

**GLEN CANYON TEMPERATURE CONTROL
ENVIRONMENTAL ASSESSMENT**

Proposed Alternatives to be Evaluated:

No Action
Addition of a Temperature Control Device

Proposed Impacts and Risks to be Assessed:

Costs

No Action
Temperature Control Device
Construction
Post-project testing

Lake Powell

Water Temperature
Dissolved Oxygen
Trace Elements
Sport Fishery
Forage Fish
Reservoir Evaporation

Nutrients
Salinity
Primary Productivity
Recreation
Native Fish
Power Production

River below GCD

Water Temperature
Dissolved Oxygen
Trace Elements
Native Fish
Recreation
Air Temperatures

Nutrients
Salinity
Primary Productivity
Non-Native Fish
Evaporation

Lake Mead

Water Temperature
Dissolved Oxygen
Trace Elements
Fishery
Reservoir Evaporation

Nutrients
Salinity
Primary Productivity
Recreation

Other

Section 7 Consultation (ESA)

404 Permit

BRIEFING PAPER

Prepared for:

Submitted: January 15, 1998

State: AZ, CA, CO, NM, NV, UT, WY

Bureau: WBR

TITLE: Glen Canyon Dam - Temperature Controls

ISSUE: Funding for Temperature Controls (\$15 million)

BACKGROUND:

- ◆ **Environmental Issues** - Prior to construction of Glen Canyon Dam, the Colorado River would warm seasonally from near freezing to about 85°F. Since construction of the dam, releases from the dam are consistently cold throughout the year (about 45-50°F). As this water moves downstream, it warms to about 60°F, but this is not quite warm enough to allow endangered warm water fish (humpback chub) to reproduce in the mainstem of the Colorado River.
- ◆ **FWS Biological Opinion** - In their Endangered Species Act (ESA) biological opinion, the FWS found that the operation of Glen Canyon Dam jeopardizes the existence of two endangered fishes. Their reasonable and prudent alternative states that "Reclamation shall implement a selective withdrawal program for Lake Powell waters..." and study the impacts.
- ◆ **Scoping Issues** - In scoping the issues and potential impacts, Reclamation has found that the majority of scientists believe that temperature controls would be an effective tool, but there are complex ecological interactions that may defy prediction. For example, there is a relatively small chance that warm water may encourage competitors, impact food bases, or have other unexpected impacts.
- ◆ **Feasibility Studies** - In its Value Planning Report dated April 24, 1997, Reclamation looked at several alternatives and found a relatively simple modification to the existing penstocks that would provide for temperature control. Based on Reclamation's September 1997 Feasibility Cost Estimates, a typical selective withdrawal structure could cost between \$40 million and \$140 million, depending upon the type of design. The proposed modification would take advantage of the existing trashrack structure and bulkhead gate rails, reducing the costs to \$15 million or less. Each penstock would be able to individually draw water from either its original elevation or at a fixed elevation near the surface. In the summer months of years when the reservoir is near full, the intakes could be opened near the surface to allow warm water to enter the penstocks. Some penstocks may be used to cool the releases if needed. Blending would be used to adjust the release temperatures.
- ◆ **Test Concept** - In scoping the potential impacts, Reclamation found that the majority of scientists believe that temperature controls have been an effective tool at other locations and should be an effective tool to aid in the management of the river below Glen Canyon Dam, but there are complex ecological interactions that may defy prediction. The hypothesis is that warm water will give more advantages to the native fish than to the nonnative fish, but this hypothesis has yet to be proven by a test. Reclamation proposes to modify the penstocks to test (confirm) this hypothesis

directly. If successful, the penstock modifications for the test may be used as a permanent temperature management tool.

- ◆ **Construction Authority** - The CRSP Act, Section 8 states, "In connection with CRSP, the Secretary is authorized to investigate, plan, construct, operate, and maintain... (2) facilities to mitigate losses of, and improved conditions for, the propagation of fish and wildlife..." This authority was used in the mid 1970's to construct a selective withdrawal structure at Flaming Gorge Dam (another CRSP facility). Section 5 of the Act, Limitations on the Use of Power Revenues, prohibits the use of power revenues for section 8 activities. As with previous work at Flaming Gorge, construction appropriations would be used to modify the intakes at Glen Canyon Dam.
- ◆ **Funding Needs** - Depending upon the outcome of the environmental assessment, 4 to 8 penstocks may be modified. The costs would range from \$10 million for the 4-unit modification, which would be the initial construction plan, to \$15 million for the 8-unit modification.
- ◆ **Current Plans** - Reclamation has begun an environmental assessment and depending upon its complexity, a draft is scheduled for completion by December 1998. If funded, the modifications to the intakes would begin in FY-2000. Construction would take 12 months and funding may be split over two fiscal years with \$10 million in 2000 and \$5million in 2001.

POSITION OF INTERESTED PARTIES:

- ◆ The FWS believes that temperature controls are required to remove jeopardy to endangered fishes. The goal of the Service's Reasonable and Prudent Alternative is to provide temperatures required for successful spawning/recruitment of humpback chub in the main channel of the Colorado River below Glen Canyon Dam.
- ◆ This plan has the support of the Glen Canyon Adaptive Management Work Group participants.
- ◆ To comply with the Endangered Species Act and meet the objectives of the Grand Canyon Protection Act, Reclamation must pursue this element of the Reasonable and Prudent Alternative.

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