



THE  
NAVAJO  
NATION

NAVAJO NATION POSITION PAPER  
GLEN CANYON DAM  
ENVIRONMENTAL IMPACT STATEMENT

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Prepared by

JOHN R. THOMAS  
ENVIRONMENTAL CONSULTING

ORIGINAL

JUNE 1993

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GLEN CANYON DAM  
ENVIRONMENTAL IMPACT STATEMENT**

Prepared for

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June 1993

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## STATEMENT OF OBJECTIVE

The Bureau of Reclamation in cooperation with numerous federal and state agencies and tribal governments, is developing an Environmental Impact Statement (EIS) for the operation of Glen Canyon Dam. The objective of this position paper is to identify and prioritize the issues and concerns of the Navajo Nation regarding the Glen Canyon EIS and to identify the Navajo Nation's preferred alternative.

### I. BACKGROUND

Glen Canyon Dam is located on the Colorado River, 15 miles upstream of Lees Ferry near the town of Page, Arizona. The Bureau of Reclamation completed the construction of Glen Canyon Dam in 1963. Since that time, the character of the Colorado River below the dam has been irreversibly altered. Prior to the dam, the Colorado River was sediment laden with high spring floods and warm summer water temperatures. The post-dam river is clear and cold with flows controlled by the demands of electrical power markets, water storage, and downstream water delivery requirements. The effect of the dam and these operational priorities has been reduction of seasonal floods, decreased water temperature, cessation of sediment transport from the upper Colorado River basin, and a daily fluctuating river flow pattern in response to peak power demands.

Many different interests including federal and state agencies, river runners, scientists, and environmental groups have argued that Glen Canyon Dam operations result in beach erosion, endanger native fishes and trout, damage archaeological sites and riparian habitats, and impact recreational river running. Other interests, including the Western Area Power Administration (Western) and power consumers, have countered that restrictions on operations will affect power revenues to the federal government, increase rates to power consumers, and require the use of more expensive and environmentally damaging alternative methods of power generation.

Two actions focused attention on the issue of how Glen Canyon Dam is operated: (1) the Bureau of Reclamation 1981 proposal to uprate the generators at Glen Canyon Dam and (2) the U.S. Fish and Wildlife Service 1978 Glen Canyon Dam jeopardy opinion for the endangered humpback chub. The result of discussions and comment on the proposed generator uprate and the jeopardy opinion was initiation of an extensive research effort to develop an understanding of how downstream resources were affected by dam operations and what could be done to

mitigate impacts. This research effort, known as the Glen Canyon Environmental Studies, evaluated impacts to endangered fish, riparian habitat, and recreation along the Colorado River corridor below Glen Canyon Dam. Phase One of the Glen Canyon Environmental Studies was completed in 1987. A Phase Two research program was initiated in 1988. The Bureau of Reclamation completed uprating of the generators in 1987; however, use of the uprated capacity was restricted until completion of the research.

In 1990, the Secretary of the Interior directed the Bureau of Reclamation to reevaluate Glen Canyon Dam operations, develop alternatives which minimize impacts on natural and cultural resources and Native American interests in Glen and Grand Canyons, and evaluate these alternatives in an EIS. In November, 1991, Interim Operating Criteria were implemented by the Secretary of the Interior. These criteria restrict powerplant discharges to a maximum of 20,000 cfs and a minimum of 8,000 cfs and restrict daily and hourly flow change. The Interim Operating Criteria include exception criteria which allow restrictions on powerplant operations to be exceeded. Under the exception criteria, unused electrical generation capacity at Glen Canyon Dam could be utilized to respond to emergency conditions, for system regulation, and as a means of avoiding the expense of purchasing replacement firm capacity and energy.

In an action distinct from but parallel to the EIS, the Bureau of Reclamation agreed in 1990 to fund seven conservation measures to assist in removing the jeopardy opinion for the humpback chub. These measures include taxonomic and ecological research, evaluations of impacts of Glen Canyon Dam operations on humpback chub, development of a management plan for the Little Colorado River, and evaluation of a potential second spawning population.

The schedule for completion of the conservation measures extends beyond the EIS completion date thereby complicating the relationship between the two processes. Therefore, the conservation measures are being integrated into the EIS in several ways. Research conducted as part of the conservation measures is being used in the evaluation of impacts associated with individual alternatives in the EIS. Research findings forthcoming after the EIS Record of Decision will be incorporated into the adaptive management program which is a component of several EIS alternatives. Evaluation of a second spawning population of humpback chub and long-term monitoring are incorporated into EIS alternatives. The preferred alternative in the EIS will be the action that the U.S. Fish and Wildlife Service evaluates in a biological opinion which will supersede the 1978 jeopardy biological opinion for humpback chub. It is unclear whether an additional biological opinion will be issued following completion of the research and

management planning funded under the conservation measures. Potentially, this issue will be resolved in the biological opinion issued for the EIS.

A recent development has been the passage of the Grand Canyon Protection Act in October 1992. This act instructs the Secretary of the Interior to operate Glen Canyon Dam in a manner that protects the resources of Grand Canyon National Park and Glen Canyon National Recreation Area. The Secretary is required to consult with Indian tribes and others in the adoption of operating criteria and plans and long-term monitoring.

The Navajo Nation has specific and unique interests which are affected by Glen Canyon Dam operations. Most significantly, the Navajo Reservation boundary extends to the Colorado River in Glen and Grand Canyons. Cultural and natural resources of the Navajo Nation associated with these lands including archaeological sites, traditional cultural properties, and riparian and aquatic habitat are directly affected by dam operations. Additionally, the Navajo Nation has other interests which may be affected. The Navajo Nation purchases power generated at Glen Canyon Dam, benefits from money spent by recreationists who utilize Glen and Grand Canyons, and has plans to develop a marina at Antelope Point on Lake Powell.

## **II. GLEN CANYON EIS**

### **PURPOSE AND SCHEDULE**

The purpose of the Glen Canyon EIS is to determine legal options for Glen Canyon Dam operations that could be implemented to minimize adverse impacts to the downstream environmental and cultural resources and Native American interests in Glen and Grand Canyons. Analysis of operational alternatives is needed to allow the Secretary of the Interior to balance and meet statutory responsibilities to protect downstream resources, produce hydropower, and protect Native American interests. The Grand Canyon Protection Act mandates completion of the EIS by October 1994.

## NAVAJO NATION PARTICIPATION IN THE EIS

The Navajo Nation became a Cooperating Agency for the Glen Canyon EIS in April 1991. A Cooperating Agency is an agency which has legal jurisdiction and/or special expertise with respect to environmental issues considered in the EIS process. In the Memorandum of Understanding with Bureau of Reclamation, which established the Navajo Nation as a Cooperating Agency, it was recognized that the Navajo Nation "has a major interest in the project because the Glen Canyon Dam operations currently and potentially impact areas in which the Navajo Nation has jurisdiction by law and expertise." The Navajo Nation is represented at the bi-monthly meetings of the Cooperating Agencies and on the EIS writing team. Other Cooperating Agencies for the Glen Canyon EIS are: Bureau of Reclamation, National Park Service, Western Area Power Administration, Bureau of Indian Affairs, U.S. Fish and Wildlife Service, Arizona Game and Fish, Hualapai Tribe, Pueblo of Zuni, San Juan Southern Paiute Tribe, Southern Paiute Consortium, and Hopi Tribe.

In addition to serving as a Cooperating Agency, the Navajo Nation is providing research services for the Glen Canyon EIS. The Historic Preservation Department is conducting ethnographic research which will contribute directly to the Glen Canyon EIS. This research is to document historic and current use and traditional cultural properties of the Navajo people in Glen and Grand Canyons. This work is funded by the Bureau of Reclamation. The Historic Preservation Department will submit a technical report to the Bureau of Reclamation in September 1993. Any confidential information will be retained by the Navajo Nation and will not be included in the technical report.

The Bureau of Reclamation is also funding research activities by the Navajo Department of Fish and Wildlife Natural Heritage Program as part of the conservation measures for the humpback chub. The Natural Heritage Program is conducting a literature review for the Little Colorado River and developing a geographic information system data base for humpback chub habitat in the Little Colorado River. The Natural Heritage Program is also performing research on the life history and ecology of the humpback chub on a subcontract to Arizona State University. As noted above, this work is being conducted for purposes other than the specific needs of the Glen Canyon EIS.

## **SUMMARY OF EIS ALTERNATIVES**

Eight alternatives are considered in detail in the draft EIS. They include seven action alternatives and the no action, or status quo, alternative. The seven action alternatives were designed to provide a broad spectrum of options. One alternative would allow unlimited fluctuations in flow to maximize power production, three would provide varying restrictions on fluctuations, and three others would provide steady flows on a monthly, seasonal, or annual basis. The alternatives are discussed below.

### **1. No Action Alternative**

The objective of the No Action Alternative is to produce the greatest amount of firm capacity and energy practicable while adhering to the releases required under the "Law of the River." Under No Action, Glen Canyon Dam operations would be the same as they were from 1963, when the dam was placed in operation, until flows to accommodate research needs began in June 1990.

Minimum flows are restricted to no less than 1,000 cfs from Labor Day until Easter and 3,000 cfs from Easter until Labor Day (the recreation season). Peak discharges under normal No Action operations do not exceed 31,500 cfs. The range of daily fluctuations under the No Action Alternative are restricted only between the minimum and maximum flows. Ramp rates are not restricted beyond power operating criteria.

### **2. Maximum Powerplant Capacity Alternative**

This alternative was developed to allow use of the maximum powerplant discharge capacity that resulted from the generator uprate. Operations under the Maximum Powerplant Capacity Alternative would be the same as the No Action Alternative except that full powerplant capacity, with estimated flows of 33,200 cfs, would be available. Monthly and annual operations, including flood control, would be identical to those under the No Action Alternative. Releases in excess of 31,500 cfs would only be possible when Lake Powell's elevation is greater than 3,641 feet.

### **3. High Fluctuating Flow Alternative**

The High Fluctuating Flow Alternative was developed to slightly reduce fluctuating flows for the benefit of downstream resources while allowing flexibility for power operations. Releases would be tied to stream flow forecasts and actual discharges and power system demand. This alternative would add flood frequency reduction measures, adaptive management and beach/habitat-building flows and would include additional restrictions on daily and hourly operations.

Minimum flows would be 3,000, 5,000 or 8,000 cfs depending on the monthly release volume. The maximum flow would be limited to 31,500 cfs under normal circumstances. The limit on daily fluctuations would often be more restrictive than the minimum and maximum flow rates. Fluctuations would be limited to 15,000, 20,000, 21,000, or 22,000 cfs over any 24-hour period, depending on the monthly release volume. The ramp rate would follow the power load for increasing flows without restrictions, but decreasing flows would be limited to 5,000 cfs per hour in winter and summer and 4,000 cfs per hour during spring and fall.

### **4. Moderate Fluctuating Flow Alternative**

The Moderate Fluctuating Flow Alternative was developed to permit fluctuating flows below no action levels for the benefit of downstream resources while allowing intermediate flexibility for power operations. This alternative would add flood frequency reduction measures, adaptive management, beach/habitat-building flows, and beach maintenance flows.

Minimum flows for a given month would vary depending on the monthly release volume but would be no less than 5,000 cfs. The maximum rate of release for a given month also would vary depending on monthly release volumes but would be no greater than 31,500 cfs under normal operations. The ramp rate would be limited to 4,000 cfs per hour for increasing flows and 2,500 cfs per hour for decreasing flows.

Allowable daily fluctuations as well as minimum and maximum flows would be determined based on the mean releases for the month. The allowable fluctuation would be plus or minus 45 percent of the mean daily flow, not to exceed plus or minus 6,000 cfs. Maximum flows during a minimum release year would not exceed 31,500 cfs.

## **5. Low Fluctuating Flow Alternative**

The Low Fluctuating Flow Alternative was developed to reduce fluctuating flows to well below no action levels for the benefit of downstream resources while allowing limited flexibility for power operations. This alternative is essentially the same as the Interim Operating Criteria except for the addition of flood frequency reduction measures, adaptive management, beach/habitat-building, and habitat maintenance flows.

Minimum flows would be no less than 8,000 cfs between 7 a.m. and 7 p.m. and 5,000 cfs at night. The maximum rate of release would be limited to 20,000 cfs during fluctuating hourly releases. Any releases greater than 20,000 cfs would be steady on a daily basis and would be made in response to high inflow and storage conditions. The limit on daily fluctuations would often be more restrictive than the minimum and maximum flow rates. Fluctuations would be limited during any 24-hour period, depending on monthly release volumes.

The Low Fluctuating Flow alternative is presented in two versions: one that includes the Habitat Maintenance Flows which is named the Modified Low Fluctuating Flow, and one that does not include this component which retains the name Low Fluctuating Flow alternative. Habitat Maintenance Flows are discussed in Section 9, Common Elements.

## **6. Existing Monthly Volume Steady Flow Alternative**

Under this alternative, water would be released from Glen Canyon Dam at a constant rate within each month to maintain the operational flexibility necessary to avoid spills and maintain conservation storage while eliminating the possible negative effects of daily fluctuating flows on downstream resources. Releases within each month would be steady and would have to equal or exceed the monthly minimums. Maximum steady releases would be determined by the monthly volume of water to be released.

## **7. Seasonally Adjusted Steady Flow Alternative**

Under this alternative water would be released at a constant rate during defined seasons to enhance the aquatic ecosystem downstream of the dam. Flows would be steady during a given month with adjustments through the year to meet downstream resource needs. The highest

releases would occur in May and June, with relatively low releases from August through November.

## **8. Year-round Steady Flow Alternative**

The Year-Round Steady Flow Alternative was developed in response to scoping comments calling for complete elimination of fluctuating flows. Under this alternative, water would be released from Glen Canyon Dam at a year-round steady rate, thus eliminating daily river fluctuations and minimizing peak discharges in order to preserve sediment within the river channel.

The minimum flow would be determined from the mean monthly release but would correspond generally to the minimum annual release volume of 8.23 million acre-feet, which is about 11,400 cfs. The monthly volume would be approximately the annual volume divided by 12, except when response to forecast changes would be required.

## **9. Common Elements**

All alternatives with the exception of No Action and Maximum Powerplant Capacity include the following environmental mitigation elements:

Adaptive Management - The Bureau of Reclamation has recognized that the exact outcome of the operational alternatives with respect to downstream resources can not be predicted with certainty. A program of adaptive management is proposed to allow operational flexibility to respond to continuing analyses of the effects of dam operations on natural, cultural, recreational, and power resources. The adaptive management program would include participation by affected agencies and tribes in developing long-term monitoring and changes in operating criteria. The Navajo Nation is directly involved in the development of the adaptive management program.

Monitoring and Protection of Cultural Resources - Ongoing monitoring and protection of cultural resources will be undertaken per a programmatic agreement between the National Park Service, the Bureau of Reclamation, the Advisory Council on Historic Preservation, the Arizona State Historic Preservation Office, and the pertinent native American tribes. This agreement is currently in negotiation.

Flood Frequency Reduction Measures - Reducing flood frequency would be accomplished by dedicating reservoir space for flood control, reduction of base reservoir storage level, and/or increasing spillway height.

Beach/habitat-building Flows - Short duration, high releases would be scheduled in the spring to rebuild beaches and restore backwater channels which are used by native fish. Releases would be at least 10,000 cfs greater than the allowable peak discharge but not greater than 45,000 cfs. Recommendations for scheduling beach/habitat-building flows would be made by the adaptive management program.

New Population of Humpback Chub - Efforts would be made to establish a second spawning population of humpback chub in a Colorado River tributary within Grand Canyon.

Further Study of Selective Withdrawal - Selective withdrawal structures could be built at Glen Canyon Dam to provide seasonal variation in water temperature. Additional research and analysis would be undertaken to determine whether or not a selective withdrawal structure would enhance endangered species and other native fish populations.

Emergency Exception Criteria - Operations described under any alternative could be altered temporarily to respond to power system emergencies.

The Moderate Fluctuating, Low Fluctuating, and Seasonally Adjusted Steady Flow alternatives also include a provision for habitat maintenance flows which are described below.

Habitat Maintenance Flows - High, steady releases within powerplant capacity for one to two weeks would be scheduled in the spring. The purpose of these flows would be to rebuild sandbars above normal peak stage, reform backwaters and maintain open beaches for camping by controlling vegetation invasion. These flows would differ from beach/habitat building flows in that they would be within powerplant capacity and would occur every year that the reservoir is low.

### III. NAVAJO NATION ISSUES AND CONCERNS

Navajo Nation officials have received briefings regarding the effects of Glen Canyon Dam operations, the Glen Canyon Dam EIS process, and potential ramifications for the Navajo Nation. Officials who received briefings or are directly involved in the EIS process include:

Marshall Plummer, Vice President, Navajo Nation  
Stanley Robbins, Bodaway/Cameron Council Delegate  
Stanley Pollack, Department of Justice  
Alan Downer, Historic Preservation Officer  
Richard Begay, Anthropologist  
Alexa Roberts, Anthropologist  
Larry Benallie, Sr., Department of Fish and Wildlife  
Michael Tremble, Natural Heritage Program  
Fredrick H. White, Tourism Department  
Henry Deal, Resources Enforcement Officer  
John Dover, Resources Enforcement Officer  
Clarence Gorman, Parks and Recreation Department  
John Norstog, Navajo Hopi Land Commission  
Marlene A. Lynch, Financial Officer, Navajo Tribal Utility Authority  
Sterling Mike, Environment and Public Affairs, Navajo Tribal Utility Authority

Residents of the Gap/Bodaway, Cameron, and Tuba City Chapters have had direct input in the identification of Navajo Nation concerns through the Historic Preservation Department technical study.

A variety of issues and concerns related to the operation of Glen Canyon Dam and the EIS process have been identified. These issues can be grouped into the following general categories:

- Impacts of Glen Canyon Dam operations on cultural and natural resources.
- Land ownership and management in Glen and Grand Canyons.

- Adequate compliance with National Environmental Policy Act (NEPA) and related legislation such as the National Historic Preservation Act which fully addresses issues of concern to the Navajo Nation.
- Recognition of Navajo Nation sovereignty and the requirement for government to government relations.
- Limitation of the issues considered in the EIS to those directly affected by the operation of Glen Canyon Dam.

The specific issues and concerns are discussed in the following sections.

## **IMPACTS TO CULTURAL AND NATURAL RESOURCES**

### **1. Cultural Resources**

Archaeological Sites - Over 400 archaeological sites have been identified by the National Park Service within the Colorado River corridor in Glen and Grand Canyons. Over 300 of these sites have been affected or have the potential to be affected by flows released from Glen Canyon Dam. Many of these archaeological sites exhibit use by Navajo peoples. These sites are concentrated upstream of the confluence with the Little Colorado River at river mile 61, however, Navajos have left evidence of use as far west as Crystal Creek at river mile 98.

The primary impact to these sites from dam releases is direct erosion by river flows or the erosion of alluvial deposits which protect the sites. A secondary impact could result from reduction in the number and size of beaches available to river runners for camping. This could force camping use onto higher terraces thereby threatening cultural resources located in these areas.

Traditional Cultural Properties - Traditional cultural properties are locations which do not necessarily contain archaeological remains but are significant because they are areas of spiritual importance and or traditional use by Native Americans. The traditional cultural properties of the Navajo peoples in Glen and Grand Canyons reflect Navajo use of the canyons over hundreds

of years and the importance of the canyons for their spiritual well being. Impacts to traditional cultural properties can occur due to physical impacts such as erosion or inundation as well as inappropriate uses by others or restriction of access by Navajo peoples.

Modern Use - The Navajo people continue to utilize the canyons and river for subsistence, recreation, and renewal. These uses can be affected by beach erosion, access restriction, and productivity of natural resources such as the Colorado River trout fishery.

Dam operations which maintain alluvial deposits that protect cultural resources and maintain natural resources which are components of traditional cultural properties are in the interest of the Navajo Nation.

## 2. Water Rights

While the operation of Glen Canyon Dam is not perceived to have a direct effect on any existing or potential water rights of the Navajo Nation, there are concerns regarding indirect affects. These concerns involve the ability to utilize Colorado River and Little Colorado River water rights due to potential conflicts with the endangered humpback chub, the potential for water marketing and transfers, and effects on available Upper Basin depletions.

The Little Colorado River is the only known location within Grand Canyon at which successful humpback chub spawning occurs. The majority of the perennial reach of the Little Colorado River, Blue Springs to the mouth, is within the boundaries of the Navajo reservation. The Secretary of the Interior has designated critical habitat for humpback chub to include the Little Colorado River from mile 8 to the confluence with the Colorado River and river mile 34 to 208 on the mainstem Colorado River (Federal Register January 25, 1993). The potential exists that the presence of critical habitat may limit future utilization of Little Colorado River water and associated groundwaters.

Certain dam operational scenarios may benefit the humpback chub population in Grand Canyon by maintaining backwater habitats which are utilized by juvenile fish. The addition of selective withdrawal intake structures at Glen Canyon Dam to warm released water and the establishment of an additional spawning population within Grand Canyon are actions considered in the EIS which may benefit humpback chub. These actions alone or in combination may reduce the importance of the Little Colorado River for humpback chub in Grand Canyon thereby potentially

mitigating constraints on development of Little Colorado River waters. The efficacy of any action to benefit humpback chub is difficult to determine in advance due to the presence of non-native fish in the system and other factors.

The potential exists in the future for the Navajo Nation to market water rights to parties in the lower Colorado River basin. This transferred water would be "delivered" through Glen Canyon Dam to the lower basin consumers. The operational regimes being considered in the Glen Canyon Dam EIS would not affect the amount of water which passes through the dam in a given year. Therefore, the ability to achieve water transfer deliveries is not here considered to be affected by dam operational alternatives proposed in the Glen Canyon EIS.

All of the Glen Canyon Dam EIS alternatives except No Action and Maximum Powerplant Capacity include measures to reduce flood frequency. One of the methods for accomplishing this reduction is the dedication of 1 million acre-feet of Lake Powell storage to flood control. As Upper Basin depletions approach the levels permitted in the Colorado River Compact, a reduction in available storage in Lake Powell would have a measurable impact on consumptive use. A 1 million acre-foot reduction in storage would reduce Upper Basin yield by 40,000 acre-feet per year which is only 0.67 percent of total yield but 58 percent of New Mexico's interim excess yield. In New Mexico, Native American and other uses are approaching their compact allocation. Water uses that could be jeopardized include the Jicarilla settlement, the Gallup-Navajo municipal and industrial uses on the reservation, and full development of the Navajo Indian Irrigation Project.

### **3. Endangered Species - Humpback Chub**

As noted above, lands of the Navajo Nation contain important habitat necessary for the perpetuation of the humpback chub in Grand Canyon. The humpback chub is listed as endangered by U.S. Fish and Wildlife Service and is the only species on the Navajo Nation Endangered Species list which could be directly affected by dam operations. Actions which would favor humpback chub populations in Grand Canyon would be of benefit to the Navajo Nation in terms of assisting in the management of a significant tribal natural resource, the humpback chub, and potentially mitigating restrictions which the endangered status of humpback chub may impose on development. Conversely, impacts to the humpback chub resulting from dam operations would be viewed as a detriment to tribal interests.

Dam operations do not appear to have direct impact on humpback chub habitat within the Little Colorado River except for potentially minor impacts at the mouth. Dam operations may have the potential to positively influence habitat availability and quality in the mainstem Colorado River primarily for juvenile life stages.

The conservation measures being implemented in response to the U.S. Fish and Wildlife Service jeopardy opinion may have significant benefit for humpback chub populations in Grand Canyon. However, the conservation measures include long-term studies and actions that continue beyond the completion date of the Glen Canyon Dam EIS. Actions common to all alternatives in the EIS include the continued evaluation of multi-level intake structures at Glen Canyon Dam and of the potential for establishing a seconding spawning population of humpback chub in Grand Canyon. These actions are potentially positive for tribal interests.

#### **4. Riparian and Marsh Habitat**

Navajo Nation lands in Glen and Grand Canyons support extensive stands of riparian habitat along the shores of the Colorado River. This habitat is part of the "new riparian" zone which has developed in response to flood control provided by Glen Canyon Dam. In addition, since interim flows have been in effect extensive marsh and backwater habitats have developed in certain reaches of Marble Canyon. Riparian and marsh areas are some of the most valuable habitats for wildlife in the Southwest. From the perspective of stewardship and management of the tribe's natural resources it is in the interests of the Navajo Nation to maintain riparian habitat on reservation lands within Glen and Grand Canyons.

#### **5. Trout Fishery**

The completion of Glen Canyon Dam in 1963 and the subsequent operation of the dam has lowered water temperatures and reduced turbidity to the point where trout have proliferated in the Colorado River. This trout fishery provides recreation for tribal members and supports tourism in northern Arizona. Dam operation alternatives that contribute to a high quality trout fishery below Glen Canyon Dam are in the interest of the Navajo Nation.

## **6. Navajo Nation Tourism**

Glen and Grand Canyons are major tourist/recreation destinations in Northern Arizona. The primary recreation activities along the Colorado River corridor are river running and trout fishing. While the Navajo Nation does not have direct interests in these activities in the form of commercial river running or sport fishing concerns, there are significant opportunities for enterprises on the reservation which can benefit from the recreation traffic attracted to Glen and Grand Canyons. These on-reservation operations range from small scale craft stands to full hotel/restaurant facilities along the major highways. These operations can make a significant contribution to the local reservation economy particularly in the Gap, Bodaway, Cameron, and Tuba City chapters. In the past, the Bennett Freeze has restricted tourist developments which could capture Glen Canyon/Grand Canyon Colorado River tourist dollars. Dam operation alternatives that maintain the attributes of the Colorado River corridor and attract recreationists are in the interest of the Navajo Nation.

The Navajo Nation has plans to develop a marina at Antelope Point on Lake Powell. Fluctuations in reservoir elevation can be very costly for marina operations particularly if the fluctuations are large. The amount of fluctuation in reservoir surface elevation is not expected to vary significantly between the proposed alternatives.

## **7. Energy**

The Navajo Tribal Utility Authority (NTUA) purchases power capacity and energy a portion of which is generated from Glen Canyon Dam. NTUA has a 22 megawatt allocation from Western Area Power Administration (Western), the marketing entity for power from Glen Canyon Dam and the rest of the Colorado River Storage Project (CRSP). NTUA's total load is approximately 110 megawatts. NTUA provides service to the majority of electricity consumers on the Navajo Nation. Navajo Agricultural Products Inc. (NAPI) receives capacity and energy from Western as part of the Navajo Indian Irrigation Project (NIIP). This will amount to 96 megawatts by 1998.

The restricted fluctuating flow and steady flow alternatives affect power operations and marketing at Glen Canyon Dam by limiting fluctuations and maximum and minimum flows. Restrictions on maximum discharge result in a reduction of generation capacity. Reducing capacity has two principal potential effects. First, a reduced capacity means that Western will

have less energy to sell during periods of peak demand. This will result in reduced power revenues which may require an increase in energy rates to Western's customers. Second, if Western is unable to replace the lost capacity, then allocations to individual customers will need to be reduced. The cost of replacement capacity will be significantly higher than that currently provided by Glen Canyon Dam.

An additional concern is expenditures for research and management. Power revenues have funded the majority of research on dam affects in Glen and Grand Canyons and are proposed as the funding for adaptive management and long-term monitoring.

As a power consumer and rate payer, the Navajo Nation is interested in maintaining low electric rates. Dam operation alternatives which maintain low rates for power generated at Glen Canyon Dam are in the interest of the Navajo Nation.

#### **NAVAJO NATION LAND OWNERSHIP AND MANAGEMENT IN GLEN AND GRAND CANYON**

In An Act to Define the Exterior Boundaries of the Navajo Indian Reservation in Arizona, June 14, 1934, Navajo lands are described as extending to the south bank of the Colorado River between the Arizona/Utah border and the Little Colorado River, then following the north bank of the Little Colorado River to a point opposite the east boundary of the Grand Canyon National Park and following the east boundary of the Park. Subsequent to the 1934 Act, the Grand Canyon Expansion Act established the boundary of Grand Canyon National Park at the rim of Marble Canyon "subject to the concurrence of the Navajo Nation." This concurrence has not been given. However, in the draft Lees Ferry Upriver Recreation Plan and Environmental Assessment dated February 1984, the National Park Service acknowledged that "the Navajo Indian reservation boundary meets the Colorado River about seven miles above Lees Ferry and follows the river downstream past Lees Ferry." The conflict inherent in these acts and other federal actions have created a controversy regarding the boundaries of the Navajo reservation and Grand Canyon National Park. The Glen Canyon Dam EIS is not the appropriate forum to resolve the claims of others on Navajo lands. However, it is imperative that the legislated boundary of the Navajo reservation, and the actions which have contributed to confusion regarding the boundary, be recognized in the EIS.

The Navajo Nation should be included in the ongoing management strategies for Glen Canyon and Grand Canyon which are developed in the EIS. The Navajo Nation deserves this recognition because of land ownership and the attendant management rights and obligations and well established cultural affinity with Grand Canyon. The Glen Canyon Dam EIS calls for a program of adaptive management to monitor the effects of the dam operation program and to prescribe changes to address adverse impacts. It is imperative that the Navajo Nation have full participation in the adaptive management program.

### **EIS PROCESS AND NEPA COMPLIANCE**

The Glen Canyon EIS is important as a process and as a document. The EIS process provides a forum to address important issues to the Navajo Nation including relations with the National Park Service and other federal agencies, the right and obligation of the Navajo Nation to have a major role in decisions affecting Glen Canyon Dam and the Colorado River, and recognition of the sovereignty of the Navajo Nation and its management and responsibilities for its lands and resources. It is also important to limit the process to issues germane to the EIS purpose and need and to not allow the process to be utilized to pursue extraneous matters that may be detrimental to Navajo interests.

The EIS will set precedent on many issues and will define research and management programs that will continue for many years. It is critical that all Glen Canyon Dam issues which are important to the Navajo Nation are treated in the document and that the language used is precise and accurate. The document will be subject to extensive review and comment. It is in the interest of the Navajo Nation that the document is complete and defensible from a technical standpoint and that it meets all regulatory requirements and is in compliance with NEPA.

#### IV. PRIORITIZATION OF ISSUES

As discussed in the preceding sections, the Navajo Nation has numerous concerns regarding the Glen Canyon EIS. The Navajo Nation recognizes that actions would favor or resolve one issue may compromise others. Prioritizing issues is necessary if the Navajo Nation is to evaluate the EIS alternatives and recommend a preferred alternative.

A subset of the issues important to the Navajo Nation are of overall concern in the EIS process and are not affected by the specific action alternatives. These issues are:

- Recognition of Navajo Nation land ownership and sovereignty
- Participation by the Navajo Nation in ongoing management
- NEPA compliance.

The remaining issues can be grouped into two priority levels. The first, and highest, priority issues are of vital importance to the Navajo Nation and avoiding or mitigating impacts to them should be the first consideration in evaluation of alternatives. These issues are:

- Cultural resources
- Water rights
- Endangered species.

The second level priority issues, while important, are less critical to the tribe. These issues are:

- Riparian and marsh habitat
- Trout fishery
- Recreation
- Energy.

## V. RECOMMENDED NAVAJO NATION PREFERRED ALTERNATIVE - MODIFIED LOW FLUCTUATING FLOW

The proposed EIS alternatives were evaluated on the basis of the issues prioritized in Section III of this document. Alternatives were first ranked per their predicted impact to the first priority issues of cultural resources, water rights, and endangered species. Alternatives were evaluated with regard to their potential impact to sediment deposits which protect cultural resources, potential threats to water rights, and any beneficial or adverse impact to humpback chub. With regard to the second priority issues of riparian habitat, trout fishery, recreation, and energy; alternatives were ranked per their predicted impact to riparian substrate, riparian community diversity, aquatic productivity, recreation benefits, maintenance of camping beaches, and energy rates. This process concluded in the recommendation that the Navajo Nation adopt Modified Low Fluctuating Flow as its preferred alternative and that the Interim Operations financial exception criteria be extended and flood protection measures be limited to raising spillway gate height. The rationale for the overall recommendation based on evaluation of the prioritized issues is presented below.

### 1. Cultural Resources

Flows prescribed in the Modified Low Fluctuating Flow Alternative have a high probability of net sediment increase. The annual habitat maintenance flows included in this alternative provide the ability to move sand to higher elevations. The combination of these factors provides greatest protection for shoreline sediment deposits; therefore, cultural resources.

A blessing to provide protection for the cultural resources in Grand Canyon and the Colorado River as a whole was given by Mr. Sam Spencer of Cameron, Arizona. He was assisted by Mr. Hotachellie Arizona. The blessing was given at Mr. Arizona's residence at Cedar Ridge and at Lees Ferry, Arizona.

### 2. Water Rights

The alternatives are considered to be equal in preference with respect to water rights of the Navajo Nation. The ability to achieve water transfers is also equivalent between alternatives.

Dedicating Lake Powell storage for flood control may impact Navajo water allocations. Raising spillway gate height to increase flood protection does not present this risk.

### **3. Endangered Species**

The affect of dam operation alternatives on humpback chub and other native fish has not been established by current research. The ongoing research under the conservation measures may provide additional insight to these issues. Pertinent findings can be incorporated into operating criteria through the adaptive management process.

While the steady flow alternatives provide more stable backwaters than Modified Low Fluctuating Flow, it has not been clearly demonstrated that providing backwater stability will be a benefit to humpback chub. However, if ongoing research demonstrates backwaters to be valuable to chub, their continued existence would be enhanced by the habitat maintenance flows included in the Low Fluctuating Flow alternative. Habitat maintenance flows are not included in the steady flow alternatives.

Research scientists and resource managers generally agree that spawning by humpback chub in the mainstem Colorado River will not occur under current temperature conditions. The Modified Low Fluctuating Flow alternative includes provision for further evaluations of selective withdrawal structures to raise mainstem water temperatures.

### **4. Riparian and Marsh Habitat**

As noted above, the Low Fluctuating Flow alternative will the provide greatest protection for shoreline alluvial deposits which form riparian substrate. The extended, high and steady discharges provided under the habitat maintenance flows will disrupt climax vegetation and maintain variability in serial stages of riparian vegetation in the river corridor. This serves to maintain diversity in riparian communities and habitats.

### **5. Trout Fishery**

Aquatic productivity is the parameter selected as the measure of an alternative's benefit to trout production. Low Fluctuating Flow has higher aquatic productivity due to higher minimum discharges than other fluctuating or steady flow alternatives.

## 6. Recreation

As noted above, the Low Fluctuating Flow alternative serves to maintain shoreline deposits which are the beaches used by river runners for camping and to control the colonization of those beaches by riparian vegetation thereby maintaining a greater availability of open camping beaches. The Low Fluctuating Flow alternative has the highest recreation benefits of any alternative with the exception of Seasonally Adjusted Steady Flow, to which it is equal.

## 7. Energy

Western Area Power Administration projects Low Fluctuating Flow to have an increase in energy rates of 24 percent over No Action. In comparison, Moderate and High Fluctuating Flows incur 21 and 3 percent increases, respectively. The steady flow alternatives all incur substantially greater energy rate increases than Low Fluctuating Flow. NTUA projects that Low Fluctuating Flow will result in an increase of \$1.15 million annual power costs. NTUA projects an increase in the bill for a 500 kilowatt hour per month customer of \$1.11 per month or six percent. NTUA projects that Modified Low Fluctuating Flow which includes beach maintenance flows will result in an increase of \$1.28 million annual power costs. NTUA projects an increase in the bill for a 500 kilowatt hour per month customer of \$1.24 per month or seven percent.

The capacity reduction associated with the Low Fluctuating Flow Alternatives is approximately 30 percent. Without action by Western to replace capacity at Glen Canyon Dam, reductions of like portion in the allocation of CRSP power capacity to NTUA would occur. Allocations to NIIP are not at risk in this scenario.

Western is pursuing short- and long-term avenues to replace lost capacity at Glen Canyon Dam. Various sources of replacement capacity are available, particularly in the short-term due to the current excess generating capacity. Additionally, the Secretary of Energy is directed in the Grand Canyon Protection Act to identify economically and technically feasible methods for replacing capacity which is lost through adoption of restricted operating criteria for Glen Canyon Dam and to report to Congress within two years after adoption of long-term operating criteria in the Record of Decision. These studies will identify additional long-term sources of replacement capacity. These studies, however, do not guarantee that Western will be allowed to replace lost capacity. Congress must pass legislation to permit capacity replacement.

Western has concerns that the Record of Decision for the EIS will rescind the financial exception criteria of the Interim Operating Criteria. The financial exception criteria allow deviation from flow restrictions for financial considerations in addition to exceptions allowed for power system disturbances and emergencies. Use of the exception criteria has not resulted in discernable impacts to downstream resources. Rescinding the financial exception criteria would effectively reduce capacity of Glen Canyon Dam powerplant to the maximum normal discharge allowed under the adopted alternative. Extending financial exception criteria through the period of time required to complete the capacity replacement study and pass legislation giving authority to develop replacement capacity will allow Western to maintain existing capacity and avoid adjustments in capacity allocations.

With regard to expenditures for research and management, the adaptive management process will have a significant role in determining the level of these expenditures. Active participation in adaptive management to control unnecessary expenditures for research and management is in the interests of the Navajo Nation.

## VI. SUMMARY

To address the issues of concern to Navajo Nation the EIS must include appropriate references to Navajo Nation land ownership and sovereignty, confirm and clarify Navajo Nation participation in adaptive management, and provide adequate NEPA compliance. The Navajo Nation, through its comments on the draft and final EIS documents, should strive to ensure that these issues are adequately addressed.

It is the conclusion of the analysis presented in this paper that the Modified Low Fluctuating Flow Alternative provides the best opportunity to maintain and preserve the Navajo Nation's high priority resources and is recommended as the preferred alternative. Modified Low Fluctuating Flow is projected to result in a seven percent increase in energy costs to power consumers served by NTUA. A seven percent increase is not inconsequential. However, in evaluating this increase the history of the Glen Canyon Dam EIS and the current political environment must be considered.

The process which has lead to the EIS has been driven by the perception on the part of the National Park Service, scientists, the environmental community, and to some extent, the public

at large, that the historical operation of Glen Canyon Dam has resulted in downstream impacts which are unacceptable. The No Action, Maximum Powerplant Capacity and High Fluctuating Flow Alternatives do not provide any meaningful mitigation for downstream impacts and these alternatives are unacceptable to the groups noted above, and are not achievable in the current political climate. In other words, the range of energy cost increase associated with Low Fluctuating Flow is probably inevitable. However, mitigation of cost increases can be achieved by extending the financial exception criteria and it is recommended that this element be incorporated into the preferred alternative.