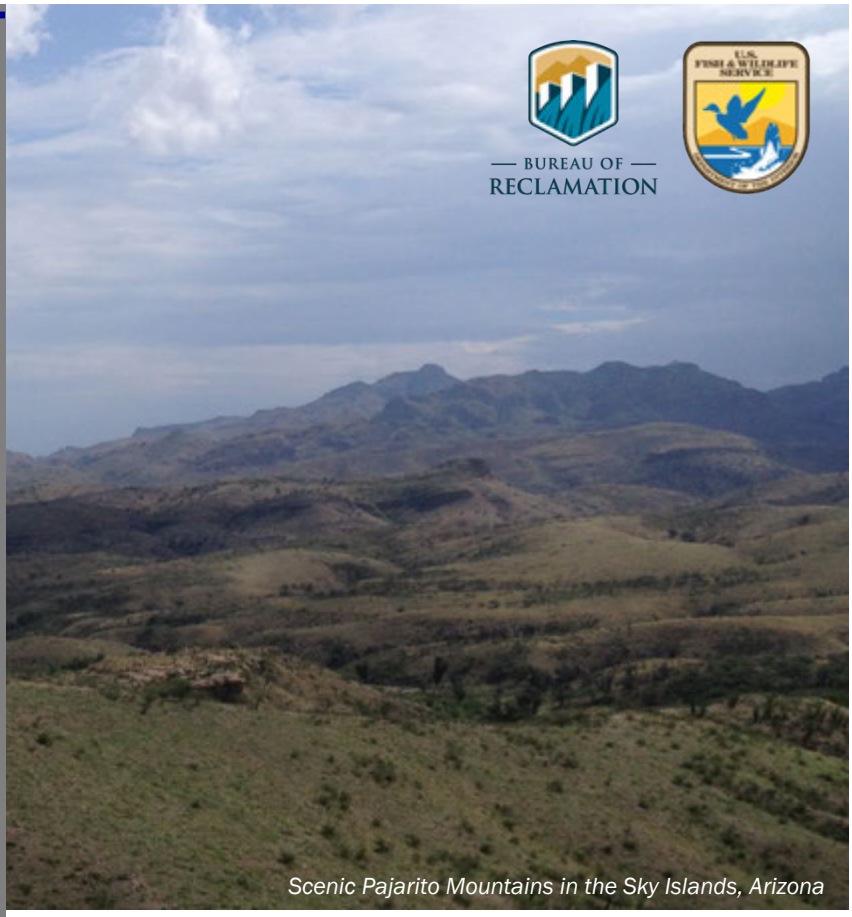
RESTORATION

Landscape-Scale Eradication of Bullfrogs for Native Aquatic Species Recovery in Southern Arizona

American bullfrogs, native to eastern North America, were introduced to waterways globally, and by the early 1900s established populations in the southwestern U.S. Bullfrogs were introduced into stock tanks, and readily dispersed and colonized the limited aquatic systems found in southern Arizona, including slow moving streams and creeks, and other aquatic systems with suitable habitat. Bullfrogs commonly outcompete and predate on native amphibians like the Chiricahua leopard frog. To restore native amphibian populations decimated by non-native bullfrogs, a collaborative team of researchers, managers, and technicians have been conducting a long-term mechanical removal effort at a landscape-level across rural areas in southern Arizona.



Scenic Pajarito Mountains in the Sky Islands, Arizona

KEY ISSUES ADDRESSED

Bullfrogs (*Rana catesbeiana*) threaten native species like Chiricahua leopard frog (CLF; *Lithobates (=Rana) chiricahuensis*), which was federally listed as Threatened in 2002 due to declining populations and habitat loss. Large-scale declines began in the 1970s, with the emergence of chytridiomycosis (chytrid), a fatal disease for amphibians like CLF when exposed. Bullfrogs threaten recovery because they not only consume and outcompete CLF, but they are also resistant to chytrid, and are carriers when they invade a body of water. Successful native frog recovery requires complete bullfrog eradication through intensive effort, long-term monitoring, and sustained financial support. This is especially difficult given the bullfrogs' abundance and ability to quickly recolonize habitats.

PROJECT GOALS

- Document bullfrog abundance and distribution in southern Arizona
- Conduct systematic eradication of bullfrogs from prioritized invaded sites
- Establish and maintain "buffer zones" to to prevent bullfrog re-colonization
- Increase recovery opportunities to expand the range and abundance of CLF

Stranded Bullfrog Following Stock Tank Draining

PUDDLE JUMPING

Biologists have documented Chiricahua leopard frogs dispersing and recolonizing habitat during the summer monsoon season once bullfrogs have been removed.

PROJECT HIGHLIGHTS

Decades of Team Effort: This is the largest active bullfrog control project in the western United States, with over 20 years of collaborative effort, led by a diverse group of scientists, managers, and practitioners.

Landscape-Level Control: The Frog Team has removed bullfrogs from large, targeted removal areas within 10,230 square miles (a total area 66 miles wide by 155 miles long) and actively manages "buffer zones" to prevent recolonization.

Prioritization Criteria to Target Sites: Through GIS, aerial imagery, and ground truthing, perennial water bodies such as stock tanks, canyons, and springs are prioritized for bullfrog eradication and "buffer zone" control.

Systematic Eradication Methods: Removal is achieved through use of a combination of mechanical methods implemented both day and night, including shooting with a .22 rifle and non-lead ammo, hand capture of adults and juveniles, pond draining, and seining (a large net) for tadpole removal.

Collaborators

- University of Arizona
- USFWS, AGFD, USFS, BLM as well as other government and non-governmental organizations
- American Museum of Natural History, Southwestern Research Station

Funding Partners

- See online Case Study for list of funding partners

Lead Author: Alex Koeberle, University of Arizona, June 2020.
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Photos courtesy of Audrey Owens and Maddy Marsh/Arizona Game and Fish Dept.

LESSONS LEARNED

Quality habitat for CLF can include larger ponds with dense surface layers of vegetation and bank cover. With suitable habitat cleared of bullfrogs, CLF are equipped to recolonize on their own if there are occupied sites in the 5-mile vicinity.

Successful bullfrog eradication resulted from systematic removal techniques that are now well-established, but must be implemented carefully to maximize both safety and effectiveness. For example, the preferred copper bullets with the best accuracy and most humane kill have high velocity. Yet, higher bullet velocities result in greater risk of ricocheting off the water. Team members must be highly trained and maintain situational awareness.

Although CLF populations recover quickly following bullfrog eradication, efforts in southern Arizona require regular, ongoing monitoring in order to ensure long-term native species recovery.

NEXT STEPS

- Continue monitoring for bullfrog removal in managed sites for eradication and maintain/expand buffer zones
- Target new areas for CLF restoration to better identify habitat conditions that support successful recovery, and expand chytrid research
- Integrate bullfrog removal with multi-species approaches for ecosystem recovery

PROJECT RESOURCES

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

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

Chiricahua Leopard Frog Release