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In Reply Refer To:
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June 25, 1999

Memorandum

To: Project Coordinator, Arizona Fishery Resources Office, Fish and Wildlife Service,
Parker, Arizona

From: Field Supervisor

Subject: Biological Opinion for Creation of Desert Pupfish Refugium at Cibola National
Wildlife Refuge, La Paz County, Arizona

This document transmits the Fish and Wildlife Service's biological opinion based on our review of the proposed creation of a desert pupfish (*Cyprinodon macularius macularius*) refugium at Cibola National Wildlife Refuge, La Paz County, Arizona and its effects on the endangered desert pupfish, razorback sucker (*Xyrauchen texanus*) and designated critical habitat, bonytail chub (*Gila elegans*), bald eagle (*Haliaeetus leucocephalus*), American peregrine falcon (*Falco peregrinus anatum*), Yuma clapper rail (*Rallus longirostris yumanensis*), and brown pelican (*Pelecanus occidentalis*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your request for formal consultation was received on May 25, 1999.

This biological opinion is based on information provided in the intra-Service consultation form, telephone conversations between yourself and Ms. Lesley Fitzpatrick of this office, and other sources of information. A complete administrative record of this consultation is on file at this office.

Consultation History

Informal consultation on the proposed action consisted of telephone conversations between Dr. Chuck Minckley of the Arizona Fishery Resources Office (AzFRO) and Ms. Lesley Fitzpatrick. No telephone records were made. The intent of the informal consultation was to determine the most appropriate manner in which to provide coverage for the transport and subsequent placement and management of the desert pupfish in the constructed refugium at Cibola National Wildlife Refuge (Cibola NWR). Formal consultations on stocking of other native endangered fish species have provided a vehicle for agencies outside the Service to participate in species

recovery actions while providing for ongoing management actions on the surrounding lands and for management specific to the species.

Prior to the issuance of the intra-Service consultation form, findings of “no effect” were made for the bald eagle, American peregrine falcon, Yuma clapper rail, brown pelican and critical habitat for the razorback sucker. Findings of “may affect, not likely to adversely affect” were made for the razorback sucker and bonytail chub populations on the Cibola NWR. The Arizona Ecological Services Office concurs with those “may affect, not likely to adversely affect” findings.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Cibola NWR, in coordination with the AzFRO in Parker, Arizona, developed a plan to create an artificial pond habitat on the refuge to establish a refugium population of desert pupfish. The pond is located near the refuge headquarters and is approximately 35 by 30 feet and varies in depth from 4 feet to 1.5 feet. Water would be provided from a non-chlorinated well. The pond is approximately 2 miles from the Colorado River.

The proposed action of stocking the desert pupfish would be accomplished between May 1 and August 1, 1999. Water will be in the pond prior to the stocking, and water quality will have been monitored, including use of a surrogate fish species to ensure the water quality is suitable.

The desert pupfish that would be stocked in the refugium are derived from stocks taken in the early 1970's from marshes near the town of El Doctor in Sonora, Mexico. The current stock is held at the Phoenix Zoo and would contribute 200 individuals for the proposal. This stock has been examined for fish health concerns by the Service and is disease free. Transport from Phoenix to Cibola NWR will take approximately 6 hours. Fish will be transported in plastic bags containing supplemental oxygen and tranquilizing chemicals. Fish will be acclimated to the refugium's water temperature prior to release. A subset of the 200 individuals will be weighed and measured prior to release.

Once established on Cibola NWR, the desert pupfish population will be monitored bi-annually to determine the status of the population. Lengths, weights, population size estimates, and characterization of the age structure will be accomplished by mark and recapture methods. Marking will be done using fin clipping. No additional stocking to this population is envisioned.

The purpose of the refugium is to provide another replicate for the El Doctor population and to promote public awareness of the species as a part of the natural history of the Colorado River. In the future, individuals from this refugium could be used for reintroductions or augmentations of

existing Arizona populations of the species, but will require additional consultation prior to any such actions.

STATUS OF THE SPECIES (RANGEWIDE)

The desert pupfish was listed as an endangered species, with critical habitat, on April 30, 1986 (USFWS 1986). The name “desert pupfish” is often incorrectly applied to all 10 pupfish species in the American Southwest (Williams *et al.* 1989, Pister 1996). There are two recognized *Cyprinodon macularius* subspecies; *C.m. macularius* and *C.m. eremus* and one undescribed form (McMahon and Miller 1985, Miller and Fuiman 1987). Critical habitat has been designated in Arizona at Quitobaquito Spring, and in California along parts of San Felipe Creek, Carrizo Wash, and Fish Creek Wash (USFWS 1986).

The following section briefly describes the biology and historic/present distribution of the desert pupfish. Unless otherwise cited, information provided herein was taken from the 1993 Desert Pupfish Recovery Plan (USFWS 1993) Additional information on the desert pupfish may be found in that document. The desert pupfish is a member of the family Cyprinodontidae. Desert pupfish are usually less than 3.0 inches total length; adults are more often 1.6 to 2.0 inches. Males are larger than females and become bright blue during the breeding season.

Under the proper conditions, desert pupfish may begin breeding as early as six weeks of age. However, most breeding does not occur until their second summer (Moyle 1976). Male pupfish are intensely territorial during the breeding season. The males patrol and defend individual territories that are 5.4 to 22 square feet and in water less than 3 feet deep (Barlow 1961, Minckley 1973, Moyle 1976). Female desert pupfish lay only one egg at a time (Constanz 1981) but may produce 50 to 800 eggs in a season (Crear and Haydock 1971). The life span of an individual is one to 3 years in the wild (Minckley 1973, Moyle 1976, Kynard and Garrett 1979).

Desert pupfish have been found in a variety of habitats and can withstand conditions that are lethal to most other fishes. They can survive temperatures up to 113°F (Lowe *et al.* 1967), dissolved oxygen concentrations to 0.1 to 0.4 milligram per liter (Barlow 1958), and high salt concentrations of 68 grams per liter (Lowe *et al.* 1967).

Historical distribution of the desert pupfish included the Gila River basin, the lower Colorado River, the Rio Sonoyta basin, the Salton Sink basin, and the Laguna Salada basin. Thirteen natural populations persist; 9 of these are in Mexico. Approximately 20 transplanted populations have been established in Arizona. Threats to the species include loss and degradation of habitat through groundwater pumping or diversion, predation and competition from non-native fish species, restricted range, small population sizes, and environmental contaminants (USFWS 1984). In addition, establishment of populations outside the historic range and populations with questionable genetic purity complicate recovery actions.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

The desert pupfish has been extirpated from aquatic habitats associated with the lower Colorado River in Arizona. Diversions, control of flows by dams, channelization and subsequent isolation and elimination of backwaters have massively altered the physical face of the lower Colorado River. In addition, non-native fish species have become entrenched in the system. Physically suitable habitat remains for the desert pupfish along the lower Colorado River, however, the species has not been recently recorded from the project area.

Cibola NWR was established as a mitigation refuge for loss of riparian, marsh and aquatic habitats due to channelization activities on the lower Colorado River. Habitats for riparian dependent bird species, waterfowl and marsh birds and native endangered fish species are found on the refuge. Cibola NWR has a water right for Colorado River water and this is used in a variety of ways to create fish and wildlife habitats. Ongoing efforts to provide habitats for aquatic, marsh and riparian species at old meanders are funded by private and Federal partnerships.

EFFECTS OF THE ACTION

Establishment of a new refugium population of the desert pupfish on Cibola NWR will provide a replicate of the existing El Doctor captive stock. In addition, this will be the only desert pupfish refugium on the lower Colorado River in the United States, historic habitat for the species. This stock is also the likely correct one for this area, derived as it is from fish captured in the Mexican reaches of the Colorado River and its associated marshes.

There will be no adverse effect to the original wild stock of El Doctor pupfish, since the Cibola NWR fish will be taken from the captive stock held at the Phoenix Zoo. The latter population is large enough to withstand the removal of 200 individuals and adverse effects to the significantly larger source population would not be expected.

Populations of desert pupfish maintained in artificial refugium can provide benefits to information and education goals of the recovery plan. Cibola NWR does not receive the level of visitation some more accessible refuges have, but especially during the winter months, people from all over the United States and Canada visit the lower Colorado River area. Additionally, there is local visitation for hunting, fishing and other recreational activities.

The Cibola NWR desert pupfish population will not directly contribute to the establishment of the populations in the wild needed for downlisting or delisting. It may be possible in the future to use individuals from the Cibola NWR population to establish populations in the wild, however, this stock has been isolated from other pupfish for numerous generations. Tests for genetic integrity would be needed before the population could be used for reintroductions.

Effects to the individual desert pupfish to be used in the establishment of the Cibola NWR population are related to transport, handling and habitat conditions. Transport of the 200 individuals from Phoenix, Arizona to Cibola NWR would be done using the appropriate protocols for handling native fish species, however, there is always a potential for mortality. The individuals and their descendants will be the subject of monitoring activities that will involve capture and handling of the fish, as well as marking them by fin clipping. These types of activities are stressful and mortalities may occur.

The new pond at Cibola NWR has not been used before and water quality parameters have not been fully established for the site. Summer temperatures along the lower Colorado River are extremely high, and shallow waters not protected from the sun can achieve near lethal temperatures for fish and other aquatic life. The desert pupfish is perhaps more adapted to withstand these harsh conditions than are fish not native to the lower Colorado River basin. That does not mean that high temperatures, low dissolved oxygen, or other water quality problems would not result in mortalities. There are additional risks from being in an outside environment. Fish eating birds such as herons and cormorants are likely to forage in the pond. Predatory invertebrates such as crayfish and dragonfly nymphs are also likely to be present in a functioning pond habitat. Although protected by its proximity to refuge headquarters, there is a risk of visitors introducing toxic materials to the pond that could kill some or all of the fish present.

Ongoing management activities at Cibola NWR for waterfowl, migratory birds, and rearing of bonytail and razorback suckers for release to the Colorado River are not expected to have any effect on the desert pupfish refugium.

No interdependent or interrelated actions have been identified for the proposed action.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

No cumulative effects are expected to occur in the action area. The land and water belong to the Federal government and are not affected by non-Federal actions in ways that would have additional effects on the desert pupfish.

CONCLUSION

After reviewing the current status of the desert pupfish, the environmental baseline for the action area, the effects of the proposed creation of a refugium population, and the cumulative effects, it is the Service's biological opinion that the establishment of a refugium population of desert pupfish on Cibola NWR is not likely to jeopardize the continued existence of the desert pupfish. Critical habitat for this species has been designated, however, this action does not affect those areas and no destruction or adverse modification of that critical habitat is anticipated.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Cibola NWR so that they become binding conditions of any grant or permit issued to an applicant, if appropriate, for the exemption in section 7(o)(2) to apply. The Cibola NWR has a continuing duty to regulate the activity covered by this incidental take statement. If Cibola NWR (1) fails to assume and implement the terms and conditions or (2) fails to require an applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Cibola NWR must report on the progress of the action and its impact on the species as specified in the incidental take statement [50 CFR§402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

The Service anticipates some individual desert pupfish could be taken as a result of the proposed activity. This take will be in actual mortality (kill) as a result of transport, handling, water quality problems at the pond or predation by piscivorous predators. The specific number of

individuals is not possible to determine at this time owing to the ways the take may occur. In a worst case scenario, it is possible that all of the 200 individuals used to found the population, and any successive generations, may be killed by some activity associated with the proposed action. Some of the take may be difficult to detect if mortality is delayed and carcasses not observed.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the take of desert pupfish.

1. Measures to reduce the risk of handling mortality will be put into place.
2. Measures to reduce the risk of habitat related mortality will be put into place.
3. Measures to reduce potential long term losses of pupfish will be put into place.

Measures 1 and 2 are focused on the known opportunities for take and defining ways to reduce the risk of this take occurring. Measure 3 is more focused on maintaining the population at Cibola NWR without having to bring in more fish to replace those lost to mortality. This would not affect any additional introductions to improve the genetic standing of the population.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, Cibola NWR must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The Cibola NWR will provide to the Arizona Ecological Services Office (AESO) a copy of all monitoring data gathered in the evaluation of the population status. Each year, a report of observed mortality, water quality parameters, and any other identified problems shall be made to the AESO.

All recovered mortalities will be preserved in such a manner to allow future use as genetic or other suitable research specimens.

To implement reasonable and prudent measure 1:

1. Provide for proper handling of individuals on trip to Cibola NWR from Phoenix. This may include aeration, sedative drugs or other appropriate techniques.
2. All handling of individuals for transport or subsequent monitoring shall be done under the guidance of a qualified fishery biologist. A handling protocol that has the individual fish captured, handled and processed, and released in a short time period should be developed.
3. All proposals to do research on this desert pupfish population shall be evaluated for the potential effect to individuals in the population. Proposals that would result in significant mortality, direct or indirect, should not be allowed without additional consultation.

To implement reasonable and prudent measure 2:

1. Habitat conditions will be monitored on the appropriate schedule to detect potential problems with temperature, oxygen or other critical water quality parameters before a significant mortality occurs. This more intensive monitoring shall last over at least two summers.
2. Observation of avian predators, and monitoring of large aquatic invertebrate predators shall be part of the established monitoring of the desert pupfish population.
3. Interpretive signage around the refugium shall discourage visitors from throwing things into the pond.

To implement reasonable and prudent measure 3:

1. After the initial stocking, the pond will be examined each morning for at least 60 days to observe any mortalities. In the event that more than 50 percent of the desert pupfish stocked into the pond die within the 60 days, no additional stockings would be done until the reason for the mortalities is determined and corrected. Such additional stockings may require additional consultation.
2. If, at any time, more than 75 percent of the total population in the pond is lost within a short time frame (less than one week), the reason for the loss will be determined before any additional stocking would occur.
3. If habitat or predators is found to be the reason for excessive mortalities, corrective measures must be taken before additional stockings of desert pupfish can be contemplated.

The Service believes that an unknown number of desert pupfish will be incidentally taken as a result of the proposed action. This level may reach to the size of the entire population. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take

represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of threatened and endangered species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

It is recommended that management actions that would enhance the desert pupfish population at Cibola NWR or provide opportunities to utilize stock from this population for reintroduction efforts be identified for use in implementing terms of the recovery plan.

It may be appropriate for Cibola NWR to consider requesting a modification of their existing endangered species permits to cover the presence of the desert pupfish on the refuge and to address any specific issues that are not covered in this consultation that may develop over time.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR§402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate the efforts to provide habitats for listed fish species shown by Cibola NWR. If there are questions, please contact Lesley Fitzpatrick (x236) or Tom Gatz (x240).

/s/ David L. Harlow

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (PARD-ES; GARD-AZ/NM)
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