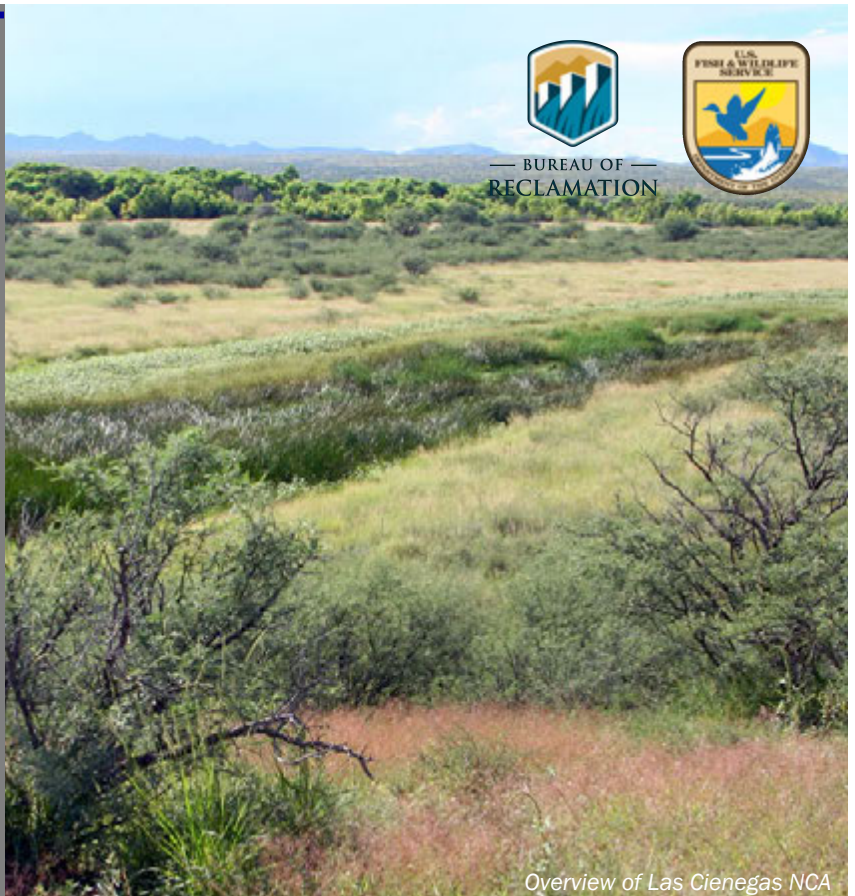


RESTORATION

Restoring Leopard Frog Habitat in Cienega Creek, Arizona

frog conservation
project
frog & fish restoration
outreach group

The Frog & Fish Restoration Outreach Group (FROG) sought to restore habitats and reintroduce threatened and endangered aquatic species in the Cienega Creek watershed of southeastern Arizona. Cienega Creek is fed by mountain ranges that drain into expansive semidesert grasslands and the riparian corridor. The watershed harbors the most ecologically intact cienega complex (valley wetland spring system) in the southwestern United States. This area includes lands managed by the Bureau of Land Management (BLM), U.S. Forest Service (USFS), Pima County, the Department of Defense, Arizona State Trust Lands, and numerous private landowners.



KEY ISSUES ADDRESSED

In arid regions around the world, wetlands and the aquatic vertebrates they support are among the most globally threatened ecological assemblages due to water extraction, drought, habitat modification, and invasive species. The American bullfrog (*Rana catesbeiana*) is a highly invasive species that was introduced to the Cienega Creek watershed in the mid 1980s. It is strongly associated with loss of local populations of the federally threatened Chiricahua leopard frog (CLF; *Lithobates* (= *Rana*) *chiricahuensis*) due primarily to predation and disease transmission (especially Chytridiomycosis). Additionally, northern crayfish and several non-native fishes exist in areas adjacent to Cienega Creek. Potential invasion by these species could impede conservation and reintroduction of CLF.

PROJECT GOALS

- Quantify the abundance and distribution of native frogs, non-native bullfrogs, and other native aquatic species in Cienega Creek
- Eradicate non-native aquatic species in ten study sites between 2014 and 2019
- Improve CLF habitat conditions and establish additional populations
- Engage the public in aquatic conservation through outreach and education

HABITAT RESTORATION

In addition to creating habitat for aquatic species, the enhanced and converted livestock waters now provide permanent water for native fish and wildlife.



Habitat Created for Chiricahua Leopard Frogs and Desert Pupfish at LCNCA

PROJECT HIGHLIGHTS

Landscape Scale: The FROG project operated on a watershed level across multiple land ownerships—this scale allowed the project to incorporate and observe metapopulation connectivity dynamics of both native and invasive aquatic species.

Successful Eradication: Bullfrog populations were successfully eradicated from Cienega Creek by 2013, followed the next year by CLF recovery activities including captive head-starting (rearing in captivity until large enough), releases, and translocations.

Leopard Frog Establishment: This effort raised 4,769 CLF that were released at 10 new sites in the project area. Most of these populations are breeding.

“Buffer-Zones” for Invasive Species Detection and Removal: The project established a buffer-zone consisting of stock tanks between Cienega Creek and potential bullfrog source populations. Regular annual removal of bullfrogs from these tanks prevents re-invasion.

Mutual Human-Ecological Benefits: Utilizing youth programs and outreach events, local residents were engaged about aquatic conservation.

Collaborators

- University of Arizona
- USFWS, AGFD, USFS, BLM as well as other government and non-governmental organizations
- Cienega Watershed Partnership

Funding Partners

- See online Case Study for list of funding partners

Lead Authors: Ashlee Simpson and Alex Koeberle, University of Arizona, July 2020.
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Photos courtesy of Dennis Caldwell/
Caldwell Design



LESSONS LEARNED

Landscape-level bullfrog eradication is possible in this watershed. Bullfrog eradication required intensive early-season removal of adults and juveniles to prevent breeding and dispersal in the summer. Fine-mesh hoop traps were effective to capture tadpoles, while shooting with 22-caliber rifles was most effective to collect adults in complex pools. Crayfish eradication is difficult even in small non-complex habitats and requires multi year persistence.

Thermal habitat characteristics are important in selecting CLF introduction sites. Chytrid is most deadly upon rapid temperature decline. Therefore, natural springs are critical because they have the most stable thermal regimes of any regional waters. Collaboration can engage regional ranchers in aquatic conservation to develop solutions that provide habitat for wildlife and watering opportunities for livestock. Mechanized aquatic habitats, i.e. maintained by pump and well, can add resilience to aquatic species populations by providing drought-proof habitat.

NEXT STEPS

- Monitor success of natural and reintroduced leopard frog populations
- Evaluate and research chytrid mitigation options
- Monitor for new non-native aquatic species arrivals (with removals as necessary), complete outstanding habitat enhancement construction, and establish native fishes in additional locations

PROJECT RESOURCES

For more information on this project, contact Audrey Owens: aowens@azgfd.gov or David Hall: davidhall31@gmail.com

For additional project resources and Case Studies, scan the QR code below or visit the CCAST website: WWW.DESERTLCC.ORG/RESOURCE/CCAST



Breeding Chiricahua Leopard Frogs