveals that the Act was designed to make use of about 2,500,000 of the 7,500,000 acre-feet of Colorado River water apportioned for use in the Upper Colorado River Basin states by and consistent with the Colorado River Compact of 1922 and the Upper Colorado River Basin Compact of 1949 (Compacts). H.R. Doc. No. 364, 83d Cong., 2d Sess. 148 (1954). The water uses and power generation authorized by the CRSP Act were considered important to the development and economic growth of the area. H.R. Rpt. No. 1087, 84th Cong., 2d Sess., reprinted in 1956 U.S. Code Cong. & Admin. News 2346, at 2350-51 (1956).

Without the power features, the project would not have been feasible. Of the $760 million appropriated for project construction, power revenues were to repay $422.7 million of construction costs allocated to power, $320 million in interest on the power investment, $246.2 million of construction costs allocated to irrigation and leave a surplus of $86 million in the U.S. Treasury at the end of 50 years. By contrast, municipal water revenues were only to recover $45.5 million of costs allocated to that purpose, plus interest; irrigation revenues were only to recover about $36.6 million of the $331.6 million of costs allocated to irrigation; and the $8.6 million of project costs allocated to flood control, fish and wildlife and recreation were and are nonreimbursable. Id., at 2355-2356; see also, 43 U.S.C. § 620g.

Thus, the importance of the three primary purposes of the CRSP Act - storage of water to meet terms of the-compacts, and use of the water for agricultural and domestic purposes, and for the generation of power - is clear. It is a theme repeated throughout the legislative history of the CRSP Act.

The importance given these three primary purposes is reflected in the CRSP Act; they appear repeatedly in various sections - Sections 1, 2, 3, 4, 5, 6, 7, 9, 13, and 14 of the CRSP Act. Other project purposes, such as conservation, recreation, and sedimentation control are mentioned much less frequently or not at all.

The hydroelectric power features of the project were of such interest to the upper basin states that three of those states, in commenting on the proposed project wrote that "the hydroelectric plants of the Colorado River storage project should be operated in conjunction with other powerplants present and potential in such a way as to produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates." See Comments of Colorado, New Mexico and Utah. H.R. Doc. No. 364, supra, at 302, 309, and 315. They were concerned that procedures for power operation be established that would produce the greatest future benefits possible for the upper basin states from the CRSP power. Id. Language in all the CRSP bills then before Congress reflected this conciiii as well as the then-present power

policy of the Congress which required "that the large multiple-purpose projects utilize the water resources to the maximum in the generation of power without impairing the use of the project for irrigation, municipal and industrial water, or flood control." H.R. Rpt. No. 1774, supra, at 4 and 9; see also, e.g., Section 6 of H.R. 3383, The Colorado River StorageProject Hearings on H.R. 70, H.R. 2836, H.R. 3383, H.R. 3384 and H.R. 4488 Before the Subcommittee on Irrigation and Reclamation of the House Committee on Interior and Insular Affairs, 84th Cong., 1st Sess. 3 (1955).

The pertinent language in those bills is found in Section 7 of the CRSP Act, 43 U.S.C. § 620f:

> The hydroelectric powerplants and transmission lines authorized by this chapter to be constructed, operated, and maintained by the Secretary shall be operated in conjunction with other Federal powerplants, present and potential, so as to produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates, but in the exercise of the authority hereby granted he shall not affect or interfere with the operation of the provisions of the Colorado River Compact, the Upper Colorado River Basin Compact, the Boulder Canyon Project Act [43 U.S.C.A. § 617 et seq.], the Boulder Canyon Project Adjustment Act [43 U.S.C.A. § 618 et seq.], and any contract lawfully entered into under said Compacts and Acts. Subject to the provisions of the Colorado River Compact, neither the impounding nor the use of water for the generation of power and energy at the plants of the Colorado River storage project shall preclude or impair the appropriation of water for domestic or agricultural purposes pursuant to applicable State law.

This language is important in two ways. First, it requires that the CRSP powerplants be operated so as to produce the maximum possible firm capacity and energy. The only limitations on this requirement are that the operation of the powerplants must be consistent (1) with the Compacts, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act and contracts entered into under those Compacts and laws, and (2) with the appropriation of water for domestic and agricultural purposes.

Second, it prioritizes the three primary project purposes. The first priority must be given to compliance with provisions of the compacts, the Boulder Canyon Project Act, Boulder Canyon Project Adjustment Act, Rio Grande Compact of 1938 and the Treaty with the United Mexican States. See also, § 9 of the CRSP Act, 43 U.S.C. § 620h. The second priority is to the appropriation of water for domestic or agricultural purposes. See also, § 4 of the CRSP Act, 43 U.S.C. § 620c. The third priority is to hydroelectric power. In fact, the project must be operated so as to produce the maximum firm capacity and energy that can be produced consistent with the above two project purposes. 43 U.S.C. §620f.

Additional project purposes of conservation of the nature and wildlife on project lands, and recreational use of the water areas created as a result of the CRSP Act were authorized in § 8 of the Act, 43 U.S.C. § 620g. Section 8 requires that these purposes be consistent with, i.e. subservient to, the primary purposes of the Act. See also, Jicarilla Apache Tribe v. United States, 657 F.2d 1126 at 1139, 1141 (10th Cir. 1981) ;and Friends of the Earth v. Armstrong, 485 F.2d 1 (10th Cir. 1983), cert. denied 414 U.S. 1171, reh'g. denied. 416 U.S. 952.

In Friends of the Earth, the court rejected a proposal by environmentalists that the Glen Canyon Dam be operated so as to reduce the level of Lake Powell below the 3,606 foot level in order to prevent waters of Lake Powell from encroaching on Rainbow Bridge National Monument. The court found that the conservation proposal would conflict with the Compacts and the CRSP Act. One of the conflicts with the CRSP Act was the negative impact such a reduction in water level would have on power because it would reduce the head or pressure available for power with a resultant drop in the amount of firm capacity and energy that could be generated, and on the amount of money available to the Upper Basin Fund for repayment of power and irrigation costs, and for the operation of project facilities as planned by Congress. It would conflict with the "specific admonition by Congress [to the officials of the Bureau of Reclamation] that the power generation facilities be operated at their most productive rate (43 U.S.C. § 620f)." Id., at 10,11.

The pre-publication copy of the Review Report for the GCES by the National Academy of Sciences (Report) describes similar problems with respect to the Bureau's proposed change in the operations of Glen Canyon dam and powerplant and notes that the GCES fails to support its recommended changes in operations to benefit recreation by discussing the impact of such changes on power production and revenue and the availability and cost of alternative power sources. The Report, pages 102-103, points out that:

> ...an increase in minimum flow during the night will produce a corresponding decrease in maximum flow during the day and a significant loss in revenue to the Colorado River Storage Project (CRSP) due to reduction in short-term sale of surplus energy during peak hours and perhaps even the inability to meet firm power contracts...in the world of energy marketing, the time of day during which energy is produced is crucial for the following reasons: (1) firm power contracts require a large fraction of energy deliveries during peak hours and (2) the opportunity to sell energy surplus to firm power contracts at much higher prices occurs during daily peaks -- not at night. The operations report does not discuss the implication of these facts. For example, if a policy of much higher minimum flows were to be adopted: (1) the existing firm power CRSP contracts could likely not be met (there would be excess capacity at night and inability to meet firm contracts during daily peaks). (2) Costs to CRSP customers would increase by perhaps 3 times

the lost revenue to CRSP because customers of WAPA would have to meet the peak period energy shortfall with much more expensive fossil fuel plants.

The Western Area Power Administration (Western) has studied the effect the proposed minimum flows would have on power production and on costs to CRSP power consumers in the region. Western's findings echo those of the court in Friends of the Earth and of National Academy of Sciences in their Report. The Western study found that the 5000/3000 cfs releases would result in losses of 89 megawatts (MW) of firm power and 218.9 gigawatthours (GWh) of firm energy in the winter season, and 11 MW of firm power and 34.5 GWh of firm energy in the summer season. These losses will increase annual costs of CRSP power users by about $5 million until 1999, at which time their annual costs of replacing the lost firm power and energy would increase to about $22 million. The lost profits that would otherwise have been returned to the Treasury after repayment of project costs were not quantified.

Conclusion

Section 7 of the CRSP Act requires that the CRSP powerplants, which include Glen Canyon powerplant, must be operated at their most productive rate - to produce the greatest practicable amount of firm capacity and energy. The only limitations on this requirement are that priority must be given to meeting the allocation of Colorado River waters contained in the Compacts and to the delivery of water for irrigation and domestic use, and operations must be consistent with the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, the Rio Grande Compact of 1938 and the Treaty with the United Mexican States. The operation of the dam and powerplant for other purposes such as recreation and conservation must be consistent with the above prerequisites. The past and present operation of the dam and powerplant have been consistent with the above prerequisites.

The proposed changes are inconsistent with the above prerequisites since they could cause significant reductions in the amounts of short and long-term firm capacity and energy that would otherwise be produced by the CRSP powerplants. Moreover, it was intended by Congress that after repayment of project costs, power revenues would flow into the Treasury as an additional benefit to the country. This benefit would also be impaired, because to the extent that power operations are reduced, the net revenues returned to the Treasury after repayment would be reduced. The economic benefit that Congress intended power consumers in the Colorado River Basin states to receive from the project power operations would likewise be reduced.

Thus the proposed change in operation of the Glen Canyon Dam to further improve two already outstanding recreational resources would, to the extent that it reduced the firm capacity and energy that could be produced by Glen Canyon powerplant, conflict with the provisions of the CRSP Act and with the intent of Congress concerning the operation of the CRSP as reflected in the CRSP Act and its legislative history.

Susan Earley
Attorney
Office of the General Counsel

FOOTNOTES

[1] The humpback chub is listed as an endangered species. The issue of whether flows-should be changed in order to comply with the Endangered Species Act has not been raised in the GCES, so it is not addressed here.

[2] Lake Powell, the reservoir behind Glen Canyon Dam, had filled in 1980.

[3] GCES, page vi.

[4] GCES, pp. 52, B-41, B-43. The extent to which trout fishery needs these minimum flows is doubtful. It is considered a blue-ribbon fishery and is so popular that the Arizona Department of Game and Fish implemented restrictive fishing regulations in 1978, 1980, and 1986 to reduce fishing pressure. GCES, at 19. The white-water rafting business is apparently also thriving. The National Park Service limits the number of rafters in order to protect the environment from overuse. GCES, at 8. Reservations for commercial trips must be made 1 year in advance. Obtaining a permit for private trips may require a wait of up to 5 years. GCES, at 19.

[5] See, for example, the portion of the CRSP legislative history compiled and reprinted at 1956 U.S. Code Cong. & Admin. News 2346-2425 (1956). See also, H.R. Rep. No. 1774, 83d Cong., 2d Sess. 11 (1954):

> In addition to these three principal purposes [referring to storage of water for river regulation consistent with the Compacts, use of the water for irrigation and municipal and industrial purposes, and generation of hydroelectric power] ... [emphasis added]

For another example, see the comments of the Department of the Army on the proposed Colorado River Storage Project and participating projects, H.R. Doc. No. 364, 83d Cong., 2d Sess. 320 (1954):

> The purpose of the structures recommended in your report would be primarily power and irrigation....

See also Salt Lake City et al. v. Western Area Power Administration, et al., No. C86-1000 G, Slip Op. at 57, fn. 51 (C.D. Utah, April 14, 1988).

[6] Salt Lake City, supra, at 57.

[7] The Bureau's remark in the GCES that all CRSP project purposes, including the generation of hydroelectric power, are incidental to the purposes of satisfying water delivery requirements of the Compacts and for providing water for irrigation and domestic use is accurate. It is also true, however, that the CRSP powerplants must be operated so as to produce the maximum practicable firm capacity and energy, limited only as necessary to meet the water delivery requirements of the Compacts and for irrigation and domestic use. The use of the project for recreation or other purposes is limited to the extent such use is consistent with the above prerequisites.

The Bureau of Reclamation has in fact, apparently operated Glen Canyon Dam and powerplant in accordance with the above requirements since the filling of Lake Powell began. See, for example, the General Governing and Operating Criteria During Lake Powell Filling Period (Filling Criteria), F.R. Doc. 62-7030, published at F.R. 6851 on July 19, 1962. Paragraph 8 of the Filling Criteria unequivocally states that Lake Powell and Lake Mead shall be operated so as to produce the greatest practical amount of power and energy. The use or operation of the project for recreational purposes is not even mentioned in the document. In 1970, the Secretary of Interior signed a document entitled "Colorado River Reservoirs Coordinated Long-Range Operation" (Operations Criteria). The preparation of the Operations Criteria was mandated by §602 of the Colorado River Basin Project Act (CRBP Act), Pub. L. 90-537, 82 Stat. 885, 900 (1968) (codified at 43 U.S.C. § 1552). When enacting the CRBP, Congress reaffirmed the importance of §7 of the CRSP Act by citing it in § 602(c) and requiring that §7 of the CRSP Act be administered in accordance with the operations criteria set forth in § 602(a) and (b). The Operations Criteria are in all respects consistent with the cited provisions of the CRSP Act and with the provisions of the CRSP Act.

8 This portion of the report fails to distinguish between capacity and energy and to note that there can be short-term sales of firm capacity and energy.

9 On pages 53 and 105, the Report, however, mistakenly asserts that "what is at stake are lost power revenues, not a legal obligation" - that the operation of the powerplant to maximize firm power and energy is a discretionary matter, not a legal requirement. This remark is controverted by the legislative history of the CRSP, Sections 1, 7, 8, and 9, and the cases cited above, which place a legal obligation on the Secretary of Interior to operate the CRSP powerplants so as to produce the maximum practicable firm capacity and energy. In accord, Salt Lake City, supra, at 57. This obligation is limited only insofar as it may conflict with the compacts and laws cited above and with the irrigation and domestic water delivery requirements. The operation of the dams and powerplants for these purposes takes precedence over their operation for other purposes.

APPENDIX B

Individual Recommendations

APPENDIX B: INDIVIDUAL RECOMMENDATIONS

PART I: BUREAU OF RECLAMATION

The occurrence of flows above powerplant capacity must be reduced to the greatest extent possible. We recommend the acceptance of the one-in-twenty program.

The existing evidence of impacts of load following operations does not support major reductions in fluctuating flows.

Minimum flows to support fishery and recreational uses could be established as operational goals without significant loss of historical power benefits.

Establish a coordinated analysis and monitoring program to determine long-term impacts of further criteria on the endangered species and the continued existence of beach environments.

PART II: FISH & WILDLIFE SERVICE

Glen Canyon Dam should be operated in a manner which reduces flood flows to the greatest extent possible. (Flood flows should not exceed one-in-twenty years.)

An interim minimum flow of 5,000 cubic feet per second (cfs) should be provided until additional studies are completed which identify and minimum flow requirements for trout, humpback chub, and other native fishes.

The interagency coordinating and planning group established during the initial stages of the GCES should be reactivated to oversee future research, review research results, and define management goals.

Additional research should be undertaken to further define the effects of the operation of Glen Canyon Dam on the natural resources of Glen and Grand Canyons (i.e., impact of fluctuating flows on humpback chub and aquatic productivity and minimum flow requirements for humpback chub and rainbow trout).

Costs associated with additional study and the development and implementation of Section 7 (Endangered Species Act) Conservation Measures should be considered project costs and funded from project power revenues.

Further studies should consider impacts to Lake Powell and other upstream Colorado River Storage Projects.

Further study should include adequate provisions for constituent involvement and review.

PART III: NATIONAL PARK SERVICE

Additional research is needed to determine the effects of several aspects of Glen Canyon Dam operations on Grand Canyon resources. Information is most limited in three areas:

a. The effects of release patterns that were rare during the GCES such as low flows and fluctuating flows.

b. The effect of operational changes initiated by the Bureau of Reclamation to reduce flood frequency on recreation and natural resources at Glen Canyon National Recreation Area.

c. The effect of increased powerplant capacity from 31,500 to 33,000 cubic feet per second.

Operational changes to protect Grand Canyon resources should be initiated along with research to determine their effects, including a refinement of flow requirements for resources and measurement of improvement that result from preliminary changes in operations.

a. Reduce the risk of flood releases to less than one-in-twenty years to protect camping beaches and other alluvial sand deposits in Glen and Grand Canyons, protect vegetation and associated wildlife, and reduce the risk of white-water boating accidents.

b. Raise minimum releases to 5,000 to 8,000 cfs to protect trout spawning, improve safety and quality of white-water boating, and provide upstream access to Glen Canyon for trout anglers and day-use rafters.

c. Reduce rate and amplitude of fluctuating releases to protect and enhance existing populations of native fish including the endangered humpback chub (Gila cypha), perpetuate high-quality white-water recreation, and reduce stranding of trout and other fish.

d. Maintain high, relatively constant flows of 20,000 to 28,000 cfs from May to September to protect and enhance reproduction of humpback chub in the Little Colorado River and improve trip quality for white-water boaters.

Do not include the Western Area Power Administration Special Study with the other materials used as background information for the Executive Review Committee without a thorough review by outside experts and other agencies.

Each agency should formally define its priorities and goals affecting the management of the Colorado River in Glen and Grand Canyons for review by other agencies and bureaus. In particular, the newly initiated operation criteria to reduce the frequency of floods from Glen Canyon Dam should be formalized and distributed to agencies and bureaus for review.

Power revenues should continue to support appropriate and agreed upon research and monitoring of the effects of Glen Canyon Dam on the downstream resources.

An interagency coordinating and planning group is needed to define annual and long-term (exceeding two years) research and management goals, review research results, and plan future research with concurrence and involvement of participating agencies.

PART IV: WESTERN AREA POWER ADMINISTRATION

The impact to power production and loss of power benefits should be thoroughly assessed prior to any decision to modify current operations other than to minimize flood flows. (The National Academy of Sciences also concluded that this relevant information should have been included in the technical report.)

A planning, coordinating, and joint decision-making group should be established for the purposes of sharing information, reaching consensus upon necessary data collection or long-term monitoring efforts, and ensuring that constituent groups are fully informed. A representative from Western and one from the power constituents should be included in the group.

Any monitoring program that is established to determine the existence and direction of any environmental trends should be designed to be cost-effective and to remain focused on the program goals and objectives.

Any short-term data collection still necessary should be clearly focused and accomplished at a substantially lower cost than the environmental studies supporting the technical report.

No substantive operational changes should be made until the compliance process under the National Environmental Policy Act is completed.

Any monitoring program costs should be shared by all program beneficiaries.

APPENDIX C

Individual Findings

APPENDIX C: INDIVIDUAL FINDINGS

Each entity of the Executive Review Committee reviewed the Glen Canyon Environmental Studies Final Report and the comments received from the representative constituent groups. From this review process, each bureau and agency developed specific findings as related to its management objectives. The findings are presented individually.

PART I: BUREAU OF RECLAMATION

* Glen Canyon Dam has had an impact on the environment downstream.

* Flows greater than powerplant capacity have the greatest impact on the downstream resources.

* Powerplant operation to follow peak demands has a significantly lesser impact.

* Endangered species (humpback chub, Gila cypha) populations appear to be maintaining themselves under existing operating conditions.

* Sport fishery and recreational opportunities have increased significantly over pre-dam conditions.

PART II: FISH & WILDLIFE SERVICE

* The Glen Canyon Environmental Studies (GCES) Final Report and other pertinent information, including constituent input, supports the recommendation that benefits to the natural resources of the Glen and Grand Canyon Colorado River corridor would occur with changes in the present operating criteria for Glen Canyon Dam. Flood flows (greater than 33,000 cubic feet per second (cfs)) were found to be so deleterious to the maintenance of backwaters and riparian habitats, that the GCES report recommended their frequency not exceed one-in-twenty years. We support modification of the operating criteria for this purpose.

* Benefits could also be derived by increasing minimum flows and reducing fluctuation. However, study results were less definitive regarding these flow patterns primarily due to the occurrence of high flows over much of the study period. Flows of approximately 5,000 cfs appear necessary for angler access, while flows of 8,000 cfs are required to prevent loss of rainbow trout spawning. Benefits to the endangered humpback chub may be possible with higher flows during spawning (May/June). Additional study is needed to further determine the extent of these benefits at various flows. Further study is also needed to more clearly determine the impacts of fluctuating flows on the overall aquatic productivity of the system and its relationship to the sediment/beach aspects of this river segment.

* Review of the GCES report by constituent groups and participating agencies was impeded by limited review time, lack of technical reports, and the limited number of reports available for review purposes.

PART III: NATIONAL PARK SERVICE

* Flood releases have negative effects on alluvial sand deposits, vegetation, and recreation.

Beaches: Erosion of beaches and other sand deposits is increased greatly at flood releases. This loss is potentially irreversible because sediment lost to the system during flooding is not quickly replaced by tributary flows.

Vegetation and Wildlife: Vegetation is destroyed during flooding, resulting in a loss of wildlife habitat. Irreversible erosion of sand deposits will also lead to irreversible loss of vegetation.

Recreation: Flood releases increase the hazard of running rapids, the number of boaters that choose to walk around dangerous rapids, and the accident rates for anglers. They also reduce recreation benefits for fishing and white-water boating. Loss of camping beaches permanently reduces the recreation benefits of white-water boating.

* Fluctuating releases have negative effects on recreation, trout, and native fishes. However, fluctuating releases were rare during the GCES and their effects need further study.

Recreation: Fluctuations reduce the quality of white-water boating by stranding boats, increasing the difficulty of running some rapids, decreasing the number of campsites and safe mooring places for boats, and reducing the perceived naturalness of the river.

Trout: Fluctuations increase stranding of adult fishes and dry out spawning beds, killing eggs and young if flows go below 8,000 cfs.

Humpback Chub: Fluctuations may dry out spawning areas for humpback chub in the Little Colorado River and transport larvae into the mainstem where cold temperatures can kill them. However, more research is needed on the effects of fluctuating releases on humpback chub.

Native Fish: Larval native fishes depend on quiet, warm backwaters for development. As releases fluctuate, the availability and quality of backwaters change, forcing fish to move into the mainstem river which increases mortality.

• Low releases (less than 8,000 cfs) have negative effects on recreation, trout, humpback chub, and vegetation but may have positive effects on other native fish species.

Recreation: Low releases increase the danger of many rapids for white-water boaters and decrease the trip quality. Low flows also increase accident rates for anglers.

Trout: Low releases expose trout spawning beds, increasing mortality of eggs and young and reducing natural reproduction. Under low releases the level of the mainstem river drops below the level of tributary mouths, restricting access to tributaries for spawning.

Humpback Chub: Low releases may restrict access to spawning areas in the Little Colorado River. More research is needed on the effects of low flows on humpback chub.

Vegetation: Seedlings, saplings, and ramets of native species have increased mortality under low flows relative to exotic species (tamarisk).

Other Native Fish: Low releases may increase the number of backwaters available to native fish larvae. More research is needed on the effects of low flows.

PART IV: WESTERN AREA POWER ADMINISTRATION

* Confusion in the technical report arises from the use of environmental assessment/environmental impact statement (EA/EIS) language which could lead to a misunderstanding that the report is a National Environmental Policy Act document, when it is not.

* To use data practically from the technical report, an appropriate baseline must be clarified; the resource enhancement/optimization issues must be separated from resource maintenance/mitigation issues; and the relationships between events must be clarified. Management and policy objectives also must be separated from scientific objectives and findings.

* There is insufficient identification and quantification of the interrelationships between fluctuating flows and environmental resources, and among the environmental resources themselves, to justify any change in operations. Costs, benefits, and trade-offs between resources need to be determined, and a detailed impact assessment be prepared before appropriate operational changes can be identified and supported.

* The GCES final report does not contain an analysis of the effects of potential operational changes upon power benefits which are essential for informed decision-making. A recent assessment by Western of the consequences to power two alternative minimum releases at Glen Canyon Dam demonstrates that the financial and economic costs of such changes are significant. The annual cost of a 5,000 cfs minimum release rate through 1999 would be in the range of $5 million. Beyond 1999, the annual costs would be about $30 million. An 8,000 cfs minimum release rate would cost $14.7 million annually

through 1999 and would increase to $60 million annually thereafter. (The current minimum release rates are 1,000 cfs in the winter and 3,000 cfs in the summer.)

* The construction of Glen Canyon Dam moderated seasonal flow variations, reduced river sediment loads, and lowered the temperature of the water for some distance downstream. These changed conditions created the opportunity for the sport fishery and white-water rafting to develop to their present high qualities.

APPENDIX D

Individual Management Objectives and Priorities

APPENDIX D: INDIVIDUAL MANAGEMENT OBJECTIVES AND PRIORITIES

Each bureau and agency provided the Executive Review Committee with a list of the priorities and goals which defines its individual management responsibilities for the Colorado River through Glen and Grand Canyons.

PART I: BUREAU OF RECLAMATION

* Stores water for beneficial consumptive use while meeting lower basin legal entitlements.

* Provides for the control of floods.

* Complies operationally with the Endangered Species Act.

* Generates hydroelectric power and energy to the •greatest extent practicable consistent with sound business practices.

* Recognizing the above, to the extent possible, maximizes fish and wildlife, recreation and environmental opportunities.

These objectives were developed in consideration of the great diversity and expectations among users, reflect appropriate consideration of all the uses of the reservoir, and are in concert with the authorizing history and mandates.

PART II: FISH & WILDLIFE SERVICE

* Protection and enhancement of endangered fish species utilizing the mainstem, tributaries, and riparian habitats of the Glen Canyon and Grand Canyon segments of the Colorado River.

* Assures that fish and wildlife resources of this segment of the Colorado River and their associated recreational uses receive equal consideration with other project purposes. This includes the establishment of a flow regime that provides the best possible habitat conditions for native fish and trout populations in concert with other resource needs, and limiting, to the maximum extent possible, the loss of sediment important to the formation of backwaters and riparian habitats.

* Protection of riparian and wetland habitats and their associated fish and wildlife resources.

PART III: NATIONAL PARK SERVICE

* Protects and enhances existing populations of the endangered humpback chub (Gila cypha).

* Maintains Colorado River alluvial deposits (beaches) by mitigating accelerated erosion due to human-induced processes.

* Perpetuates and enhances the opportunity for a high quality white-water boating experience in Grand Canyon.

* Protects and enhances populations of other native fish species.

* Perpetuates the recreational trout fishery.

PART IV: WESTERN AREA POWER ADMINISTRATION

* To satisfy the mandate of Section 7 of the Colorado River Storage Project (CRSP) Act, to operate Glen Canyon and other authorized CRSP hydroelectric plants "so as to produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates, consistent with the Colorado River Compact and the Boulder Project Acts", which include:

    a. Utilizing as much water as possible for power generation, and minimizing releases that exceed the capacity of the powerplant; and

    b. Maximizing the value (not revenue) of power produced by following load and providing the maximum practicable amounts of power during peak use times of the day, week, and year.

* To market Glen Canyon power so "as to encourage the most widespread use thereof at the lowest possible rates to consumers consistent with sound business principles", under policies consistent with Section 5 of the Flood Control Act of 1944.

APPENDIX E: CONSTITUENT GROUP COMMENTS
PART I: BUREAU OF RECLAMATION CONSTITUENCY

INDEX
COMMENT LETTERS
GLEN CANYON ENVIRONMENTAL STUDIES
SEPTEMBER 1987 DRAFT REPORT

Entity	Letter Date	Date Received
Colorado River Board of California	10-30-87	11-01-87
New Mexico Interstate Stream Commission	11-09-87	11-13-87
Wyoming State Engineers Office	11-17-87	11-19-87
Upper Colorado River Commission	11-20-87	11-20-87
State of Utah Natural Resources	11-09-87	11-10-87
Representative John J. Rhodes, III	11-06-87	11-12-87
U.S. Geological Survey	12-30-87	1-05-88
Western Area Power Administration (Reviewed August Draft Report)	9-09-87	9-11-87
National Park Service	12-02-87	12-02-87
Western Region	12-03-87	12-03-87
(Draft comments in two telecopier messages, finals not transmitted)		
Plateau Group of Sierra Club	11-12-87	11-30-87

SUMMARY

COMMENTS RECEIVED FROM BOR CONSTITUENTS ON
GLEN CANYON ENVIRONMENTAL STUDIES
SEPTEMBER 1987 DRAFT REPORT

Dennis B. Underwood, Executive Director, Colorado River Board of California, Los Angeles, CA Date of Letter: Oct. 30, 1987

Requests copy of Glen Canyon Environmental Studies Draft Report and suggests it be sent to Colorado River Commission of Nevada and Arizona Department of Water Resources.

Philip B. Mutz, Interstate Stream Engineer, New Mexico Interstate Stream Commission, Santa Fe, NM Date of Letter: Nov. 9, 1987

Glen Canyon Environmental Studies Draft Report should be reviewed and revised by Bureau of Reclamation personnel familiar with the documents concerning the "Law of the River", the operation of Glen Canyon Dam and Lake Powell, and development of the annual operating plan for the Colorado River System reservoirs.

Frequency of flood releases is one in every 25 years, not one in every four years.

Report should mention River Management Work Group which arrives at current annual operation plan for the Colorado River System reservoirs which minimizes change of releases exceeding 31,500 cfs.

Report shows that operation of Glen Canyon Dam has not had serious adverse effects on the overall river environment below the dam.

Report does not evaluate in dollars the benefits of the primary purpose of Glen Canyon Dam.

There is little to be gained by continuing the studies or starting new studies of the effects of the operation of Glen Canyon Dam.

John W. Shields, Water Resources Engineer, Wyoming State Engineer's Office, Cheyenne, WY 82002

ERC Report and Options Report should be subject to review and comment by the seven Basin States prior to being forwarded to the Secretary of the Interior.

There should be thorough review of the Operations Report with respect to the "Law of the River" and Annual Operating Plan.

Several comments regarding language, facts, and interpretation of dam operations.

John W. Shields (continued)

Report should be rewritten to acknowledge the efforts of the Colorado River Management Work Group and their present and future efforts to avoid bypassing water at Glen Canyon Darn.

Little can be gained by continuing the Glen Canyon Environmental Studies or initiating other studies.

Gerald R. Zimmerman, Executive Director, Upper Colorado River Commission, Salt Lake City, UT Date of Letter: Nov. 20, 1987

Glen Canyon Environmental Studies Draft Report contains numerous inaccuracies concerning the "Law of the River", has failed to recognize the present environmental and other multi-purpose benefits that are due to the operation of Glen Canyon Dam, does not take into account the Federal/State Colorado River Management Work Group efforts to implement new approaches for developing annual operating plans for Colorado River reservoirs, and does not present evidence that operation of Glen Canyon Dam should be changed.

Upper Colorado River Commission and the seven Colorado River Basin States should review and comment on the Executive Review Committee draft report prior to its being transmitted to the Secretary of the Interior.

D. Larry Anderson, Director, State of Utah Natural Resources, Water Resources, Salt Lake City, UT Date of Letter: Nov. 9, 1987

The Operating Criteria have given appropriate consideration to all factors (water conservation, power production, water quality control, recreation, enhancement of fish and wildlife, and other environmental factors) in an effort to balance the benefits of the Colorado River Reservoirs to all users.

Study failed to address the impacts (costs) of enhancing environmental benefits of water conservation and hydropower generation.

Study completed during a period of record setting floods and fails to take into consideration new approaches to river operation that reduce adverse impacts on the environmental features below the darn.

Secretary of Interior should not propose any changes in the operation of Glen Canyon Dam based on this report, but should continue to work with the Colorado River Basin States to develop a jointly acceptable plan to all those involved in the operation of the river.

Congressman John J. Rhodes, III, House of Representatives, Washington, D.C. Date of Letter: Nov. 6, 1987

Extend the review and comment period at least 30 days.

James F. Devine, Assistant Director for Engineering Geology, U.S. Geological Survey, Reston, VA Date of Letter: Dec. 30, 1987

Data are not complete or accurate enough to define how large and/or how frequent floods can be before a net loss of sand from the canyon occurs.

Evidence does not support conclusions that frequent flood releases (above 31,500 cfs) will cause significant and irreversible degradation of the environment by eroding substantial portions of the sand deposits, and frequency of one flood in 20 years producing a net long-term loss of camping beaches and substrate.

Marlene A. Moody, Deputy Area Manager, Department of Energy, Western Area Power Administration, Salt Lake City, UT Date of Letter: Sept. 9, 1987 (Comments on August 1987 Draft Report)

Disagrees with the baseline selected and the approach to the study.

Study should outline present operations as part of existing baseline, then examine changes that could be made to this baseline condition to enhance recreation resources.

Construction of Glen Canyon Dam produced trout fishery and allowed development of white-water rafting and day float trips.

Twelve pages of specific remarks included.

Stanley T. Albright, Regional Director, Western Region, National Park Service, Date of Draft Telecopier Message: Dec. 2, 1987

The Glen Canyon Environmental Studies did not acquire sufficient information to demonstrate the full range of effects of dam operations on humpback chub.

Steps to reduce flood risk to beaches should be put in place immediately and studies should be initiated to study the relationship between fluctuating flows (considering rate and amplitude) and beach erosion processes.

Several operational changes are necessary to reduce/mitigate impacts to white-water boating, including: (1) increase minimum releases to 5,000 to 8,000 cubic feet per second, (2) reduce flood frequency, (3) reduce rate/magnitude of fluctuating flows, and (4) maintain high flows during peak recreational use season.

Further information is necessary regarding life history of native fishes to protect and enhance populations of endemic fish.

Several operational changes are necessary to perpetuate the recreational trophy trout fishery, including: (1) provide minimum release to preclude dewatering of redds (5,000 to 8,000 cfs minimums), (2) provide adequate releases to ensure

Stanley T. Albright (continued)

upstream access to the dam from Lees Ferry, and (3) reduction of fluctuation rate/magnitude to reduce trout stranding.

Maximum powerplant discharge should not be allowed to exceed 28,000 cfs pending further study.

Support continuation of interagency study/planning process and funding by power revenues.

Stanley T. Albright, Regional Director, Western Region, National Park Service, Date of Draft Telecopier Message: Dec. 3, 1987.

Technical studies should be completed so that they can be reviewed.

Operational changes may help humpback chub.

GCES sediment studies do not define relationship between sediment storage in mainstem pools and rate of beach erosion.

Report raises serious questions to the Finding of No Significant Impact on the uprate and rewind program.

Twelve pages of technical comments.

Dan Dagget, Conservation Chair, Plateau Group of the Sierra Club, Flagstaff, AZ Date of Letter: Nov. 12, 1987

Glen Canyon Environmental Studies Draft report had inadequate distribution and short review time.

Impacts of operations obvious and the remedy is to dismantle the dam.

Full National Environmental Policy Act procedures should be initiated. Why has it not been done?

STATE OF CALIFORNIA THE RESOURCES AGENCY GEORGE DEUKMEJIAN. Gererno,

COLORADO RIVER BOARD OF CALIFORNIA
107 SOUTH BROADWAY ROOM 8103
LOS ANGELES. CALIFORNIA 90017
(213) 620 4480

October 30. 1987

Mr. Dave Wegner
Glen Canyon Environmental Studies Manager
Attention: UC - 410
P.O. Box 11568
Salt Lake City, Utah 84147

Dear Mr. Wegner:

The Colorado River Board of California, California's **state agency charged with** protecting **California's rights and interests in the water and power resources of the Colorado River system, is vitally concerned with the operation of the river's reservoir system and actively participates in the formulation of the annual operating plan for the coordinated operation of the reservoir system.**

I understand that agencies involved in resource management in the Grand Canyon and others have recently completed a joint study on the operation of Glen Canyon Dam and that a draft report an the study entitled "Glen Canyon Environmental Studies", dated September 1987, has been made available for review and comment. **Because of our vital** interest **and** involvement **in the operation** of **reservoir system. I would** appreciate receiving a copy of the repor rev **Inasmuch as the state** agencies **in the other Lower Colorado River Basin states involved Colorado River operations would be** similarly interested, su g that revie ies also be furnished to the Colorado River Commiss evada and izona Department or Water Resources.

Thank you for your cooperation on this matter.

Sincerely,

Dennis B. Underwood
Executive Director

LL: **Alan P. Kleinman**
Director
Arizona Department of Water Resources.

Jack L. Stonehocker
Director
Colorado **River** Commission **of Nevada**

NEW MEXICO INTERSTATE STREAM COMMISSION

COMMISSION MEMBERS
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PETER A CASADOS, El Guique
JACK D COOK, Farmington

BATAAN MEMORIAL BUILDING
STATE CAPITOL
SANTA FE, NEW MEXICO 87503

N 9, 1987

M . C I. B
R D
B **of Reclamation**
Upper Colorado Regional Office
P. O. B **11568**
Salt Lake City, **Utah 84147**

Dear Cliff:

This **letter is in response to your October 7, 1987,** letter, **which transmitted for review and comment a draft copy of the Glen Canyon Environmental Studies (GCES) Integration Report.**

The report should be reviewed and revised by Bureau of Reclamation personnel familiar with the documents concerning the "Law of the River," the operation of Glen Canyon Dam and Lake Powell and **the development of the annual operating plan for the** C R **System reservoirs. The report contains a number of inaccurate statements and errors regarding the Law of the River and the operation of Lake Powell** and **does not acknowledge development** .

A , or misrepresentation , statement "U **operating conditions, flood releaser will occur in about** ." F , **flood releases** ali **in** of 31,500 . I U **Colorado River Commission meeting on October 22, 1987, it developed that the high flow years of 1983-86** were **used to arrive at this frequency of occurrence of flood releases, but that, using a representative period of record, the frequency of such a discharge is greater than once in every 25 years. Because much of the report is devoted to the effects on the river environment of flood releases, this one item alone is of considerable importance.**

Mr. Clifford I. Barrett
November 9, 1987
Page Two

The report does not take into account the product of the River Management Work Group in arriving at the current annual operating plan for the Colorado River System reservoirs, which, among other facets, minimizes the chance of releases from Glen Canyon exceeding its power plant capacity, 31,500 cfs. It can be anticipated that future annual operating plans will also minimize the need for releases in excess of power plant capacity.

The report shows that the operation of Glen Canyon Dam has not had serious adverse effects on the overall river environment below the dam. The report further shows that a change in the operation to benefit one aspect of the environment could adversely affect another. Moreover, changes in the current operation could adversely affect both power production and water conservation which would materially reduce the large benefits realized from the current operation.

The report goes into considerable detail to evaluate in dollars the benefits of fishing and rafting, aquatic biology and their environmental aspects, but does not evaluate the benefits of the primary purposes of Glen Canyon Dam.

The report evidences a great deal of work by a number of dedicated individuals over a period of four years. It appears that there is little to be gained by continuing these studies or starting new studies of the effects of the operation of Glen Canyon Dam. The data and analysis of the report can be used together with the annual operating plans to demonstrate that no change in the current operation of the structure is indicated.

Thank you for the opportunity to review and comment on the draft.

Sincerely,

P. Kay
Colorado River Engineer

jl.1 [illegible]

THE STATE OF WYOMING

MIKE SULLIVAN
GOVERNOR

GORDON W. FASSETT
STATE ENGINEER

State Engineer's Office

HERSCHLER BUILDING November 17, 1987 CHEYENNE WYOMING 82002

Dave Wegner
Glen Canyon Environmental Studies Manager
Attention: UC-140
Bureau of Reclamation
Upper Colorado Regional Office
P. O. Box 11568
Salt Lake City, Utah 84147

Dear Mr. Wegner:

In accordance with Regional Director Clifford Barrett's October 7, 1987 letter transmitting a copy of the draft Glen Canyon Environmental Studies (GCES) Integration Report and the discussion on the draft report which occurred at the Upper Colorado River Commission's October 22, 1987, meeting in Denver, Colorado, this letter will serve to provide the State of Wyoming's comments and observations concerning the draft GCES Integration Report. We first wish to take this opportunity to thank you and the four Subteam Leaders for your time and efforts in informing the Upper Colorado River Commission about the GCES and answering questions relating to this work. We found all of the presentations did a creditable job in summarizing very detailed studies. We provide the following comments concerning the Integration Report for your consideration and do appreciate the opportunity to review the GCES Integration Report and provide these comments.

As an initial overall comment on the disposition of the report and what is understood to be planned for the near-term future as the results of the GCES, it has come to our attention that the Executive Committee, consisting of one representative of the five principal agencies who have conducted these studies and prepared the subject report, intends to prepare two additional reports for forwarding along with this one, to the Secretary of the Interior. It has been learned that an Executive Committee Report and an Options Report are to be prepared. Given the complexities of the administration of the Colorado River in accordance with the multi-elemented "Law of the River," the large stake of the seven Basin States in the common river resource and in recognition of the cooperative effort between the seven Basin States and the Bureau of Reclamation which occur (as one example, we note the activities of the State/Federal Colorado River Management Work Group) as the Annual Operating Plan for the Colorado River Reservoir is developed and the operations are monitored and revised, if necessary, the State of Wyoming believes that the Executive Committee Report and the Options Report should he provided to the States for review and comment before they arc forwarded to the Secretary of Interior. We do not recall being informed of the fact that these two reports are being prepared for submittal to the Secretary at the October 22nd Upper Colorado River Commission meeting. Again, we wish to state that we think the opportunity to review and provide input to these two reports, before they are presented to the Secretary of Interior should be given to the Colorado River Basin States. We would appreciate a timely response to our request.

Our review of the report indicates to us that a thorough review of the report and appropriate revision should be conducted by the Bureau of Reclamation with respect to discussion of the "Law of the River" and the elements of and customary preparation of the Annual Operating Plan, before this report is delivered to the Secretary of Interior. There are many inconsistencies and misstatements made in this report with regard to the AOP's and the "Law of the River." We will attempt to point these out in our comments provided below. The report should be more factually correct and complete in its citings and references. For instance, contrary to what is stated at page 33 of the report, the Colorado River Storage Project Act (CRSP Act) does not identify as one of its objectives the "satisfying [of] water delivery requirements to the Lower Basin ..." Further, on page 34, discussion occurs of "Section 602 (a) of the CRSP Act," when the discussion should be about Section 602 (a) of the Colorado River Basin Project Act of 1968. The CRBPA was passed 12 years after the CRSP Act. There is, of course, no Section 602 (a) in the CRSP Act. We also note that no mention whatsoever is made in the report to the State/Federal Colorado River Management Work Group which played a principal role in the development of the Water Year 1988 Annual Operating Plan. These are but three examples of the problems we note with the factual basis upon which the report is grounded. The report should be thoroughly reviewed again and revised to correct its many problems.

Throughout the report, the term "flood release" has been used to define discharges greater than the designated maximum powerplant release of 31,500 cubic feet per second (cfs). The report is consistent in using this term when speaking to releases greater than the designated maximum powerplant release capacity, except in several instances to be noted herein below. We understand from the discussion at the Upper Colorado River Commission meeting that the reason this term was used rather than the more explicit term of powerplant bypasses is due to the fact that the local people in the area around the Glen and Grand Canyons use the term "floods" and "flood releases" to generically describe releases from Glen Canyon Dam in excess of 31,500 cfs. Further, it was noted that when the river outlet works, with capacity of about 15,000 are used, they are generally used to the extent of most of their capacity so that releases then occurring (due to both the powerplant and the river outlet works) are in the range of 40,000 to 46,500 cfs.

We would certainly prefer to see the term "powerplant bypasses" **lowd** rather than "flood releases," because we feel it is more accurate, descriptive and, in our view, is not an emotive term having the same negative connotation that the word "flood" automatically has associated with it. This is a subtle but nonetheless very real point as one reads the text in its entirety. It also takes away any possibility of generically distinguishing powerplant bypass releases from true historic flood flows in the past, thus lumping into the same group extremely rare, very high flow rates with flows that occurred rather commonly. For instance, with respect to the pre-dam period (1922-1962, for the purposes of this study), the text at page D-15 notes that "[m]ean daily flows in excess of 80,000 cubic feet per second (cfs) were not uncommon and were occasionally as high as 100,000 cfs . . . Average daily flows greater than 30,000 cfs occurred about 18 percent of the time ..."

Thus, within this entire report, the reader has no way to know, unless there is specific clarification and explanation made, which is noted to be rather infrequent, as to whether the intention by the words "floods" and "flood releases" is to a flow level that was exceeded about 16 percent of the time or to a rare historical event.

For instance, the "Summary and Principal Conclusions" section of the report refers to the flood releases of 1983 in its fourth paragraph (wherein the Glen Canyon release on June 29, 1983 was about 92,000 cfs and inflow to Lake Powell peaked at 116,000 cfs on June 28, 1983) and in its fifth paragraph immediately below speaks to the effect of "frequent flood releases" on the environment due to the erosion of sand deposits. It would seem to us that the word "flood" just gets worn out in this report and comes to have only a very blurred meaning. Given the thorough scientific foundation upon which this integration report rests, it seems less than proper and very undesirable to have important distinctions like the difference between 90,000 cfs and 31,500 cfs releases lost in this report so that the word usage (perhaps even characterized as slang) of people living near the Canyons area can be accommodated in this report. We would be pleased to discuss this comment at more length and elaborate on our thinking if you so desire.

As concerns "flood releases," we note that the statement is made several times in this report that "under current operations, flood releases will occur in about one of every four years." Further, but intensive, reading of the report plus some clarification provided at the October 22nd Upper Colorado River Commission meeting, indicates that this statement is extremely misleading. While the report does recognize that the GCES "occurred at a critical juncture in the 'life history' of Glen Canyon Dam, when significant releases above powerplant were occurring with regularity for the first time," we believe that a very poor decision was made in characterizing the "current operations" as being based on Water Years 1983 through 1986 and deriving a "flood release" return period of 1 in 4 years based on those four years of data. As even a perfunctory evaluation based on the full period of record will demonstrate, the actual return period for releases greater than powerplant capacity is more like once each 25 years.

Because much of the report is devoted to the effects of **these "flood releases" on the river environment, the** importance **of this one** repeated mischaracterization cannot be overemphasized. The report should be rewritten to deal with the fact that Water Years 1983 through 1986 are the highest four years of recorded Colorado River flows since the Colorado River Compact of 1922 was signed. We further point out that the three 4-year periods of highest natural flow were, in order of magnitude, 1983-1986, 1982-1985 and 1920-1923, based on estimates of the natural Colorado River flow from present back to 1906. The four-year period of 1920-1923 reflects a volume of almost 10 million acre-feet less than 1983-1986. Other studies have documented that the probability that the flow experienced during Water Years 1983-1986, the study period, will again be equaled or exceeded is extremely small, such that a return period of well in excess of 100 years can be calculated. These facts have not been given their due consideration in the GCES approach and their write-up in this report. It seems clear that revision of the report with regard to these areas is definitely warranted. The 1 in 4 year return period just isn't so.

With regard to the discussion of the functions of Lake Powell at the bottom of page 9, and specifically the mention of the Mexican Treaty (second line from the bottom of page 9), we comment that the Upper Division States do not concur with the Bureau of Reclamation's statements as to the obligations of the Upper Division States to deliver water to satisfy the Mexican Treaty requirement. It is the position of the Upper Division States that with the delivery of 75 million acre-feet of water in each period of ten consecutive years at Lee Ferry, the water supply is sufficient to meet the apportionments to the Lower Basin provided for in Article 111(a) and 111(b) of the Colorado River Compact and the entire Mexican Treaty obligation. The position of the Upper Division States should be noted in the text of the report at this point, or alternatively, the sentence should be rewritten to avoid specific mention of the Treaty by reference to the "Law of the River" or in some other general manner. The word "dam" should be capitalized in the second line from the bottom of page 9 also.

At page 31, the fourth line of the third paragraph should state that the combined discharge capacity of the eight turbines is approximately "33,100" cfs, not "31,500" cfs. This is evidently a typographical error. As noted at page D-25, the powerplant can release a maximum of 33.200 cfs at a water storage elevation of 3,700 ft and 33,100 cfs at an elevation of 3,693 ft or below. An operational cap has been placed on the releases as is explained in the text on pages 31 and 0-25.

In the fourth paragraph of page 31, it is indicated in the seventh line that the combined powerplant and river outlet release can reach 48,500 cfs, however the figures given above add to only 48,100 cfs.

We note that the discussion of the objectives of the CRSP Act at the top of page 33 with respect to the Act listing the satisfying of water delivery requirements under the Colorado River Compact as one of the identified objectives of the Act is incorrect. Section 1 of the CRSP Act, 70 Stat. 105, sets forth the purposes of the Act and does not list what is identified in the first sentence of page 33 as item (2) as one of the Act's purposes. This paragraph should he rewritten. A comment along these same lines concerns the first sentence at the top of page 34, wherein the text states that "Section 602(a)" is in the CRSP Act. This is of course not true. The text has confused the CRSP Act And the Colorado River Basin Project Art of September 30, 1968, Public Law 90-537. This point is again made that a hard review of the sections of the report dealing with the statutes would seem to he in order. Given the importance of the compacts, laws and decrees governing the Colorado River and the delicate balance which these "rules" maintain, it is particularly important that these he accurately described and represented in a report of this type.

For the sake of accuracy, it is suggested that the word "Division" he substituted for "Basin" in the second paragraph on page 33 in the first three instances in which the word "Basin" appears. In the second to last line of that paragraph, the usage of "Basin" is appropriate,

but, as we state immediately above, the term "Division" would be directly in accordance with the terms and definitions provided in the Colorado River Compact and hence would be more appropriate in the first three places in this paragraph.

With regard to the paragraph on page 34 which addresses the objectives of avoiding [anticipated] spills as found in Article II (3) (c) of the "Criteria for Long-Range Operation of Colorado River Reservoirs" (the Operating Criteria), we note that the term "spills" is defined in Article IV (a) of the Operating Criteria. We comment that the language in the paragraph is not a good paraphrasing of Article IV (c), in that this paragraph speaks only to powerplant bypasses as opposed to water releases which "cannot be utilized for project purposes, including, but not limited to, the generation of power and energy." The discussion in the third paragraph on page 34 has oversimplified the objective of avoiding anticipated spills. The fact that the decision as to water releases is tied to the 602(a) storage determination by the Secretary within the context of the annual operating plan process is not acknowledged in this paragraph. The words "at any time" and "later" appearing in this paragraph strike us as not recognizing the fact that the Operating Criteria specifically provides several objectives which must all be considered and weighed in making release decisions, nor do they recognize the language of Article II (4) relating to the retention of storage in Lake Powell to avoid bypass of water for subsequent release as soon as practicable to equalize Lake Powell and Lake Mead storage. We would suggest redrafting this paragraph to point out the several factors which are integral to meeting the objective of avoiding anticipated spills, and believe that in so doing this will correctly advise the reader that releases cannot be increased "at any time" but, rather, that the decision to increase releases is conditional upon other objectives, such as that the water can be reasonably applied to Article III(e) uses, etc., being met as well.

On page 35,. the third paragraph states that "Glen Canyon Dam has not been used significantly for river regulation ..." What is meant by this statement? This sentence is not consistent with the discussion on page 34 as to the contributions of Lake Powell towards meeting the 8.23 million acre-foot minimum objective release, nor is it consistent with the text found at the top of page 33 which summarizes the purposes of the CRSP Act.

It appears to us that the elevation figure of 3,648 feet found in the first full paragraph at the top of page 36 is a typographical error. The reservoir elevation at which 22.6 million acre-feet of water (useable storage) is in storage is understood to be 3,684.605 feet. The elevation figure of 3,648 feet is the permanent spillway crest and corresponds to about 17,530,000 acre-feet of live storage or 19,530,000 acre-feet of total storage.

Our next comment is offered on page D-8. In the seventh line of the second paragraph on page D-8, the word "Lees" should correctly be "Lee." The Compact point is Lee Ferry while the closest gaging station to the point is Lees Ferry, which is about seven miles above Lee Ferry.

In Table D-2, found on page D-12, the column "Energy" has the unit of kilowatts immediately below the column title. It is noted that kilowatts is a measure of power as opposed to energy and that the correct unit should be kilowatt-hours.

On page D-17 is found Table D-3. The first column of the table attempts to show the period of time during which the Operating Criteria and the Filling Criteria have been in place on the river. This first column is not correct. The Operating Criteria was not promulgated until June 4, 1970. The Filling Criteria were approved on April 2, 1962 and were terminated prior to the date shown in the first column of this

On page D-19, mention is made in the first paragraph (which begins on the previous page) of the agreement as to the annual January 1st storage target in Lake Powell. We would comment that this agreement •be referred to as a general agreement rather than an informal one. We should note that the agreement is set out in writing in a May 13, 1983 letter from Cliff Harrett to the Executive Director of the Upper Colorado River Commission.

A typographical error is noted as to the spelling of the word "ascending" in the first line of the fourth paragraph on page D-27.

Concerning the definition of "flood" on page 4 of the Glossary, we have previously commented at length on the use of this wording throughout the report. We feel that the definition provided hereat points out additional reasoning as to why release in excess of powerplant capacity should be called just that.

On page 7 of the Glossary, the definition provided for "Lower Basin" actually describes the "Lower Division"; or "States of the Lower Division" as defined in Article II of the Colorado River Compact.

The definition of "surplus water release" provided on page 12 of the Glossary is extremely poor and should be revised. Consideration of the meaning of the term within the various documents comprising the "Law of the River," and the fact that the word has different meaning depending on which document is being studied, dictates that a "tighter" definition be provided herein. The definition provided should definitely state that the definition being provided is only to mean and be used within the context of this report. This is an important point because of the sensitivities and importance of the term within the Colorado River Basin.

The definition of "Upper Basin" found on page 13 of the Glossary in actuality is more correctly that for the "Upper Division" as defined in Article 11 of the Colorado River Compact. That article provides a definition for "Upper Basin" and "Lower Basin" which could appropriately he used in this report.

We again call to your attention that the report does not take into account the work of the State/Federal Colorado River Management Work Group which has implemented a process for developing annual operating plans for the Colorado River reservoirs. By its very charter - that is,

a primary purpose for which the Work Group was initiated -- the Work Group is working to minimize the risk of powerplant bypasses. It will be recalled that in documents sent out by the Secretary of Interior explaining the Water Year 1988 Annual Operating Plan that was agreed to by Reclamation and representatives of the seven Colorado River Basin States, the AOP analysis stated that the probability that releases will exceed the Glen Canyon powerplant capacity is in excess of 1 in 25 years, or less than a four percent chance. A four percent chance is, of course, well within the range that the draft report suggests would be an acceptable "flood" frequency and is, of course, much smaller than the twenty-five percent chance which this report misstates with its 1 in 4 year figure.

We think a very strong argument can be made that the current process for developing annual operating plans, involving the Colorado River Management Work Group, will continue in future years to minimize the risk of powerplant bypasses - or "flood releases" as they have been termed in this draft report. The report should be rewritten to acknowledge the efforts, both this year and the anticipated continuance of the Work Group, to prevent powerplant bypasses. We believe that there is no need to continue these or pursue additional studies or to attempt to suggest operational changes at Glen Canyon Dam.

According to the report, one of the prime motivating factors for initiating these studies was the public concern expressed about fluctuation of the releases from Glen Canyon Dam. We note the report states that this public concern was raised in connection with, or was focused by, the Uprate and Rewind Program, per page 11 of the report. At page 74, the draft report states as a conclusion on this issue that the impacts of increasing the powerplant capacity to 33,100 cfs "cannot be assessed at this time." We are somewhat concerned that a more definitive conclusion cannot be drawn on one of the main questions posed in these studies, which have occurred over a 5-year period and have involved many studies, many researchers and many dollars. It would seem that further studies are not warranted to try to answer a question about a 5 percent change in powerplant capacity if it could not be answered given the very large expenditures of time and money that have occurred to date.

The above constitute our specific comments on the report. We have not found any items in Appendices A, B and C which merit repeating previously-made comments on here, although we have read over those sections of the report as well. With respect to comments on the report in general, we offer the following thoughts for your consideration.

The report seems to be indicating that the operating plan for Water Year 1988, as recently agreed upon by the Seven Basin States and the Bureau of Reclamation, provides the best mix of acceptable uses and releases to best protect the "critical Canyon resources." We note that the implication stated in the report is that the risk of anticipated spills must be kept very low in order to protect and maintain the Canyon's resources, particularly with respect to sediment transport and disposition. The Water Year 1988 Annual Operating Plan has set forth a means of operating the reservoir system which provides a

probability determined to be in excess of 1 in 25 that a spill might occur. The present operating plan thus meets the principal recommendation embodied in the study's results, and hence should be supported in future years. We see little to be gained by continuing these GCES studies or initiating others. We believe that this conclusion should be clearly made known as this document is revised and forwarded to the Department of Interior.

Thank you for the opportunity to review and comment on the Glen Canyon Environmental Studies Draft Report. We wish to note that we have been involved with, and hence concur with, the comment letter provided to you by the staff of the Upper Colorado River Commission, as signed by Gerald R. Zimmerman. That letter, like this one, raises many substantive points and issues which need to be properly addressed in this report. We look forward to an early response from Reclamation concerning the Executive Committee Report and Options Report and what the States' role may be in the preparation with those reports. Please do not hesitate to contact me if I may answer any questions or provide clarification of the points made herein.

With best regards,

JOHN W. SHIELDS
Water Resources Engineer

JWS/llw
cc: Gerald R. Zimmerman
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D. Larry Anderson
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Division of Water Resources
1636 West North Temple
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BUREAU ... TIC

UPPER COLORADO RIVER COMMIS

355 South Fourth East Street
Salt Lake City, Utah 84111

November 20, 1987

Mr. Clifford I. Barrett
Regional Director
Upper Colorado Region
U. S. Bureau of Reclamation
P. O. Box 11568
Salt Lake City, Utah 84147

Dear Cliff:

The Upper Colorado River Commission has reviewed the Bureau of Reclamation's "Glen Canyon Environmental Studies Draft Report" (draft report) dated September 1987. Because of the short time period allowed to provide comments and because the technical reports that provide the supportive data and information are not available for review, the Commission's comments will be general in nature and confined to the "Summary and Principal Conclusions" and the "Draft Report" sections of the draft report. The lack of detailed specific comments on the draft report should not be construed as agreement with the technical information or conclusions presented in the draft report.

The Upper Colorado River Commission finds that the Glen Canyon Environmental Studies draft report:

(1) contains numerous inaccuracies concerning the "Law of the River" as well as other errors;

(2) has looked at the operation of Glen Canyon Dam as it may impact selected environmental resources but has failed to recognize the present environmental and other multi-purpose benefits that have been and are being received from the current operation of Glen Canyon Dam;

(3) does not take into account efforts by the Federal/State Colorado River Management Work Group to implement new approaches for developing annual operating plans for the Colorado River reservoirs; and

(4) does not present evidence that the operation of Glen Canyon Dam should be changed.

The draft report should be thoroughly reviewed in-house by Bureau of Reclamation personnel who are familiar with the "Law of the River" and the operations of the Colorado River. Through such a review misused and misquoted references to the "Law of the River" and other glaring errors should be found and corrected.

The draft report does not recognize that due to the construction and operation of Glen Canyon Dam the white water boating season has been extended, a trout fishery has been established, a more diverse ecology has been established in Glen and Grand Canyons, the risk of extremely low or large discharges has been virtually eliminated, and the populations of plant and animal species in the canyons have increased and new species have taken up residence in the study area.

Statements in the draft report that "flood" releases are expected to occur once every four years under current operations (a twenty-five percent chance of occurrence) are incorrect. Under the Water Year 1988 Annual Operating Plan that was agreed to by representatives of the seven Colorado River Basin States and released by the Secretary of the Department of the Interior on October 1, 1987, the probability that releases from Glen Canyon Dam will exceed the power plant capacity is less than one in twenty-five years, or a four percent chance of exceedence. A four percent annual chance of bypassing the Glen Canyon power plant is considerably less than the twenty-five percent annual chance of occurrence referred to in the draft report and is well within the range that the draft report suggests would be an acceptable "flood" frequency.

Modifying the operation at Glen Canyon Dam to enhance selected recreational or environmental resources could adversely affect the continued existence of the endangered humpback chub and may be non-beneficial to other critical recreational and environmental resources in Glen and Grand Canyons. Modifying the operation of Glen Canyon Dam definitely would have adverse effects on the primary benefits for which the Dam was authorized and constructed.

The current annual operating plan for the Colorado River reservoirs developed by the Federal/State Colorado River Management Work Group adequately balances the primary and incidental benefits of Glen Canyon Dam. Given the existing process for preparing annual operating plans and based on the comments contained herein and the results of the draft study, it is not necessary for the Secretary of the Interior to conduct any further studies or environmental assessments to evaluate additional management options or to study the impacts of alternative reservoir operating scenarios at Glen Canyon Dam as suggested in the draft report.

The Commission understands that an Executive Review Committee is reviewing the draft report, comments received on the draft report, the report prepared by the National Academy of Sciences, and other material related to the Glen Canyon Environmental Studies. Based on its review, the Executive Review Committee will prepare reports and recommendations for transmittal to the Secretary of the Interior. The Upper Colorado River Commission appreciates the opportunity to comment on the Glen Canyon Environmental Studies Draft Report and trusts that its comments will be considered by the Executive Review Committee. Also, the Commission requests that it and the seven Colorado River Basin States be provided copies of the Executive Review Committee's reports and recommendations in draft form before they are transmitted to the Secretary of the Interior.

Very truly yours,

Gerald R. Zimmerman
Executive Director

cc: Mr. Dave Wegner
Glen Canyon Environmental Studies Manager

STATE OF UTAH
NATURAL RESOURCES
Water Resources

Glen Canyon
Environmental Studies

Norman H Bangerter, Governor
Dee C Hansen, Executive Director
Dalarry Anderson, Division Director

1636 West North Temple • Suite 310 • Salt Lake City UT 84116-3156 801-5335401

November 9, 1987

Mr. Dave Wegner
Glen Canyon Environmental Studies Manager
Bureau of Reclamation
Upper Colorado Region
Salt Lake City, Utah 84147

Dave:

We appreciate the time and effort expended by you and your team leaders in presenting the background and results of the draft report titled "Glen Canyon Environmental Studies". Your explanations answered a number of questions that puzzled us as we reviewed the September 1987 draft report.

As you stated in the meeting, the study was initiated by Secretary of Interior Watt in 1983 to: (1) quantification of impacts of Glen Canyon Dam on downstream environmental uses (ex. white water rafting, trout fishing, Humpback Chub, riparian habitat, etc.) and (2) identify operational changes in releases from the dam can increase the benefits of the environmental uses. You stated that the report was not a proposal for operational changes, but was to provide information on operational alternatives. Since it is always useful to have objective information developed in the study will be helpful in the preparation of future operational plans on the Colorado River.

It should be stressed, though, that the Criteria for Coordinated Long-Range operation of Colorado River reservoirs commonly referred to as the "Operating Criteria" states that "The plan of operation ... shall reflect appropriate consideration of uses of the reservoirs for all purposes, including ... water quality control, [illegible] Article 6 [illegible] have reference to appropriate [illegible]

Since we have not had an opportunity to review any of the back round studies (41 separate reports) which formed the basis of the draft report, we cannot comment on the technical adequacy of the study. The conclusion in the draft report that individual environmental features can be enhanced by modifying the dam release pattern is not surprising and have been anticipated without the study. A weakness in the study is that it failed to [illegible] the [illegible] gas s[illegible]en [illegible]ing environmental benefits, water [illegible]ation and hydropower generation, the principal purposes for which the dam was constructed. Without that analysis the report cannot be evaluated in a meaningful way. Further, the report was completed during a period of record setting flood flows and fails to take into consideration new approaches to river operation that reduce adverse impacts on the environmental features below Glen Canyon Dam.

The Secretary of Interior should not propose any changes in the operation of Glen Canyon Dam based on this report, but should continue to work with the Colorado River basin [illegible] in the Jeve[illegible]olen [illegible]10 [illegible]ver. Thank you again for your presentations, and the opportunity to review the draft study.

Thank you,

D. Larry Anderson
Director

cc: Gerald R. Zimmerman
William McDonald
Steven Reynolds
Jeff Fassett
Alan Kleinman
Dennis Underwood
Jack Stonehocker
Don Christiansen
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GLEN CANYON UNIT
CRSP

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MINORITY ENTERPRISE DEVELOPMENT
ANTITRUST IMPACT OF DEREGULATION
AND PRIVATIZATION

REPUBLICAN POLICY COMMITTEE

N[illegible] 6, 1987

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D[illegible] M[illegible]. B[illegible]:

T[illegible] G[illegible] C[illegible] E[illegible] S[illegible] (GCES) I[illegible] R[illegible].

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S[illegible],

John J. R[illegible], III
M[illegible] of C[illegible]

JJR:jh

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VA 22092

In Reply Refer To:
WGS-Mail Stop 423

Glen Canyon
Environmental Studies

30

Memorandum

To: Glen Canyon Environmental Studies Manager, Salt Lake City, Utah

From: Assistant Director for Engineering Geology

Subject: Review of draft technical report/environmental studies for Glen Canyon, Utah

We have reviewed the report as requested in your letter included in the document dated September 1987.

We found that a large amount of scientific work was accomplished despite unanticipated extremely high flows during the study period. The study team responded by shifting the primary focus of the investigation from the analysis of impacts due to peaking power operations to an assessment of the effects of large floods. These large flows made possible the collection of some very valuable information, but limited that which could be analyzed for more typical floods.

The report reaches a valid conclusion that frequent large "flood" releases of sediment-free water will cause significant erosion of a substantial portion of the sand deposits in the canyon. The data are not complete or accurate enough, however, to precisely define how large and/or how frequent the floods can be before a net loss of sand from the canyon occurs.

The principal conclusion that frequent flood releases (greater than 31,500 ft 3/s) will cause significant and irreversible degradation of the environment by eroding a substantial portion of the sand deposits does not appear to be supported by the evidence presented. Furthermore, the principal conclusion that "even a frequency as low as one flood in 20 years will produce a net long-term loss of camping beaches and substrate" seems highly unlikely.

With the respect to sand transport, the report correctly implies that the long-term fate of the sand-based resources in the canyon depends largely on the difference between the supply of sand to the canyon and the loss of sand from the system. The current supply is almost entirely from the tributaries which is estimated to be about 3.6 MT/year (2.9 MT from the three major tributaries, and 0.7 MT/year for the 310 ungaged tributaries, pages A28-A30). This estimate is extremely tenuous, however, as indicated on pages A28 and A30. The supply may even be changing with time because of climate shifts or other factors (page 27). At any rate, however, the supply is independent of release rates.

The sand supplied to the canyon is transported out of the canyon by the flow and the transport rate of sand increases rapidly with increasing flow so that large flows transport the bulk of the sand. Because truly large flows (greater than 100,000 ft 3/s) have been eliminated, the ability of the river to transport the reduced supply of sand out of the canyon has been greatly reduced. On page A43, the report correctly states that the rate of sand loss is affected by the magnitude, duration, and frequency of floods but it also states that our present knowledge is not sufficient to define the relative importance of the factors to sand loss. On page 59, the report states that they have "very little idea of how the system responds to a given frequency of floods."

The principal conclusion that flood releases (greater than 31,500 ft 3/s no matter how short in duration) even as infrequent as once every 20 years will cause significant and irreversible degradation of the environment by eroding a substantial portion of the sand deposits is counter to almost all available evidence. The conclusion in effect says that a release of 31,600 ft 3/s for even 1 day every 20 years will. transport more sand out of the system than has been supplied by the tributaries during that time. Evidence to the contrary is summarized below:

Page A19 - Fluctuating flows with peaks below 31,500 ft 3/s for annual volumes of 8.2 million acre-feet ,transport only 12 percent more sand than a study flow of 12,000 ft 3/s.

Page A26 - The STAB model indicated a net sand loss of only 6.6 MT (a 1.8 year supply) as a result of floods in 1984 and 1985. These were flows of nearly 50,000 ft 3/s for 3 1/2 to 4 months.

Page A31 - Figure A9 shows that although the huge flood of 1983 (97,200 ft 3/s, for 2 1/2 months) eroded the bed significantly, the floods of 1984 and 1985 had little effect on the bed elevation.

Page A32 - "Sediment transport modeling and analysis of data from gaging stations demonstrate that flows less than maximum power plant releases (31,500 ft 3/s) are not capable of transporting all the sand delivered annually from tributaries unless annual volumes *exceed* 12 maf." The mean annual volume is 11.3 maf.

Page A42- The huge flood of 1983 did not cause consistent erosion throughout the canyon "Some sand deposits did aggrade in 1983." "The area of sand exposed at low discharge increased at many sites in the reach from River Mile 122 to River Mile 160 between 1973 and 1984 (Schmidt and Graf, 1987) " (page A44) "Vertical aggradation of channel margin deposits was reported by Beus and others (1985)." (page A44)

Page A51 - "Estimates made with the STAB model suggest that sand storage in the main channel pools will increase under current operations (floods of 40,000 to 50,000 ft 3/s for about 6 weeks about once every 4 years) and average annual tributary delivery of sand. Aggradation is predicted because the degradation associated with the short periods of flood releases which occur once every fourth year is more than balanced by the aggradation during the low-release years."

Page A55 - The STAB model estimates suggest that flow releases of 33,100 ft 3/s for 2 months each year will be incapable of removing the sand supplied by the tributaries.

It is agreed the frequent large releases will cause a net loss of sand but the size, duration, and frequency of releases which will result in a stable sand budget is hi9hly uncertain. The limited evidence available suggest that current operating procedures would result in approximate balance, however, and that limiting the flows to 31,500 would cause gradual aggradation. In light of the limited evidence, the following statements should be modified:

Page 81 - "Even infrequent floods cause loss of camping beaches and vegetation substrate, and it appears that this loss is irreversible."

Page 82 - It has not been clearly established that eliminating flood ($Q > 31,500$) releases wil reduce impacts.

Page A19 - "Frequent flows higher than 31,500 ft 3/s will severely deplete sand" should be modified to read "Frequent flows significantly higher than 31,500 ft 3/s ..."

In regard to the loss of camping beaches and substrate, the argument is made on pages 59, 60, and A43 that because the flood of 1983 occurred after a period of 20 years with no floods that floods even as infrequently as once every 20 years will cause severe losses of sand. This argument is carried over in the Principal Conclusion that "Current knowledge indicates that even a frequency as low as one flood in 20 years will produce a net long-term loss of camping beaches and substrate although at a rate reduced from current operations."

We do not believe these conclusions can be substantiated since the 1983 flood was an extreme event with a discharge three times larger than the report's definition of a flood. The data in figure A9 indicates that even this extreme flood was capable only of removing the sand which had accumulated during the preceding 18 years. The Principal Conclusion should be modified to emphasize that only one "extreme" flood can be tolerated every 20 years and not imply that a flood of 31,600 ft 3/s every 20 years will cause irreversible losses.

There are a number of inconsistencies in the report which should be corrected. They are as follows:

Pages 2, 11,43, and 18.

The report defines a flood as any instantaneous release in excess of 31,500 ft3/s (page 2 of the Summary and Principal Conclusions, and pages 11 and 43), but also defines it as a release of 40,000 ft 3/s or greater for a month or more (page A18). A consistent definition should be used throughout the report.

Page 15 - Top of page, text is missing.

Page 59 - The report states the 1983 flood occurred after 20 years with no floods, yet on page 12 the report states, floods occurred in 5 of the last 7 years (report ends in 1986), so at least two floods would have had to occurred before 1984. This reduces the frequency from flood in 20 years to one flood in 10 years, for example.

Page 61 - Refers to this chapter and a previous chapter, but the report does not have chapters—it has sections

Page 62 - The last sentence on page 62 should be clarified.

Page 72 - The discussion on page 72 refers to a flow release pattern shown in Figure VII-6 but no such information is provided in Figure VII-6.

Page A15 - The report discusses the location of a gaging station in Figure Al as being near Bright Angel Creek but Figure Al does not show Bright Angel Creek.

James F. Devine

Copy to District Chief, WRD, Salt Lake City, Utah

Department of Energy

Western Area Power Administration
Salt Lake City Area Office
P.O. Box 11606
Salt Lake City, UT 84147

SEP 0 9 1987

Mr. Clifford I. Barrett
Regional Director
United States Bureau of Reclamation
ATTN: Mr. Harold Sersland
P.O. Box 11568
Salt Lake City, UT 84147

Glen Canyon Environmental Studies
Received 9/11/87

Dear Mr. Barrett:

Enclosed are comments on the August 1987 preview copy of the Glen Canyon Environmental Studies (GCES) Draft Technical Integration Report, as requested in your letter dated August 15, 1987. In general, this draft report is much improved from the earlier versions. The writing is more clear and concise, and the document is much better focused. Presentation and organization also appear to be improved from the earlier documents.

Western Area Power Administration (Western) offers the following comments based on a review of the August 1987 draft of the Technical Report.

Western disagrees with the baseline selected and the approach to the study. The study uses a hypothetical situation of ideal conditions for white-water rafting and trout fishing as a baseline for the determination of impacts resulting from the present operations of Glen Canyon Dam. Any situation of less-than-optimal conditions for these recreation interests is considered an "impact" by the study. The study then proceeds to justify the optimization of these recreation interests based on the "impacts" identified.

Western has a number of concerns related to this approach. In the usual environmental impact analysis, a hypothetical optimum cannot be used as a baseline. It is recognized that this was not and is not a National Environmental Policy Act (NEPA) analysis. However, it is clearly more of a recreation resource optimization plan than an environmental study. Western feels that the document should reflect this. The study should outline present operations as part of the existing baseline situation, then examine changes that could be made to this baseline condition to enhance the recreation resources.

As discussed in the report, the construction of Glen Canyon Dam produced the cold, clear water that allowed the trout fishery to flourish. The moderated and regulated flow regime also allowed the development of white-water rafting and day float trips. All of these recreation resources are of extremely high

quality, as shown in the Technical Report. In its present format, the study struggles to identify "impacts" attributed to the very conditions that formed the resources in the first place. Western feels the approach described above, essentially a straightforward optimization plan, would greatly reduce the confusion introduced by the idealized baseline and relationship of the dam to the recreation resources.

For similar reasons, the term "impact" as used in the study is inappropriate. "Impact" is a term loaded with NEPA meaning--it is nearly impossible to use the word disassociated from these NEPA connotations. Because of the relationship of Glen Canyon Dam and its operations to the resources in question, "impact" cannot properly be used to describe any effects present operations would have on an idealized optimal recreation resource. The approach advocated by Western would resolve this problem by the change in perspective.

A major objective of the GCES is to quantify the existing baseline conditions and to identify parameters that could be potentially modified to enhance the recreation resources. It it Western's understanding that the GCES were intended to provide enough information to the Secretary of the Interior so that he could make a decision whether or not the possibility of modifying present Glen Canyon operations for recreation and environmental preservation should be pursued. The benefits that could be derived from a change in operations have not been sufficiently quantified in the draft report to adequately serve this purpose.

Specific remarks on the text of the draft integration report are enclosed.

We appreciate the opportunity to consider this preview copy and to provide these comments. It is my understanding that our comments, and comments from other involved agencies, will be compiled and distributed to the Executive Committee members prior to general distribution of the draft integration report.

A list of Colorado River Storage Project preference customer representatives who should receive a copy of the draft integration report is also enclosed, as requested.

Sincerely,

for Marlene A. Moody
Deputy Area Manager

2 Enclosures

bc:
S. Earley, A0207, Golden, CO
W. Jamison, A0400, Golden, CO
G. Frey, A0420, Golden, CO
J. Hall, A6000, Golden, CO
R. Fullerton, A6100, Golden, CO
G. Greeny, A6300, Golden, CO
(ea. w/copy of enclsures)

bcc:
10000
10600
L22
L2 [redacted]
[redacted]B00 (w/copy of enclosures and incoming letter)
L1007 RF(2), OF

L6300:JMcCoy:jw:x5399:09/08/87
Final:09/09/87:dw
PMO/JAMPC00038

Page	Comments
	Western was a contributor to the report, however was not credited as such. In fact, major portions of Appendix D regarding CRSP operations were initially generated by Western personnel.
vi	2nd paragraph. 1st sentence. Define "adverse" or delete. This page contains a discussion of study goals including the position that existing operations impact existing conditions. As discussed in the letter, Western feels that existing operations cannot affect the resources they created and the term "impact" is inappropriate.
vii	1st summary block. Conclusion of 'substantial adverse effects' is not consistent w/ text in 1st paragraph. Also, contradictory to later statements that rafting is better with the dam than without the dam. Last paragraph. 1st sentence. Define "frequent" in reference to flood releases. Western believes that the discussion on this page should be more oriented toward identifying components of the existing environment that could be manipulated to optimize the recreational resources of concern. The preoccupation with "impact" is unnecessary given the intent of the GCES. As previously pointed out, Western does not agree with the definition of "impact" as it is used in this report. The institution of regulated flows from Glen Canyon Dam did not impact existing rafting or trout fishing; if it had, then the approach used in the Technical Report would be correct. Instead, the regulated flows created the resources and the studies merely seek to optimize them.
vii	1st paragraph. 3rd sentence. General note: Western echos this recommendation that flood releases be avoided, if possible.
viii	2nd summary block. Recreation and aquatic resources? Summary statement is inconsistent w/ later text in 2nd paragraph, 5th sentence, regarding deleterious effects on " . . . recreation and aquatic resources.' 2nd paragraph. 3rd sentence. It should be noted that fluctuations depends on river reach. Are these recreation "benefits" needed to repay the project?
ix	Benefit noted in 1st paragraph re: ". . . short periods of fluctuations at other times may increase food availability and trout growth," is a benefit not reflected in the summary box on the previous page (viii). 1st summary block. General note: The text would provide another reason to delete "adverse" in the first summary block on page vii. The dam, not its operation have impacted the Chub. Last paragraph. No rationale is provided to support the last sentence on this page.

Page	Coments
1	3rd paragraph 2nd question. The phrase, '..consistent w/ Colorado River Storage (CRSP) water delivery requirements.." would seem to require 'greatest practicable amount of power and energy . . ."'. See Section 7 of CRSP Act. The second question to be answered by the studies is really the focus of the effort. Western believes the first question is based on a faulty premise; i.e., that existing operations can affect conditions created by the same operations. In addition, the first question is redundant; all that is needed is to establish the proper baseline condition, then proceed to answer the second question. The Technical Report seems to require some 'impact' to justify proposing the possibility of altering operations. As noted in the letter, Western believes a better approach would be to identify how much the environmental resources could be improved, what the benefits would be, and through what means such improvements would be accomplished. The effects of implementing any recommended changes have been termed outside the scope of the GCES, so a similar commitment to investigate the effects of any proposed changes would be necessary. General comment: The environment assessed is site-specific to the river-related environment of the Glen Canyon and Grand Canyon. Though assessment of regional or national environmental impacts is well beyond the scope of this study, to provide a proper perspective it should be stated in the introduction that consideration of modifying operations to reduce or eliminate fluctuating flows would have a most definite and adverse impact on the ability to utilize the full Glen Canyon installed capability. Such a change might result in the need by power customers to replace the unavailable capacity with non-hydro (thermal, perhaps) generation. Replacing a renewable resources with a non-renewable alternative would most likely have wide-ranging environmental impacts. Principal among these impacts might be (1) the impact to air quality, (2) the depletion of the non-renewable fuel (coal, gas, etc.), and (3) the economic impact or the impact to the human environment due to the increased cost of alternative generation, to mention just a few.
5	1st paragraph. 2nd sentence. Statement re: recognition that changes to operations might have negative consequences for other CRSP functions is not consistent w/ question No. 2 on the 1st page of the Introduction. The last sentence of the first paragraph indicates that the studies are intended "to enable decision makers to assess the significance of impacts." Again, Western cannot agree with this approach. The studies should allow the decision makers to determine if the increment of optimization for the recreation and environmental resources is justified in light of the changes that would be required to accomplish the optimization.

Page	Comments
5	The comment on this page that changes to operations to protect or benefit downstream resource might have negative consequences for other CRSP functions, should be changed to indicate that changes would most definitely have negative consequences to higher priority functions of tRSP, that is , water delivery and power generation.
6	Western questions the wording 'protecting downstream resources" as used in outcome 1. As it is known that trout fishing and rafting benefited greatly from the Glen Canyon Dam and present operations, and it is admitted that these resources are of extremely high quality (see page 19), it is extremely doubtful that they need "protection" from the conditions that provided them.
8	Western suggests including statistics on the number, type, percent of power supply of firm power customers/consumers. Western's customers should be given equal consideration with the anglers. The first sentence is unsupported by any facts or figures, and is therefore conjecture. Support the statement or delete it. The last sentence in the first paragraph is similarly unsupported; how many more? The sentence at the top of page 9 gives the source for the statement--more of this should be done to enhance the credibility of the report.
9	1st line Re: Annual gross power revenues, $80 million. This figure should be qualified to reflect the period considered. Is this an average revenue estimate for a specific period? Also, the gross power revenues from the post-filling period have been significantly greater. This should be noted if proper comparison is to be made. 3rd and 4th paragraph. The reference to 'public concern' in the text only considers the river-users, fisherman, and environmental groups. These segments of the public have been perhaps the most vocal, to date. However, a significant segment of the public have not been heard--the wholesale customers and retail power user, as well as the water interests. It is appropriate to mention that fact to provide a more proper perspective of the "public concern". 1st paragraph. General note: This operation is consistent w/ the large reservoir behind Glen Canyon Dam which stores years of annual flows and the objective of maximizing the value of this precious renewable resource. General note: As referenced elsewhere in the report, early plans for an afterbay dam to accommodate the peaking operation at Glen Canyon and moderate downstream flows were discarded by USBR.
10	3rd paragraph. 2nd sentence. What is the rarity of higher releases? Last paragraph. 1st sentence. General note: Flood releases were more common because of (1) high flows and (2) USBR was unwilling to operate under a pre-release program because of the Upper Colorado River Commission.

Page	Comments
10	Western would agree and strongly support the reduction and/or elimination of flood control releases from Glen Canyon, and as such, have supported USBR in their efforts to prepare required annual operation plans. However, no mention has been made in the report of the recent efforts by the USBR to evaluate and improve past operational philosphies in an effort to minimize the risk of future flood releases. It should be noted in the last paragraph that the filling of Lake Powell coincided with some extremely wet hydrological years. Flood releases may be far less common in more normal or dry years, and also as more experience is gained in operating the dam with a full reservoir. Western agrees that flows above plant capacity should be avoided if at all possible.
11	Was the powerplant bypassed prior to the filling of Lake Powell, as stated? We understand that flows above 33,000 cfs were extremely rare, and may. in fact, have not occurred at all.
13	Table II-1, missing flow distribution data during filling period.
14	Resource 'protection' is again referred to. See comment 6.
17	Dollar figures for benefits are presented without source or derivation. Where did they come from, and why should they be relied upon?
20	The pre-dam discussion needs to relate the conditions present at that time to the recreational resources in question. How good was the situation then? The last sentence on the page is true if qualified by stating that over the long term, sediment carried by the river would eventually restore scoured beaches.
22	2nd para. 4th sentence. Representative post-dam, low-runoff year (1982, 8.3 maf) is a release, not inflow. Unregulated inflow was 12.5 maf. Regulated inflow was 10.9 maf. 2nd paragraph. "Contrast' between High and Low Water Years in Figure IV - is not obvious, as stated in text. 3rd paragraph. 1st sentence. High-water year of 1986, unregulated inflow 18.2 maf, regulated inflow equal to 17.8 maf. The number 16.6 maf refers to releases, rather than inflow. 'All" used in the last paragraph is incorrect. Some suspended sediment does, of course, get through.

Page	Comments
27	Note positive benefits of post-dam: (1) regulation of river flows and lengthening of the white-water season has certainly been a factor in the increase in the number of boat trips and increase in related recreational benefits. (2) number of trips would not be as high if Glen Canyon dam did not exist. 2nd paragraph. Last sentence, regarding depletion of 8 native fish species. Is the increase in water temperature and sediment reduction the only reasons why ". . . only 4 remain"? Are there other natural causes not mentioned and worth noting?
28	4th paragraph. Last sentence. Combined releases range from 31,500 cfs to 46,500 cfs, rather than 48,500, as stated. Total release is stated as . . over 250,000 cfs". More precisely, from the numbers given, the total release would be 254,500 cfs.
30	1st paragraph. Last sentence. Note that "all other project purposes" are not equal in priority to each other. 3rd paragraph. 1st sentence, 2nd line. Insert the phrase ". . . objective of maintaining a . . ." between the word "the" and "minimum". 4th paragraph. 2nd sentence. Should read, "Glen Canyon Dam is operated with the objective of releasing a minimum of 8.23 maf to the Lower Basin each year . . . etc." 4th paragraph. Last sentence. Change "must" to "may".
31	1st paragraph. Change "CRSP Act" to 'Colorado River Basin Project Act" when referencing "602(a) storage". 4th paragraph. The priority of the objectives described in this paragraph are not as stated in Section 1 of the CRSP Act.
35	2nd paragraph. 1st sentence. Change the word 'practical" to "practicable", to be consistent w/ the CRSP Act. General note: Power pays 87 percent of all CRSP costs.
36	1st paragraph. Last sentence. Insert the word "practicable" between the word as "greatest" and "amount". Mention "renewable" nature of hydro when discussing relative value.
38	Table V-1: - 1st item under 'Annual Requirements". Insert the word "objective" before the word "minimum".

Page	Comments
38	- Following the 1st item under "Hourly Schedules', insert a new item No. 2, 'Maintain minimum release rates'. Renumber the remaining items.
39	2nd paragraph. 6th sentence. Regarding flood releases since 1980, '5 out of 7 years". As noted, 1981 through 1986 was an extremely wet period. Therefore, this representation is misleading.
40	Figure VI-la. For the graph of hourly steady flows, replace the label on the x-axis with "MIDNIGHT", "NOON", and 'MIDNIGHT' at the appropriate locations.
41	Figure VI-lb. Similar comment for this Figure, as for Figure VI-la.
50	Much importance is attached to the "naturalness" of rafting trips, usually in reference to fluctuating flows. Is cold, clear water seen as "unnatural" also? The recommendations are for the elimination of floods and the reduction or elimination of fluctuations, certainly not a natural situation.
52	The study's use of a hypothetical optimum baseline leads to a comparison between existing conditions and the ideal. Such a comparison needs the benefit of an additional comparison between the ideal and pre-dam conditions to provide perspective, as previously stated, Western believes the whole "impact" issue to be irrelevant anyway. Refer to the suggested approach described in our accompanying letter. The second paragraph references an "immediate reduction in the quality of white-water boating trips." Earlier (page 19 and others) the report indicates that the conditions for rafting are among the best in the world. The utopian baseline selected for comparison again appears to be inappropriate.
55	2nd paragraph. General note: The discussion of potential benefits of infrequent flooding immediately follows conclusion regarding impacts. The order should be reversed.
57	4th paragraph. If 'fluctuating flows" are defined as changes in flows greater than 10,000 cfs per day, then can it be inferred that "steady flows" are changes in flows less than 10,000 cfs per day? Further, can it be assumed that changes in flows +/- 5,000 cfs per day could be reflective of 'steady flows"?
68	Western questions the logic that says natural flow conditions have "strong negative impacts" on natural resources. Using the approach advocated by Western, the discussion here would center on whether or not natural flows would help or hinder the optimization of the resources in question, and avoiding "impact" questions which, by the nature of the studies and the relationship of the resources, are both incorrectly based and irrelevant.

Page	Comments
69	Figure VII-6. Release pattern, as referred to in the text in the 1st paragraph, is missing. General note: The discussion in the second paragraph would indicate that rafters do not place such a high value on "naturalness" after all.
75	Last paragraph. Why is the option of artificially protecting camping beaches summarily rejected with little or no investigation? This would seem to be a reasonable direction to take, unless it can be shown not to be viable. The costs, feasibility, and possible impacts of making operational modifications were considered beyond the scope of the study, but changes to operations were not eliminated from consideration on the same grounds.
76	1st paragraph. In keeping with the study approach proposed by Western, conclusion (1) is better phrased, 'Downstream environmental and recreational resources would benefit from the elimination of flood releases and minimization of fluctuating flows.' Last paragraph. Western disagrees that "Daily fluctuations . . . degrade the natural character of the environment . . ." any more than artificially block-loaded flows would.
77	2nd Paragraph. Fluctuating flows do not lead to a loss of backwater habitat. These backwaters formed in a fluctuating flow regime in the post-dam period--there were no pre-dam backwaters. Possible flow patterns exist that would result in the creation of more backwater area, or may result in the preservation of backwaters existing at a given point of time. This again points out the inappropriateness of using an idealized baseline for comparison. 4th paragraph. Under conclusion (2), why was it decided that only the CRSP water delivery requirements were binding? As an assumption in the various technical analyses it made sense to use this parameter, but this passage indicates it has some higher importance than all of the other provisions of the CRSP act and other 'law of the River" components. The text to recognize that the area downstream of Glen Canyon Dam is and always has been a dynamic environment. Grand Canyon itself was formed by the "degradation" of natural resources. Steady releases of annual runoff may preserve for the short run the status quo, but it will not be "natural" at all.
78	Under Management Options, the study seeks to convince the Secretary of the Interior that "impacts" to the recreation resources are justification for taking action. Western disagrees with this approach. The question before the Secretary is whether or not improving the recreational resource is worth the costs to other river interests. The GCES should have focused its efforts more on providing the Secretary with options that would achieve the study's goals, and the potential costs of these options, than trying to justify a change based on "impacts" to

Page	Comments
78	idealized optimal conditions for these resources. Essentially, all the study has demonstrated is that hypothetical optimal conditions for recreation resources are better than reality. Western has no concerns with the possible management options presented on pages 78 and 79--indeed these are logical steps to take to achieve the stated goal of the GCES. It must be made clear that optimization of recreational resources will not be reached without costs to other resources, and the Secretary should understand that the increment being 'bought' is to make excellent recreation more perfect.
A-1	Not enough has been said in the integrated report about the long-term effects of eliminating floods and moderating fluctuations with regard to rapids and debris flows. What will happen to rafting as these constrictions increase? Are the short-term advantages to optimize the rafting experience worth the long-term costs? This point should have been investigated in depth in the main report, as it could affect the entire viability of modified flows.
A-47	Apparently, camping beaches do reach equilibrium under daily fluctuating flows. In the main report, however, fluctuating flows are held to be detrimental to camping beaches. More discussion is needed to clarify this discrepancy.
B-51	The second paragraph states that riparian and rivering ecosystems are dynamic and adapted to high levels of disturbance. This idea did not make the transition to the integrated report the way it should have. The report advocates the imposition of a static regime on the natural resources below Glen Canyon as the ideal situation. Western maintains that this is theoretical and more or less impractical. This is particularly true in light of the lack of information on the long-term effects if such a proposal were implemented.
C-4	Question (2) again references "protection" of the recreational resources. Protection from what? Existing operations are not a new feature introduced to the present situation, but are part of the existing situation.
C-11	Western does not agree that fluctuations necessarily impair the naturalness of the rafting experience. Why does the study not just state the simple facts? Apparently, some rafters just do not want to put up with the inconvenience sometimes caused by fluctuating flows.
C-15	As discussed in comment 14, Western has reservations concerning the methods used in measuring recreational quality, assigning dollar values, and defining "impact" based on lost opportunity. Extreme caution must be used in gathering and interpreting user attitude data. Eliminating bias in a major problem with such studies. Western is not implying that the researchers in this area did not do a thorough job in minimizing bias or calculating dollar values--Western is merely saying that the report does not provide enough information for the

Page	Comments
	reader to conclude that the study methods are valid. The report should state the assumptions used, the methods utilized to minimize bias, and a measure of confidence in the results.
C-35	How much of a problem are launch windows when put in the context of the NPS restrictions on the total number of raft trips allowed annually. Does the reluctance of outfitters to launch on weekends due to fluctuating flows benefit the day-trip rafters who may favor weekends?
C-60	Conclusion (1) states that "normal dam operations have been, to a considerable extent, conducive to white-water recreation . . ." and that fishing flows have been reasonable also. This fact has not been given appropriate attention in the main body of the report.
C-62	The recommendations on this page fail to address long-term effects to the same recreational resource, such as how rapids will be affected if fluctuations are minimized and flood releases eliminated.
D-4	1st paragraph. 1st sentence. General note: The phrase '. . . lives, industry, and recreation" seems to be an inappropriate mix of elements. It is to be inferred that power generation and water delivery are lesser priorities than recreation?
	1st paragraph. 4th sentence. General note: The phrase "The economic health, recreational opportunities, and growth potential . . ." seems to be an inappropriate mix of factors relating to the management of the Colorado River. No mention is made of the 'real' management priorities.
D-4	1st paragraph. 6th sentence. General note: Glen Canyon is not the only facility of CRSP on the Colorado River. Glen Canyon, in conjunction with these other facilities have impact on the "lives, industry, etc.", not just Glen Canyon Dam.
D-6	1st paragraph. 2nd sentence. Include Gunnison River as additional tributary to the Colorado River.
	3rd para. 2nd sentence. Change "3,330,000 kilowatts" to "3,624,000 kilowatts'. (WAPA, 1986 Annual Report)
	Maybe we need another paragraph on the # on consumers in the Basin, S annual revenues, and overall economic impacts of hydropower.
0-7	2nd para. 2nd sentence. Change 'Lees Ferry" to "Lee Ferry". Lee Ferry is the Compact point. Lees Fery is where the gaging station is and where the rafters begin their trips.
D-8	2nd para. Last sentence. Change "Aspinall" to "Curecanti". Technically , the CRSP Act authorized the Curecanti Unit, which later was renamed the Aspinall Unit.

Page	Comments
D-9	Figure 0-2. Is generation capability per unit (112,500 kW) correct?
D-10	1st sentence. Change 'practical' to "practicable", to be consistent with the CRSP Act.
D-10	5th sentence. Delete 'not available', replace w/ "not guaranteed to be available'.
	Last sentence. Change the words 'nameplate energy' to 'nameplate capacity'. Change the word 'overall' to 'maximum'. Delete the phrase, ". . . or limits. . . .".
D-11	Correct Table D-2. Heading should read 'Nameplate Capacity (kW)", rather than 'Energy (kW)". Insert the word "Maximum" above the column heading 'Capacity (kW)".
0-12	2nd para., 1st sentence. Insert the parenthetic phrase "(Colorado River Basin Project Act)" after the reference to P.L. 90-537.
	2nd para., last sentence. Delete the words 'Operating Criteria' and replace with 'Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs'.
	3rd para. The word "act" should be capitalized in several places in this paragraph.
	4th para., 1st sentence, 6th line. Insert the words, 'river regulation, beneficial consumption uses, power production" following the words 'flood control'.
0-13	2nd para., last sentence. Definition of active storage as noted is inconsistent with Figure D-2 on page D-9.
D-14	Text re: Phase I. Elaborate on unpredictability of pre-dam flows and high susceptibility to flash flooding. Text should stress range of variation--erratic.
D-15	It is unclear whether these graphs are based upon monthly, daily or hourly flows.
D-16	Table D-3. Are the delineations under the column heading "Operating Regimes', reversed?
0-17	Phase III. 2nd paragraph. 6th sentence. Del >31,500 should be rare if USBR is able to adopt pre-rel. program.
	4th para., 1st sentence. Change "These" to "The".
0-18	4th paragraph. Determination of Monthly Release Volumes. 2nd sentence. Insert the words 'power and", before the word "energy".

Page	Comments
0-21	1st paragrap.. Last sentence. At the end of this sentence, insert the phrase ". . . and best meet the mandate to market the maximum power and energy'.
D-23	Figure D-5. We suggest adding a vertical line to show the release volume at 31,500 cfs in order to explain the outlying data. Also, change the range in the caption to 500,000--1,200,000.
D-24	2nd para., 3rd sentence. Change the word "inititated" to "initiated".
0-24	Last paragraph. After 4th sentence, insert the following sentences: "This increased release capability through the powerplant provides enhanced ability to avoid bypasses and/or spills. This benefit is substantial if releases occur over a length of time".
D-28	1st paragraph. Last sentence. It is believed that 27 maf is too high. 25 maf (?).
D-30	2nd paragraph. Insert additional item before existing item (4), as follows: "(4) how the resource was to be allocated,' Renumber the subsequent items. 3rd para. Items (1) through (6), pg. 0-30, and items (7) and (8) on pg. D-32. Suggest that 2nd paragraph may be sufficient information regarding contents of marketing criteria. Items (1) through (8) may be considered redundant. Consider their deletion.
D-31	Figure D-7. Correct legend for Northern Division such to exclude interpretation that California and Northern Nevada are in Northern Division. Not true.
0-32	1st full para., 4th sentence. Change "Army Corp" to "Army Corps". 2nd para., 1st sentence. Reference Figure D-7 regarding the geographic market area, especially if item No. 1 on page D-30 is removed as discussed above.
D-33	3rd para., 1st sentence. Reference Figure D-7 here, especially if item No. 1 on page D-30 is removed.
D-34	4th para., 1st sentence. Change the word 'often" to "mostly".
D-35	Last paragraph. 2nd sentence. General note: Item (4) does not occur.
D-36	Figure D-8. Add to the description below the figure the following: "(Note: This is for illustrative purposes only, and is not intended to represent the actual load pattern of any of the CRSP customers)".

Page	Comments
D-36	On the X-axis, delete the word 'HOURS" and insert the words "MIDNIGHT", "NOON", and 'MIDNIGHT' at the appropriate places. Figure D-8. (1) Provide horizontal line at 5 MW through graph. Add the note above line "HYDRO LOAD". (2) General note: re: graph. Hydro load occurs throughout day, not just 5 hours, as indicated.
D-38	3rd paragraph. 2nd sentence. Change 1978 to 1987.
D-40	Figure D-9. The reduction of this figure has made parts illegible.
D-41	Last paragraph. Last sentence. Change "for" to "or".

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CRSP CUSTOMER REPRESENTATIVES TO RECEIVE A COPY OF
DRAFT GLEN CANYON ENVIRONMENTAL STUDIES

September 1987

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SUPERINTENDENT

Memorandum

To: Regional Director, Upper Colorado River Basin, Bureau of Reclamation

From: Regional Director, Western Region, National Park Service

Subject: Final National Park Service Comments on the September 1987 Draft Glen Canyon Environmental Studies Report

We appreciate the opportunity to review the subject document. This effort represents a solid integration of diverse studies culminating from the extensive efforts of the combined agencies. We appreciate the impact these studies will provide in assisting us to better perform the resource protection mandate of the National Park Service. This effort has been well received by our publics as confirmed through our recent constituency involvement (see enclosure).

With incorporation of these final comments, we will have a quality effort which we can jointly take forward to the Department. For your convenience, we have divided our comments into three sections: major comments, technical comments, and future research needs. If you have questions about any of these comments, please contact Grand Canyon National Park Superintendent, Richard W. Marks, at FTS 765-7701.

We look forward to continuing our positive working relationship with the Bureau as we search for the best operational scenarios for all affected parties.

DRAFT

Stanley T. Albright

Enclosures

cc:
Superintendent, Grand Canyon
Regional Director, USFWS, Albuquerque, New Mexico
Director, Arizona Game and Fish
Superintendent, Lake Mead NRA
Superintendent, Glen Canyon NRA
Chief, Water Resources Division, NPS

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MAJOR COMMENTS

1. As stated in our previous memoranda (January 20, 1987, and June 1, 1987), it is essential that all technical studies be completed as soon as possible. To date, we have received only one of the over 30 studies in its final version. Thus, our ability to review this final draft has been seriously impaired, since we are unable to review the technical reports which were used in developing many of the conclusions in this document. This is of particular concern as we observe new information and changes in the conclusions contained in this document over the three different versions we have reviewed. We wonder how the different technical studies have been changed to reflect this. Some of our constituents have also raised this concern. The current version of the final report does not even contain a full list of these studies.

2. We are confused by the principal conclusion that operational changes are unlikely to help humpback chub. In fact, this statement appears to be contradicted several times in the body of the report. For example, on page 62, the text reads "high flows in May and June would back up the Little Colorado River, creating a large area of relatively warm, low-velocity flow which appears beneficial to chub reproduction and larval survival."

3. While Glen Canyon Environmental Studies (GM) does present much information on important beach building processes , the fundamental shortfall of the studies is that they do not define the relationship which exists between sediment storage in the eddies pools and the rate of beach erosion. Further, the models used to characterize the river sediment regime contain errors so large, they cannot be relied upon to present an accurate representation of conditions along the river corridor. Thus, significant new research must be designed with input from the National Academy of Sciences to address this fundamental issue before a knowledgeable decision regarding the long term fate of this critical park resource can be developed.

4. This report raises serious questions as to the appropriateness of the Finding of No Significant Impact signed on the uprate rewind program. How does the Bureau intend to address this new information in terms of

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additional NEPA compliance and/or studies which may be necessary prior to utilization of the new upratad capacity?

3. The discussion of "outcomes" (page 6). "non-operational approaches" (page 77), and "management options" (page 83) are actually the task assigned to the Executive Review Committee and thus do not appear logical for inclusion in this document what the purpose is to define the impacts of various flow regimes. Further, the limited treatment given to these topics may ..... more questions than it provides answers. These three sections should either be combined and more fully treated as an appendix, transmitted in a formal document from GCES to the Executive Review Committee, or deleted from this document.

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TECHNICAL COMMENTS

Page 1, paragraph 1 - As correctly presented on page 33, paragraph 1, power generation is not a "primary mandate of the Colorado River Storage Project Act."

Page 10, paragraph 2 - Was Glen Canyon Dam actually "designed" as a peaking power facility?

Page 30. paragraph 4 - The 20 whitewater rafting concessioners operating in Grand Canyon National Park grossed in excess of $14 million in 1986.

Page 34, paragraph 1 - We do not concur that storage space in Glen Canyon is not a criteria governing the release of water from Glen Canyon Dam. Water storage space, or lack thereof, is a major factor governing the water release schedule.

Page 34, paragraph 4 - As currently written, the implication is that recreation and fish/wildlife resources are of equal value in the consideration of dam operations with power production. Is this actually the case?

Page 48, paragraph 1 - Why does the plus indicate a positive impact, but a minus indicate a "significant" negative impact? These two symbols should be indicative of the same level of impact.

Page 49, footnote - The term "consumer surplus" should be defined earlier in the document where it is first used.

Page 59, paragraph 4 - The process of interchange of sediment in the riverbed with beach building sediments is currently unknown.

Page 68, paragraph 2 - The addition of three 2-weak periods of fluctuating flow to benefit trout cannot be justified based on the data collected at this time. This proposal should be withheld until there is an adequate database to support inclusion of a meaningful period of fluctuating flow.

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Page A-17, paragraph 1 - The report would be improved if the "important channel and flow characteristics" were listed.

Page A-17, paragraph 4 - "(1) Loss or gain of sand in reaches depends on many factors and therefore varies with time." This statement, and the two statements following it in the paragraph, do not answer the question that they address (see objective 1, page A-13). The three statements, however, will generally apply for any pool-and-rapid stream that carries a relatively wide range of discharges and a mixture of sediment sizes. Phrased differently, the statements that are given would have been well-founded, based on common knowledge, intuitive reasoning, and results of other studies - even without GCES. However, they do not describe "reaches of the river that are losing, gaining, or are in equilibrium with respect to sedimentation." We believe the authors could (and should) present more definitive statements, based on results of GCES, pertinent to reaches that are losing, gaining, or are in equilibrium. If the authors believe that more definitive statements cannot be justified, then they should present a statement that says, in effect, "Reaches of the river that are losing, gaining, or are in equilibrium could not be determined with methods being used."

Page A-18, paragraph 3 - "(3) Net loss of sand from Grand Canyon is highly variable." The subject statement, and the one that follows it, do not directly answer the question that they address. The two statements are technically sound and are supportable - based on common knowledge and results of other studies - even without GCES. However, they do not represent answers to questions concerned with "the present net sand outflow from Grand Canyon into Lake Mead" (see objective 3, page A-13). Statements should be given that either describe the average annual sediment outflow (with statements of probable errors) or else that say, in effect, "The net sand outflow from Grand Canyon into Lake Mead could not be determined with methods that were used." A statement similar to the above appears in paragraph 2 on page A-59. Why wasn't the STAB model used to generate this information?

Page A-18, paragraph 4 - "(4) Camping beaches in narrow reaches and the downstream parts of recirculation zones are particularly susceptible to erosion." The subject statement and others in the paragraph represent a good response to the question being asked (see objective 4, page 13). These statements are logical and they are supported by results by Schmidt and Graf (1986). However,

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the scope of the beach studies (Schmidt and Graf, 1987) were too limited to allow the researchers to "identify specific campsite beaches that are gaining, losing, or are in equilibrium." This statement, or a similar one, should be included in the text.

Page A-18, paragraph 6 - "(6) Current operations will result in loss of some beaches in the long run." The subject statement plus other statements in the paragraph represent a good discussion of several aspects of the problem being addressed (objective 6, page A-13). Also, the statements are well-founded by results of GCES. However, they do not represent a good reply for the question: "What will the river morphology be like up to 100 years from now based on operational alternatives?" A statement, or a group of statements, should be added that says, in effect, that a complete, or detailed, description of the river morphology 100 years from now could not be developed from results obtained from GCES.

Page A-19, paragraph 2 - "(7) Flow routing model was recalibrated." The flow routing model was calibrated for conditions that prevailed along the Colorado River in 1986. Results from use of the model may, however, contain significant errors (see page A-60, second paragraph). As the hydraulic conditions - streamflow velocity, travel time, reservoir storage, and scour-and-fill in pool - for a given discharge change with time, the reliability of the model will diminish (Burkham, written communication, January 1987).

Page A-19, paragraph 4 - "The long term fate of campsites depends on sand storage in main channel pools." Much discussion in the report, especially that on pages A-36 and A-37, seems to support the subject statement. A different viewpoint - that the long term fate of campsites does not greatly depend on sand storage in main channel pools - also has considerable support. Arguments for this different viewpoint are given in the following discussion.

The GCES did not define the relation that exists between sediment storage in pools - or lack of sediment in pools - and the rate of erosion of beaches. The GCES did show, however, that the sediment deposits used as beaches were composed mainly of fine sand (Schmidt and Graf, written communication, 1986). Deposits along the Colorado River that are primarily fine sand are found where

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Memorandum

To: Regional Director, Upper Colorado Region,
Bureau of Reclamation

From: Western Regional Director, National Park Service

Subject: Transmittal of the Preliminary National Park Service Position Regarding Future Glen Canyon Dam Operations

We appreciate the opportunity to provide you with our views on this subject. The Glen Canyon Environmental Studies (GCES) process has been a beneficial one for all participating agencies in terms of development of a spirit of cooperation. as well as the generation of critical information concerning the internationally significant Grand Canyon resources. Based on information contained in the GCES report, we now believe there is an adequate data base to develop and implement an operational scheme which provides for a more balanced consideration between power revenue generation and protection of downstream recreational, biotic and abiotic resources. While some data gaps clearly still exist, this should not deter us from implementing what we have learned during this 4-year, $7.0 million study.

Resource protection objectives of critical concern to the National Park Service (NPS) which must be considered in future operating scenarios include the following:

1. Protect and Enhance Existing Populations of Endangered Humpback Chub - The Little Colorado River/Colorado River confluence within Grand Canyon National (GRCA) provides the lest appreciable refuge for the Humpback Chub in the Lower Basin and perhaps the only genetically pure population of this species in the entire Colorado River basin. Construction and subsequent operation of Glen Canyon Dam has severely altered the habitat of this endemic fish and restricted suitable spawning habitat to a small portion of its historic range.

While recognizing the existing habitat deficits, the GCES would indicate that relatively high flows, near powerplant capacity, during the peak spawning period (May/June) appear beneficial to chub reproduction and larval survival. Further investigation of other flow regimes seem warranted at other times of the year.

Recognizing data gaps were evident, the National Park Service does not feel the CCES acquired sufficient information to demonstrate the full range of effects of Dam operations upon Humpback Chub.

2. Maintain the Colorado River alluvial deposits (beaches) by mitigating accelerated erosion due to man-induced processes. Protection of beaches in Glen Canyon National Recreation Area (GCNRA) and GRCA is essential. Unfortunately, the effects of various flow regimes on beach erosion processes is not yet fully understood. It is known that flood flows have significant adverse effects on beaches and the current annual flood risk of one in four is unacceptable. Steps beyond improved forecasting should be put in place immediately to reduce the flood risk to at least one year in twenty. Additionally, studies *of the* relationship between fluctuating flows (considering both rate and amplitude) and beach erosion processes should be initiated.

3. Perpetuate and enhance the opportunity for a high-quality whitewater boating experience in GRCA. The whitewater raft trip within Grand Canyon, involving more than 15,000 visitors annually, is one of the pre-eminent visitor experiences within the National Park System. Current dam operations have been shown to have significant adverse impacts on this experience both from the perspective of safety and trip quality. Several operational changes are necessary to reduce/mitigate these impacts, including: (1) increase minimum releases, (2) reduce flood frequency, (3) reduce rate/magnitude of fluctuating flows, and (4) maintain high flows during the peak recreational use season.

Einimum releases should be immediately raised to 5,000 to 8,000 cfs (see number 5 below). While the exact minimum release for whitewater recreation cannot be determined without further study, releases below 5,000 cfs are not acceptable from both a safety and trip quality perspective.

Flood flows have been shown to have adverse affects on recreational whitewater safety, especially at Crystal Rapids. Further, as previously discussed, flood

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flows have substantial adverse impacts on beaches. These beaches are essential to the current whitewater rafting experience and rust be protected.

Fluctuating flows have also been demonstrated to have significant adverse effects on the recreational whitewater experience. Fluctuations that are currently experienced reduce the visitor's perception of the canyon as a natural environment, create operational difficulties in terms of running rapids and establishing camps, and may have safety implications in terms of flooding campsites at night. We believe some acceptable level for the rate and magnitude of fluctuating releases in regard to impact on whitewater boating could be defined pending further study. Moreover, a reliable schedule of fluctuations must Le developed to keep boaters downstream informed of upcoming release patterns.

High, relatively constant flows of 20-28,000 cfs are desirable during the peak whitewater use season from May to September. These releases significantly Improve trip quality and are consistent with releases necessary for Humpback Chub protection.

4. Protect and enhance populations of other endemic fish species. Protection of this resource has the greatest potential for conflict with other resource values of concern to the National Park Service. Further information regarding the life history of these native fishes is necessary to fully understand the impacts of high recreational releases on these fish. However, protection of Humpback Chub and beaches would both take priority over protection of the common endemic fish species.

5. [illegible] the recreational trophy trout fishery. This objective relates primarily to fishing within GCNRA and to a lesser extent, within GRCA. Factors to be considered include: (I) providing minimum releases to preclude dewatering of redds (2) providing adequate releases to ensure upstream access to the dam from Lees Ferry. and (3) reduction of fluctuation rate/magnitude to reduce trout stranding.

Minimum releases for both fisherman access and protection of redds need further investigation, but appear at this time to fall in the 5,000 - 8.000 cfs minimums

required for whitewater boating. Similarly, effects of fluctuation rate/magnitude on stranding of adult fish requires further investigation before a solid recommendation can be developed. While the GCES report identifies two, 2-week periods of fluctuations to enhance trout growth, we cannot concur that adequate information exists to support this recommendation at this time.

In addition to these resource protection objectives, we believe that maximum powerplant discharge should not be allowed to exceed 28,000 cfs pending further study. This level represents the approximate recent historic level of discharge (prior to the rewind project). Further, we cannot identify any downstream resources which would be enhanced by higher powerplant discharge. However, additional work on enhancement of Humpback Chub populations in the vicinity of the Little Colorado River could provide additional information. Currently we concur with the conclusion that the "effects of the Uprate and Rewind Program on downstream resources cannot be determined at this time" and urge that this program not be implemented until the effects are fully defined.

Finally, we strongly support the continuation of an interagency study/planning process as we move forward toward changes in operations and additional study. As in the past, power revenues should be the funding source for this activity. However, we see a need for reorganization of the framework of this program to where the study manager reports to all cooperating agencies and all future work has full concurrence with and involvement by the participating agencies.

We appreciate the opportunity to provide you with our position on this matter. If you have further comments, please contact Grand Canyon Superintendent, Richard W. Marks, at FTS 765-7701.

Stanley T. Albright

cc:
Superintendent, GRCA
Superintendent, GCNRA

the stream velocity is relatively low. For the Colorado River. low-velocity zones can be found along the river banks and in the "shadow" of objects - large boulders. rock outcrops. debris fans - protruding into the river. The river bank can represent a protruding object, thus causing low velocities in a nearby downstream zone. Recirculation zones occur commonly in the "shadow" of objects protruding into the Colorado River. Thus. low velocity zones represent sinks for fine grain sediments.

Sediments in deposits found along the main path of river flow - the high-velocity zone - are primarily coarser than those found in the low-velocity zone. The high-velocity zones then primarily represent sinks for coarse sand. gravel and boulders.

The fact that coarse sand - and larger size sediments - are not found in significant amounts in the recirculation zones indicates that the currents that move sediment from the main channel to the recirculation zones do not have the competence (sediment transport capacity in terms of particle dimensions) to transport significant amounts of coarse sand to the beaches. This statement is true regardless of the main-channel discharge or the bed-level in main channel pools. Also, data collected by CUB researchers (Pemberton, written communication, October 1986) indicate that the current flow along the main path of river flow had the competence to move fine sand in suspension even when the discharge is relatively low, less than 5,000 cfs. Furthermore, results from studies by Schmidt and Graf (written communication. 1986) apparently support an argument that the current along the main path of flow always has the competence to move fine grain sand (see discussion on pages 13-14 of this project). Apparently then, if the arguments presented in this discussion are basically valid, the long_term fate of campsites is not greatly dependent on the sediments stored in pools along the main path of river flow. Instead, the fate is mainly dependent on the fine sands that are stored in low-velocity zones along the margin of the main path of river flow and that are derived directly from tributary streams.

Page A-19, paragraph 5 - "Main channel transport of sand within powerplant capacity is only slightly higher under fluctuating flow than under steady flow of the same volume." The two statements in the paragraph are supported by

results from the sediment transport model (Randle and Pemberton, written communication, 1986). However, they do not describe the difference in erosion of beaches between that which occurs when the flow is fluctuating and that which occurs when the flow is steady. The 12 percent higher transport when the flow is fluctuating could be very large, and very important, if it represents a 100 percent increase in erosion of beaches.

The relationship between the transport capacity of the main channel and the rate of erosion of the beaches was not defined by GCES.

Page A-26, paragraph 2 - The estimated value present, 42 mt, may have only limited significance and reliability pertinent to the beaches. Uncertainty about the importance of the number is developed because:

(1) The ratio of sand amount in beaches and in recirculation zones near beaches to the total of 42 mt is not known.

(2) The reliability of the estimated thickness of the sand, 20 ft., is highly questionable (see pages A-58 and A-59).

(3) Most of the sand that remained along the channel bed after the record post-dam discharge, about 97,000 cfs, probably is not available for transport at discharges in the powerhouse range (Burkham, written communication, 1986).

(4) Of the amount of sand along the main channel bad, probably a relatively small percent is of a fine sand size, the size that is found in the beaches (Schmidt and Graf, written communication, 1986).

(5) Most of the fine sand that is eroded from the main channel bed occurs during high discharges and, of this amount, a large part 10 transported through the Grand Canyon during the high flow rate.

Page A-21, paragraph 1 - "At that gage, discharges of about 40.000 cfs corresponds to the velocity at which degradation begins when the bid is at a low elevation. (See Burkham...)" This reference is not correct. On page 46.

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Surkhem (written communication, 1986) states "Regardless of how high the discharge becomes..... the riverbed did not scour significantly below the -13.0-foot level." On page 53, he states "However, a discharge of more than 100.000 cfs and velocities of about 10 fps would not cause the bed to scour more than -14 feet." The bed is at a low elevation when it is at about -13 to -14 feet.

Page A-36, paragraph 3 - "At some discharge below maximum powerplant discharge, sand in main channel pools begins to be transported." This statement is not necessarily true, especially for pools that had previously been scoured to a low level. For instance, channel bed data for the measurement section at Lees Ferry indicate that ther was no significant movement of channel bed, either scour or fill, during 1966-85. (The fact that no significant change in bed level occurred during 1966-85 also seems to indicate that fine sand eroded from upstream deposits - in low-velocity zones - during a relatively long period of regulated flow was transported through the pool.) Scour in a pool occurs when the stream competence exceeds that required to move sediments found on the stream bed. Fill occurs when the stream competence is not high enough to continue to transport sediment in the flow.

Page A-43, paragraph 1 - A description of the process by which fine sand is moved from the reattachment deposit to the separation deposit is needed. For a given site, the separation deposit is at a higher elevation thin the reattachment deposit. The authors apparently expressed their view on the need for a better definition of the process when they stated (page A-43, paragraph 1) that "The processes involved in sand transport from reattachment to separation deposits are not understood well enough for us to estimate the rate at which this loss would occur under given flow conditions."

Page A-50, paragraph 4 - A strong argument has previously been presented that suggests the level of the pool may have only limited influence on the movement of fine grain sediment to and from the beaches. (See pages 9, 10, and 11.)

Page C-7, paragraph 3 - River companies have contracts, not permits.

Page C-8, paragraph 5 - Flows less than 1,000 cfs are "technically feasible."

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Page C-10, paragraph 1 - Change "accident rate" to "accident variables."

Page C-10, paragraph 3 - What percent of recreationists perceive fluctuations in excess of 10,000 cfs daily?

Page C-12, paragraph 2 - What percent increase is represented by the $800,000?

Page C-40, paragraph 4 - What are examples of the positive and negative effects of high water?

Appendix D - Operation Report - This appendix provides a detailed discussion of the Colorado River Storage Project and its history and constraints. Other applicable, and possibly contradictory, legislative directives such as the Grand Canyon Enlargement Act, Endangered Species Act, and other National Park Service legislation should also be presented. This would allow the Secretary and others evaluating the project to understand the implication, and trade-offs which will undoubtedly have to be made.

Page D-29, Section III - This flood risk analysis is an integral component of the entire effort and must be fully analyzed at this time. Further statistical analysis at a later date is not a reasonable approach for ensuring this important piece of information is available.

Page D-43 - National Park Service water rights under the Winters Doctrine need to be recognized.

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FUTURE RESEARCH NEEDS

The National Park Service recognizes that, in any research undertaking of this magnitude, data gaps are certain to exist at the end of the effort. We recognize that additional data needs exist in relation to the Glen Canyon Studies and we support additional work. We have reviewed the idea, for additional research contained in the report and find that many of these ideas should be further considered. However, any future research program should be based on the following framework.

(1) In order to improve communication and ensure that all *agencies* are fully involved in authorizing future research, an interagency study team must be developed. The study manager would be responsible to this study team, and all agency participants would have to agree in writing to research projects before they can be initiated. A new single cooperative agreement should be signed with all participating agencies so that all participants are sure to be involved for the full program.

(2) No .....h should be initiated until the National Academy of Sciences Report is received and thoroughly reviewed.

(3) No research should be initiated until a comprehensive research program outline has been completed. That comprehensive research program would consider NAS recommendations, be reviewed by scientific experts (outside GCES), revised as necessary, and agreed to by all participating agencies prior to initiation of any additional research.

(4) All research contracts will be solicited through a competitive bid process or through a negotiated procurement document. This competition would ensure the best person/organization is awarded the work and would increase accountability wherein substantial payment would be withheld until the final product is received.

The following list of research projects should be considered in the comprehensive research program outline:

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Sediment

(1) Examination of a representative range of potential dam releases which would allow definitive evaluation of the effect of variable flow rates and amplitudes on beaches.

(2) Development of a model to predict long-term beach erosion at specific sites. This study would include an analysis of the mechanism for the transference of mainchannel sediment to sand deposits, eddies, and backwaters.

(3) Development of a base map of beaches/vegetation along the river.

(4) Repetitive low level aerial photography (every several years at selected beaches).

(5) Periodic rephotographing from selected historical oblique photopoints.

(6) Replication of topographic surveys at selected beaches.

(7) Develop a model for estimating the delivery of sand-sized sediment from ungauged tributaries.

NOTE: The above studies should be designed to collect data above Lees Ferry as well.

BIOLOGY

(1) Analysis of the effect of high releases on humpback chub recruitment and the effect of low and fluctuating flows on reproduction and rearing.

(2) Feasibility study of reintroduction of humpback chub into other Grand Canyon stream..

(3) Further analysis of the relationship between native fish utilization of backwaters and flows.

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(4) Monitoring of mesquite/arcis growth rates in the new and old high water zones.

(5) Develop baseline data on the role of insects in the food chain.

(6) Study the effects of lake level on endangered peregrine and bald eagle populations of Lake Powell.

(7) How do low and fluctuating flows affect trout foodbase, growth, mortality, and reproduction in Glen Canyon National Recreation Area.

(8) How will soil fertility change in the long term, especially in regards to flooding.

RECREATION

(1) Refinement of acceptable levels of fluctuations and minimum releases necessary to protect whitewater raft trip safety and quality.

(2) Analysis of the effects of fluctuations in Glen Canyon angler safety.

(3) Analysis of angle use above Lees Ferry based on new fishing regulations.

(4) Further development/verification of the Wilderness Simulation Use Model regarding Grand Canyon Whitewater reaters.

(5) Development of long-term survey instruments for all recreational user groups.

(6) How do flows affect user impacts on the terrestrial environment.

OPERATIONS

(1) How can operations be modeled to simulate flows at the level of detail necessary to determine their effects on downstream resources.

Summary of OCRS Comments

Organization

Arizona River Runners
- reduce magnitude of daily fluctuations.
- eliminate flood rel.....
- reduce frequency of rele ■ : which are less then 5,000 cfs.

Arizona Raft Adventures
- reduce magnitude of daily fluctuations by operating Glen Canyon Dam as a base-load facility and Hoover Dam as a peaking power facility.

Friends of the River
- establish protection of recreation use as a priority consideration in operation of Glen Canyon Dam.
- prepare an EIS to fully analyze impacts of current dam operations.
- reduce frequency of fluctuating flows and flood rel.....
- NPS should aggressively pursue establishment of Glen Canyon Dam as a bass-loaded facility.
- supports the alternative for "maximizing fishing and whitewater recreation".

Outdoors Unlimited
- establish a constant flow regime, allowing only gradual flow reductions (10% per day or 1% per hour).
- restore critical beaches by use of suction dredges during the winter (low use period)
- establish a silt bypass system or dredge system to restore Colorado River sediments to the below dam environment.

Pete Reznick
preclude flood flows until mainstem sediment replenishment schedule is better understood.

Sierra Club (Grand Canyon Chapter)
reports lack much baseline data (i.e., where beaches are located).
300 copies of the document for public distribution is inadequate.
30 days for public comment on en issue of this complexity is unrealistic, especially when baseline reports are unavailable.
• full 113 should be completed before any changes are implemented;
priorities of release patterns should be reconsidered, especially in the area of power production vs. resource protection.

NPS River Concessioners
- river recreation should be a much greater consideration in the development of the flow releases schedule.
to a great extent, delayed releases of flow. ha. translated into winter releases and daily spikes which are of little use to river runners.
immediately increase the minimum flow to at least 5,000 cfs from October 1 through March 31.
revise the summer (April 1 to September 30) release pattern to that experienced from 1966 to 1976.
continue studies, especially those related to a better understanding of beach erosion processes.

National Parks and Conservation Association
avoid flood flows
seek dam operations which protect a prioritized hierarchy of resource values:
(1) humpback chub,
(2) beaches and associated sediment deposits,
(3) whitewater boating opportunities, especially as related to fluctuating flows which have a significant negative impact on the whitewater experience,
(4) other endemic fish species, and
(5) terrestrial vegetation and wildlife - only to the extent that management for these resources not jeopardize those resources previously listed.
operation of Glen Canyon Dam as a peaking power facility should be reconsidered in light of
(1) peaking power generation is not a primary purpose of the dam, and
(2) significant environmental impacts which have been documented in GCES.

Sleight Expeditions
- flood releases and fluctuating floods should be reduced to ensure protection and maintenance of the existing environment.
minimum flows of 8,000 cfs should be established.
flows of 8,000 to 20,000 cfs should be maintained during the recreational use season.
more data is needed in the following specific arm prior to any operational changes:
(1) low flows (below 10,000 cfs),
(2) fluctuating powerplant rel.....
(3) impacts to humpback chub and other native fishes,
(4) relationship between flows and beaches,
(5) relationship between flows and safety/quality of boating.

Dan Dagget
1961 Meteor
Flagstaff, AZ 86001

November, 12 1987 –

Dave Wegner
Grand Canyon Study Manager
P O Box 11568
Salt Lake City, UT 84147

Dear Mr. Wegner

First of all, to send me a document over an inch thick containing the results of over thirty technical studies and ask me to read, consider, digest and comment on it in less than two weeks is a joke I don't know about you, but I work for a living I have other things to do than drop everything to contribute to the shaky legitimacy of another boondoggle The extremely short period for which this document is being held open for review indicates to me either that either you believe its a joke too or that you have something to hide That feeling is confirmed by the fact that even though this draft report deals with a subject as important as the environmental effects of the greatest change to come to the Grand Canyon since the last lava flow dammed it up a few eons ago, you only sent out 300 copies With all that in mind, I'll do my best to give it the consideration it deserves

In your cover letter you ask for answers to two questions I'll respond to them in order

First **Are the impacts of operations identified by the GCES significant?"**
Hell yes' Any fool can see that, and while you've been out spending a small fortune putting this study together those wiser souls have been wondering why the problems are being studied instead of remedied

Second **What should be done next?"**
Dismantle the dam, of course That'll take care of its environmental effects

You imply a third question, **should full NEPA procedures be initiated?**

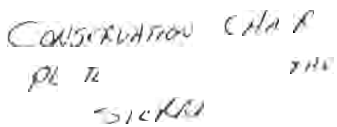
While that will just continue the paper shuffling and deficit spending to fund another several years worth of free Grand Canyon/Colorado River **vacat** ions for a bunch of bureaucrats, I'll reluctantly say yes, that is, if you don't follow my advice from the previous paragraph

What I'd like to know is why didn't we get a NEPA document in the first place instead of this not so cheap but nevertheless pale substitute. I realize its a lot of fun to keep riding those waves in Lava at the taxpayer's expense, but don't you think you ought to be honest enough to give them something real in return. And then you ought to give us the pleasure of really getting our teeth into it and tearing it apart for a few months instead of teasing them us with something like this

I guess the question I have for you is, now that this charade is out of the way, are we really going to address the issues'?

Sincerely,

Dan **Dagget**



APPENDIX E

Constituent Group Comments

APPENDIX E: CONSTITUENT GROUP COMMENTS
PART II: FISH & WILDLIFE SERVICE CONSTITUENCY

INDEX
COMMENT LETTERS
GLEN CANYON ENVIRONMENTAL STUDIES
SEPTEMBER 1987 DRAFT REPORT

SUMMARY

COMMENTS RECEIVED FROM FWS CONSTITUENTS ON
GLEN CANYON ENVIRONMENTAL STUDIES
SEPTEMBER 1987 DRAFT REPORT

Rob Smith, Associate Southwest Representative, Sierra Club Southwest Office, Phoenix, AZ Date of Letter: Oct. 28, 1987

Glen Canyon Environmental Studies Final Report represents a great amount of work and data collection and needs to receive wide distribution with adequate response time. Comment time is too short and should be 120 days.

Made suggestion of eight environmental groups which should receive the report. Also suggested that Indian Reservations which border the Colorado River (Navajo, Hualapai, and Havasupai) and academic experts should receive the report.

George P. Vlassis, President, Zane Grey Chapter, Trout Unlimited, Phoenix, AZ Date of Letter: Nov. 13, 1987

The review period of the Glen Canyon Environmental Studies Draft Report (September) was too short.

Federal Energy Regulatory Commission required by law to give equal consideration to fisheries impact and recreational use as it does to the benefits of power production.

State and Federal fishery agencies and plans must be considered.

There is a need for more information and analysis for water levels (minimum, fluctuating, and maximum), periodic replacement of gravel for spawning bars below the dam, impact of superconducting technology on water releases, adverse water temperatures, net economic benefit, need for current and additional power capacity, and alternative sources of peaking power.

Report needs more emphasis on the world-class nature of the trout habitat.

Conservation and enjoyment of the Colorado River Storage Project lands needs consideration.

A review of the fish and wildlife studies is required under 16 U.S.C.A. Section. 662(b)(2) by U.S. Fish and Wildlife Service and Arizona Game and Fish Department.

Report should address public need for lands and water.

Further research is warranted.

George P. Vlassis (continued)

Report had inadequate distribution, short review time, and confusing format.

Recent low flows at the Lees Ferry reach are harming fish populations.

Dr. Gerry 0. Hall, member of Desert Flycasters, Arizona Flycasters, White Mountain Flycasters, and Trout Unlimited, Tempe, AZ Date of Letter: Nov. 16, 1987

At flow levels below 5,000 cubic feet per second (cfs): (1) fish are isolated in backwaters and may die from excessive water temperatures and lack of oxygen, (2) redds are destroyed, (3) fish food source is destroyed, and (4) stocked and larval fish become easy prey for adults.

Need to maintain a minimum flow level at 5,000 cfs.

U.S. Fish and Wildife Service needs to coordinate efforts with all government agencies to safeguard all wildlife.

Paul C. Marsh, Associate Professor, Research, Center for Environmental Studies, Arizona State University, Tempe, AZ

Glen Canyon Environmental Studies Draft Report lacks data upon which quantitative assessments can be made. Thus, report cannot be critically evaluated. Reader must review multiple technical reports.

Report stretches available data beyond reasonableness.

Operational changes at Glen Canyon Dam may help endangered humpback chub, especially in main channel backwaters.

Additional study is warranted.

Temple A. Reynolds, Director, Arizona Game and Fish Department, Phoenix, AZ Date of Letter: Dec. 1, 1987

Glen Canyon Environmental Studies Draft Report fails to adequately emphasize limitations in determining the effects of fluctuating flows on aquatic resources, due to lack of these flows during the study period.

The report overzealously extrapolates current knowledge of ecological requirements of aquatic species in the Colorado River and tributaries.

There is an unwarranted distinction made between effects of dam construction and dam operations.

The trout fishery downstream of Lees Ferry is disregarded.

Report cannot be critically evaluated.

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SIERRA CLUB SOUTHWEST OFFICE

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APA
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CL

, 1997

U.S. Fish and Wildlife Service
Jim Young
Albuquerque, NM 87103

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Director

"NH

Dear Mr Young -

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I attended the meeting your agency hosted on October 20 regarding the j..1rn Canyon Environmental Studies, and I'd like to express some of my initial concerns while there may still be time to do something about

that went into their studies is impressive and the data will be key to making informed and justifiable decisions on ·nagement' of Glen Canyon Dam, a major influence on the of Grand Canyon National Park and its resources. As you s were done in large part to address the highly of potential changes in the way releases from Dam, in other matters dealing with the Grand Canyon, a widespread and well-informed multitude of people of varied care deeply about what goes on there.

is why it is quite disturbing to me to see the distribution of so **sever.ly** limited and to have so little **time to** with the quality of comments you told us you seek.

Field only **300** copies were printed even though this document is ly to be a key reference work for the debates which will involve thousands of people before it is over. This limited printing was not sufficient in number for even all of the government experts at our meeting to have a copy. I know of many others **who would be interested** and have **useful** comments **to** make, but I was informed at the meeting that only a handful of copies remain even now and that the one (1) copy which was sent to the Sierra Club in Arizona maybe all we can though copies should be printed to more closely meet the level of demand **and to make sure those who can make quality comments** can do **so**

Even the few copies that were printed were not distributed to many of the parties who ought to receive one. I got a letter a week ago from Grand Canyon National Park saying I should have already received a copy of the draft studies, but none has ever appeared. The Fish and Wildlife Service notice had a distribution list attached that suggested that each conservation organization would get only one or two copies regardless of size, and that individuals were completely excluded. It was incomplete at that.

Let me request the following modest additions to the mailing list in hopes that at least the few remaining copies can see broader distribution. This is by no means an exhaustive list, but merely some of the more obvious organizations I know about who are regularly involved in Grand Canyon and related issues:

- Arizona Nature Conservancy, **300 E. University** Blvd., #230, **Tucson. AZ 85705**

- The Wilderness Society, 234 N. Central, Suite 430, Phoenix, **AZ 85004**

- National Parks and Conservation Association, **Box 67, Cottonwood, AZ 86326**

- Arizona Wilderness Coalition, 2127 E. **Osborn,** Phoenix, **AZ 85016**

- Arizona Whitewater Association, PO **Box 26028,** Tempe, **AZ 85282**

- Southwest **Resource Council, Box 1182, Hurricane, UT 84737**

- Grand Canyon Trust, 1660 L St., NW, suite 812, Washington, **DC 20036**

- American **Rivers, 801 Pennsylvania Ave., SE, suite 303,** Washington, **DC 20003**

was surprised **to** find **no Indian tribes on the mailing list even** though **the Grand Canyon is an important feature for the** Navajo, Hualapai **and Havasupai tribal lands. It was also noted at the meeting** that almost no academic **experts were included. These exclusions seriously detract** from **the breadth and quality of comment that could** be **had;** these **parties and other similar ones should be identified and mailed copies.**

The November 13 comment deadline seems unusually hasty given that the Bureau of Reclamation and your agency frequently allow 90 day comment **periods on much less controversial and complex** issues. **I also heard the government experts at the meeting say that they had just received their copies the day** before. **In this case, given the distribution problems** I've **mentioned already and the desire for top-quality comments, a comment period of 120 days seems fully warranted.**

I appreciate very much the work you and the others have put into these

Draft studies and I make these remarks with the hope that the information you've compiled can be put to best possible use and made a part of the discussion which will certainly follow on the management of Glen Canyon Dam.

Thank you for taking these comments into consideration.

Sincerely,

Rob Smith
Associate Southwest Representative

x: Senator John McCain
Senator Dennis DeConcini
Rep. Rob Stump
Rep. Mo Udall
Rep. Jay Rhodes

ZANE GREY CHAPTER
1545 W. Thomas Road
Phoenix, Arizona 85015

November 13, 1987

Mr. Jim Young (Attn: Dick Morgan)
U.S. Fish & Wildlife Service
P. O. Box 1306
Albuquerque, New Mexico 87103

To Whom It May Concern:

The Zane Grey Chapter of Trout Unlimited for the State of Arizona obtained a copy of the Glen Canyon Environmental Draft Report dated September 1987 only within the week past.

We have been informally advised that a written response must be made by November 13, 1987. This has been extremely difficult to do since the document was almost impossible to obtain and the sheer size of the report requires extended review. To review the work of over a hundred researchers compiled over what appears to be five years is not an easy task even if the report had been available in September, the date its legend bears.

Our initial review of the draft study suggests the following:

1. The September 1987 draft may be part of the process leading to the relicensing of the Glen Canyon Hydro Project.

   A. If so, the Federal Energy Regulatory Commission (FERC) is required by law to give the sare consideration to the impact on fisheries and recreational use as for the benefits of power production.

   B. Recommendations from state and federal fisheries agencies must be considered, as well as any existing state or regional fisheries plans.

   C. FERC cannot relicense a project over the objections of fish and wildlife agencies unless specific findings show that the objectives do not comply with the Federal Power Act.

2. The text and the conclusions of the report are inadequate with respect to:

A. Water levels:

i) uneven flows;
ii) fluctuating water levels;
iii) appropriate guidelines for minimum and maximum flow.

B. Possible need for periodic replacement of spawning gravel below the dam.

C. Impact of superconducting technology which requires less fluctuation of water flow.

D. Adverse water temperatures.

E. Net economic benefit and actual need for additional or the current power capacity.

F. Alternative sources of peaking power such as the Spring Canyon storage site at Lake Mead.

3. Sufficient emphasis has not been given to the unique nature of this trout habitat as being one of a handful of world class fishing attractions on a national and international basis.

4. Little consideration is shown for the requirements of 43 U.S.C.A. Sec. 620g which refers to the conservation use and enjoyment of these Colorado River Storage Lands.

5. No adequate reference or support for the fish and wildlife studies required under 16 U.S.C.A. Sec. 662(b)(2) by the U.S. Fish & Wildlife Service and the Arizona Game and Fish Commission has been made and is hereby requested. We understand no review of this nature has been made since the 1950's.

6. The totality of the myriad public needs for these lands and waters has not been adequately addressed nor has sufficient attention to alternatives been given.

7. The essence of this draft report seems to suggest only that further research must be accomplished. With that, we agree.

The circumstances under which this report has been pr duced (a) sparse distribution, (b) short response time, (c)

in a format that is confusing and unfocused, thus giving rise to what may be unfounded suspicions that fisheries, wildlife and recreation are preordained to have minimal consideration. Lastly, the recent diminishment in water flow at Lee's Ferry seems, by simple observation, to be extraordinarily low. Low enough to give rise to expressions of concern from public users, and federal and state field workers who are familiar with the area that the fish population is being harmed on a current basis.

Given the totality of what is not known, even by an organization whose primary concern is the preservation and enhancement of the nation's fisheries, we believe, at the least, a program of dissemination of information be initiated at once.

This letter should also be deemed a formal request for the implementation of all state and federal fisheries, wildlife and recreational use studies mandated by law or allowed as a discretionary matter.

Further specific requests will be made as we become more familiar with this matter.

We offer our cooperation and assistance in any way to facilitate a full review and consideration of this unique natural resource.

Very truly yours,

Geo e P. Vlassis, President

GPV:bjl
cc Dave Wegner, GCES
Fish & Wildlife Service, Arizona
National Park Service, Arizona
Arizona Game & Fish
Kenneth Plumb, FERC

March 16, 1987

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Mr. Jim YOUNG
U. S. Fish & Wildlife Service
P.O. BOX 1306
Albuquerque, NM 87103

for' Mr. YOUNG :

SUBJECT: LEES FERRY WATER FLOW CONCERN

As a member OF DESERT FLYCASTERS , ARIZONA FLYCASTERS , WHITE MTN. FLYCASTER , AND TROUT UNLIMITED I WOULD like TO CALL your ATTENTION TO A SERIOUS MATTER .

The ARIZONA GAME AND FISH DEPARTMENT AND MANY OTHER interested ORGANIZATIONS , IN OUR STATE , HAVE LABORED diligently AND EXPENDED FUNDS WITH THE OBJECTIVE BEING TO restore LEES FERRY TO ONE OF THE PREMIER TROUT FISHERIES IN THE WESTERN UNITED STATES , ONCE AGAIN .

The present problem SEEMS TO BE IN MAINTAINING A MINIMUM flow LEVEL OF AT LEAST 5,000 CUBIC feet PER SECOND THROUGH the Glen CANYON DAM TO ENHANCE AND MAINTAIN THE WORK AND efforts THAT HAS GONE ON TO DATE . If WATER LEVELS DROP below THIS FIGURE , THE FISHERY EXPERIENCES THE FOLLOWING problems:

1. FISH BECOME isolated IN sidewater AND BACKWATER POOLS . If ALLOWED TO REMAIN TOO LONG , THE FISH DIE FROM EXCESSIVE WATER TEMPERATURE AND LACK OF OXYGEN .

1. The reds (NESTING) ARE DESTROYED .

1. THE FRESH WATER SCUDS ARE killed DUE TO THE LACK OF ADEQUATE FLOW , RESULTING IN A MAJOR FOOL SOURCE REDUCTION .

1. Newley HATCHED AND /OR planted FISH BECOME **easy pray** TO ADULTS , DUE TO THE LACK OF FINDING A STABILIZED habitat THEY CAN RELY ON .

My understanding **is that** the Bureau CAN MAINTAIN A MINIMUM 5,110 cfs, UNLESS WE HAVE BEEN FACED WITH A serious situation. We ALSO are concerned FOR ALL wildlife THES low RELEASE PERIODS , AS WELL . Therefor, WE ASK to try AND cut THROUGH THIS preponderance OF RED TAPE coordinate YOUR EFFORTS WITH THE OTHER GOVERNMENT as involved IN THIS [illegible] , [illegible] AFF [illegible] training [illegible] the MINIMUM 5,000 CFS FLOW THAT IS NECESSARY to GUARD OUR CONCERNS .

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Sincerely,

Gary O. Hall

Gary O. Hall
510 S. Concord Dr.
Tempe, AZ 85282

ARIZONA STATE UNIVERSITY
Center for Environmental Studies
Tempe, Arizona 85287-1201
(602) 965-2977

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Regional Director
Fish and Wildlife Service
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In response to a request for review of the draft report on the Glen Canyon Environmental Studies (GCES) I have read the subject and offer the following comments.

The draft report is unintercstable because it lacks many areas which quantitative assessments can be made. Thus, is beyond the review capable. additional technical reports as it were as part of GCES to have a fair perspective from which to [illegible] the draft report. Unfortunately, these technical reports have not been readily available. My request (22 October 1987) for copies of Ferrari 1986, Maury 1986; Leibfried and Blinn et al. 1986, and Wagner 1986 were unfulfilled, and I have results expected by Maddux et al. 1988 against which [illegible] the draft report.

[illegible] it is clear that the draft report [illegible] the limits of reasonableness. This is [illegible] all potential effects of fluctuating flows upon [illegible] very few data streams [illegible] that [illegible] ed in the draft report.

[illegible] in the draft report [illegible] Colorado [illegible] main [illegible] [illegible] that our general [illegible] Grand Canyon which exceed [illegible] report appears lucid and well [illegible] evaluation without additional [illegible] or alterations of [illegible] ire. If received after [illegible]

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• r, of the bc ow Glen Canyon Dam, then they must
GCES tc arte as a good start on thet pr cess especially as
fluctuating flow. There is much yet to be lezrned before
ion l rt Glen Canyon can be seriously considered.

o the this opportunity to comment on the dre4t Glen Canyon
ort. If you require additional information, or wish tc
expand cf thir comments, contact

Paul C Tessman

8

ARIZONA GAME & FISH DEPARTMENT

2222 West [illegible] Phoenix 85023 942 3000

December 1, 1987

Jim Young
Glen Canyon Executive Review Committee
U.S. Fish and Wildlife Service, Region 6
P.O. Box 1306
Albuquerque, NM 87103

Dear Mr. Young:

This letter and appended comments constitute the Arizona Game and Fish Department's response to the Service's request for review of the Glen Canyon Environmental Studies (GCES) Draft Integration Report (DIR). I regret that we were not able to provide the review by the requested deadline. Unfortunately, the Department's Planning and Evaluation Branch, which handles our environmental action review procedure, never received a copy of the report from your agency or any other federal agency. This has led to some confusion and slowed the departmental review process.

The DIR obviously represents a great deal of work by the authors, and they are to be commended for their efforts. Compilation of more than 30 technical reports into a single, comprehensive, readable document was indeed a formidable task. The DIR represents a giant step forward by GCES in furthering our knowledge of the operation of Glen Canyon Dam and its effects on the natural resources and recreational opportunities of the Colorado River in Glen and Grand canyons.

Our comments and criticisms of the DIR are directed mainly at a few key issues, namely: (1) failure to adequately emphasize GCES limitations in determining the effects of fluctuating flows on aquatic resources, an a result of limited availability of these flown during the study; (2) overzealous extrapolations of our current knowledge of the ecological requirements of aquatic npecien in the Colorado River and its tributaries in Glen and Grand canyons; (3) unwarranted distinctions between the effects of dam construction and dam operations, and; (4) disregard for the trout fishery downstream from Lee's Ferry, a recreational resource of growing importance. I hope that our review is taken

[illegible] [illegible]

in the spirit with which it is intended, as constructive criticism, and I assure you that the Department appreciates the opportunity to comment on this important document. We look forward to seeing the final version and to future cooperative efforts in the management of resources in Glen and Grand canyons.

Sincerely,

//

Temple A. Reyflolds
Director

TAR:dah

cc: Richard Marks, NPS
Dave Wegner, BOR

Appendix: Page and paragraph citations of Arizona Game and Fish Department (AGFD) comments on the Glen Canyon Environmental Studies (GCES) Draft Integration Report (DIR)

SUMMARY AND PRINCIPAL CONCLUSIONS

Page Para

3 2 Fluctuations which occur during critical times of the year can negatively impact trout, the endangered humpback chub, and common native fishes. Loss of spawning sites, stranding of fish, desiccation of algae and invertebrate food resources, and increased mortality of larval fish are effects of fluctuating flows. Increased food availability to trout through greater drift may be a short-term benefit, but could have negative long-term effects on food resource populations (p. B-18, DIR). Cumulative negative impacts to aquatic resources from fluctuating flows are sufficient to place these resources on a level with effects on recreation, and, thus, the banner over this paragraph should be changed to: Fluctuating Releases Primarily Affect Recreation and Aquatic Resources.

4 3 There is little, if any, evidence to support the contention of the banner preceding this paragraph that Operational Changes Are Unlikely To Help Humpback Chub. Indeed, the following text suggests that modified operations might increase chub population size in this area, an obvious benefit. We are currently unaware of what combination of factors controls the range of humpback chub in Glen and Grand canyons.

The DIR states that humpback chub rearing is now restricted to the mouth of the Little Colorado River (LCR) at its confluence with the mainstem. Present knowledge of humpback chub in the LCR does not include the linear extent of this tributary used for either spawning or rearing purposes. Kaeding and Zimmerman (1983, p. 588) noted the possibility of upstream reproduction, and they collected Age 0 chub throughout most of the Little Colorado below Blue Spring. AGFD personnel have collected spent humpback chub below Blue Spring and what appear to be chub eggs in drift samples above the mouth of the LCR.

The next to the last sentence should be changed to "... unsuitable habitat for spawning and rearing chub."

Page Para

5 1 It may be argued that there is only one humpback chub population in the Colorado River between Glen Canyon Dam and Lake Mead, but there is no strong evidence for a "...humpback chub population in the Little Colorado River." GCES (AGFD) tag-recapture data showed that humpback chub move from the mainstream into the tributary from distances of at least 10 km (p. B-18, DIR, see also Kaeding and Zimmerman 1983), and numerous young-of-the-year chub were collected from mainstream backwaters below the LCR. It is highly probable that many humpback chub in the study area utilize both the tributary and the mainstem for completion of their life cycle.

GCES data were insufficient to state with certainty that current operations (of Glen Canyon Dam) do or do not have a deleterious impact on humpback chub in Grand Canyon. Dam operations during the period of the study consisted largely of high, steady flows. Fluctuating flows were not provided during the time of year when early life stages of humpback chub would be rost susceptible (p. 14 DIR). We have hypothesized that high steady flows during May and June would be beneficial to early life stages of humpback chub. No experimental tests of this hypothesis have been conducted, but based on information at hand we recommended this modification to dam operations in our GCES report (see also pp. 62-64 of DIR). In contrast, our observations suggest that fluctuating flows may negatively impact early life stages of humpback chub both in the mouth of the LCR and in mainstream backwaters. This paragraph misstates our conclusions, and we suggest strongly that it needs to be rewritten. Note also that p. 12 of the DIR states that the Fish and Wildlife Service concluded in 1978 that construction and operation of Glen Canyon Dam has jeopardized the continued existence of humpback chub. To date, this opinion has not been rescinded.

DRAFT REPORT

9 1 Estimated angler use figures for the Lee's Ferry reach in recent years have greatly exceeded 10,000 anglers/year. The range of estimated anglers/year for the period 1980-1985 was 18,986-52,725.

Here and throughout the report, the trout fishery below Lee's Ferry is ignored. While certainly not utilized to the same extent as the Ferry reach, many commercial river trips ve anglers aboard who fish. Furthermore, many people hike to tributaries such as Bright Angel and Nankoweap creeks. This gment of the sport fishery should not be ignored.

Page

11 1 Are the authors sure that the public's questioning of the BOR environmental assessment (FONSI) was due to a blurring of the difference between Peaking Power and the Uprate and Rewind Program?

14 II-1 Use of the term "flow range" in Table II-1 is confusing. We assume that these flows are minimum, maximum, or mean daily values and the percentages of days in which these flows occurred.

15 1 Text missing.

21 3 According to AGFD records, average size (length and weight) of trout caught in the Lee's Ferry area peaked in 1980. Fishing pressure peaked in 1983 with an estimated 52,725 anglers visiting the Ferry; user-days at 8 hours/day were 44,816.

Changes in AGFD regulations were instituted more to reduce fish harvest than fishing pressure.

30 2 Here and elsewhere in the DIR the statement is made that humpback chub spawning is restricted to the LCR. This may not be entirely accurate for other investigators found ripe females in Shinumo Creek, and we observed what appeared to be a spawning aggregation in Havasu Creek. Furthermore, Kaeding and Zimmerman (1983) suggested that chub may well spawn in the mainstream, but that these waters are probably too cold for hatching of most eggs.

35 4 GCES information shows that winter flows of 1,000 cfs are detrimental to both the Lee's Ferry trout fishery and to downstream trout attempting to gain access to tributaries for spawning. Not only are trout negatively impacted, but in the Lee's Ferry area the safety of trout fishermen and their equipment is jeopardized. We feel that this minimum flow is insufficient for AGFD to fulfill its commitment both to wildlife and fishermen.

38 3 On pp. 33-35 of the DIR, it is stated that power production is one of several objectives of Glen Canyon Dam that are incidental to the primary functions of water storage and delivery. Here it says that the dam must be operated to produce the greatest practical amount of power. Does power production take precedence over other incidental objectives? If the

Page Para

38 3 (continued) maximization of power production results in real dollar losses to other incidental objectives, are these losses to be compensated and, if so, how? The DIR needs to clarify these points.

47 All Flow sensitive aspects for humpback chub should include mainstream backwaters as rearing habitat; access to tributaries for spawning is also important to downstream trout.

Recreational use of the Lee's Ferry fishery is highest during the period September to April, but fishing in this reach is a year-long occurrence. Boating safety and angling quality are thus sensitive to flow impacts during the entire year.

53 4 "Once chub reach a size that allows them to survive in the mainstem river, dam operations have few direct impacts on them." The term dam operations should be replaced by floods in keeping with the context of this section. The sentence as it stands is tautological, and it may well be that dam operations determine the size at which chub can survive in the mainstem. Furthermore, we see little difference between "direct" and indirect impacts of dam operations as they affect this endangered species. Both types of impacts should be considered in an analysis of this sort.

57 1 The volumetric proportion of amphipods increased during a 3-day period in October 1984 when flows were decreased dramatically and held low. Long-term effects of increased drift have not been examined and may prove detrimental to food resource populations (see comments for Summary, Page 3, Para 3).

57 3 We do not know at what size most young humpback chub move out of the Little Colorado River or what proportion of young individuals leave the tributary. Passive movement (drift) of eggs or larval chub have not been investigated sufficiently to justify this statement. Certainly, we do not know that young chub wait until they reach a certain size to move into the mainstream. Furthermore, we do not know what impacts occur to young chub in backwaters under conditions of fluctuating flows. It may well be that larval chub (or eggs) experience very high mortality if they are carried into the cold mainstream waters during periods of fluctuating flows. This paragraph should be rewritten as should Figure VI-7, p. 58 and its caption.

Page Para

58 3 The results of GCES must be viewed in the context of the limited availability of fluctuating flows and the consequent restrictions on our ability to determine their effects on aquatic resources. The discussion of relative effects of flood releases and fluctuating flows does not recognize this major shortcoming.

62 Banner There seems to be a conflict between this banner and the one on p. 4 of the Summary and Principal Conclusions section. Certainly, the discharge scenario presented here would be a modification of current dam operations designed to maximize power production.

62 4 The continuation sentence from p. 62 to p. 64 makes no sense. Something is missing.

64 3 As indicated, the scenario of preferred flows for native fishes is based on limited information. It assumes that maximizing backwater numbers during a three-month period with low flows, coupled with steady flows during the remainder of the year, optimizes conditions for these species. This seems like a great extrapolation of our limited information on the ecological needs of these species; particularly when one considers that they evolved in a desert river system characterized by large annual floods and great variation in year-to-year flows.

66 2 A sustained decrease in flow from 26,000 cfs to 5,000 cfs would result in a major loss of habitat space for both fish and their food resources at any time of the year. Would this have no negative effects?

74 3 The text following the banner considering the effects of the Uprate and Rewind Program hardly follows the banner, which contends that these effects cannot be assessed. In fact, the text points to increases in the amplitude and rate of change of fluctuations, which would have negative impacts on most resources.

77 2 This paragraph, as elsewhere, disregards the effects of low and fluctuating flows on the downstream fishery, which is dependent upon natural reproduction that occurs largely in tributaries. The reach of the Colorado River in Grand Canyon is one of the few places in the conterminous United States where trout fishermen can experience the pleasure of fishing for "wild trout" that are generations removed from the parent hatchery stock.

Page Para

77 3 How can modifying the intake structure of Glen Canyon Dam and routing water from higher levels in Lake Powell be considered a non-operational alternative? This most certainly involves changes in operations as well as new construction.

78 2 Most marshes in Grand Canyon apparently were formed after flow regulation was initiated in 1963 (pp. A-42, B-9, DIR). If marshes formed naturally under dam operations (limited floods) during this period, why would non-operational measures be necessary to reestablish these streamside habitats?

81 1 Here, and elsewhere in the report, reference to fluctuating flows should acknowledge that the effects of these flows on aquatic resources could not be adequately determined by GCES. High runoff and far above average inflow into Lake Powell made difficult the delivery of fluctuating flows necessary for GCES to evaluate their effects on aquatic resources. Sufficient fluctuating flows during periods critical to native fishes were not available to our researchers (see p. 14, DIR and comments for page 5, paragraph 1 of this review).

82 3 Again, we do not know what the long-term effect of fluctuating flows would be on humpback chub. This paragraph and paragraph 5 following seem to be contradictory; the first suggests no long-term effects for most resources, while the latter states that approximations to steady releases will cause least degradation to most environmental resources.

82 5 No comparative measurements of trout growth were made under conditions of steady and fluctuating flows. We know only that in the short-term more food is available to trout under fluctuating flows.

82 B-9 The contention that reducing vulnerability of humpback chub can be realized only through non-operational alternatives is not supported. Again, we have proposed, and the DIR contends repeatedly, that high, steady flows during May and June might benefit the chub. It certainly is also probable that reductions in fluctuating flows could benefit spawning and immature chub in mainstream backwaters. Backwaters largely isolated from mainchannel water circulation warm appreciably as evidenced in our GCES report. It may be that these areas would serve as spawning habitat for mainstream chub under sustained, optimum flow conditions prior to and during the reproductive period.

Page Para

82 8-9 Humpback chub reproduce successfully in pond environments at the Fish and Wildlife Service hatchery in Dexter, New Mexico. Any discussion of warming the entire mainstem river should include the potential to increase the distribution and abundance of fishes that might be competitors with or predators on humpback chub.

83 4 We recommend full support for pursuit of the management options expressed on pp. 83-84 of the DIR. We would emphasize that if monitoring programs had been in effect since building of Glen Canyon Dam, many presently unanswered questions concerning critical resources and dam operations might have been resolved.

APPENDIX B

B-25 5 Does this statement adequately portray peregrine importance in the Grand Canyon? It is true that they nest there in small numbers, but these numbers are probably higher than anywhere else in Arizona. The National Park Service has funded a three year study to investigate this species in Grand Canyon.

8-30 Table B-2 Here it says that fluctuations are not likely to have a direct effect on riparian birds. Elsewhere it is stated that some of the obligate riparian species nest 2-3 feet above water level, yet fluctuations of up to 13 vertical feet are possible. Will these nests be inundated?

B-31 3 Again, fluctuating flows were limited during this study. The first sentence here, and elsewhere in the report, does not adequately address problems that ca. 150% of average inflow into Lake Powell caused not only AGFD researchers, but other GCES researchers, power managers, etc.

8-51 2 What about downriver reproduction of trout and loss of the aesthetic value of catching naturally reproduced fish?

Reference: Kaeding, L. R. and M. A. Zimmerman. 1983. Life history and ecology of the humpback chub in the Little Colorado and Colorado rivers of the Grand Canyon. Transactions of the American Fisheries Society 112:577-594.

APPENDIX E: CONSTITUENT GROUP COMMENTS
PART III: NATIONAL PARK SERVICE CONSTITUENCY

INDEX
COMMENT LETTERS
GLEN CANYON ENVIRONMENTAL STUDIES
SEPTEMBER 1987 DRAFT REPORT

SUMMARY

COMMENTS RECEIVED FROM NPS CONSTITUENTS ON
GLEN CANYON ENVIRONMENTAL STUDIES
SEPTEMBER 1987 DRAFT REPORT

Joni Bosh, Chairperson, Grand Canyon Chapter, Sierra Club, Phoenix, AZ 85016 Date of Letter: Nov. 13, 1987

Glen Canyon Environmental Studies Draft Report successfully presented vast array of separate bits of data, but is not complete or adequate enough upon which to base operation decisions.

Why were so few copies made available to agencies and the public?

Comment time too short, implies that the Bureau of Reclamation did not want public comment and participation.

Strongly urge a full environmental impact statement be completed before any changes to dam operations are instituted.

Colorado River Storage Project rules should be modified to account for environmental effect of dam operations, and importance of environmental protection should not come last after power production, water retention and other uses of the river.

Robert Lippman, Colorado Plateau Representative, Friends of the River, Flagstaff, AZ Date of Letter: Nov. 10, 1987

Recreational values, interests, and downstream environmental impacts of Glen Canyon Dam were not being afforded the proper consideration in the early 1980's.

The Glen Canyon Environmental Studies confirmed the "obvious" substantial adverse effect on downstream environmental and recreational resources.

The development of long range operating criteria, documentable trend to maximize peaking releases, and enhancing power revenues in a carefully defined power brokerage scheme are "major federal actions" necessitating National Environmental Policy Act consideration.

Floods and fluctuating releases adversely impact existing park resources and values.

Operating criteria were shown by the 1983-84 "flood" to be grossly out of balance with competing uses, resources and considerations, and with general concepts of prudent conservative operations.

Fluctuating flows observably may have had a greater impact on beach stability than indicated by draft report.

Robert Lippman (continued)

National Park Service should support proposals for modified operations which mitigate present level of impacts by dam operations.

Environmental Impact Statement on modified operations is long overdue.

Recommend that National Park Service should actively and affirmatively encourage an accelerated Environmental Impact Statement process and Glen Canyon Dam releases be modified to a base loaded pattern subject to water availability and delivery commitments.

Steady flows of 25,000 to 30,000 cubic feet per second for the April through October season should be followed as it would permit beach stabilization and enhance most identified "critical resources".

Sleight Expeditions, P.O. Box 40, St. George, UT 84770 Date of Letter: Nov. 13, 1987

Protection of Grand Canyon environment is critical until all aspects of impact on the Grand Canyon can be determined.

Dam releases have increased both the safety and quality of white water recreation.

An operating scenario which protects beaches, terrestrial vegetation, wildlife, and recreation would be preferable.

Flood releases should never occur for the protection of the Grand Canyon environment. Low flows (below 8,000 cfs) and rapid fluctuations (3,000 to 31,000 cfs) need to be avoided.

More research needed before sound judgement can be made on: low flows, fluctuating flows, high flow effect on endangered species, how flows relate to beaches, and how flows relate to safety and quality of boating.

Flow scenarios too incomplete to judge which would most benefit the Grand Canyon resource and inconclusive in deciding which would have precedence over others in protecting the environment.

Need to study how to ensure continuation of common native fish and humpback chub before any modification of dam operations is implemented.

All issues need to be carefully studied before any modification to dam operations are put into effect.

Russell D. Butcher, Southwest & California Representative, National Parks and Conservation Association, Cottonwood, AZ Date of Letter: Nov. 10, 1987

Glen Canyon Environmental Studies Draft Report confirms that the dam has grossly altered and manipulated sedimentation, turbidity, aquatic life, riparian habitat, terrestrial wildlife, and white-water recreation.

Suggests that Glen Canyon be operated in order to place greatest emphasis on values and resources that have higher priority. Urges that the following list receive priority attention:

(1) Humpback chub: this federally listed, endangered, native fish species must be accorded special management emphasis. Its jeopardy status must be addressed by meaningful dam operations to assure fish's survival and enhancement in the park.

(2) Erosion of sediments from river channel and river banks must be slowed as much as possible by restricting flood releases.

(3) Sharp daily fluctuations caused by peaking power should be eliminated or greatly reduced so not to impair white-water recreation.

(4) Other native species of fish and habitat requirements need to be protected and enhanced while taking into account the aforementioned priorities.

(5) Enhancement of artificially expanded terrestrial wildlife and related riparian habitat, but not at the expense of the priorities listed above.

Efforts should be enacted to mitigate impairments caused by dam construction. Develop best set of priorities for management. Continued professional monitoring and research is necessary to fully understand impacts and to improve operations of the dam for the welfare of Grand Canyon National Park and its resource values.

Funding for on-going monitoring and research program should be derived from dam revenues.

Combined response letter from 20 Grand Canyon Concessionaires, Date of Letter: Nov. 12, 1987.

Although Glen Canyon Environmental Studies Draft Report states that flows from Glen Canyon Dam have been beneficial to commercial and private river running by attenuating seasonal flow extremes (high and low), it fails to mention that water releases have prevented river running for six weeks in

Grand Canyon Concessionaires (continued)

August-September 1973, six weeks in May 1977, and two weeks in June 1977. Also, there have been low water problems every year which lead to inconveniences, damaged equipment, injured passengers, and helicopter evacuations of passengers, boats, and crew.

Surplus water has been released during winter months and by daily spikes which are of little use to river runners and recreationists.

Interests and opportunities of white-water boaters should be major factor in the operational management of Glen Canyon Dam.

Propose operational changes: (1) Minimum releases from the dam to be at least 5,000 cfs and a maximum of 28,000 cfs from October 1 through March 32, and (2) release summer runoff in the summer similar to pre-dam pattern with minimum at 11,461 cfs and maximum of 28,000 cfs. This will yield an annual average of 8.23 million acre-feet.

Urge continuation of environmental studies and funding for them.

Bruce Winter, Arizona River Runners, Inc., Phoenix, AZ Date of Letter: Nov. 10, 1987

Glen Canyon Environmental Studies Draft Report supports observation that operation of the dam has an adverse effect on the Grand Canyon and river users downstream of the dam.

Short-term and daily fluctuating flows are causing irreversible loss of sand and beaches, thus negatively impacting recreation and other aspects of the Canyon.

Flood releases above 31,500 cfs and resultant erosion are causing extreme damage to beaches, vegetation and wildlife habitat, and eliminating camping sites. Flood flows also have negative impact on safety of white-water boating and angling.

Flows below 5,000 cfs have negative impact on almost all users and should be avoided.

Bill Wasley, Operations Manager, Arizona Raft Adventures, Flagstaff, AZ Date of Letter: Nov. 10, 1987

Glen Canyon Environmental Studies Draft Report documents observations shared by many who have seen the damage caused by fluctuating flows.

Hoover Dam should be operated to producing peaking power while Glen Canyon Dam should be operated as a base-load plant for electrical needs.

Sand on the beaches and river bottom are disappearing and not being replenished. Destruction of beaches is detrimental to the entire environment of the Grand Canyon.

John Vail, Outdoors Unlimited River Trips, Lotus, CA 95651 Date of Letter: Nov. 6, 1987

Past and present operations of Glen Canyon Dam have caused two significant changes in Grand Canyon: (1) beaches have been lost due to extreme daily fluctuation in flow and loss of replacement silts and clays, and (2) composition of beaches have been altered by water fluctuations and high water releases.

Proposes study to include three phases for mitigation of the loss and alteration of beaches:

(1) Flow reductions of no more than 10% per day, not to exceed 1 percent per hour.

(2) During November through February use suction dredges to restore critical beaches by pumping sand from adjacent river bottom.

(3) Retrofit the dam for a silt bypass to be supplied by sand/silt slurry or sand barges.

Peter Reznick, 1460 W. Palmer Ave., Flagstaff, AZ 86001 Date of Letter: Nov. 10, 1987

Theories that sand beaches may be replenished by side canyons bringing enough silt for resupply may be incorrect.

Andy W. Laurenzi, Field Representative/Public Lands, Arizona Nature Conservancy, Phoenix, AZ Date of Letter: Nov. 30, 1987

Principal conclusions of the Glen Canyon Environmental Studies Draft Report in regard to possible effects of current and modified operations on humpback chub are misleading and not adequately demonstrated by the data presented.

Operational changes are likely to help humpback chub.

Time length of study is too short. Continued monitoring for several years of key natural resources, both biological and physical, necessary before a reasonable decision can be made about how dam operations affect resources.

SIERRA CLUB

Grand Canyon Chapter · Arizona
2127 E. Osborn Phoenix, AZ 85016

NOV 16 '87

November 13, 1987

Dick Marks, Superintendent
Grand Canyon National Park
PO Box 129
Grand Canyon, AZ 86023

Dear Mr. Marks,

On behalf of the Grand Canyon Chapter of the Sierra Club, I'd like to respond to your request for comments on the Glen Canyon Environmental Studies Draft Report. There are, indeed, several points we think should be carefully considered.

First, the overall impression is that this first round report pulled together a vast array of separate bits of data, and did so successfully. However, as a first attempt it is not complete or adequate enough to base any operations decisions upon. For example, the report, as far as I can tell, lacks even the simple data on where beaches are located or have been redistributed. Several of the beaches that formed after the high water in 1983 disappeared by the end of 1984. I also am interested in seeing the data that supports the contention that 30,000 cfs is preferred by white-water enthusiasts. At flows of 28,000 cfs and above is when river running problems and accidents start to occur at Crystal Rapids.

Second, after four years or more of work, why in the world did the agency make only 300 copies available to other agencies and the public? I've been aged for copies by several people (whom I referred to your agency) and loaned my copy to one other person. It is inconceivable to me that after so many people have expressed interest in Glen Canyon Dam that so few copies would be available.

Third, it is hard to believe that the agency really wants to hear from the public. Allowing well less than 30 days for comments on a document that took more than four years to write boggles the mind. Does the Bureau of Reclamation not want public comment and participation, or do they not intend to take comments seriously? How can they expect to get thoughtful comments in such a short amount of time? I've had my copy for only 18 days. I read appendix D once and need to review it more carefully, especially the information on 602 (a) that regulates some dam operations.

Fourth, we would strongly urge that a full environmental impact statement be completed before any changes to dam operations are instituted. As brief as the GCES is, it is obvious that the impacts associated with

operations changes are either unknown or would have a significant impact. While the theoretically best option would be to tear the dam down and let the river run naturally, that isn't the best scenario for the river with the dam in place. High flows will destroy the beaches and the riparian habitat, which is one of the longest in the state even if created artificially. Monster fluctuations will do the same. Further, it is conceivable that, had the high waters of 1983 been released just a bit later, the vegetation that reemerged would have been composed primarily of native species. Also, non-operational changes should be fully investigated before any decisions are made.

Lastly, the fact that environmental protection of an internationally recognized park comes last after power production, water retention and other uses of the river is disturbing and outdated. The Colorado River Storage Project rules should be modified to account for environmental effects of dam operations.

Thank you for this chance to comment.

Sincerely,
Joni

Joni Bosh, Chairperson
Grand Canyon Chapter, Sierra Club

FRIENDS OF THE RIVER — Colorado Plateau
101 East Birth Street • P.O. Box 1115 • Flagstaff, Arizona 86002 • (602) 774-0130

November 10, 1987

Mr. Richard Marks, Superintendent
Grand Canyon National Park
P.O. Box 129
Grand Canyon, Arizona 86023

Re: Comments on Glen Canyon Environmental
Draft Report

Dear Mr. Marks:

As you know the GCES were undertaken largely as a response to the public and technical controversy generated by the Glen Canyon Power Plant expansion project proposal and the rewind and uprate program (or "Peaking Power Project") in the early 1980's. At that time, it was clearly articulated that recreational values and interests long institutionalized by the National Park Service at Grand Canyon National Park were not being afforded the proper consideration justly due in the prioritizing of Glen Canyon Dam operations and uses, and that the downstream environmental impacts were totally ignored with no efforts at mitigation.

The draft report indicates several critical factors which now ju:-.ify the informed proposing of alternative operating criteria at Glen Canyon Dam and the institutionalizing of recreation and downstream ecological protection as a "purpose" or priority in the operating criteria.

First, the GCES confirmed the "obvious" observable phenomenon that the existence and subsequent operations of Glen Canyon Dam have "substantial adverse effect on downstream environmental and recreational resources."

The development of long range operating criteria and the documentable trend to maximizing peaking releases and enhancing power revenues in a carefully defined power brokering scheme, are, "major federal actions" occurring subsequent to the passage of the National Environmental Policy Act, although the Dam itself was constructed prior to the Act. Any new proposal to modify the operations and releases would also be a "major federal action" due to its far reaching effects.

Second, the impacts of flood and fluctuating releases documented by the study adversely impact existing park resources and values (i.e. the riparian ecology, beaches and terrestrial resources, as well as recreational values and experience).

It is noted here that recent operations and flood releases have violated one of the primary present operating criteria being simply that "spills are to be avoided." The 1983-1984 "flood" situation clearly illustrated how the gradual trends to promote water storage and enhance power revenues above all other uses, resources and considerations have resulted in further impacts and depredations to those ignored uses, resources and considerations, i.e. recreation and the downstream riparian environment. The operating criteria were shown to be grossly out of balance with competing uses, resources and considerations, and with general concepts of prudent conservative operations.

It is also noted that fluctuating flows observably may have had a greater impact on beach stability then indicated by the draft report, especially considering that fluctuating flows were not the norm during the study period.

Third, as modified operations have been shown to have value in mitigating the present level of impacts caused by dam operations, and in protecting or even enhancing most downstream resources, it appears that the National Park Service should support proposals for such modified operations.

Such proposals, for the above noted reasons, would require the preparation of an environmental impact statement which again is long overdue regarding the impacts of Glen Canyon Dam.

Friends of the River thus supports the articulation of a preferred proposal for modifying operations to protect and enhance downstream resources and values, via an accelerated EIS process. We therefore recommend that the National Park Service propose that releases from Glen Canyon Dam be modified to a base loaded pattern subject, of course, to the physical constraints of water availability and delivery commitments, and that the National Park Service actively and affirmatively encourage the executive committee representing the participating agencies in the GCES to reach consensus on such a recommendation. That recommendation and consensus should be forwarded to the Secretary of the Interior for the immediate establishing of an accelerated EIS process addressing the proposal.

Friends of the River would, at this time, under the unfortunate realities of Glen Canyon Dam's presence, recommend that releases on the order of those described in the scenario for "fishing and white water recreation" (pages 70 through 71; Figure VII - 5) be proposed as the preferred alternative, as high flows (but not flood flows) have been shown to be the most preferred by recreational interests for safety and quality of experience. Steady flows of 25,000 to 30,000 cfs can be achieved during the peak river running seasons, (April through October), would permit beach stabilization, and would enhance most identified "critical resources".

In contrast, it has been our position since the "peaking power project" that the monthly and daily release patterns as proposed by the Western Area Power Administration (Appendix D, Pages D-21 to D-22) are completely unacceptable and extremely damaging to all critical resources.

National Park Service support for the Grand Canyon Environmental Studies, as well as this opportunity for participation, are most appreciated by Friends of the River. We trust that the opportunity to mitigate this most far reaching resource problem at Grand Canyon National Park will similarly be appreciated by the Park service through its affirmative advocacy of the above proposal for modifying operations at Glen Canyon Dam.

Sincerely,

Robert Lippm
Colorado Pla au Representative

PL/tIc

cc: Dave Wagner, U.S. Bureau of Reclamation
Upper Colorado Reaion

99

SLEIGHT EXPEDITIONS

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November 13, 1987

NOV 17 T7

Grand Canyon National Park Service
Attn : Superintendant Richard Marks
Post Office Box 129
Grand Canyon, Arizona 86023-0129

RE: Glen Canyon Environmental Studies Draft Report
Comments :

Dear Sirs.

We appreciate the opportunity to assess the findings and conclusions of this report, and the opportunity to express our opinions and comments.

In reviewing the report, we recognize the fact that since the dam was created , the Grand Canyon has become a completely new and transformed environment. We beleive that protection of this environment is critical. This environment needs to be fully protected until all aspects of the impact on the Grand Canyon can be determined.

White-water recreation (as stated in the report) would probably be at or near the level of activity it is now. But the Glen Canyon Dam has certainly provided a less dramatic flow, because of its regular seasonal flow levels, which has increased both the safety and quality of the white water recreation.

In the Glen Canyon Environmental Studies suggested operating scenarios: the scenario that protected the beaches, terrestrial vegetation and wildlife also benefits the white-water. recreation. These two different aspects can work hand in hand together creating a quality environment of beaches, different vegetation and wildlife habitat which all add to the white-water enthusiast's experience and enjoyment of the Canyon.

List of Important Issues

Protection & Maintenance of the existing environment. As stated in the report, flood releases and fluctuating releases were found to have negative impacts on downstream resources. It also stated that flood releases occur one in every four years. "hese flood releases cause irrepairable damage to the downstream eaches, vegetation and wildlife. Even 1 flood release in 20 -ears is too often I The Glen Canyon Dam operation needs to be hanged so that Flood releases may never occur for the protection of the Grand Canyon Environment.

Also, low flows (below 8,000 cfs) and drastic fluctuations of between 3,000 cfs and 31,000 cfs need to be avoided. The ideal recreation level may be for flows between 8,000 cfs and 20,000 cfs. This flow should be consistent enough to protect the Grand Canyon Environment.

More Data is Needed. It is clear from reveiwing the Draft Report that much more research is going to be needed before sound judgement can be made in regards to the Grand Canyon Dam Operational Flow. Especially more data is needed on

1 Low Flows (below 10,000cfs)
2 Fluctuating Flows (3,000cfs to 31,000cfs)
3 How Flows effect endangered species.
4 How the Flows relate to the Beaches.
5 How the Flows relate to safety and quality of Boating.

All the flow scenarios are too incomplete to judge which would most benefit the Grand Canyon Resource and are inconclusive in deciding which scenario would have precedence over the others in protecting the environment.

Concern Over Endangered Species. How to best ensure the continuation of the comman native fish (which needs a quiet, warm backwater for proper growth and survival) and the Humpback Chub (which represents 80% of the total population) needs to be studyed more fully before any modification of the Dam Operation is implemented.

In Conclusion. All issues should be carefully studied before *any* modification to the operations of the Glen Canyon Dam are put into effect. Only through continued and careful study can a modification be chosen that will benefit the majority of the resources. Again, we appreciate the opportunity to express our concerns over the issues and look forward to discussing these concerns with the different agencies, so that they can provide an operating scenario that can fully protect the natural resources in the Grand Canyon.

Sincerely,

Sleight Expeditions

N[illegible] P[illegible] & C[illegible] A[illegible]

1701 Eighteenth Street, N.W. • Washington, D.C. 20009

RUSSELL D. BUTCHER
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[illegible] VED
[illegible]

November 10, 1987

[illegible]

RE: GLEN CANYON ENVIRONMENTAL STUDIES DRAFT TECHNICAL REPORT, September 1987

Mr. Richard W. Marks
Superintendent
Grand Canyon National Park
P.O. Box 129
Grand Canyon, AZ 86023

Dear Dick:

National Parks and Conservation Association, a nonprofit membership organization founded 68 years ago to promote the protection, enhancement, and public understanding of the National Park System, appreciates this opportunity to offer preliminary comments on the September 1987 "Glen Canyon [Dam] Environmental Studies Draft Technical Report."

We first want to say how impressed we are with the thoroughly professional quality of this document. The many persons involved with its preparation deserve to be commended.

As for the document's conclusions as to the state of affairs downstream from Glen Canyon Dam, they unfortunately and certainly assumptions made at the time the dam war built and put into operation that a project of this magnitude would inevitably drastically change what had always been a naturally functioning ecosystem--which Grand Canyon National Park was established to protect. For the dam has grossly altered and manipulated sedimentation, turbidity, aquatic life, riparian hauitat, terrestrial wildlife, and white-water recreation.

Because the complex interrelationships have been so dramatically changed, it is, as the document so well points out, no easy matter to find ways of operating the dam so as to enhance the array of disrupted natural ecological processes and needs, and to enhance, as well, the visitor's use and enjoyment of the river.

For instance, to minimize the process of "flushing" sediments

on through the Grand Canyon and into Lake Mead (sediments that in post-dam years are coming into the Canyon at but a small fraction of pre-dam sediment load), the dam should be operated to avoid flood flows. Yet, floods are needed to keep the quantity of boulders at rapids from steadily accumulating and building themselves into massive barriers that are hazardous to and disruptive of white-water boating. (Actually some of the buildup of boulders could only be kept from occurring by much greater pre-dam spring runoff floods than have resulted from dam flood-flow releases. But at least the dam's flood-flow releases can help to some extent.)

What must be sought, in our view, is a method of operating Glen Canyon Dam that will place the greatest emphasis upon those values and resources that have the higher priority. We urge the following listing of relative priorities, not that any should be mutually exclusive of any others, but that this listing should suggest relative emphases:

(1) The Humpback Chub, as a federally listed endangered native fish species must, under the law, be accorded special management emphasis. Construction and operation of Glen Canyon Dam has so drastically altered the habitat tolerances of the chub that its range in Grand Canyon National Park is now but a precarious small fraction of its pre-dam range. Its jeopardy status must be addressed by meaningful dam operations that will not only assure the fish's survival in the park, but will offer the chance for enhancement of the species there.

(2) The steady erosion of sediments from the river channel and along the riverbanks in the national park must be slowed as much as possible, to forestall for as long into the future as can be possible the flushing of this relatively finite resource on through the Grand Canyon and into Lake Mead. This steady erosion is the inevitable reality, since Glen Canyon Dam and its reservoir are now capturing the bulk of sediments that formerly were carried by the free-flowing river into Grand Canyon. With this once-enormous sediment load no longer constantly replenishing the sediments then being carried on through Grand Canyon, the only remaining sources come from such tributaries as the Paris and Little Colorado rivers, and from side drainages in the Canyon. All of these, however, comprise but a tiny fraction of the fine-grained sediments that once were available to continually rebuild the beaches and sandbars.

beaches and sandbars are, of course, essential to white-water boating, most especially to non-motorized river trips through Grand Canyon. As the bulk of the beach and sandbar sediments are gradually flushed farther and farther downstream without the pre-dam replenishing process, the size and quantity of such places that are valued for rivertrip camping sites will inexorably diminish.. .until camping becomes unbearably congested and until too few camping sites remain for the running of non-motorized river trips (remaining camping areas, at

least in some stretches, becoming too far apart for a non-motorized day's journey). We urge that there be no more flood releases.

(3) The sharp daily flow fluctuations should either be eliminated or greatly reduced, since they often greatly disrupt white-water boating trips. When Glen Canyon Dam was constructed and put into operation, it was intended as a base-load power generation facility. However, it has since been used to supply daily peaking-power needs, thereby creating the sharp fluctuations in the quantity of water released from the dam. We urge that peaking-power electrical needs be provided by other facilities; or at the least, that those needs be spread out across a number of major facilities. It should also be pointed out that the Repayment schedule for Glen Canyon Dam was predicated exclusively upon base-load power generation. Peaking power is, thus, not part of the repayment arrangement; it is "gravy." We urge that Grand Canyon National Park and its white-water recreation should not be sacrificed or impaired to meet this aspect of power generation. White-water recreation deserves a very high priority in terms of just how Glen Canyon Dam is operated.

(4) Other native species of fish and their habitat requirements need to be protected and enhanced as much as possible, taking into account the urgent priority needs, 1, 2, and 3, above.

(5) As for the terrestrial wildlife and related riparian habitat, since this is already a significantly altered situation, we suggest that enhancement of this artificially expanded abundance not be manipulated/managed at the expense of the priorities listed above.

It is a monumental tragedy, in our view, that Glen Canyon Dam was ever built--both because of the loss of magnificent Glen Canyon--,a place of exquisite natural beauty that is now destroyed, and because of the array of impacts upon the Colorado River downstream from the dam. The challenge now is not to try to "mimic" how things originally were (the changes have been too drastic to ever accomplish that), but instead to try to mitigate the impairments caused by the dam by establishing the best set of priorities possible.

A vital part of such mitigation management is for continued professional monitoring and research so that complexities of the dam's impacts can be more fully understood and so operational techniques of the dam can be gradually improved for the welfare of Grand Canyon National Park and its resource values.

Funding for an on-going monitoring and research program should naturally be derived from the dam's operating revenues. Since it is the dam that has radically disrupted and altered the river's ecosysten and recreation, it is the consumers of the dam's power who should pay for the long-term costs of monitoring, research, and, where necessary,

too, any costs of implementing protective management programs designed to protect and enhance our only Grand Canyon.

We greatly appreciated the October 28th briefing session in Flagstaff, and we look forward to participating in further phases of this process.

As we never did directly receive a copy of the draft report, I'd greatly appreciate my name being added to the mailing list.

With st

RDB/prb

cc: T. Destry Jarvis,
NPCA Vice President

Ru D. Butcher
Southwest -& -California Representative
Box 67, Cottonwood, AZ 86326

November 12, 1987

Mr. Richard W. Marks,
Superintendent, Grand Canyon National Park
P.O. Box 129
Grand Canyon, Arizona

Dear Superintendent Marks:

Subsequent to a public meeting in Flagstaff on October 28, and discussions at their annual river concessioners' meeting on October 29-30, the Grand Canyon river concessioners agreed to issue a combined response to the Draft Glen Canyon Environmental Studies Report. This letter is our combined response.

It is stated in the Report, and elsewhere, that control of Grand Canyon river flows by Glen Canyon Dam has has been beneficial to commercial and private river running because it has attenuated seasonal flow extremes, high and low.

That, however, is only part of the effect, part of the time. It fails to mention that Glen Canyon water release management prevented river running for about six weeks in August and September of 1973, for lack of boatable releases, that it did the same thing for about six weeks in May and half of June 1977, and that there are a number of low water problems just about every year, ranging from inconveniences, to damaged equipment and injured passengers, to the necessity for helicopter evacuation of passengers, crews and boats from the canyon. The Study's observation that past water relase scenarios have not always met the best interests of the boating community is something of an understatement, and it has become more so in the last 11 years.

In 1966 (generator installation had just been completed) the highest water released through Glen Canyon Dam was 20,900 cubic feet per second.Now, through rewinds and uprates, and utilizing the lull stroke of the turbine gates, as much as 37,296 cfs can be released downstream.

That additional water, however, has since 1976, gone into daily spikes, and into releases in the dead of winter, when they are of almost no use to river runners, or other recreationists. To a very great degree, water release patterns since 1976 have "prolonged" the river season by "prolonging it" into months for which there is no public or private demand because of severe temperatures and weathers.

We believe the interests and opportunities of whitewater boaters should be a major factor in the operational management of Glen Canyon Dam, and we speak for ourselves, and about 15,000 people who want a safe enjoyable Colorado River/Grand Canyon experience each summer.

The Grand Canyon river trip is one of our nation's premiere outdoor recreational experiences. It is the nucleus of a very significant regional economy,

generating about $14,000,000.00 in passenger fares and related expenditures each year, employing several hundred professional guides, and generating significant sales, income, and excise taxes, and franchise fees.

That experience, and those values, can only survive if they are factored into water release management policies at Glen Canyon Dam. Toward that objective, we recommend the following operational changes:

1. Immediately establish the minimum release from the dam to be at least 5,000 cfs at any and all times, around the clock and throughout the week, from October through March 31.

2. Revise toward release of summer runoff in the summer, similar to the pre-dam pattern of the river, and similar to the release practice at the dam from 1966 to 1976.

3. Significantly reduce the magnitude and rate of fluctuating releases.

The chart below provides an equation for accomplishing the above revisions:

October
November
December
January
February
March

minimum 5,000 cfs; maximum 28,000 cfs

totaling 4,115,000 acre-feet + or -

April	685,833 acre-feet, @ 11,461 cfs minimum, 28,000 cfs maximum	
May	685,833 acre-feet, @ 11,461 cfs minimum, 28,000 cfs maximum	totaling
June	685,833 acre-feet, @ 11,461 cfs minimum, 28,000 cfs maximum	4,115,000 acre-feet
July	685,833 acre-feet, @ 11,461 cis minimum, 28,000 cfs maximum	firm
August	685,833 acre-feet, @ 11,461 cfs minimum, 28,000 cfs maximum	
September	685,833 acre-feet, @ 11,461 cfs minimum, 28,000 cfs maximum	
		6,230,000 acre-feet

The above figures are used because:

6,230,000 af is the amount that must be released as an annual average.
On a shift of that annual average would be released in summer and another shift in winter.
One-twelfth (685,833 af) of the annual requirement would be released each summer month.
Releasing 685,833 af in a month requires a constant flow of at least 11,461 cfs, which is sufficiently high for safe, if not enjoyable river running.
The difference between the low of 11,461 and the high of 28,000 would provide for fluctuations necessary to reasonable peaking power generation.
Higher inflows, or greater storage needs could be provided by more sustained releases upward of 28,000. (Constant release of 28,000 cfs would provide 1,680,000 acre-feet of downstream release or upstream storage capacity per month.
Winter limits of 5,000 cfs minimum / 28,000 cfs maximum would allow the Bureau of Reclamation to reasonable peaking power demands, which would resultingly provide sufficient averages for the few winter river trips that take place, and it would provide adequate protection for trout spawning and rearing.

The 28,000 cfs figure would provide a good whitewater boating experience while slightly shaving the peaking power "spikes" that are removing Grand Canyon's camping beaches. Bureau of Reclamation data has shown that flows higher than 28,000 would be foregone only 2-1/2% of the time.

In addition to adoption of the foregoing water release equation, we also urge continuation of the studies and the funding for them. After the studies had begun, a three year period of unusually high inflows and releases took place that eliminated the very conditions that were to be studied as far as Grand Canyon beaches were concerned. The availability of these beaches is essential to continuation of these incomparable river trips and the economic and financial activities they produce. It is vital to determine the water release patterns under which they can survive.

We appreciate and urge your attention to these concerns and alternatives.

Sincerely,

ARIZONA RAFT ADVENTURES, INC.
Flagstaff, Arizona

ARIZONA RIVEk RUNNERS
Phoenix, Arizona

CANYON EXPLORATIONS, INC.
Flagstaff, Arizona

CANYONEERS, INC.
Flagstaff, Arizona

COLORADO RIVER & TRAIL EXPEDITIONS
Salt Lake City, Utah

CROSS TIMBER EXPEDITIONS, INC.
Orem, Utah

DIAMOND WEST, INC.
Orem, Utah

HOKI MAC RIVER EXPEDITIONS, INC.
Salt Lake City, Utah

OARS, INC.
Angels Camp, California

OUTDOORS UNLIMITED
Lotus, California

DIAMOND RIVER ADVENTURES
Page, Arizona

EXPEDITIONS, INC.
Flagstaff, Arizona

GEORGIE'S ROYAL RIVER RATS
Las Vegas, Nevada

GRAND CANYON DORIES, INC.
Menlo Park, California

GRAND CANYON EXPEDITIONS CO.
Kanab, Utah

MATCH RIVER EXPEDITIONS, INC.
Vernal, Utah

SLEIGHT EXPEDITIONS, INC.
LaVerkin, Utah

WESTERN RIVER EXPEDITIONS, INC.
Salt Lake City, Utah

WHITE WATER RIVER EXPEDITIONS
Mariposa, California

WILDERNESS RIVER ADVENTURES
Page, Arizona

November 10, 1987

Richard Marks
Superintendent
Grand Canyon National Park
P.O. Box 129
Grand Canyon, Arizona 86023

Dear Mr. Marks,

We have read and reviewed the "Glen Canyon Environ ental Studies Draft Report, September 1987", initiated by the Department of the Interior.

We feel there is now concrete evidence to support what we as a Grand Canyon rafting company have been experiencing for many years. The operation of the dam is having an adverse effect on the Grand Canyon and most of the river users downstream from the dam. We feel, the report points out many realistic operational changes that can be made to eliminate or at least minimize the adverse effects.

We strongly support a review of the dams operations to consider and adopt these changes. The following points we feel are some of the most important ones that need to be addressed.

1. The greatly fluctuating flows(especially the short term and daily fluctuations) are causing an irreversible loss of sand and beaches throughout the Grand Canyon. This is having a negative impact on the recreational rafting and many other aspects of the canyon.

2. Flood releases (releases over 31,500 CFS) are causing extreme damage to the beaches through erosion. This also damages vegetatio wildlife habitat and eliminates camping sights for the whitewater trips. These flows have a very negative impact on the safety of whitewater boating and fishing below the da

3. Finally the low flows (below 5,000CFS) again have a negative impact on almost all the users of the river below the dam and should be avoided.

It clearly seems time for the Bureau of Reclamation to consider the negative effects that the operations of the Glen Canyon Dam are having on our national treasure the Grand Canyon and the users of the river below the dam.

Sincerely,

Bruce

Bruce Winter

cc:
Senator Dennis De Concini, AZ.
Senator John Mc Cain, AZ
Clifford Barrett, Regional Dir., Bureau of Reclamation

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Arizona RIVER RUNNERS Incorporated

PO BOX 47788 PHOENIX, ARIZONA 85068-7788 (602) 867-4866

Arizona Raft Adventures, Inc.

4050 E. HUNTINGTON DR., FLAGSTAFF, AZ 86004 (602) 526-8200

November 10, 1987

Richard Marks
Superintendent
Grand Canyon National Park
Grand Canyon, AZ 86023

Dear Dick,

I would like to respond to the meeting held in Flagsta on Wednesday, October 28, 1987 regarding the Glen Canyon Environmental Studies draft report. This response comes from an individual representing a river running concession in the Grand Canyon, as well as a citizen of the United States. My concern is the amount of sand that is being lost along the Colorado River through the Grand Canyon due to the fluctuating flows from Glen Canyon Dam.

I was impressed with the GCES report explaining the effects of Glen Canyon Dam on the Colorado River. Individuals who have been around the Grand Canyon for years have seen the damage caused by fluctuating flows, and now that it is documented, I hope something can be done to preserve what is left.

It is my understanding that Hoover Dam could handle the fluctuating *flows,* and Glen Canyon Dam could operate as a base load operation for the electrical needs. I understand this switch is not implemented because of political reasons. As a base load operation, Glen Canyon Dam could be set up to provide both the needed electricity and to help protect the fragile river environment.

Whether irreversible damage has been done to the Canyon or not, the point is that it is being done to the Canyon, affecting not only our business as a river running concession, but also the preservation of the Grand Canyon for future generations.

My concern is that the beaches and sands at the bottom of the Grand Canyon are disappearing and not being replenished. Today this effects primarily the human impact of the Canyon. If it continues as it has, the riparian habitat in the Grand Canyon will also feel the impact. The destruction of the beaches is detrimental to the entire environment of the Grand Canyon. Thank you for your time

Sincerely,

Will Wasley
Operations Manager
Arizona Raft Adventures

OUTDOORS UNLIMITED RIVER TRIPS

PO Box 854 • Lotus, CA 95651 • (916) 626-7668

November 6, 1987

Richard Marks, Superintendent
Grand Canyon National Park
P. O. Box 129
Grand Canyon, AZ 86023

Dear Dick:

The following are my initial comments on the draft report of Glen Canyon Environmental Studies.

Past and present operations of Glen Canyon Dam have caused two significant changes to occur in the bottom of the Grand Canyon. First, beaches have been lost due to extreme daily fluctuations in flow and loss of replacement silts captured upstream behind Glen Canyon Dam. Second, the composition of the beaches themselves has been altered by water fluctuations and high water releases.

In the past beach composition ranged in gradation from passing #4 grandular fines down to 5 and one micron sized clays with a heavy concentration of passing #270 to 5 micron (silts, in between. These silts and clays are more easily suspended in water than the coarser materials and rapid flow reductions cause their migration through the saturated beach substrate and on down the river. The result of this loss of fines is a coarse particle beach composition that, without the fines to bind it together in a cohesive mass, becomes unstable and highly susceptible to damage from river currents, foot traffic and high winds. A good analogy would be the composition of a concrete mixture, wherein engineers specify blends of material sizes to maximize strength with cement (like clay) acting as the binder between particles big and small.

I would like to propose that the study include three phases of mitigation for the loss and alteration of beaches.

First -- Normalize releases into a constant flow regime, allowing only gradual reductions in flow. This would give suspended sediments time to settle into eddys and also allow existing beaches to drain under low head conditions simulating natural circumstance. I suggest flow reductions of no more than 10% per day, not to exceed 1% per hour.

Second -- During the winter low-use period (November through February) Bureau of Reclamation should use suction dredges to restore in a limited way the most critical beaches by pumping what fines it can from the adjacent river bottom for deposition on the shore. The Park Service would determine these critical site locations.

Long Term -- If possible to retrofit, a silt bypass such as those designed and used by the Chinese on many of their major dams should be installed on Glen Canyon Dam to begin the restoration of sediments to the riverbed. In addition, the use of a large dredge upstream of the dam to supply silt for downstream should be considered for long-term mitigation. Said dredge would either send silt in a slurry to a collection area or deposit it onto barges for transporation to a collection area near the dam for deposition into the river at the most opportune time.

Sincerely Yours,

n Vail

Peter Reznick
1460 W. Palmer Ave.
Flagstaff, Az. 86001
602 774-7805

11/10/87

Attn. Dirl Marks
Glen Canyon Environmental Studies
Public Imput Program
United States Park Service
Grand Canyon, Arizona 86023

Dear Mr. Marks,

I am writing, as you suggested at the meeting in Flagstaff, to press my feelings on the Glen Canyon Environmental Studies report.
I was a part of the studies by guiding many of the trips, and I feel that Dave Wegner has done a fine job throughout. I learned at the Flagstaff meeting that the sandy beaches are in danger of serious further erosion thus reducing what camps are left in Grand Canyon. The Bureau of Reclamation seems to think that the studies prove that side canyons can bring in enough silt to replenish the beaches in a 50 year period. I would hate for them to be proven wrong by peaking the flows too much or too quickly and seeing insufficient replenishment of sand. It seems to me that if their theories are incorrect, then we could lose these beaches forever.
Thank you for hearing my views.

Sincerely,

[illegible]

The Nature Conservancy

The Arizona Nature Conservancy

300 East University Boulevard. Suite 230. Tucson. Arizona 85705
• (602) 622-3861

November 30, 1987

Mr. Richard Marks
Super intendant
Grand Canyon National Park
P.O. Box 129
Grand Canyon, AZ 86023

Dear Mr. Marks,

The Arizona Nature Conservancy appreciates the opportunity to submit our comments in response to the Glen Canyon Environmental Studies Draft Technical Report. As a national, non-profit conservation organization dedicated to the preservation of biological diversity, we are especially concerned with land management activities and their potential impacts on rare plants, animals and plant communities. We include a specific concern related directly to the Gila chub, an endangered species and a more general concern related to several aspects of the study.

1. The principal conclusions related to possible effects of current and modified operations on the Humpback Chub are misleading and not adequately demonstrated by the data presented. The document states in the summary that "Flucuations during the summer months reduce habitat for native fishes". On page B-31 the document indicates that juvenile chub used backwaters during three seasons but because flows were steady during most of the study period it was not possible to determine what effect flow fluctuations had on the chub. Because flow fluctuations were shown to impact other native fish, it appears reasonable to assume that flow flucuations have the potential to impact juvenile chub. Without adequate study, It is difficult to discern how you arrived at the conclusion that flow flucuations do not appear to have a deleterious effect on the chub.

A second conclusion related to the chub indicates that modified flows are not likely to benefit the chub due to its reliance on the LCR confluence for spawning. Once again no data appears to be available that can provide some understanding of the importance of mainstem backwaters to the chub during the Juvenile and adult portions of their life cycle when they are known to inhabit the mainstem of the Colorado River.

In addition, studies performed by C.O. Hinckley during the summer of 1987 (reported at the Desert Fishes Council meeting in November 1987) suggest reproductive chub congregate at the mouth of the LCR in the shallows near the confluence. Dewatering of these shallows by flucuating flows could have a serious deleterious effect on chub reproduction and larval survival. Concommittently, the document indicates that Humpback chub "would probably fare well with a more 'natural' release pattern because flood flows increase the area of reproductive and rearing habitat at the mouth of the Lower Colorado River". Based upon this statement it is difficult to understand how you arrived at the summary conclusion that "operational changes are unlikely to help humpback chub".

2. It is clear, in almost all aspects of these studies, that most of the natural resources in the Canyon have normal disturbance patterns and recovery cycles. These cycles span a period of from one to many years, as for example, in the case of long-lived riparian trees that may need up to fifty years to mature. The three year span of these studies, is not adequate to provide a solid understanding of the dynamics of the riparian biological community, particularly since all of those years were characterized by high flows. Continued monitoring for several years of key natural resources, both biological and physical, will be necessary before a reasonable decision can be made about how dam operations affect those resources.

We appreciate the opportunity to provide comments on an important study effecting one of North America's truly special treasures of our natural heritage. Please continue to keep us informed on this project. Thank you for your time and consideration.

Sincerely,

Andy V. Laurenz

Andy V. Laurenz
Field Representative/Public Lands

APPENDIX E: CONSTITUENT GROUP COMMENTS
PART IV: WESTERN AREA POWER ADMINISTRATION CONSTITUENCY

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COMMENT LETTERS
GLEN CANYON ENVIRONMENTAL STUDIES
SEPTEMBER 1987 DRAFT REPORT

SUMMARY

COMMENTS RECEIVED FROM WESTERN CONSTITUENTS ON
GLEN CANYON ENVIRONMENTAL STUDIES
SEPTEMBER 1987 DRAFT REPORT

Larry LaMaack, Executive Director, Wyoming Municipal Power Authority, Lusk, WY
Date of Letter: Oct. 23, 1987

Member of CREDA. Support CREDA comments.

Stress that reader be able to understand the adverse impacts to power customers as a result of restriction in daily releases.

Wyoming Municipal Power Agency (and others) have built base-load thermal generators to compliment existing operation of CRSP powerplants.

Changes to daily operation would most certainly result in uneconomic adjustments in WMPA operations, add coal or gas-fired generation, and cause increased emissions of pollutants. Such impacts are appropriate topics for this report.

Concerned over the use of dollars as a relative measuring index for recreation, but not for other areas (such as power generation). Recommend including relative dollar impacts to all areas, or eliminate.

Request to remain on list of interested and affected parties for further information.

Daniel E. MacLeod, General Manager, Tri-State Generation and Transmission Association, Denver, CO Date of Letter: Nov. 6, 1987

Important from the preference power customer standpoint that the economic, operational, and planning impacts to the power community be appropriately documented in the report.

Concerned for the impacts of "late" consideration of operational impacts. Suggest appropriate documentation of power impacts to provide decision-makers the necessary data to set priorities.

Impacts to purchasers of Federal power not limited to immediate area around Glen Canyon. There may be substantial impacts even in an insignificant change of operations.

Expect NEPA compliance process required if decision is made to change operations. Tri-State would participate at that time.

John F. Sullivan, Manager, Power Contracts, Salt River Project, Phoenix, AZ Date of Letter: Nov. 10, 1987

Member of CREDA. Fully subscribe to CREDA comments.

Concerned that there is no discussion of impacts to power as a result of modifications to releases. Such operational patterns would eliminate SRP's ability to use SLCA/IP allocation for peaking.

Estimate present value of replacement cost for peaking power to be $29 million.

Additional generation required would be from fossil fuel generation.

Recommend including explanatory note to support recent USBR claim that flood flows will be significantly less frequent than one year out of four, as stated in the report.

Appreciate being kept informed of progress of the GCES and additional opportunities to comment.

John R. Allum, Chairman, Colorado River Energy Distributors Association Date of Letter: Nov. 11, 1987

Interested in any studies or decisions which could change quantity or price of power available from the project.

Reference constraints that must be followed: (1) CRSP Act, Section 7, re: "greatest practicable amounts of power and energy...", and (2) Operating Criteria.

Include reference to CRSP Act and Operating Criteria in disclaimer on back of cover.

Inappropriate to include dollar impacts for recreation, but not for other sections. Recommend removing dollar references or include references in all sections.

Interested in the decision-making process for priorities for native fisheries vs. recreational fisheries, and recreational use by anglers vs. boaters. Operations and marketing should also be represented in decision-making.

Concerned about cumulative impacts of GCES and other related studies in the Upper Colorado. Concern for possible change to operations of hydro facilities (peaking to base load operation) which could require addition of generation, using nonrenewable resources.

Very interested in being kept informed of studies being performed, and being allowed to participate whenever possible.

John R. Allum (continued)

Urge WAPA to take an active role in representing **the power viewpoint, expressed as early and as** often, as possible.

Thaine J. **Michie, General** Manager, Platte River Power **Authority, Fort Collins, CO Date of Leter: Nov. 12, 1987**

Member of CREDA. Fully support CREDA comments.

Either delete dollar impacts to recreation section, or include dollar impacts in all sections.

Concerned for cumulative impacts of various environmental studies.

Critical that power community be represented and actively participate in this type of study. Important to stay within the "spirit and intent" of the law. Reference to CRSP Act.

Encourage WAPA to take active role in representing power viewpoint.

Robert S. Lynch, Asst. Secretary/Treasurer, Irrigation & Electrical Districts Association of Arizona, Phoenix, AZ Date of Letter: Nov. 12, 1987

Membership includes 10 Southern Division Customers.

Also a member of CREDA. Supports CREDA comments.

Recommend report contain an outline of areas not studied that would need to be studied if further consideration were given to operational changes at Glen Canyon.

Summary of omitted areas: (1) impacts on power generation, contractual compliance, and power purchasers, (2) cost/benefit analyses of alternatives, (3) water right constraints on operation changes, (4) impacts on downstream and upstream river operations re: other studies, (5) potential conflicting impacts among endangered species for recovery alternatives, and (6) operational constraints resulting from modifications, such as Glen Canyon Uprates.

Current text in summary pages leaves several "false impressions." False impressions are: (1) this study can be the basis of a decision to make operational changes and the Secretary should know the scope of the feasibility studies and NEPA compliance activities that would need to be undertaken, (2) discussions have been rigorously reviewed, (3) alternatives considered are legal with respect to Law of the River, (4) text in summary (pg 4) might mislead reader to believe that such alternatives are without legal objection, and (5) statement on top of pg 33 is legally misleading.

Support CREDA request to include reference on back cover to Operating Criteria.

Robert S. Lynch (continued)

Support SRP request to include post-study data re: frequency of flood releases.

Concerned over the possible cumulative impacts of this GCES and other such studies.

Request to be kept informed of progress of GCES, notified when these documents and the Executive Review Committee Report are forwarded to the Commissioner of Reclamation and to the Secretary and provided a copy of the Executive Review Committee Report.

Clifford C. Michaelis, Director, Bountiful City Light and Power, Bountiful, UT Date of Letter: Nov. 12, 1987

Support comments by CREDA.

Bountiful very concerned that studies could lead to changes in operations which would reduce power resources available to WAPA's customers.

Two constraints: (1) CRSP Act. Reference to Section 7; and (2) Operating Criteria.

Interested in being kept aware, and of being allowed to participate whenever possible.

Edward C. Rampton, Manager of Federal Water and Power Issues, Intermountain Consumer Power Association, Sandy, UT Date of Letter: Nov. 12, 1987

Member of CREDA. Supports CREDA's comments.

Concerned with the apparent direction and attitude to reply on power revenues as a source of funding for uses not contemplated or authorized under applicable laws. Reference to CRSP Act, Section 7 language re: greatest practicable power and energy. Activities jeopardizing power revenues should be examined to assure recovery from other sources.

Encourage WAPA to continue its active role in representing its power customers, and allow opportunity for customer input.

Arthur J. Faul, President, Arizona Power Pooling Association, Benson, AZ Date of Letter: Nov. 24, 1987

Identical comments as Arizona Municipal Power Users' Association.

- Support CREDA comments, dollar impacts, cumulative effects of studies, and power community participation.

Michael A. Curtis, Executive Secretary, Arizona Municipal Power Users' Association, Phoenix, AZ Date of Letter: Nov. 24, 1987

Member of CREDA. Support CREDA comments.

It is inappropriate to include dollar impacts for recreation, and not for any other section (including power).

Cumulative impact of the various environmental studies is a concern. It is important that these impacts be viewed on a total basin basis.

It is important that the power community participate and be actively involved in any and all studies.

Urge WAPA to take "necessary action" in order to present the power viewpoint.

WYOMING MUNICIPAL POWER AGENCY
P.O. BOX 900 — WEST HWY 20
LUSK, WYOMING 82225
(307) 334-3170

October 23, 1987

Ms. Marlene Moody
Western Area Power Administration
438 East 2nd South, Suite No. 2
Salt Lake City, Utah 84111

Dear Ms. Moody:

As a constituent of the Western Area Power Administration with interests in the operation of the Colorado River system, the Wyoming Municipal Power Agency is pleased to be able to offer its comments on the draft copy of the Glen Canyon Environmental Studies Integration Report. The Agency is also a member of the Colorado River Energy Distributors Association (CREDA) and as such, endorses those comments made by CREDA on the report. While it is clear from reading the study that it is primarily technical in nature and was not necessarily designed to focus on potential adverse impacts to those who benefit from existing operations of Glen Canyon Dam, it is that aspect of existing releases which is of concern to the Agency.

Lit

Of primary importance to us, is that those who read the report gain a clear understanding that any restriction in the daily release pattern from Glen Canyon would have an adverse impact on the character of the power delivered to the Agency from the CRSP system. The power received from the federal system is now delivered in a manner which follows the swings in our load and therefore is most valuable when integrated with our existing base-load thermal generators. The Agency and other preference customers of the CRSP have built thermal generation which takes into account the variable nature of the power deliveries from the project and blends together with it to produce the lowest cost of power to our customers. To restrict the release regimes on a daily basis would almost certainly require the Agency to make uneconomic adjustments in its operation of those plants, add additional coal or gas fired generation and cause increased emissions of pollutants into the atmosphere from accelerated use of fossil fuels. It seems to us that such adverse environmental and economic results from restrictions in daily releases are an appropriate topic for the report.

The Agency is also concerned that confusion may result from the use of dollars as a relative measuring index for recreation, but not for any other area of investigation. We do not argue that it is an inappropriate index, only that there are clearly monetary implications to almost every other aspect of dam operation addressed in the report and that no such comparable index has been assigned to them to gauge

the merit of changing release patterns. To achieve maximum clarity in the assessment of relative impact to changing release regimes, dollars should either be included in all elements under study or eliminated from all sections. From our perspective, this is especially significant when discussing any impact to power generation.

The Agency is grateful for the opportunity to become familiar with and comment on the GCES report. We wish to remain on your list of interested and affected parties for further information as the report takes final form. Should you have any questions concerning our comments please do not hesitate to contact me.

Sincerely,

WYOMING MUNICIPAL POWER AGENCY

L[illegible]aMaack, P.E.
E[illegible] D[illegible]

LEL:kt

TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION, INC
12076 GRANT STREET P.O. BOX 33695 DENVER, COLORADO 80233 (303) 452-6111

November 6, 1987

M. M M
Western A P Administration
438 E. 200 S., S #2
S L C, U 84111

S: G C Environmental Studies

Dear M. Noody:

T G C Environmental Studies completion some administrators Department I .

T O 20 S L C indicated , fishermen, and , customers and . I from customer standpoint economic, impacts community appropiately. T impacts economic impacts. A documentation impacts provide policy- .

The impacts utility beyond Clenc what operations.

We assume , NEPA compliance, and would .

W policymakers impacts, documented, priorities.

Sincerely,

Daniel E. Macleod
General M

DEM:NB:r

SALT RIVER PROJECT
POST OFFICE BOX 52025
ARIZONA
85072 2025
(602) 236-8900

N 10, 1987

M. M M
W A P A
438 E 200 S, S N. 2
S L City, Utah 84111

D M :

W G C E S D R S , 1987, C M B R O 20, 1987, S L City. S R P C R E D A (CREDA) CREDA D R. W CREDA, our .

W D R generation G C D corresponding . T R S S R P ' S L C A I P 15 P -89 (1989-2004), constant G Canyon D $29 1987 . T D R four, . I B R ' U C R C not .

Draft Report, it should be included either by way of footnote or within explanatory material which accompanies the Report.

Again, we appreciate the opportunity to review the Draft Report and attend the informational meeting with the Bureau of Reclamation. Such open and informal exchange of information is becoming a hallmark of the Salt Lake City Area Office's relationship with the power community. We would appreciate being kept informed of the progress of the Glen Canyon Environmental Studies, particularly if there will be additional opportunities to review and comment on the material. If you have any questions on our comments, please contact me at (602) 236-5812 or Charles Reinhold at (602) 236-5840.

Sincerely,

hn F. Sullivan
nager, Power Contracts

JFS/CR

cc: Leroy Michael, Jr.
Darrell Smith
CREDA Steering Committee
CREDA Marketing Committee

CREDA
COLORADO RIVER ENERGY DISTRIBUTORS ASSOCIATION

November 11, 1987

Ms. Marlene Moody
Western Area Power Administration
438 East 200 South, Suite 12
Salt Lake City, Utah 84111

Dear Ms. Moody:

Thank you for sending us a copy of the Glen Canyon environmenta study report dated September 1987 and the opportunity to get additional information in the public information session held on October 20, 1987, in Salt Lake. As you are aware, the Colorado River Energy Distributors Association ("CREDA') is a non-profit corporation made up of the entities who purchase power from the Colorado River Storage Project ("CRSP") and represent over 85% of the power marketed from the project. As the primary source of revenue for CRSP, we are very interested in any studies or decisions which could change the quantity or price of power available from the project.

We understand that the Glen Canyon environmental study was requested by the Secretary of Interior to (i) try to quantify the impacts of the project from a technical standpoint, and (ii) to determine if changes in operation, with appropriate constraints, could minimize these impacts. We would like to emphasize that two of the major constraints of this study are the CRSP Act which specifically states that "the project shall be operated . . . so as to produce the greatest practical, amounts of power and energy that can be sold at firm power and energy rates" and the Operating Criteria which has been established by the seven states to optimize the water operation. Obviously these two constraints must be followed.

Other concerns and suggestions we have include:

(1) The disclaimer on the back side of the cover should include reference to the Operating Criteria as well as the CRSP Act.

(2) We feel quite strongly that it is inappropriate to include dollar impacts for recreation but not include dollar impacts for the other sections. We would strongly urge you to either remove the dollar references from the recreation section or include dollar impacts in all other sections.

(3) We are very interested in the decision-making process involved with determining what the priorities are for native fisheries versus recreational fisheries and recreational use by anglers versus boaters. We feel that it is important that the operations and marketing areas be represented in this decision-making process.

(4) We are also very concerned about the cumulative impact of these studies. We are aware of environmental studies which are being done on the Flaming Gorge Project, Black Canyon which could impact the Aspinall units, and these Glen Canyon studies. Our concern is that individually the changes in operation may not be too significant but, when they are all considered together, they can have a very significant impact on the water and power benefits of the river and violate the original intent of the CRSP Act. For example, CRSP customer facilities have been constructed in a manner which relies upon using the hydro power features in CRSP primarily for peaking and load following generation. Supplemental sources have been added as base load units. If constraints on the river mandate constant releases with no flexibility, then these hydro units are essentially base load units and peaking and load following resources will have to be added which will more than likely use non-renewable resources.

(6) We are aware that it is important to continue to study the river operation and try to optimize it as much as possible. We are therefore very interested in being aware of the studies which are being done as early in the process as possible and being allowed to participate whenever possible:

We appreciate your participation in these Glen Canyon studies and would urge you to take a very active role in representing the power viewpoint. We understand that there may be future opportunities to comment on the Glen Canyon studies, especially if NEPA compliance is required. However, we feel that it is important to get the power viewpoint expressed in the process as early and as often as possible. If we can be of further assistance, please give us a call.

Sincerely,

PLATTE RIVER POWER AUTHORITY

ohn R. Allum, Chairman
REDA Marketing Committee

/kmr

PLATTE RIVER POWER AUTHORITY

TIMBERLINE HORSETOOTH ROADS • FORT COLLINS, COLORADO 80525 • (303) 226-4000

November 12, 1987

Ms. Marlene Moody
Western Area Power Administration
438 East, 200 South, Suite 12
Salt Lake City, Utah 84111

Dear Ms Moody:

We received a copy of the Glen Canyon Environmental Study Report dated September 1987, and attended the public information session held on October 20, 1987, in Salt Lake. As we understand it, this report was a summary of information which was requested by the Secretary of Interior to try to quantify the impacts on several technical areas, and to determine if operational changes were appropriate. At the meeting on October 20, comments from the power community were requested and this letter is in response to that request.

Platte River is a member of the Colorado River Energy Distributors Association (CREDA) and is in full support of their comments dated November 11, 1987. In particular, we would emphasis the following concerns:

(1) The report should be as unbiased and fair as possible and, therefore, it is inappropriate to include dollar impacts for recreation and not for other sections including power. Since dollars are always a sensitive topic, I strongly urge you to make sure that the dollar impacts are either deleted from the recreation section, or included in all other sections.

(2) We are very concerned about the cumulative impact of the various environmental studies. What seems like a minor impact in one area, could become very significant when viewed with all of the other changes that are being proposed. It is important that these impacts be viewed on a total basin basis.

(3) We feel that it is critical that the power community be represented and actively participate in this type of environmental study. We understand that it is important to optimize the multiple uses of the river, however, it is vitally important to stay within the spirit and intent of the law. Since the CRSP act is one of the primary governing laws, and this law has specific language concerning the use of the river for power generation, it is important that the power community be involved in any and all studies.

Thank you for the opportunity to make comments on this report and we would encourage you to take a very active role in representing the power viewpoint with the other federal agencies. If we can be of further help, please let us know.

Sincerely,

PLATTE RIVER POWER AUTHORIYT

Thaine J. Michie
General Manager

/Jm

IRRIGATION & ELECTRICAL DISTRICTS ASSOCIATION OF ARIZONA

R GALE PEARCE
PRESIDENT

RD JUSTICE
VICE-PRESIDENT

CLYDE GOULD
SECRETARY-TREASURER

ROBERT S LYNCH
ASSISTANT SECRETARY-TREASURER

SUITE 204
2001 NORTH THIRD STREET
PHOENIX. ARIZONA 85004-1472
(602) 254 5908

H.B. RAYMOND
CHAIRMAN OF THE BOARD

WA DUNN
VICE-CHAIRMAN

FEDERAL EXPRESS

November 12, 1987

Ms. Marlene Moody
Western Area Power Administration
438 E. 2nd Street South, Suite #2
Salt Lake City, Utah 84111

Re: Glen Canyon Environmental Studies

Dear Marlene:

As you know, the Irrigation and Electrical Districts Association of Arizona includes within its membership ten (10) of the Southern Division allottees for power and energy from the Colorado River Storage Project. IEDA is also a member of the Colorado River Energy Distributors Association (CREDA) and we have participated with other CREDA members in developing comments on the draft report integrating the various Glen Canyon Environmental Studies. Obviously, we support the comments submitted by CREDA on this subject. We will attempt to make our comments on the draft study and the study process cumulative rather than repetitive.

First and foremost, we think that the summary pages of the draft report together with the text of the Executive Review Committee Report must contain an outline of areas not studied that would need to be studied If any further consideration were being given to operational changes at Glen Canyon Dam. These areas that have not been studied were outlined for us at the constituent meeting with the study team on October 20, 1987 in Salt Lake City. The omitted areas include:

1. Impacts on power generation, contractual compliance, and power purchasers;
2. Cost/benefit analyses of alternatives;
3. Water right constraints on operational changes due to the "law of the river";
4. Impacts on downstream and upstream river operations resulting from decisions made in this process as well as other ongoing studies on the river;

5. Potential conflicting impacts among endangered species for recovery alternatives (looked at briefly in a biological sub-report but not analyzed In any depth); and

6. Water operation constraints resulting from further development or modification of water projects on the river including but not limited to Glen Canyon uprates and their cumulative impact within the context of the operating criteria.

We think that the study and the Executive Review Committee Report must note these areas that would require detailed inquiry in any feasibility analysis as well as the environmental impact analysis that would have to accompany such further studies. The Secretary of the Interior should have at his **disposal in** the summary documents and summary pages of the study document a clear and concise outline of these omitted areas in order to be able to properly gauge the impact of any decision on the Department and its resources. This is especially true since the current language in the summary pages of the draft report leaves several false impressions.

The first false impression is that this study can be the basis of a decision to make operational changes at Glen Canyon Dam. While the language in the first paragraph of the summary says that the study is not designed to lead that way "directly", it is clearly the intent of the study to suggest to the Secretary that he could consider studying operational changes and use this report as a basis for such consideration. He needs to know the scope of the feasibility studies and NEPA compliance activities that would have to be undertaken in addition to the documents he has in front of him should he consider further study of operational changes.

The second false impression is that the discussions in this study have been reviewed in some rigorous legal analysis and the alternatives suggested fall within the legal constraints for operation of the Colorado River Storage Project. While there is an excellent discussion in the operational appendix of the development of CRSP, it is clear that no documentation has been supplied even remotely purporting to be a legal analysis of any range of alternatives as it relates to the "law of the river". Yet the language on the fourth page of the summary could easily lead one to believe that the modified operations discussed in the document have been given sucn analysis and are without legal objection. This false impression about the depth of inquiry on legal issues is carried forward by the discussion at the top of page 33. While it is true that the major purposes of the CRSP dams are as stated, there is a direct command within the Act to operate Glen **Canyon Dam to produce the greatest practical amount**

of power that could be sold at firm power and energy rates. That is not a goal totally incidental to the water goals of the facility and the statement at the top of page 33 is, in our view, legally misleading. It is true that the operational mandate is referenced on page 38 and in Appendix D at page 11, but these references do not overcome the false impression given by the offending language.

While we are on page 33, we wish to second the CREDA suggestion that the caveat about interpretation on the back of the cover of **the draft study** be expanded to include the operating **criteria. The criteria are** discussed on pages 33 and 34 but clearly this is a discussion for purposes of the study and not an administrative interpretation of those criteria. The need to point this out is highlighted by the language in the middle of page 34 in which the underlined language at the beginning of the second paragraph does not agree with the language In the text of the paragraph. Nor would either discussion of the relationship between Lake Mead and **Lake** Powell necessarily satisfy water lawyers In either the Upper or Lower Basins, based on discussions I have had with them.

We would also like to join with the Salt River Project in **suggesting that the post-study data on frequency** of flood **releases be** included in the Executive Review Committee Report.

We would close with the comment that this is but one of at least three (3) studies currently ongoing on operation of dams on the Colorado River. The cumulative impacts of all these studies are of great concern to us as well as other power users on the system. Any further study in this process would obviously have to study the cumulative impacts of all of these efforts.

We appreciate the opportunity to comment on these studies and the draft integration report. We would join with CREDA and others in asking that we be kept apprised of the process, notified when these documents and the Executive Review Committee Report are forwarded to the Commissioner of Reclamation and to the Secretary, and provided with a copy of the Executive Review Committee Report.

Sincerely,

Robert S. Lynch
Asst. Secretary/Treasurer

RSL:psr
cc: CREDA Board of Directors
CREDA Marketing Committee
I DA **Members**

BOUNTIFUL CITY LIGHT AND POWER

CLIFFORD C MICHAELIS
DIRECTOR

November 12, 1987

Mr. Lloyd Greiner
Western Area Power Administration
438 **East** 200 **South, Suite** #2
Salt Lake City, Utah 84111

Dear Lloyd:

I appreciated your report which you gave at the ICPA **Meeting in October** 1987 **on the Environmental and Fish Mitigation Studies being conducted on the Colorado River.** Because **the outcome on these studies** could lead to changes **in the power operations** which would reduce power resources available to Western customers, Bountiful is very concerned with this study.

We understand the Glen Canyon Environmental Study was requested by the Secretary of Interior to try and quantify the impacts **of the projects and determine if changes in operations with the appropriate restraints, could minimize these impacts.**

We appreciate this opportunity to comment and would like to state that two major constraints of this study are 1) the CRSP Act, which specifically states that "the projects shall be operated so as to produce the greatest practical amount of power and energy that can be sold at firm power **and energy rates", and** 2) **it needs to follow the operating criteria which has been established by the seven** (7) **states to optimize the** water operations. We make reference to **the November** 11, 1987 CREDA **letter to Miss Marlene** Moocy, **and agree with the concerns included in this letter.**

Again, we appreciate your role in these Glen Canyon studies and **the** opportunity you have given us to comment. We understand that there will be **future opportunities to comment on** these **Glen** Chnyon **studies when** NEPA Compliance is begun. We are very interested in being aware of the studies which are being done as early in the process as **possible and** being allowed to participate whenever possible.

Sincerely,

Clifford C. Michaelis,
Director

CCM:paw
cc: Ted Hampton, ICPA

198 South **200** Wee • Bountiful, Utah **84010** • Phone 801-295-9490

ICA
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November 12 1987

Ms. Marlene A. Moody
Western Area Power Administration
438 East 200 South, Suite 2
Salt Lake City, Utah 84111

Dear Marlene:

We appreciate the opportunity afforded to the CRSP customers to review and comment concerning the Glen Canyon Environmental Studies Draft Report. As a purchaser of Colorado River Storage Project power, ICPA is vitally interested in all activities surrounding future operations of the project. ICPA submits the following comments for and in behalf of its membership for your consideration.

ICPA is a member of the Colorado River Energy Distributors Association (CREDA) and has participated in CREDA's review of the Glen Canyon study document. ICPA fully concurs and supports CREDA's comments pertaining to this matter.

In addition to the concerns addressed by CREDA, ICPA wishes to emphasize the following:

The Colorado River below Glen Canyon Dam is enjoyed by thousands of individuals who would not have had the opportunity unless the dam had been constructed. Power generation has been designated to be the significant source of repayment of the facility. ICPA is concerned with the apparent direction and attitude to rely on power revenues as a source of funding for uses not contemplated or authorized under laws pertaining to the **development of the Colorado River. The operation of Glen Canyon** Dam should be such as to produce the ;reatest practical amounts of power and energy that can be sold as **firm power revenues for the repayment of the** project. Any other uses or activities jeopardizing power revenues should be examined to determine if lost revenues **could** be recovered from other sources.

It is our experience that in studies and evaluations of the Colorado River, there has been some reluctance to include the involvement of power users. We are pleased the power users are being consulted and represented through Western Area Power Administration in **the completion of** the Glen Canyon Environmental Studies. We wish to encourage Western to continue its active role in representing its power customer and allow every opportunity for customer inputs.

We again thank you for the opportunity to submit these comments and look forward to our future participation in this process.

Sincerely yours,

Edward C. Ram on
Manager of Federal Water and
Power Issues

ECR/yta

ARIZONA POWER POOLING ASSOCIATION
P. 0. BOX 670
BENSON, ARIZONA 85602 • (602) 586-3631

ARTHUR J. FALL, PRESIDENT
ROUTE 1, BOX
COOLIDGE, ARIZONA 85228
(602) 723-3700

November 24, 1987

Ms. Marlene Moody
Western Area Power Administration
438 East 200 South
Suite *2
Salt Lake City, Utah 84147

Re: Glen Canyon Environmental Study

Dear Ms. Moody:

The Arizona Power Pooling Association (APPA), as a member of the Colorado River Energy Distributors Association (CREDA), is in full support of the comments dated November 11, 1987 which were submitted by CREDA regarding the Glen Canyon Environmental Study.

APPA would like to emphasiie the following concerns:

1. Since dollars are always a sensitive issue, we feel the report should be fair to all sections. Therefore, APPA feels it inappropriate to include dollars impacts for recreation, and not for other sections (including power). If it is absolutely necessary for the dollar impacts to remain in the report, then such impacts should be included for all other sections.

2. The cumulative impact of the various environmental studies is of concern to APPA. What appears to be a minor impact in one area could very well become a significant impact when viewed with all of the other changes that are being proposed. APPA feels it important that these impacts be viewed on a "total basin" basis.

3. Since the CRSP Act is one of the primary governing laws and this law has specific language concerning the use of the river for power generation, APPA feels it important the power

community be involved in any and all studies. The power community should be adequately represented and actively participate in this type of environmental study so as to optimize the multiple uses of the river.

APPA thanks you for this opportunity to submit comments on the report, and urges you to take the necessary action in order to present the power viewpoint to other federal agencies.

Should you have any questions regarding these comments or be in need of further information, please do not hesitate to contact the undersigned.

Very truly yours,

ARIZONA POWER POOLING ASSOCIATION

By_____
Arthur J. Faul, President

ARIZONA MUNICIPAL POWER USERS' ASSOCIATION

POWER USERS'

2712 NORTH SEVENTH ST. • PHOENIX, ARIZONA 85006-1090

MICHAEL A. CURTIS
EXECUTIVE
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SLCAO
OFFICIALFILECOPY
NOV 30 1987

November 24, 1987

Ms. Marlene Moody
Western Area Power Administration
438 East 200 South
Suite 82
Salt Lake City, Utah 84147

Re: Glen Canyon Environmental Study

Dear Ms. Moody:

The Arizona Municipal Power Users' Association (AMPUA), as a member of the Colorado River Energy Distributors Association (CREDA), is in full support of the comments dated November 11, 1987 which were submitted by CREDA regarding the Glen Canyon Environmental Study.

AMPUA would like to emphasize the following concerns:

1. Since dollars are always a sensitive issue, we feel the report should be fair to all sections. Therefore, AMPUA feels it inappropriate to include dollars impacts for recreation, and not for other sections (including power). If it is absolutely necessary for the dollar impacts to remain in the report, then such impacts should be included for all other sections.

2. The cumulative impact of the various environmental studies is of concern to AMPUA. What appears to be a minor impact in one area could very well become a significant impact when viewed with all of the other changes that are being proposed. AMPUA feels it important that these impacts be viewed on a "total basin" basis.

3. Since the CRSP Act is one of the primary governing laws and this law has specific language concerning the use of the river for power generation, AMPUA feels it important the power community be involved in any and all studies. The power community should be adequately represented and actively participate in this

type of environmental study so as to optimize the multiple uses of the river.

AMPUA thanks you for this opportunity to submit comments on the report, and urges you to take the necessary action in order to present the power viewpoint to other federal agencies.

Should you have any questions regarding these comments or be in need of further information, please do not hesitate to contact the undersigned.

Very truly yours,

ARIZONA MUNICIPAL POWER USERS' ASSOCIATION

By
Its Executive Secretary

cc: Management Committee