# Zuni bluehead sucker
## *(Catostomus discobolus yarrowi)*

## 5-Year Review:
## Summary and Evaluation

**Zuni bluehead sucker, Rio Nutria. Photo by Angela Palacios U.S. Fish and Wildlife Service**

**U.S. Fish and Wildlife Service**
**New Mexico Ecological Services Field Office**
**Albuquerque, NM**

**5-YEAR REVIEW**
**Zuni bluehead sucker (*Catostomus discobolus yarrowi*)**

# 1.0 GENERAL INFORMATION

## 1.1 Listing History

**Species:** Subspecies, Fish, Zuni bluehead sucker (*Catostomus discobolus yarrowi*)

**Date listed:** July 24, 2014

**FR citation(s):** 79 FR 43131

**Classification:** Endangered

**Critical habitat/4(d) rule/Experimental population designation/Similarity of appearance listing**: Critical habitat designated June 7, 2016 in 84 FR 36113

## 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 List of Threatened and Endangered Wildlife and Plants. The U.S. Fish and Wildlife Service (Service) most recently evaluated the biology and status of the Zuni bluehead sucker (*Catostomus discobolus yarrowi*) as part of a listing rule conducted on July 24, 2014. For this 5-year review, we examined whether new information was available and whether that new information would alter or affect analyses and conclusions we 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 July 26, 2019. We searched the literature and information in our files. No new information exists for the species other than population monitoring data and reports (i.e. surveys) by the New Mexico Department of Game and Fish, the Service and the Navajo Nation Department of Fish and Wildlife (NNDFW), and thus the 5-year review process consisted of reviewing previous listing rules including the final listing rule (Service 2014) and designation of critical habitat (Service 2016), and monitoring reports (Gilbert 2015, Kitcheyan and Mata 2020, Kitcheyan 2020, NNDFW 2019).

## 1.3 FR Notice citation announcing the species is under active review:

The Federal Register Notice: 84 FR 36113-36116, published July 26, 2019, announced the active review of the Zuni bluehead sucker.

# 2.0 REVIEW ANALYSIS

## 2.1 Updated Information and Current Species Status

### 2.1.1 Biology and Habitat:

Our published final listing rule for the Zuni bluehead sucker (Service 2014) provides a detailed summary of the biology, habitat, trends and distribution. The range-wide distribution of Zuni bluehead sucker has been reduced by over 90 percent in New Mexico and the extent of range reduction in Arizona is uncertain (Service 2014). Zuni bluehead suckers are restricted to isolated locations within the Little Colorado and San Juan River drainages in Arizona and New Mexico. Locations of occupancy are mostly located on tribal lands on the Navajo Nation and Zuni Reservation. Annual surveys to monitor distribution and abundance of Zuni bluehead sucker has been ongoing in New Mexico, primarily on Forest Service lands, the Zuni Reservation, and private lands since 2004; however, sampling in Arizona on the Navajo Nation has been sporadic. These survey efforts have continued for the following Arizona populations on the Navajo Nation (Black Soil Springs, Kinlichee Creek and Scattered Willow Wash) and New Mexico populations (Agua Remora, Rose Springs [formerly Tampico Springs], Rio Nutria and Tampico Draw).

**Arizona Populations (Black Soil Springs, Kinlichee Creek and Scattered Willow Wash)**

The NNDFW continues to be proactive in the conservation and management of Zuni bluehead sucker. The NNDFW Fisheries Management Plan outlines management goals, objectives, and tasks to protect, conserve, and enhance native fish species on the Navajo Nation.

The NNDFW conducted population surveys in Black Soil Springs from 2015 through 2018; Kinlichee Creek in 2016 and 2017; and Scattered Willow Wash in 2016 (NNDFW 2019). These survey efforts have expanded upon previous work conducted by New Mexico Department of Game of Fish as described in the final listing rule (Service 2014). From the results of the increased survey effort, these populations appear to be in stable condition and there is evidence of reproduction and recruitment at all locations. However, survey efforts at some sites in Kinlichee Creek have only yielded adult Zuni bluehead sucker, which could indicate a lack of successful spawning, likely due to unsuitable habitat conditions. In addition, nonnative northern crayfish *(Orconectes virilis)* continue to be present in Kinlichee Creek. Their presence means that predation is a continuing threat and may also be a contributing factor to the absence of younger Zuni bluehead sucker in Kinlichee Creek.

As Secretarial Order 3206 states, “The Departments shall work directly with Indian Tribes on a government-to-government basis to promote healthy ecosystems”, this includes providing tribes adequate opportunities to participate in data collection. The NNDFW has been the leader in collecting data on Zuni bluehead sucker for their management efforts and these data are housed with the NNDFW. We rely on their data and expertise to keep us informed about the status of the Zuni bluehead sucker within the Navajo Nation (NNDFW 2019).

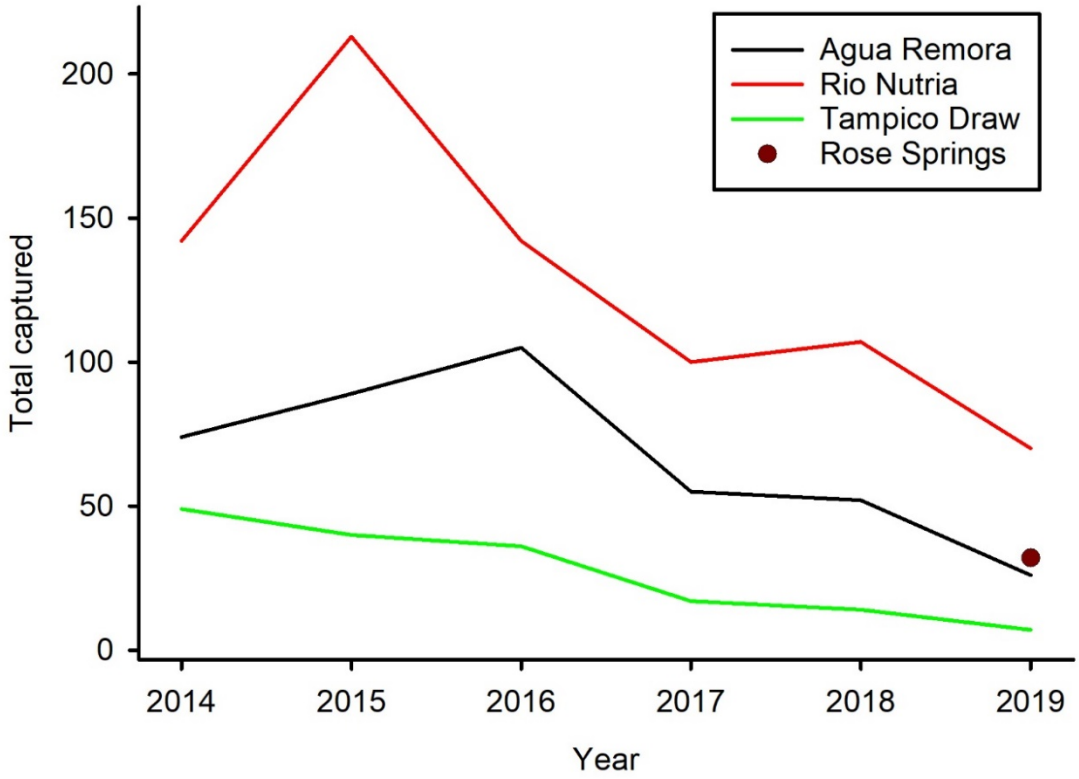


Figure 1. Zuni bluehead sucker count data collected (total fish captured) in New Mexico between 2014 and 2019 (Gilbert 2015, Kitcheyan and Mata 2020, and Kitcheyan 2020).

**New Mexico Populations (Agua Remora, Rose Springs (formerly Tampico Spring), Rio Nutria and Tampico Draw)**

In the final listing rule (Service 2014), we relied on catch per unit effort, or catch rates, to evaluate Zuni bluehead sucker population trends after 1991. Prior to 1991, the available data is limited. Catch rates were measured by the number of fish caught per second of electrofishing and provided a metric for evaluating population trends. This review continues that analysis from 2014 to 2019. In some cases, we make qualitative comparisons of fish numbers or evaluate presence or absence of Zuni bluehead sucker. While catch per unit effort is valuable for assessing trends over time, it does not allow us to estimate overall population.

For example, a 2014 survey at Agua Remora found eight Zuni bluehead sucker, a lower number than expected based on previous surveys. We decided to re-survey one-month later and found 74 individuals (Figure 1). Variability in Zuni bluehead sucker capture rates may be attributable to a combination of factors such as environmental conditions (e.g., instream cover, turbidity, substrate, etc.), water chemistry (e.g., conductivity), electrofishing settings, fish size, or surveyor skill.

Zuni bluehead suckers have persisted at Agua Remora since listing, with catch rates ranging from 0.014 per second to 0.106 fish per second (Figure 2). Catch rates in Agua Remora remained steady in 2016. After 2016 total numbers captured decreased by half in 2017 and remained below 100 individuals in 2018 (Figure 1). The population size distribution includes young-of-year, juveniles and adults, indicating that spawning and recruitment is occurring. Nonnative green sunfish (*Lepomis cyanellus*) and fathead minnows (*Pimephales promelas*) are also present at Agua Remora. Their presence means that predation and competition from nonnative fishes is a continuing threat.

Rose Springs (formerly Tampico Springs) located on private, new name was officially approved by the U.S. Board of Geographic Names (USBGN) as of October 11, 2018 (USBGN 2018). Access to survey Rose Springs has been limited, but access was granted in 2019 resulting a collection of 32 Zuni bluehead sucker (Figure 1). This collection is the lowest number of Zuni bluehead sucker collected since sampling has occurred at this location. We hope to continue working with the private landowner to continue monitoring this population in the future to assess the population trend over time.

Only a small portion of the Rio Nutria (below the confluence of Tampico Draw) is reported to evaluate trends and due to the lack of access for sampling on the Zuni Reservation. Rio Nutria continues to be the stronghold for the New Mexico populations of Zuni bluehead sucker and has the highest catch rates (Figure 2). However, total numbers of Zuni bluehead sucker captured, as well as catch rates decreased from 2015 to 2017. The population size distribution of the Zuni bluehead sucker, is similar to Agua Remora, indicating that young-of-year, juveniles and adults are present. There is also a small presence of fathead minnows.

Total numbers of Zuni bluehead sucker captured were lowest in Tampico Draw (Figure 1). Total numbers captured, as well as capture rates show a decreasing trend from year to year (Figure 1 and Figure 2). Low numbers of the smallest size distribution (< 50 millimeter [mm] standard length [SL]) were present in 2014 and 2015, indicating natural recruitment. However, this size class was absent in 2017 and 2018. The population size distribution is quite variable year-to-year based on whether each age class (young-of-year, juveniles and adults) is present (Kitcheyan and Mata 2020).

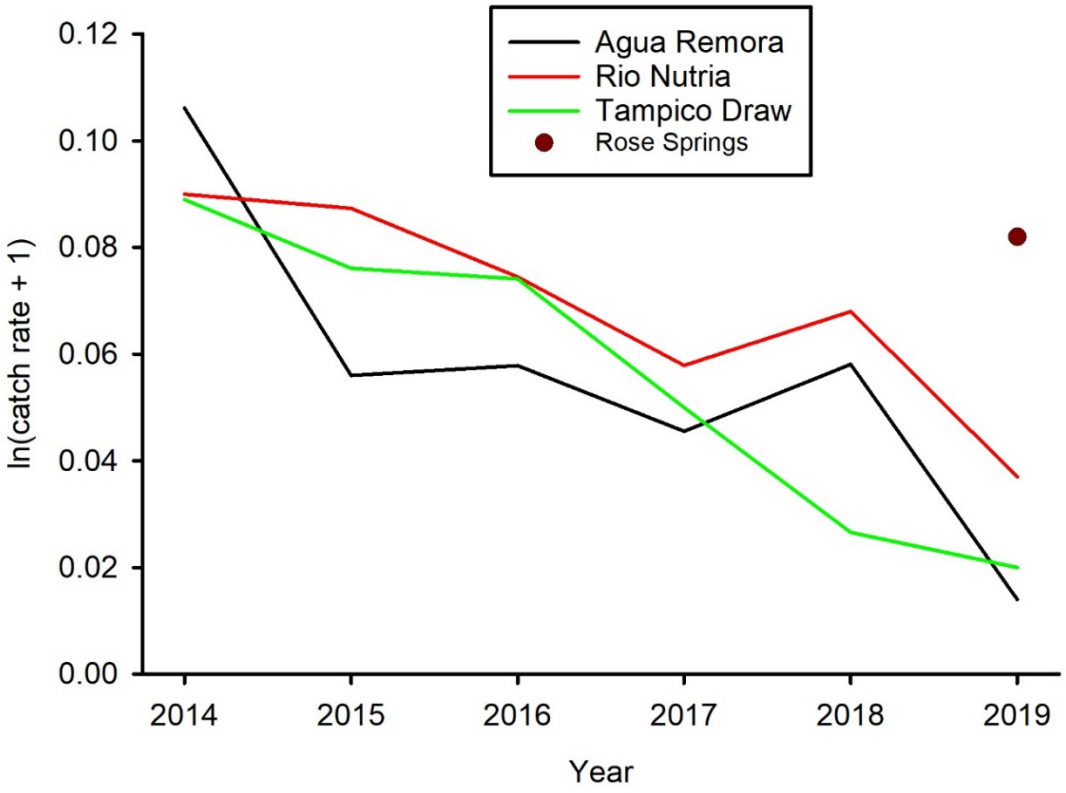


Figure 2. Catch per unit effort (CPUE) on a natural logarithm scale (catch rate = number of fish per second of electrofishing, metric = ln (catch rate + 1)) of Zuni bluehead sucker collected in New Mexico from 2014 and 2019 (Gilbert 2015, Kitcheyan and Mata 2020, and Kitcheyan 2020).

In summary, the Zuni bluehead sucker persists in all the locations identified above, and surveys show a general decline for populations within New Mexico. However, NNDFW has expanded survey efforts within occupied locations and these populations appear to be in stable condition. Both Arizona and New Mexico populations of Zuni bluehead sucker experience nonnative fish predation or competition and habitats are susceptible to drying and reduced water quality.

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

Here we summarize the threats affecting the Zuni bluehead sucker that were identified in the original listing rule, critical habitat rule and post-listing survey reports. The threats are based on observations of habitat changes and presence of nonnative predatory fish. For example, many of the Zuni bluehead sucker continue to be highly sensitive to change, whether it is the presence of nonnative species (Green sunfish, fathead minnows and northern crayfish) (Factor C), spring and stream flow input. With this information we completed a five-factor analysis as required under section 4(a)(1)

of the Act. The factor(s) that each threat satisfies is listed in parentheses; the five factors include: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) over-utilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; and (E) other natural or humanmade factors affecting its continued existence.

#### 2.1.2.1 Lack of Access for sampling in the Zuni Reservation and private lands (Factor A and D):

One of the continuing challenges in conserving the Zuni bluehead sucker is the lack of access for sampling the Rio Nutria population on the Zuni Reservation. We do have a partnership with the Zuni Tribe, but effective sampling methods do not align with Zuni cultural beliefs. On the Zuni Reservation we can make visual observation, but we lack permission to sample using electrofishing. This limits our ability to assess the current status of the species. The Rio Nutria population has been considered the stronghold for the species in New Mexico and this appears to be the case in the upper reaches of Rio Nutria, but numbers are unknown on the Zuni Reservation. In addition, access to survey Rose Springs has been limited but we are currently continuing to work with the private landowner to continue survey efforts from 2019.

#### 2.1.2.1 Hydrologic and Water Quality Changes (Factor A):

Catch rate declines may be attributable to a combination of factors such as water quality (e.g., oxygen depletion), drought, and predation. Frus et al. (2020) examined dissolved oxygen (DO) concentrations at, below, and upstream of the spring at Agua Remora and concluded DO concentrations below and at the spring provided optimal water quality conditions to support Zuni bluehead sucker. However, surface flows above the spring are intermittent with stagnate pools, with hypoxic and anoxic conditions (Frus et al. 2020). Monsoonal precipitation and spring runoff from snow melt can connect these pools mixing low DO water downstream into pools occupied by fish (Frus et al. 2020). This may explain why the Zuni bluehead sucker is often found in some, but not all pools, and why yearly catch rates and size structures fluctuate between years within Agua Remora and possibly to other locations that are spring-fed.

#### 2.1.2.1 Vegetation Encroachment (Factor A):

In addition to collecting fish survey data, habitat data is collected to characterize habitat conditions. We have been documenting the presence of cattails (*Typha* species) in Agua Remora since 2014. Cattails were dominant and showed upstream encroachment from 2017 to 2018 in the lower and middle pools of Agua Remora (Kitcheyan and Mata 2020). In 2019, cattails were observed for the first time in Tampico Draw and Rio Nutria (Kitcheyan 2020). The continued abundance of cattails is concerning because of its ability to rapidly colonize habitats and form monodominant vegetation stands (Bansal et al. 2019). *Typha*

invasion is associated with hydrologic alterations and increased sediment deposition (Bansal et al. 2019). *Typha* ability to eliminate of open-water zones (Bansal et al. 2019) could be detrimental to the amount of available habitat for Zuni bluehead sucker and alter the persistence of the species.

### 2.2 Synthesis:

The Act defines an endangered species as any species that is "in danger of extinction throughout all or a significant portion of its range" and a threatened species as any species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." After evaluating threats to the species and assessing the cumulative effects of the threats under the section 4(a)(1) factors, we conclude that the Zuni bluehead sucker is currently in danger of extinction throughout all of its range because of its limited geographic range, continuing population declines, and exposure of all populations to significant threats.

The range of this species was formerly widespread within the Little Colorado and San Juan River drainages in Arizona and New Mexico. Over the years, the range-wide distribution of Zuni bluehead sucker has been reduced by over 90 percent (Service 2014). Factors contributing to these declines are habitat loss and degradation from sediment deposition related to wildfires, dewatering, impoundments, housing development, and nonnative predators, climate change impacts including reduced water availability and higher water temperatures continue to be a threat. The species' range has been significantly reduced, and the remaining habitat and populations are threatened by a variety of factors acting in combination to reduce the overall viability of the species. The risk of extinction is high because the remaining populations are small, isolated, and have limited potential for recolonization. This species is extremely vulnerable to environmental changes and cannot relocate without intervention by conservationists. Our ability to conserve the species is limited by lack of access to populations on private and tribal lands.

## 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.*
__X__**No change is needed**

### 3.2 New Recovery Priority Number: 6

**Brief Rationale:**
We recommend assigning a recovery priority number of 6 during this review because a

Recovery Plan has not been developed for this subspecies. The designation of recovery priority number of 6 indicates a high degree of threat and low recovery potential for a subspecies. The extreme isolation of this subspecies and the lack of consistent access to survey populations limits our ability to assess the current status of the species. By not fully understanding the current status of the species, our ability to determine conservation needs to protect Zuni bluehead sucker decreases. Other threats include the continued presence of nonnative species and habitat encroachment by cattails. Collectively, all these issues indicate that the magnitude of risk to this subspecies is high. We conclude that recovery potential is low because the subspecies is a narrow endemic restricted to springs, perennial and intermittent streams in an arid region, and the potential for range or population expansion is limited.

### 3.3 Listing and Reclassification Priority Number:

Reclassification is not recommended

**Reclassification (from Threatened to Endangered) Priority Number: ____**
**Reclassification (from Endangered to Threatened) Priority Number: ____**
**Delisting (Removal from list regardless of current classification) Priority Number: ___**

**Brief Rationale:** Zuni bluehead sucker continues to meet the definition of endangered.

## 4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

1. Continue cooperative efforts with all partners (U.S. Forest Service, New Mexico Department of Game and Fish, The Nature Conservancy, Zuni Tribe, and Navajo Nation) to annually monitor Zuni bluehead sucker populations and stream habitats.

2. Continue to collaborate with private landowners to assess additional sites within the Rio Nutria and Tampico drainages.

3. Identify and assess other potential areas within the Zuni bluehead sucker historical range, such as Little Water Canyon, to determine presence, evaluate current habitat conditions, and document any physical, biological, environmental, and chemical factors that may inhibit the species persistence.

4. Depending on the availability of suitable habitat conditions, consider using the captive-reared population from the Albuquerque BioPark to extend or enhance the Zuni bluehead sucker current range.

5. Consider augmenting wild populations with captive-reared individuals from the Albuquerque BioPark; if appropriate.

6. Seek alternative captive refugia, such as Navajo Nation Tribal Hatchery, New Mexico Fish and Wildlife Conservation Office holding tanks, etc. that could serve as alternative sub-hatchery facilities to house Zuni bluehead sucker populations before the onset of catastrophic events.

7. Continue to monitor the encroachment of cattails in the Agua Remora and collaborate with Cibola National Forest to derive and implement strategic efforts to eradicate cattails in the Agua Remora reach.

8. Continue nonnative removal efforts of green sunfish in Agua Remora to alleviate predatory impacts to Zuni bluehead sucker.

9. Seek funding to aid with expenses associated with collection and analyses of Environmental DNA (eDNA) samples collected from various locations currently or historically occupied by Zuni bluehead sucker.

10. Consult with Zuni Fish and Wildlife Department to propose eDNA as an alternative non-lethal sampling technique on the Zuni Reservation. If approved and accepted by the Zuni Tribe, correspond with U.S. Forest Service to utilize their sampling protocol and techniques to collect water samples in Rio Pescado, Rio Nutria, and Zuni River to determine Zuni bluehead sucker presence.

11. Formulate an emergency contingency salvage plan for Zuni bluehead sucker, in case of catastrophic events (e.g., drought, fire, etc.). Such a plan would outline procedures and protocols for rescuing, handling, transporting, holding facility, lead agency, partner involvement, roles and responsibilities, funding, etc.

12. Formulate a Recovery Team composed of Tribal, State, Federal, and non-governmental partners) to develop a recovery plan for Zuni bluehead sucker.

## 5.0 REFERENCES


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**U.S. FISH AND WILDLIFE SERVICE**

**5-YEAR REVIEW of** Zuni bluehead sucker (*Catostomus discobolus yarrowi*)

**Current Classification**: Endangered

**Recommendation resulting from the 5-Year Review**:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
__X__ No change needed

**FIELD OFFICE APPROVAL**:

**Lead Field Supervisor, Fish and Wildlife Service, New Mexico Ecological Services Field Office**

Approve SHAWN SARTORIUS Digitally signed by SHAWN SARTORIUS Date: 2020.09.30 12:08:43 -06'00'