

Determining the distribution of
the lowland leopard frog (*Rana
yavapaiensis*) and the Colorado
River toad (*Bufo alvarius*) along
the LCR and its tributaries

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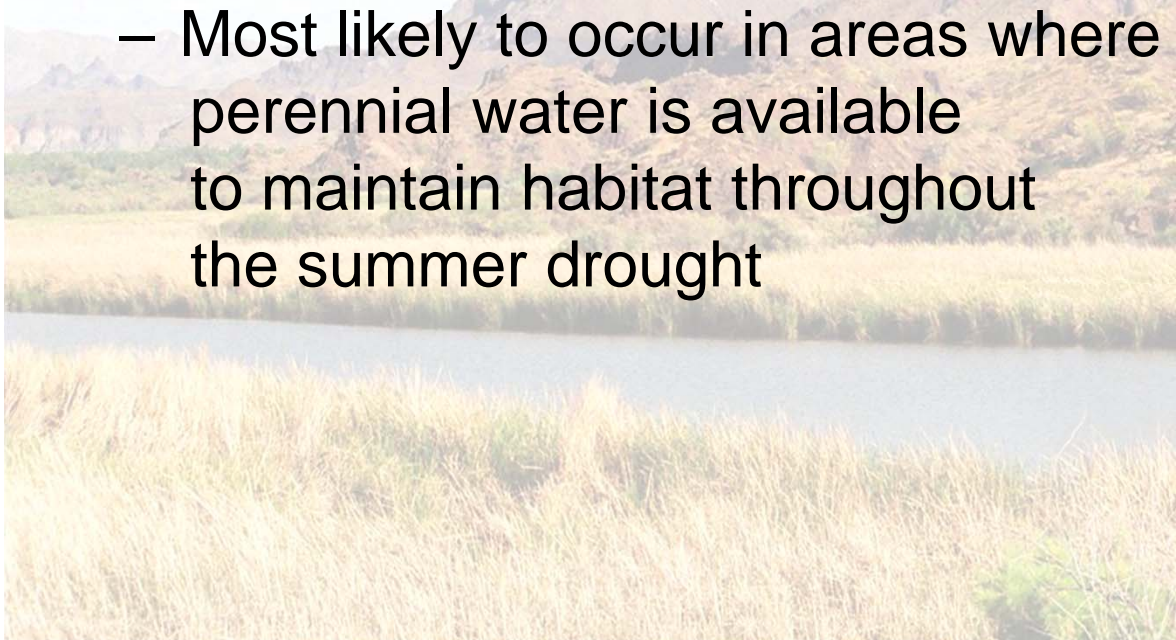
Arizona Game and Fish Department
Research Branch

Objectives

- LLFR1 and CRTO1 of the LCR MSCP:
 - Determine the distribution of LLFR and CRTO along the LCR and its tributaries
 - Describe habitat characteristics associated with presence and absence of each species along the LCR
 - Develop management recommendations to conserve extant populations of LLFR and CRTO, and create suitable habitat conditions for future reintroductions of both species along the LCR

Background

- Lowland leopard frog
 - Historically distributed throughout the LCR
 - Now classified as extirpated along the main stem of the LCR by some accounts
 - Recently detected near Mineral Wash on the Bill Williams River NWR
 - Habitat generalists
 - Along the LCR could be found in pools in mid-sized lotic backwaters (e.g. Bill Williams River) irrigation canals, ponds, stock tanks, roadside ditches, etc.
 - Most likely to occur in areas where perennial water is available to maintain habitat throughout the summer drought



Background

- Colorado River Toad
 - AKA the Sonoran Desert Toad
 - Exists in very low numbers along the LCR
 - Periodic incidental detections – most recently at Planet Ranch along the Bill Williams River and near Parker
 - Spends much of its time in burrows, emerging to breed in ephemeral and permanent pools during the monsoon rain season



Study Area

- Reaches 3-7 of the LCR

- From the Davis Dam to the International Border, including the Bill Williams River up to and including Planet Ranch

- To organize field effort, we divided our study area into four sampling segments:

- 1) LCR MSCP Reach 3
- 2) LCR MSCP Reach 4
- 3) LCR MSCP Reaches 5-7
- 4) The Bill Williams River



Approach

- Potential Habitat Inventory
 - Conduct inventories for potential LLFR and CRTO habitat along the LCR and the Bill Williams River
 - Collect information regarding the quality of potential habitat for each target species based on the level of colonization by bullfrogs, pool size, water quality, etc.



Approach

- Select sampling locations weighted by the likelihood to provide habitat for each target species as determined through habitat inventories, and stratified by type of aquatic system (e.g., irrigation canal, lotic backwater, etc.)
- Conduct repeat visit presence/absence surveys at a portion of potential habitat



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Approach

- Visual Encounter Surveys
 - Will be conducted at night and during the day
 - Surveys will be conducted using a standard VES protocol developed by Heyer et al. (1994)¹ and amended by AZGFD for Chiricahua Leopard Frog monitoring



¹Heyer, W.R., M.A. Donnelly, R.W. McDiarmid, L.C. Hayer, and M.S. Foster (eds.). 1994. Measuring and monitoring biological diversity. Standards and methods for amphibians. Smithsonian Inst. Press, Washington, D.C. 364 pp.

Approach

- Evening Audio Counts/Call-Response
 - Surveys will begin ½ hour after sunset
 - Observer will listen for all amphibian calls for 3 minutes, followed by 30 second broadcast of LLFR call, followed by 2 minutes of listening, 30 second broadcast of CRTO call, then another 2 minutes of listening¹
 - The presence of all amphibians will be noted
 - Calls of all unknown species will be recorded for post-survey identification

¹Modified from the United States Geological Survey North American Amphibian Monitoring Protocol (<http://www.pwrc.usgs.gov/naamp/index.cfm>)

Approach

- Pitfall Drift Arrays
 - Arrays will be constructed adjacent to a portion of potential habitat
 - Arrays will be active for 7-day periods, and monitored daily

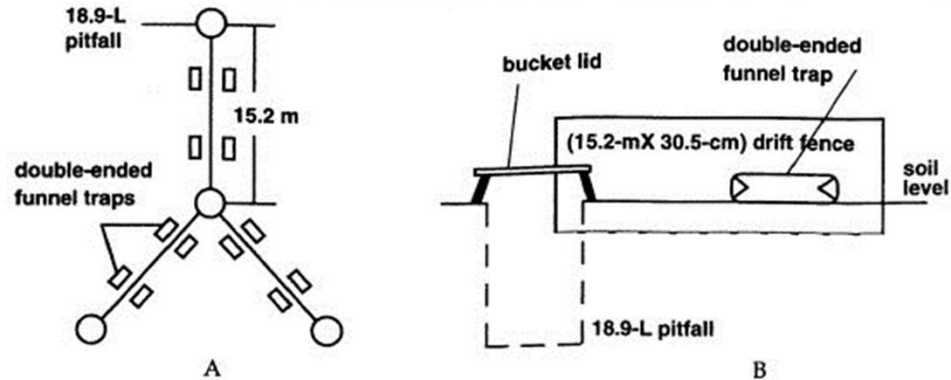


Figure 1. Design of drift fence arrays. (A) Configuration of drift fences, pitfall, and double-ended funnel traps. (B) Side view of an array segment showing the intersection of a pitfall trap with the drift fence.



Approach

- Capture
 - We will attempt to capture target species detected using any survey method
 - Capture will allow for physical verification of species
 - We will also take genetic samples to provide BOR with genetic information



Approach

- Habitat Assessment

- We will characterize the aquatic and surrounding terrestrial habitat where each target species was detected, as well as at an equal number of sampling locations where the species was not detected
- We will measure a variety of biotic (e.g., vegetation density and composition, canopy cover) and abiotic (e.g. water pH, turbidity, bottom substrate type) characteristics



Approach

- Data Analysis

- Presence/absence surveys and habitat assessment will inform occupancy models for each species
- We will use occupancy models to determine the habitat characteristics that predict presence and absence of each species within the LCR ecosystem
- Analysis will also be used to inform management recommendations to mitigate current factors limiting the distribution of each species and create favorable conditions at future reintroduction sites



Input Welcome

- Please forward the locations of any incidental detections or potential habitat to:
Vincent Frary, Research Biologist, Arizona Game and Fish Department:

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