

## Showcase of climate change adaptation management tools for amphibians:

1. **Windmill and solar-powered pump installed to retain water levels in ponds, New Mexico, USA.** Project provides habitat for threatened Chiricahua Leopard Frogs. Project implementation: Turner Ranch Properties, L.P.; M. Christman, US Fish and Wildlife Service. Photo credit, top: C. Kruse, Turner Enterprises, Inc. Photo credit, below, showing grazing enclosure: Bruce Christman.



2. **Log Directional Felling into Ponds to Assist Metamorph Dispersal, Washington, USA.** Logs provide microclimate refugia and likely refuge from predation; several pond-breeding species appear to benefit. “14 Lakes Habitat Enhancement Project”, design by Heidy Barnett, Seattle Public Utilities. Photo credit: Sally Nickelson, Cedar River Watershed. For more information see: [http://www.seattle.gov/util/About\\_SPU/Water\\_System/Habitat\\_Conservation\\_Plan/Species/Amphibians/Pond-Breeding/HCPPProgress/index.htm](http://www.seattle.gov/util/About_SPU/Water_System/Habitat_Conservation_Plan/Species/Amphibians/Pond-Breeding/HCPPProgress/index.htm)



3. **Portable irrigation sprayers manipulate water potentials at breeding sites for the terrestrial toadlet *Pseudophryne bibronii* in South Australia.** Photo credit: Nicola Mitchell



4. **Wildlife Escape Ramp Project**

Livestock watering structures such as tanks and troughs can provide important sources of water for bats, birds, reptiles, and other wildlife in the arid western U.S. As development, drought, and climate change increase pressure on natural water sources, these structures may become even more critical. However, especially at low water levels, animals like this Western Fence Lizard can become trapped in the tank, and often die. The Aquatic Escape Ramp Project, a cooperative project of USFS Region 5, Bat Conservation International, and Partners in Amphibian and Reptile Conservation, seeks to address this problem by bringing prototype affordable, effective escape structures to water sources on national forest lands. For more info, see <http://www.parcplace.org/images/stories/bciwaterforwildlife.pdf> Photos: Kary Schlick, USFS R5.



**Figure A** - Western Fence Lizard trapped in nearly-empty water trough



**Figure B** - Lizard climbs to freedom on escape ramp

## **5. Cap Open Vertical Pipes!**

Although this is not a very innovative engineering solution, and it is not really related to climate change, it warrants special consideration because open-topped pipes can be quite prevalent. Capping or removing such pipes used as sign posts, fence posts, survey markers, irrigation systems, or for other purposes can aid much more than herpetofauna that get trapped and die within these structures. Read more at <http://www.parcplace.org/images/stories/ClimateChange-Pipes.pdf>