

**Sonora Chub/Charalito Sonorense
(*Gila ditaenia*)
5-Year Review:
Summary and Evaluation**



Photo credit: J. Rorabaugh/U.S. Fish and Wildlife Service (Retired)

**U.S. Fish and Wildlife Service
Arizona Ecological Services Office
Phoenix, Arizona
August 2022**

5-YEAR REVIEW

Sonora chub (*Gila ditaenia*)

1.0 GENERAL INFORMATION

1.1 Listing History

Species: Sonora chub (*Gila ditaenia*)

Date listed: April 30, 1986

FR citation(s): 51 FR 16042

Classification: Threatened

Critical habitat/4(d) rule/Experimental population designation/Similarity of appearance listing: 51 FR 16042 (critical habitat and 4(d) rule concurrent with listing)

1.2 Methodology used to complete the review:

In accordance with section 4(c) (2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a 5-year review is to assess each threatened species and endangered species to determine whether its status has changed, and it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants.

The U.S. Fish and Wildlife Service (Service) most recently evaluated the biology and status of the Sonora chub as part of a status review concluded on August 16, 2013. We examined whether new information was available and whether that new information would alter or affect analyses and conclusions made in the previous status review. Data for this current review were solicited from interested parties through a Federal Register notice announcing the review on February 2, 2022. We also contacted the Arizona Game and Fish Department (AGFD) to request any data or information we should consider in our review. Additionally, we conducted a literature search and a review of information in our files.

The announcement that the Sonora chub was under active review appeared in the Federal Register (FR) on February 2, 2022 (87 FR 5834; Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews of 35 Species in the Southwest).

2.0 REVIEW ANALYSIS

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of “endangered species” or “threatened species.” The Act defines an “endangered species” as a species that is “in danger of extinction throughout all or a significant portion of its range,” and a “threatened species” as a species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act requires that we determine whether a species meets the definition of “endangered species” or “threatened species” due to any of the five factors described above.

The identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an “endangered species” or a “threatened species.” In assessing

whether a species meets either definition, we must evaluate all identified threats by considering the expected response of the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species—such as any existing regulatory mechanisms or conservation efforts. The Service recommends whether the species meets the definition of an “endangered species” or a “threatened species” only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

2.1 Distinct Population Segment (DPS) policy (1996):

Not applicable.

2.2 Updated Information and Current Species Status

2.2.1 Critical Habitat Petition:

The Service has received photographic documentation of livestock and their purported effects to habitat for Sonora chub within a petition to revise Sonora chub critical habitat (Center for Biological Diversity 2021) to include California Gulch. The Service evaluated the information provided in the petition and found that it did not present substantial scientific information demonstrating that California Gulch is essential to the conservation of Sonora chub (Service 2022). Therefore, the Service is not proceeding with a revision of critical habitat.

2.2.2 Biology and Habitat:

The biology, life history, and status of the Sonora chub and its critical habitat remain largely as described in the 2013 5-Year Review (Service 2013). The species occurs in southern Arizona and in northern Sonora, Mexico. No scientific publications on the biology of the Sonora chub have been published since the 2013 5-Year Review, but field notes inform the species’ status.

The Coronado National Forest (CNF) has provided multiple annual monitoring reports since the 2013 5-Year Review (CNF 2013, 2020a, 2020b, and 2021). The CNF noted Sonora chub were present in California Gulch in April, May, and August 2012 (CNF 2013). The CNF reported on activities to conserve Sonora chub from 2014 to 2021 (CNF 2020a and 2020b), but did not report on the presence of Sonora chub other than stating no dead or dying individuals were observed. All three reports stated that international border security issues make it difficult to monitor populations of this species.

The AGFD reports on Sonora chub presence at more frequent but irregular intervals. Sonora chub were noted in Sycamore Canyon in 2007 (Nate Berg pers. comm. 2022). Sonora chub were detected in three pools at Casita Spring (protected spring run that feeds into Sycamore Canyon near the Mexican border) in 2017 (Hunter McCall pers.

comm. 2017). Sonora chub were noted in Sycamore Canyon- one of the species' mainstem habitats in the United States - on site visits in 2019 and 2022 (Elizabeth Grube pers. comm. 2022a), but fish were absent from dry reaches of Peñasco Canyon and an unnamed tributary (Elizabeth Grube pers. comm. 2022b). No Sonora chub were detected in sampling of California Gulch in June of 2022, although the pools sampled by AGFD may have only recently become inundated by rains (Elizabeth Grube pers. comm. 2022b). International border security issues were noted by AGFD as further complicating efforts to monitor populations of Sonora chub.

Service staff have also reported on the presence of Sonora chub. Numerous individuals were noted in a large pool in Sycamore Canyon in May 2014 (Cat Crawford pers. comm. 2014a) and at a Tarahumara frog (*Lithobates tarahumarae*) release site, also in Sycamore Canyon, in October 2014 (Cat Crawford pers. comm. 2014ba).

Post-2013 detection data for Sonora chub in Mexico also exists. A 2015 collection from the Rio Cocospera at Rancho El Aribabi in Sonora (Doug Duncan pers. comm. 2022 and James Rorabaugh pers. comm. 2022) was the source of the cover photograph to this document. Sonora chub was again detected in the Rio Cocospera in 2017, in two Rio Cocospera locations in 2022, and in the Rio Bambuto in 2022 (Doug Duncan pers. comm. 2022). It is likely border security issues confound Sonora chub survey efforts south of the International Boundary as they do along the border in Arizona.

2.2.3 Threats Analysis (threats, conservation measures, and regulatory mechanisms):

The specific threats associated with the present or threatened destruction, modification, or curtailment of its habitat or range (Factor A) include mining, roads and infrastructure, fire, and border activities; these have not changed since the 2013 5-Year Review.

Grazing also remains as described in the 2013 5-Year Review. Biologists from AGFD noted cattle present in an enclosure at Casita Spring in 2022 (Ian Latella pers. comm. 2022), although the site visit was performed in the context of restoring Casita Spring and preventing additional cattle entry. We have not received annual monitoring data from the Coronado National Forest that would indicate the livestock grazing had affected the Sonora chub's status.

The specific threats posed by overutilization for commercial, recreational, scientific, or educational purpose include human fishing and unregulated transporting (Factor B) have not changed. The specific threats of disease or predation (Factor C) include Asian tapeworm (*Bothriocephalus acheilognathi*), non-native fishes, and bullfrogs (*Lithobates catesbeianus*) have also not changed, nor has the threat resulting from an inadequacy of existing regulatory mechanisms (Factor D).

The threats from other natural or manmade factors (Factor E) affecting Sonora chub's continued existence include border activities and climate change. The Service is not aware of substantive changes in border activities, other than construction of walls along portions of the International Boundary in 2019-2021, which likely increased cross-border traffic and the associated law enforcement response into non-Fenced areas near

California Gulch and Sycamore Canyon.

The threat posed by climate change (Factors A and E) has not changed and remains potentially severe. Increasing aridity has affected Hank and Yank's Tank - a structure that impounds the discharge from Yank's Spring - a Sonora chub locality in Sycamore Canyon previously known to be consistently occupied by the species. The site was found dry by AGFD staff in May 2017 (Hunter McCall, pers. comm. 2017). A site visit by AGFD staff in June 2022 found Hank and Yank's Tank filled with water to a depth of approximately 0.7 meter, but the tank contained no Sonora chub (Elizabeth Grube pers. comm. 2022b). Aridity has also affected California Gulch. Arizona Game and Fish staff sampled California Gulch in June 2022 and finding no fish, hypothesized that the stream had only become wetted due to runoff from recent rains and the United States reach was likely ephemeral (Elizabeth Grube pers. comm. 2022b).

These threats however have very low effects on the Sonora chub maintained at the Arizona-Sonora Desert Museum (ASDM), a refugial site outside of the species' range. The approximated number of individuals (between 400 and 500) at ASDM is a strong counterbalance to threats to the wild populations. If one of the threats described above extirpates a wild population, then the population at the Museum can be used to repopulate an area once the habitat is deemed suitable. The ASDM can also be used as a refugium if needed. This refugium population at the ASDM allows potential flexibility for recovery.

Hank and Yank's Tank, while found not to be occupied by Sonora chub in June 2022, may also serve as a refugium, as it has in the past. Arizona Game and Fish Department staff have noted that as drought conditions become more frequent, Sonora chub may be conserved by establishing a genetic refuge, with regular augmentations, and seeking out additional refuge waters. Casita Spring, mentioned briefly in the Threats Analysis above, would further allow for establishment of Sonora chub outside of the mainstems of Sycamore Canyon and California Gulch (Elizabeth Grube pers. comm. 2022b).

Current information on the specific population sizes in the two metapopulations within the U.S., habitat dynamics, population dynamics, and information on how to effectively address the threats to the species are unknown, but Sonora chub have remained present over the long term at varying levels of abundance. This information needs to be further researched, analyzed, and addressed to achieve recovery. The status of Sonora chub in Mexico is not definitively known but it remains present there as well. The remaining occupied sites can thus serve as sources for upstream and/or downstream recolonization during times when surface flows are elevated, and connections exist between source sites and temporarily unoccupied areas between Mexico and the U.S. (Hendrickson and Romero 1990, Carpenter and Maughan 1993).

Conservation measures remain as described in the 2013 5-Year Review (Service 2013). The aforementioned establishment of the captive population at the ASDM, and establishment of other captive populations, if possible, is the primary conservation measure taken to preserve this species since its listing. We do not know of any refugia or captive populations of Sonora chub in Mexico, nor do we know of any refugia or

captive populations of individual Sonora chub from Mexico.

Regulatory mechanisms to protect Sonora chub also remain as described in the 2013 5-Year Review (Service 2013). The majority of habitat occupied by Sonora chub within the U.S. exists within the CNF. Portions of Sycamore Canyon and its tributaries are critical habitat, and include the Pajarito Wilderness and Goodding Research Natural Area, each of which lends a high degree of administrative protection for the species. Land ownership patterns in México are variable, and the species has comparatively little administrative protection there.

2.3 Synthesis:

We have reviewed the best available scientific information, including the threats affecting the species under the factors in 4(a)(1) of the Act; the analyses of the status of the species in our 2013 5-Year Review; and potentially increased effects of livestock grazing, border activities, and climate change. It is our determination that the Sonora chub remains a threatened species.

3.0 RESULTS

3.1 Recommended Classification:

☐ **Downlist to Threatened**

☐ **Uplist to Endangered**

☐ **Delist** (*Indicate reasons for delisting per 50 CFR 424.11*):

☐ *The species is extinct*

☐ *The species does not meet the definition of an endangered species or a threatened species (i.e., is recovered, or new information on status and threats indicate species does not meet definitions)*

☐ *The listed entity does not meet the statutory definition of a species.*

☒ **No change is needed**

3.2 New Recovery Priority Number:

No change is needed; the Sonora chub should retain its 2C Recovery Priority classification.

Brief Rationale:

A 2C Recovery Priority classification is appropriate because the Sonora chub is a distinct species within a polytypic genus, existing under a high degree of constant threats, while maintaining a degree of recovery potential. The threats that the Sonora chub faces are constant and show little evidence of amelioration. The threat of drought and climate change has the potential to increase in severity. Furthermore, there is the potential that conflict due to increased water development to meet human needs will lower water availability and decrease quality of habitat.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

The 2013 5-Year Review recommended a series of additional measures for implementation. We again recommend the same measures, which are as follows:

- Develop, refine, and finalize a standardized survey protocol for the Sonora chub to provide a method for rigorous and repeatable species abundance surveys and determine population trends.
- Systematically survey species and habitat to evaluate population and physical habitat trends should be established under the direction of the current recovery plan (Service 1992) and should be implemented throughout the species' range in the U.S. and Mexico.
- Conduct studies with a focus on ecological factors that influence distribution, density-dependence issues, resource requirements for survival, demographic trends, population biology, and the amount and condition of suitable habitat.
- Model climate factors to a scale (i.e. the Río de La Concepción watershed) whereby changes in the biological and physical environment occupied by the Sonora chub can be ascertained. The uncertainty regarding climate change equates with an ecological risk to Sonora chub.
- Lastly, strengthen cooperative relationships with agencies and organizations in Mexico to facilitate studies and future recovery planning and implementation efforts for the Sonora chub.

5.0 REFERENCES

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U.S. FISH AND WILDLIFE SERVICE

5-YEAR REVIEW of SONORA CHUB (CHRALITO SONORENSE)

Current Classification:

Recommendation resulting from the 5-Year Review:

- ☐ Downlist to Threatened
- ☐ Uplist to Endangered
- ☐ Delist
- ☒ No change needed

Appropriate Listing/Reclassification Priority Number, if applicable:

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service, Arizona Ecological Services Office

Approve _____