Supplemental Finding for the Leon Springs pupfish (*Cyprinodon bovinus*) Recovery Plan

Original Approved: August 14, 1985
Original Prepared by: Rio Grande Fishes Recovery Team

For
U.S. Fish and Wildlife Service
Southwest Region
Albuquerque, New Mexico

June 2019

Approved: ____V____DRAFT_____ Date: 7/25/19
Regional Director, Region 2
U.S. Fish and Wildlife Service

BACKGROUND INFORMATION

Section 4(f)(1)(B)(ii) of the Endangered Species Act (Act) requires that each recovery plan shall incorporate, to the maximum extent practicable, "objective, measurable criteria which, when met, would result in a determination…that the species be removed from the list." It is possible that for some species, however, delisting cannot be foreseen at the time a recovery plan is written. In some rare cases, the best available information is so seriously limited that it is truly not possible to identify delisting criteria. This would be an unusual case, such as one in which the species' threats are not understood well enough to identify priorities and appropriate actions to remove (or offset) the threats. For example, the natural habitat may have been so reduced for an endangered species that captive propagation and active management is necessary for the life of a reasonable recovery plan. In another example, the population of a long-lived, slow growing species may be so depleted that possible recovery may be beyond the life of a reasonable recovery plan.

A 2006 Government Accountability Office (GAO) audit of the National Marine Fisheries Service's (NMFS) and U.S. Fish and Wildlife Service's (USFWS) endangered species recovery programs recommended that the Secretaries of the Department of Commerce and the Interior direct their staff to ensure that all new and revised recovery plans have either recovery criteria evidencing consideration of all five delisting factors or a statement regarding why it is impracticable to do so (GAO 2006). Since the 2006 GAO audit, we have updated our recovery planning and implementation guidance (NMFS and USFWS 2010), and new plans have included determinations regarding the feasibility or possibility of incorporating delisting criteria related to each of the five factors, as recommended by the GAO. Active recovery plans remain, however, that lack delisting criteria and contain either an incomplete determination regarding the practicability of incorporating delisting criteria, or are silent about the absence of delisting criteria in the recovery plan. In this document, we clarify why it remains impracticable to incorporate delisting criteria for the Leon Springs pupfish in the Leon Springs Pupfish Recovery Plan (Recovery Plan).

METHODOLOGY USED TO COMPLETE THE FINDING

This review was conducted by Austin Ecological Services Field Office (ESFO) staff using information from the original listing of the Leon Springs pupfish under the Act (45 FR 54678), the 1985 Recovery Plan (USFWS 1985, entire), the Leon Springs pupfish 5-year status review (USFWS 2013, entire), and other published and unpublished sources, as listed below.

FINDING

The Leon Springs pupfish is only known to occur in a single spring fed system (Diamond Y Spring system) in Pecos County, Texas. The best available information indicates that the primary threats to the Leon Springs pupfish are 1) habitat loss from the potential loss of spring flow due to a decline in groundwater levels, 2) egg predation by the Pecos gambusia (*Gambusia nobilis*), 3) habitat loss due to the encroachment of bulrush into the species habitat, 4) hybridization with introduced species, primarily the sheepshead minnow (*Cyprinodon variegatus*), and 5) potential contamination of habitat from local oil and gas activities, all of which are compounded by the small size of the pupfish population in the wild (USFWS 2013, p. 19). Loss of suitable habitat due to bulrush encroachment and egg predation by the Pecos gambusia are relatively new threats to the species not originally addressed in the 1985 Recovery Plan.

The information reviewed does not indicate that impacts to spring flows from a significant increase in groundwater use or declines in recharge are imminent (defined here as likely to occur in the next 15 years). However, diminished spring flows could occur over the next 50 to 100 years as a result of climate change or to meet increased human needs for more water resources (USFWS 2013, p. 20). The magnitude of impact on the Leon Springs pupfish if this threat were realized is extremely high; the range of the species is limited to a small, isolated location, and habitat modification due to a decline in spring flows could result in its extinction in the wild.

The threat of egg predation during breeding events from the Pecos gambusia is high and ongoing, and the magnitude of the impact of this threat on the species is also high (Itzkowitz 2010, p. 5). Loss of suitable breeding habitat locations within the Diamond Y Spring system primarily due to bulrush encroachment has decreased numbers of pupfish males defending spawning territories. This has increased numbers of Pecos gambusia intruding into these territories and consequently, has increased egg predation and in some cases caused complete spawning failure (Gumm *et al*. 2008, p. 655). Additional threats include habitat modification from water quality degradation, local habitat changes, and the introduction of a disease, parasite, or non-native species.

Climate change is another source of potential threats to the species (USFWS 2013, p. 20). All possible impacts associated with future climate change cannot presently be reliably predicted. However, accelerating climate change could exacerbate any of the threats already considered or result in new threats not conceived at this time. Either way, subtle but significant changes in the ecosystem of the Leon Springs pupfish resulting from climate change, such as potential ground water loss, reduced spring flows, or lack of significant aquifer regeneration in the foreseeable future (50 to 100 years) could cause the species' extinction in the wild due to habitat loss and presents a high magnitude threat.

All of these threats must be considered in the context of a fish with an extremely small range, no opportunity for natural movement (relocation), a small population size, and a short life span of less than two years. Therefore, the magnitude of impact of any potential threat or future stochastic event is exceptionally high. Any events negatively affecting the species or its habitat could result in extinction of the Leon Springs pupfish in the wild. The species has been considered completely extirpated from the wild once since the original 1980 listing due to introgression with sheepshead minnows in the late 1980s and early 1990s, requiring eradication efforts and restocking with genetically pure individuals from the refugia population at the Southwestern Native Aquatic Resources and Recovery Center in Dexter, New Mexico.

Development of Quantifiable Delisting Criteria "Not Practicable" Finding

The Recovery Plan does not contain delisting or downlisting criteria. The goal and prime objective of the Recovery Plan is to improve the status of the Leon Springs pupfish to the point that survival is secured and viable populations of all morphotypes are maintained in the wild (Service 1985, p. 11). This goal and objective has not been met. The Leon Springs pupfish faces multiple imminent, high magnitude threats, and its entire range is limited to one small spring system. Any decreases in spring flow rates or any future events that negatively impact the pupfish could easily result in the complete loss of the species in the wild. There are no current existing regulatory mechanisms in place which have any meaningful impact or control over the quantity of water being pumped or removed from the aquifers which support the spring system the species depends on. In addition, there are no currently known suitable areas available where the pupfish can likely be established because it is a very narrow habitat specialist.

The Leon Springs pupfish recovery team acknowledged in the Recovery Plan that while it may be possible to eventually downlist the species, due to the restricted areas of natural occurrence and continual declining water flow from the springs supporting the habitats of this species, it will likely never be delisted. Since recovery plan development, several of the known existing threats such as spring flow declines and oil and gas development have increased in magnitude (USFWS 2013, p. 13), and several new threats such as loss of habitat due to bulrush encroachment, egg predation by the Pecos gambusia, invasive snails and their associated gill parasites, and climate change are additional threats to the species that were never considered by the recovery team (USFWS 2013, pp. 15-20).

Therefore, due to the extreme limited range of the species, unmitigated current and future threats to survival, and lack of suitable habitats within the historic range that this species could be reintroduced into, the development of meaningful quantifiable delisting recovery criteria is not practicable at this time.

REFERENCES

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