



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES
3616 W. Thomas, Suite 6
Phoenix, Arizona 85019

2-21-91-F-330

June 27, 1991

Memorandum

To: Regional Director, National Park Service, San Francisco, CA

From: Acting Field Supervisor

Subject: Biological Opinion - Issuance of a Permit to Arizona State University Personnel to Collect Humpback Chub and Razorback Sucker in the Grand Canyon National Park, Coconino County, Arizona

Introduction

This responds to your request dated June 13, 1991, for formal consultation pursuant to the Endangered Species Act of 1973, as amended, on the proposed issuance to Arizona State University personnel (ASU) of a National Park Service (NPS) permit to collect endangered humpback chubs (*Gila cypha*) and proposed endangered razorback suckers (*Xyrauchen texanus*) in the Little Colorado River, Grand Canyon National Park (Park). The following biological opinion is based upon information provided by ASU in their technical proposal to Glen Canyon Environmental Studies (GCES), data in Fish and Wildlife Service (FWS) files, and discussions with biologists knowledgeable about the species.

BIOLOGICAL OPINION

It is my biological opinion that the issuance of the proposed NPS permit to ASU personnel is not likely to jeopardize the continued existence of the humpback chub, but will promote the conservation of the species.

BACKGROUND INFORMATION

Species Description

The humpback chub was listed as endangered by the FWS on March 11, 1967. No critical habitat has been designated for the species. The humpback chub is one of the "big river" fish endemic to the Colorado River Basin that has become very reduced in abundance and occurrence. The species is currently found in the Colorado, Little Colorado, Green, and Yampa Rivers. The Grand Canyon population of the Colorado and Little Colorado Rivers is the largest. The humpback chub is currently in decline. This decline may be due to a combination of factors such as: stream alteration (dams, irrigation, dewatering, channelization, habitat fragmentation), competition with and predation by introduced nonnative fish species, and pollution.

The humpback chub is an unusual and striking fish. It is a medium-size (less than 500 mm total length [TL]), freshwater fish of the minnow family (Cyprinidae). Adults generally have a pronounced dorsal hump (Minckley 1973). Further description of the humpback chub can be found in the recently revised Recovery Plan for the species (FWS 1990).

Humpback chubs are found in a variety of habitats; unfortunately, its habitat preferences are poorly understood. Humpback chubs in the lower basin of the Colorado River have been captured in the main channel and tributaries between Lake Powell and Lake Mead. Humpback chubs are known to feed upon chironomid and simuliid larvae and other aquatic and terrestrial insects (Kaeding and Zimmerman 1983).

Site Description

The humpback chub was described from a specimen taken in the Grand Canyon of the Colorado River and two other specimens of unknown origin (Miller 1946). Glen Canyon Dam profoundly changed the Colorado River from a seasonal pattern of temperature, sediment, and flow to one of constant cold, usually clear, and controlled releases. Downstream of Lake Powell, humpback chubs have been collected in the Colorado River from just below Glen Canyon Dam to River Mile 216 (AGFD unpublished data). The species has been collected in five tributaries to the Colorado River in the Grand Canyon; however, successful spawning is known to occur only in the Little Colorado River (LCR), the largest tributary (Kaeding and Zimmerman 1983)(Maddux et al 1987).

The study area is the perennial, lower 21 kilometers (km) of the LCR, from the Blue Springs area to the confluence with the Colorado River. The jurisdictional limit of the Park extends from the LCR's confluence and upstream approximately 3.2 km.

Action Description

Issuance of the permit will enable ASU to begin a multi-year research study on the ecology and conservation of the humpback chub in the LCR. This study will be part of the endangered and native fish studies identified by an interagency consultation team for Glen Canyon Dam as one of the conservation measures that would lead to the protection and recovery of the humpback chub in the Grand Canyon. The study will provide information for both the existing formal Section 7 consultation and the Environmental Impact Statement on the operation of Glen Canyon Dam.

Principle investigators for this permit are Drs. P. Marsh and M. Douglas (ASU), and additional responsible parties include Messrs. C. Minckley and B. Bagley (ASU) and P. Ryan (Navajo Nation National Heritage Program).

The purpose of the investigation is to determine duration and extent of movement of older juvenile and adult humpback chubs and other native fish in the LCR, their span of residency within the LCR, and other life-history characteristics of the species that are

presently unknown. The study will began in July 1991 and is scheduled to continue through summer 1995. Field work will be of 1-3 weeks duration at 1-3 week intervals, for a total of 8 months each year. Intensity of sample effort is planned to coincide with expected numbers of humpback chub seasonally present in the LCR.

Within the Park, hoop nets and trammel nets will be used to capture the fish. Nets will be similar to those used during the last several spring monitoring seasons by Arizona Game and Fish Department (AGFD). Trammel nets will be checked every six hours and hoop nets will be checked every 12 hours.

Upstream of the Park, fish will be collected in gear described above and with the use of two weirs placed across the LCR. The weirs are designed to capture older juvenile and adult fish moving upstream or downstream. Mesh size of the weir and holding cages will be 3/4 inch, and it is anticipated that humpback chubs smaller than approximately 100 mm will not be restrained by the weirs. Weirs will be checked every 12 hours.

Humpback chubs and razorback suckers greater 150 mm TL or greater will be marked with Passive Integrated Transponder (PIT) tags. This fish size is based on the current advise to the FWS from the GCES Aquatic Coordination Team (ACT).

In addition to the application for a NPS permit, ASU personnel have also obtained for their research activities in the LCR a scientific collecting permit from AGFD, a permit from the Navajo Nation, and an endangered species permit from the FWS .

IMPACTS OF THE ACTION

Environmental Baseline

The Colorado River in the Grand Canyon has been physically modified by Glen Canyon Dam, as described above in the Site Description, and by the introduction of nonnative fishes beginning in the late 1800's (Gilbert and Scofield) 1898). A jeopardy biological opinion in 1978 on the effects of Glen Canyon Dam on the humpback chub recommended that studies should be conducted to find alternatives that would remove the threat of jeopardy to the humpback chub and lead to the recovery of the species.

Studies, such as Kaeding and Zimmerman (1983) and Maddux et al (1987), have contributed to the knowledge of the humpback chub and have identified the importance of the LCR to the humpback chub. The 1983 study by the FWS referenced above estimated an adult (TL greater than 200 mm) humpback chub population in the LCR of 7,000 to 8,000. Preliminary estimates from AGFD's mark and recapture surveys (May 1987 through 1989) suggest 5,000 to 18,000 humpback chubs use the LCR in the spring season (AGFD 1990).

Direct and Indirect Effects of the Proposed Action

The proposed action is expected to have a positive effect on the survival and recovery of the humpback chub. Beside the purposes stated in the Action Description above, issuance of the proposed permit for research activities on the humpback chub in the LCR will contribute to the following tasks identified in the species' recovery plan (FWS 1990):

3. Implement monitoring programs.
 32. Monitor relative abundance of juveniles and adults.
4. Investigate the life history and ecological requirements of humpback chub.
 411. Describe reproductive biology.
 412. Describe age-and-growth characteristics.
 413. Determine movement between and within populations.
 414. Determine population dynamics.
 415. Determine factors that affect survival with emphasis on recruitment.
 421. Determine the biological, chemical, and physical requirements of all life stages.

Capturing, handling, and tagging of humpback chubs, while not expected to produce mortality, will cause some injury and stress, disruption of normal behavior patterns, and local disturbance of habitat due to placement and operation of nets. Stress will be reduced by minimizing the time fish are restrained in the nets. Utmost care will be employed in processing the fish and administering the PIT tag.

The novel feature of this study are the two bi-directional weirs devised to capture fish approximately 100 mm and greater. The weirs will be located in pool reaches of the LCR, and netting for them will hang from a cable stretched across the river channel. The bottom of the net will be secured by sand bags to the channel bottom. If flooding of the LCR is anticipated, the weir can be quickly released from the top or bottom to allow passage of flood waters. In the event no one is at the weir during a flood event, the bottom of the net will pull out from the sand bags, and the net will float on the surface. The holding cages will be of sufficient size to prevent crowding and will be located in still water habitats of the channel. These design considerations will assist in reducing injury to captured fish.

Because this study will be conducted in conjunction with study efforts by the AGFD, BIO/WEST, and FWS, coordination and cooperation among the various research groups will be essential to the successful completion of this study and to the reduction of stress and adverse effects on the fish populations of the LCR.

INCIDENTAL TAKE

Section 9 of the ESA prohibits any taking (harass, harm, hurt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct) of any listed species without a special exemption. Under the terms of Section 7(b)(4) and 7(o)(2), taking

that is incidental to, and not intended as part of, the agency action is not considered taking within the bounds of the ESA provided that such taking is in compliance with the incidental take statement.

Although mortality of humpback chub as a result of activities associated with the proposed permit is not expected to occur, some incidental mortality may be experienced during the six month period of the proposed permit. Incidental take has been estimated from previous experiences employing similar collecting gear. The weir, being a newly developed gear, is more difficult to quantify at the onset. After this first permit period, we believe a more accurate evaluation of the weirs performance will be available for future permit actions.

Based upon review of the permit request and study proposal, the FWS anticipates that up to 5 humpback chub mortalities (young-of-year, juvenile, or adult) could occur in the Park portion of the study area during the period of the permit. We anticipate that 10 humpback chub mortalities (young-of-year, juvenile, or adult) could occur in the remainder of the study area using hoop and trammel nets. We also anticipate that 10 humpback chub mortalities (juvenile or adult) could occur at each of the weir stations.

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize take:

1. Ensure that all fish collecting and tagging crews are adequately trained for such activities as detailed in ASU's technical proposal.
2. Handling of humpback chubs will be accomplished in a manner that reduces stress and injury to the fish.
3. The FWS will use the monthly reports, results of the other permit reviews, and the latest estimates of population levels to further evaluate incidental take over the duration of the multi-year study.

In order to be exempt from the prohibitions of Section 9 of the ESA, the following terms and conditions must be complied with in order to implement the above measures:

1. Efficient actions of the processing crew will reduce the time the fish is removed from its environment. Use of PIT tags, which are easily inserted and electronically scanned, will support this condition. Methods of marking humpback chubs less than 150 mm TL will need to be determined later by the FWS with advice from the ACT. The time between examination of an entanglement net (trammel) will not exceed 6 hours, and the time between examination of an entrapment net (hoop or weir) will not exceed 12 hours. Further reduction of these intervals may be necessary during periods of intense humpback chub activity.
2. Trip Reports on a one to two month basis prepared by the applicant shall be sent to the FWS and other members of the ACT, as appropriate. Observations of any adverse effects or unusual condition of the humpback chubs encountered

shall be included in the report. The FWS will conduct a review of this permit with the applicant by November 15, 1991. Methods or techniques that would reduce adverse study impacts related to the issuance of this permit for the humpback chub will be solicited from ASU personnel and other members of the ACT. As necessary, these recommendations will be incorporated as a permit amendment or included in future permits.

If, during the course of the action, the amount of take or extent of the incidental take limit is exceeded, the NPS must reinitiate Section 7 consultation immediately to avoid violation of Section 9. Operations must be stopped in the interim period between initiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an adverse impact on the species, as per Section 402.14(i). An explanation for the causes of the taking should be provided.

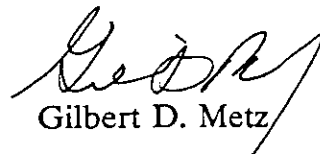
PROPOSED RAZORBACK SUCKER

The razorback sucker was proposed as endangered on May 22, 1990. It has been severely reduced to extirpated throughout its range (Colorado River Basin). Since 1984, five individuals were collected in the Grand Canyon (Maddux et al. 1987 and AGFD unpublished data). The species' likely listing as an endangered species in 1991 has alerted the ACT for the need to include this species in a rigorous data collection program. Presently the ACT is recommending that all razorback suckers be PIT-tagged and that data be collected on the specimens' length, weight, and habitat characteristics similar to that being recorded for the humpback chub. Photographs should also be taken for each razorback collected since there may be questions regarding hybridization with species such as the flannelmouth sucker (Catostomus latipinus).

CONCLUSION

This concludes formal consultation on this action. Reinitiation of formal consultation is required if the amount or extent of incidental take is exceeded, if new information reveals effects of the action that may impact listed species or critical habitat in a manner or to an extent not considered in this opinion, if the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion, or if a new species or critical habitat is designated that may be affected by this action.

For further assistance, please contact Frank Baucom or Sam F. Spiller, Field Supervisor, Phoenix Field Office (Telephone: 602/261-4720 or FTS 261-4720).


Gilbert D. Metz

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (FWE/SE)
Superintendent, Grand Canyon National Park, Grand Canyon, AZ
Director, Arizona Game and Fish Department, Phoenix, AZ
Dr. Paul Marsh, Center for Environmental Studies, Arizona State
University, Tempe, AZ
Regional Director, Bureau of Reclamation, Salt Lake City, UT
Regional Director, Fish and Wildlife Service, Denver, CO
Project Leader, Fish and Wildlife Service, Pinetop, AZ
Unit Leader, Cooperative Fish and Wildlife Research Unit,
Tucson, AZ
Senior Scientist, Glen Canyon Environmental Studies, Center for
Environmental Studies, Arizona State University, Tempe, AZ
Program Manager, Glen Canyon Environmental Studies, Bureau of
Reclamation, Flagstaff, AZ
Superintendent, Glen Canyon National Recreation Area, Page, AZ
Principal Investigator, BIO/WEST, Logan, UT
Regional Environmental Officer, Department of the Interior, San
Francisco, CA
Area Manager, Western Area Power Administration, Salt Lake City, UT
Program Director, Navajo Natural Heritage Program, Window Rock, AZ

LITERATURE CITED

- AGFD (Arizona Game and Fish Department). 1990. Grand Canyon humpback chub and razorback sucker monitoring project, 1990 scope of work. Report to National Park Service. Phoenix, AZ. 13pp.
- FWS (Fish and Wildlife Service). 1990. Humpback chub recovery plan. U.S. Fish and Wildlife Service, Denver, CO. 43 pp.
- Gilbert, C.H. and N.B. Scofield. 1898. Notes on a collection of fishes from the Colorado Basin in Arizona. Proc. U.S. National Museum 20:487-499.
- Kaeding, L.R. and M.A. Zimmerman. 1983. Life history and ecology of the humpback chub in the Little Colorado River and Colorado Rivers of the Grand Canyon. Transactions of the American Fisheries Society, 112(5):577-594.
- Maddux, H.R., D.M. Kubly, J.C. deVos, Jr., W.R. Persons, R. Staedicke, and R.L. Wright. 1987. Effects of varied flow regimes on aquatic resources of Glen and Grand Canyons. Final Report to Bureau of Reclamation by Arizona Game and Fish Department, Phoenix, AZ. 291 pp.
- Miller, R.R. 1946. Gila cypha, a remarkable new species of cyprinid fish from the Colorado River in Grand Canyon, Arizona. Journal Washington Academy of Science 36(12):409-415.
- Minckley, W.L. 1973. Fishes of Arizona. Arizona Game and Fish Department, Phoenix, AZ. 293 pp.