



United States Department of the Interior

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Upper Colorado Regional Office
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IN REPLY REFER TO:

UC-702
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MAY 8 2002

MEMORANDUM

To: Field Supervisor, U.S. Fish and Wildlife Service, 2321 W. Royal Palm Road,
Suite 103, Phoenix, AZ 85021-4961

From: ^{Acting} Rick L. Gold
Regional Director

Subject: Implementation Status of the Elements of the Reasonable and Prudent
Alternative from the December 21, 1994, Biological Opinion on the Operations of
Glen Canyon Dam

A detailed description of the status of each element of the referenced Reasonable and Prudent Alternative (RPA) is attached. We appreciate the willingness of your staff to work with us in completing this assessment. Dennis Kubly of our Adaptive Management and Environmental Resources Division will serve as the point-of-contact for coordination of RPA activities. Please contact him at (801) 524-3715 if you have any questions.

Connie L. Rupp

Attachment

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1999-2001 PROGRESS REVIEW
IMPLEMENTATION OF THE GLEN CANYON DAM OPERATIONS
BIOLOGICAL OPINION

This is Reclamation's fourth progress report for implementation of the Reasonable and Prudent Alternative (RPA) for the 1994 Glen Canyon Dam Operations Biological Opinion. It addresses activities completed during calendar years 1999-2001. Each previous review included at least one preliminary communication between the staffs of Reclamation and the Service. The first progress report was prepared on November 27, 1996, and the Service formally responded on April 3, 1997. The second report was issued on December 12, 1997. No formal response was received from the Service. The third report was sent on February 25, 1999, and the Service responded on May 27, 1999.

At the close of calendar year 2001, five of the seven elements of the biological opinion are in progress, with one item completed and another awaiting follow-up action by the Service.

Following is a discussion of each element.

ELEMENT 1

Reclamation shall develop an adaptive management program (AMP).

PROGRESS ON ELEMENT 1

The Glen Canyon Dam AMP retains the same organizational structure as presented in the last sufficient progress communication. A review of the 1997 GCMRC Strategic Plan, as amended, was conducted by a National Research Council committee and published in 1999 (National Research Council 1999). The AMP Charter was renewed in January 2001. New and continuing representatives to the Adaptive Management Work Group (AMWG) were confirmed by the Secretary of the Interior during 2001. Protocol Evaluation Panels have provided evaluations and recommendations for Grand Canyon Monitoring and Research Center's (GCMRC) programs in Physical Resources (Wohl and others 1999), Cultural (Doelle 2000), Terrestrial Biology (Urquhart and others 2000), Trout Fishery (Culver and others 2000), Integrated Water Quality (Jones and others 2001), and Aquatic Studies (Anders and others 2001) investigations. Each of these reviews has resulted in modifications to the GCMRC monitoring and research protocols. The Science Advisory Board, which provides advice and counsel to GCMRC and the AMP, was convened in 2001. Results of the first major experiment conducted under the auspices of the AMP, the controlled flood of March-April 1996, were published in two collected works (Webb and others 1999, Patten and Stevens 2001). A very important step in developing an ecosystem-based science program has been the development of a conceptual model of the Colorado River ecosystem in the Grand Canyon region (Walters and others 2000). A complementary exercise has been the development of the AMP strategic plan, which has been recommended for adoption to the Secretary of the Interior by the AMWG.

STATUS OF ELEMENT 1

Completed. The AMP has been developed and implemented.

ELEMENT 1.A

Carry out a program of experimental flows, including high steady flows in the spring and low steady flows in summer and fall during approximately 8.23 million acre foot (maf) water years. The RPA set forth a schedule for development and implementation of experimental flows. Design of experimental flows and associated studies were to have been completed by October 1996. Unless the Service doubted the validity of the study design or the ability of the flow to contribute to removal of jeopardy, the flows were to be implemented in April 1997. The flows could begin even later in 1997, if good faith effort to make sufficient progress was completed. Absent sufficient progress, flows were to be implemented in spring of 1998.

PROGRESS ON ELEMENT 1.A

Previous communications have identified the implementation of a beach habitat building flow in March-April of 1996 and a habitat maintenance flow in November 1997. During 1998 and early 1999 Reclamation and the Service exchanged several draft environmental compliance documents pursuant to planning for another beach habitat building flow anticipated sometime in the period May-July 1999, however triggering criteria for this controlled release did not materialize. In September 1999, a presentation was made to the TWG by Dr. Richard Valdez on a report (Valdez and others 2000a) to GCMRC providing recommended hydrology to assess this element of the RPA. The report contained a proposed 3-year program of experimental flows, consisting of one year of the EIS preferred alternative (modified low fluctuating flow) as a baseline, followed by two years of a hydrograph characterized by spring and autumn spike flows, more extended, moderately high, steady spring flows to back up tributary mouths, and an extended summer period of low steady flows (called collectively the low steady summer flows [LSSF] test). In January 2000 Reclamation predicted the Upper Colorado River Basin would have an approximately 8.23 maf year. Reclamation provided the TWG with a provisional hydrograph similar to the LSSF to be completed as a "test of concept" for the experimental flow hydrograph portrayed by the Service in the biological opinion. A science plan was constructed under the auspices of GCMRC and research was conducted during much of 2000. In April 2001, GCMRC convened a science symposium that was largely directed at presentation of preliminary results from the LSSF research and monitoring. We are awaiting final reports from GCMRC.

The TWG has worked for an extended period to develop a program of experimental flows, including flows for native fish that would meet the needs of the biological opinion. Two ad hoc committees have been formed, and there have been numerous meetings and deliberations on this subject. The TWG Sediment Ad hoc Committee has produced a report with recommendations on flows to test sediment conservation hypotheses (Technical Work Group Ad-hoc Committee on Sediment 2001), and the AMWG has transferred the report to the Secretary of the Interior. The Experimental Flow Ad Hoc Committee has met several times with the Native Fish Work Group to discuss flow recommendations for native fish experiments, but no report has yet been produced.

STATUS OF ELEMENT 1.A

Ongoing. Although several experimental releases have been conducted under the auspices of the AMP, the program of experimental flows identified in the RPA is not yet completed. The longer than anticipated period for developing this program is attributable largely to its being made a part of the adaptive management process. Reclamation believes that the final program of flows will be much improved by the incorporation of scientific results from investigations conducted as part of the adaptive management program. Reclamation will strive to have a

complete program of experimental flows developed, and delivered to the AMWG by July 2002 for their consideration of a recommendation to the Secretary of the Interior. Dam releases from Glen Canyon Dam during 2001-2002 have followed the preferred alternative of the Glen Canyon Dam EIS to provide baseline measurements as recommended by Valdez and others (2000a). Funds have been sequestered within the AMP for augmentation of the research and monitoring necessary to measure the effects of future experimental flows.

ELEMENT 1.B

Reclamation shall implement a selective withdrawal program for Lake Powell waters and determine feasibility.

PROGRESS ON ELEMENT 1.B

Reclamation produced a draft environmental assessment on the proposed temperature control device (TCD) in January 1999. There were sufficient concerns evidenced during the review process that Reclamation decided to withdraw the assessment. One of the elements of the TCD assessment identified as lacking in the review process was a science plan to evaluate effects of the TCD. In October 1999, GCMRC produced a draft science plan for review by the TWG (GCMRC 1999). In November 1999, Reclamation convened a workshop to discuss TCD issues and to further develop the research and monitoring plan to assess TCD effects. A workshop attended by invited experts was held in January 2001 to further develop potential operational scenarios and the research and monitoring plan. Results of these workshops were communicated through the Upper Colorado Region's web site (<http://www.uc.usbr.gov>) and through presentations to the TWG and AMWG. Reclamation is in the process of conducting a survey of operators of dams having selective withdrawal devices, including TCDs, to determine whether concerns evidenced by scientists and managers for effects of the Glen Canyon Dam TCD have been experienced at other facilities. Results of this survey and other related investigations will be presented to the AMWG at their July 2002 meeting. The AMWG will be asked to make a recommendation on whether it is feasible and warranted to produce a preferred alternative for construction and operation as a test of the device's effects on aquatic resources in the Colorado River.

STATUS OF ELEMENT 1.B

Ongoing. Reclamation expects to complete the feasibility evaluation for the temperature control device in autumn 2002. If the decision is made to pursue construction and testing of a TCD, a new draft environmental assessment will be issued accompanied by a science plan to measure effects of the TCD.

ELEMENT 1.C

Determine responses of native fishes in Grand Canyon to various temperature regimes and river flows of the experimental flows and other operations of Glen Canyon Dam.

PROGRESS ON ELEMENT 1.C

Robinson and others (1998) considered implications of larval native fish drift from the LCR into perennially cold mainstem waters. Clarkson and Childs (2000) investigated the effects of different water temperatures on growth, development, and physiology of larval and early juvenile life stages of native Colorado River fishes. Robinson and Childs (2001) compared projected

growth rates in the seasonally warm LCR and the perennially cold mainstem. Trammel and others (*in preparation*) have investigated responses of native fishes to the experimental flows of year 2000. Hoffnagle (2000), Hoffnagle and others (2000), and Cole and others (2001) have produced reports on distribution and environmental needs of parasites of native and non-native fish in Grand Canyon, including the endangered humpback chub. A compilation of these reports has been submitted for publication and is in review (Hoffnagle and others *in review*).

One of the impediments to identifying responses of native fish to changes in water temperature regimes and river flows has been the lack of a consistent monitoring plan and assessment analysis. Under the auspices of GCMRC, with the aid of Dr. Carl Walters, University of British Columbia, a stock assessment model has been developed and is being applied to both humpback chub and flannelmouth sucker. The stock assessment approach concentrates on changes in the number of individuals recruiting to the populations of native fishes, which for humpback chub is ages 3-4. Preliminary results of this work, recently presented by GCMRC, indicate that the number of recruiting individuals to the LCR population of humpback chub declined from 1993-1999, the most recent year for which they have estimates (Coggins and Walters 2001).

STATUS OF ELEMENT 1.C

Ongoing. Research and monitoring of native fishes in Grand Canyon, as well as their predators, competitors, diseases, and parasites is being carried out largely under the auspices of the GCMRC with funding provided to the GCDAMP. Research and monitoring work accomplished through GCMRC is accomplished through competitive proposals that are peer-reviewed by independent scientists. Results of this work are presented on a regular basis at TWG and AMWG meetings, and are published as peer-reviewed articles in technical journals.

ELEMENT 2

Protect humpback spawning population and habitat in the Little Colorado River (LCR) by being instrumental in developing a management plan for this river.

PROGRESS ON ELEMENT 2

In Reclamation's response to the Service's 1994 biological opinion on operation of Glen Canyon Dam, we agreed to assist the Navajo Nation and other entities having authority and jurisdiction to fund and implement the management plan. We contracted with the Navajo Nation to develop a management plan, because of the Nation's ownership of much of the lower reach of the LCR and the large percentage of the basin that lies within their boundaries. The Navajo Nation subsequently contracted with SWCA, Inc. to develop the plan. That contract expired during the transition from GCES to GCMRC, so a new cooperative agreement was finalized and a draft report was issued in November 1998. The Service reviewed the report and provided their comments in a June 8, 1999, letter to Dr. Richard Valdez of SWCA. In that letter the Service requested Reclamation to state more clearly what was intended in our response to the Service's biological opinion with the statement "We will continue to work cooperatively with those entities having authority and jurisdiction to fund and implement the (LCR management) plan." We will now clarify our meaning in this sentence.

Reclamation does not have the authority or the responsibility to implement the LCR management plan. Indeed, no single agency or entity has the authority or responsibility to implement a management plan that would protect the endangered humpback chub and its

critical habitat from threats arising throughout the basin. Watershed management, by its very nature, must be carried out as a cooperative effort among government agencies and other entities that have authorities and responsibilities for resources in the watershed area. We have agreed to cooperate with those entities having the appropriate authority and jurisdiction in their efforts to fund and implement the plan, and to participate in an appropriate organization to carry out the plan.

After the Service reviewed the draft SWCA plan in 1999, it was revised and divided into a draft management plan and a supplemental report. Subsequently, SWCA has experienced a change in ownership, the lead author, Dr. Valdez, is no longer employed by the company, and the contract for the work has expired. SWCA finalized the supplemental report, but the management plan has not been completed.

Reclamation recently made a presentation to the Little Colorado River Multi-Objective Management watershed group (LCR-MOM) on the need for a LCR management plan for humpback chub and our efforts in that endeavor. The LCR-MOM is an umbrella watershed group having as members LCR basin subwatershed groups, Native American tribes, and city, county, state, and federal agencies. At the meeting LCR-MOM representatives indicated that they are interested in partnering with Reclamation and the Service in the development of the management plan. In subsequent conversations with Ecological Services staff we have confirmed that the Service also is supportive of this approach. Therefore, we have agreed to work with the Service, LCR-MOM and other watershed entities in developing a management plan, which will meet Reclamation's commitment for this element of the biological opinion. Reclamation anticipates that the plan can be completed by the end of June 2003, and we will work with other drafters of the plan to meet that deadline.

STATUS OF ELEMENT 2

Ongoing. Reclamation is working with the Service, LCR-MOM and other watershed entities to develop a management plan that will satisfy this element of the RPA. The plan will be developed cooperatively and completed by the end of June 2003, thereby completing Reclamation's responsibility under this element of the RPA.

ELEMENT 3

Develop actions that will help ensure the continued existence of the razorback sucker by first sponsoring a workshop within one year following the biological opinion. Following review of the workshop results, the Service will recommend a course of action and develop a Memorandum of Understanding with Reclamation and other entities who may wish to participate.

PROGRESS ON ELEMENT 3

Reclamation sponsored a workshop on the endangered razorback sucker on January 11 and 12, 1996. The results of the workshop were sent to participants, including the Service, on February 12, 1996. The Service has not initiated development of the Memorandum of Understanding for razorback sucker management. In the Service's response to Reclamation's last progress evaluation, dated May 27, 1999, several action items of interest to the Service were identified. Because the only known extant population of razorback sucker above Hoover Dam is in Lake Mead, we believe these actions should be addressed primarily by the Lower Colorado Region Reclamation office. However, we are partially addressing two of the actions—

non-native fish control and provision of experimental flows that could affect habitat of razorback sucker in upper Lake Mead—through the AMP.

STATUS OF ELEMENT 3

Ongoing. Reclamation has completed the workshop, which was the first step for this element. It is our understanding that the next step for satisfying this element is for the Service to recommend a course of action and to develop a Memorandum of Understanding with Reclamation and other entities who may wish to participate.

ELEMENT 4

Establish a second spawning aggregation of humpback chub downstream of Glen Canyon Dam.

PROGRESS ON ELEMENT 4

Development of environmental conditions that would allow successful reproduction by humpback chub in the Colorado River below Glen Canyon Dam is associated with efforts to assess the feasibility of a temperature control device and the testing of flow regimes for native fishes. In December 2000, GCMRC received a final report from Valdez and others (2000b) providing recommendations on the establishment of a second population of humpback chub in Grand Canyon. The authors evaluated four alternatives: (1) existing mainstem aggregation, (2) metapopulation approach, (3) tributaries, and (4) tributary and mainstem. They concluded that:

The primary criteria for establishing a second population of humpback chub in Grand Canyon are (1) establishing successfully reproducing adults of sufficient number to maintain the maximum genetic viability of the species and (2) achieving long-term demographic stability in suitable habitat reasonably protected from threats and catastrophes. Preliminary habitat analyses show that genetic criteria (i.e., target population size and structure) are unlikely to be met in a tributary, but may be met in two contiguous aggregations (Stephen Aisle/Middle Granite Gorge) or in the mainstem taken as a whole (the metapopulation concept, which assumes sub-populations periodically exchange individuals and, hence, are linked genetically). The metapopulation concept is thought to present the greatest likelihood for success in establishing a new, genetically viable population of humpback chub in Grand Canyon.

The authors identified several prerequisites to enhance the probability of success for a reproducing mainstem population. First, they identified that mainstem water would need to be sufficiently warmed by implementation of the proposed temperature control device on Glen Canyon Dam. They were clear, however, that this finding should not be construed as a recommendation by them for that implementation. Second, the authors proposed that a non-native fish control program must be an important consideration before attempting to establish a second population. Third, they recommended that a formal, standardized fish monitoring program be in place and gathering data for at least one year before establishment of the second population is attempted.

STATUS OF ELEMENT 4

Ongoing. Investigations and actions are in progress to satisfy prerequisites to establishment of a second population as identified by Valdez and others (2000b). As indicated above, under

element 1b, Reclamation intends to make a determination on feasibility of the TCD for Glen Canyon Dam in 2002. Proposals presently are under consideration for control of brown trout in Bright Angel Creek and Reclamation is funding an evaluation of sampling gear for capture of channel catfish and carp in the Little Colorado River. The use of Glen Canyon Dam releases to negatively impact non-native fish, in addition to directly improving habitat for native fish, has been investigated and is being incorporated into the development of a program of experimental flows to satisfy the needs of element 1a. GCMRC also is conducting an investigation of the genetics of humpback chub aggregations in Grand Canyon to determine the extent of genetic relatedness among the aggregations. This work, which will be completed in 2002, is very important in determining whether the aggregations can be considered a single population. Results from this work could have significant effects on the selected approach to establishing a second spawning aggregation of humpback chub in Grand Canyon.

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