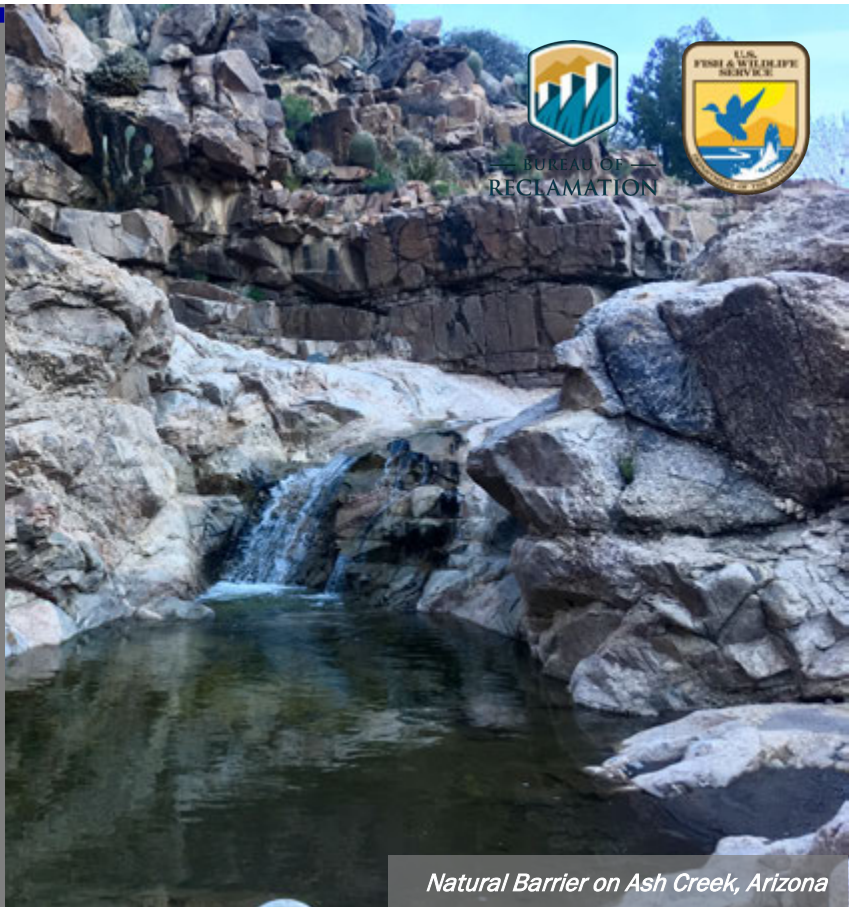


## RESTORATION

# Green Sunfish Eradication to Restore Native Aquatic Species in Ash Creek, Arizona



Ash Creek, located in west-central Arizona, is a tributary to Trout Creek in the Bill Williams River drainage. It is home to a diverse array of native fishes, reptiles, and amphibians yet also contains a population of non-native Green Sunfish (*Lepomis cyanellus*). To protect its native species, biologists from Arizona Game and Fish Department (AGFD) and U.S. Fish and Wildlife Service (FWS) are mechanically removing Green Sunfish from Ash Creek. Once Green Sunfish are eradicated, Ash Creek will contain three miles of sunfish-free habitat to support native fish recovery.



Natural Barrier on Ash Creek, Arizona

## KEY ISSUES ADDRESSED

Green Sunfish threaten the unique assemblage of native species in Ash Creek. In systems that contain non-native Green Sunfish in the desert Southwest, Green Sunfish often outcompete populations of native aquatic species. Green Sunfish also have high-reinvasion potential, as they easily evade removal efforts and have high reproduction rates, making control efforts difficult for managers. Due to decreases in native fishes like Roundtail Chub (*Gila robusta*), Sonora Sucker (*Catostomus insignis*), Desert Sucker (*Catostomus clarkii*), and Speckled Dace (*Rhinichthys osculus*) in Ash Creek, managers have focused their efforts on Green Sunfish control and have conducted mechanical removal in Ash Creek since 2017.

## PROJECT GOALS

- Conduct a baseline inventory of Green Sunfish in Ash Creek
- Eradicate Green Sunfish from 8 km of intermittent stream in Ash Creek and ~4 km in East Ash Creek above a natural waterfall barrier
- Restore native fish populations including Roundtail Chub, Sonora Sucker, Desert Sucker, and Speckled Dace

## NATIVE SPECIES RECOVERY

Since conducting Green Sunfish removals in Ash Creek, biologists have documented an increase in leopard frogs, woodhouse toads, and juvenile native fish diversity each year.



*Backpack Electrofishing in Ash Creek*

## PROJECT HIGHLIGHTS

**Informed Surveys:** For early survey efforts in 2014, AGFD biologists searched on Google Earth for bright green cottonwood stretches along creeks to determine if water was present. They also combed through historical reports from ranchers and local community members for firsthand accounts of native fishes.

**Natural Barrier as a Management Tool:** A rock waterfall located in a narrow canyon that drops 15-20 feet forms a natural barrier. Project managers use this barrier to isolate native populations without concern of sunfish re-invasion from further downstream.

**Mechanical Removal:** AGFD biologists started monthly mechanical removal of Green Sunfish in 2017, using any means possible to remove fish. During initial trips, thousands of sunfish were removed in each pass using hoop nets, backpack electrofishing, spot lighting and seine nets.

**Native Fish Re-Introductions:** Native fishes with low population numbers, including Roundtail Chub and Speckled Dace, were translocated from a source population in the Trout Creek drainage to boost population numbers and genetic diversity in Ash Creek.

## Collaborators

- Arizona Game and Fish Department
- U.S. Fish and Wildlife Service, Arizona Fish and Wildlife Conservation Office, Parker, AZ
- Desert Fish Habitat Partnership

Lead Author: Alex Koeberle, University of Arizona, October 2020.

Photos courtesy of AGFD

For more information on CCAST, contact Genevieve Johnson ([gjohnson@usbr.gov](mailto:gjohnson@usbr.gov)) or Matt Grabau ([matthew\\_grabau@fws.gov](mailto:matthew_grabau@fws.gov)).

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## LESSONS LEARNED

Biologists have observed an increase in native amphibian and fish diversity and a significant decrease in Green Sunfish. Biologists have also seen a significant increase in native young-of-year fishes as well as recaptured translocated adult Roundtail Chub. Project managers need to achieve complete eradication of Green Sunfish before focusing their efforts exclusively on native fish restoration efforts.

In Ash Creek project biologists can use conditions during dry years to their advantage by heavily targeting isolated pool habitats. Conversely, during monsoon years, project biologists have found that intensive surveys (e.g. twice or more a month) to target fish isolated in smaller pools is an effective strategy leading up to the start of monsoon rains. Being adaptive and not giving up is essential for long-term success of non-native fish removals. Isolated desert streams are manageable systems for non-native species removal. However, significant time must be dedicated to repeated sampling efforts.

## NEXT STEPS

- Achieve complete Green Sunfish eradication and continue annual monitoring to prevent re-invasion
- Incorporate eDNA sampling to improve detection rates for Green Sunfish that are difficult to detect through traditional methods with low fish density
- Conduct population surveys to better understand native fish recovery
- Achieve Green Sunfish eradication at a basin-scale in >80 miles of intermittent stream throughout the Trout Creek drainage

For more information on this project, contact Andy Stites:

[astites@azgfd.gov](mailto:astites@azgfd.gov)



*Native Roundtail Chub in Ash Creek*