

Appendix B. Updated guidelines for wildlife-friendly water features in Arizona (USFWS).



United States Department of the Interior

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Recommended Guidelines for Development and Management of Wildlife-Friendly Water Features in Arizona February 2019

Water resources on arid landscapes are instrumental for managing livestock operations and also help maintain healthy wildlife communities. Below, we have summarized available guidance on water developments to both maximize their benefits and reduce their potential risks.

Ponds

Minimizing sediment — Ponds/tanks can be developed in succession within an ephemeral drainage to slow water, encourage settling of sediment out of the water column, and improve water quality of downstream impoundments (NRCS 2016a).

Minimizing disturbance — If excavating a pond/tank, stockpile topsoil for placement on previously disturbed areas to facilitate revegetation (NRCS 2016a).

Minimizing connectivity — Ponds should be located outside the floodplain to avoid any hydrologic connection during flood events which helps minimize the threat of nonnative species expanding their range.

Inspecting earthen tanks — Inspections focusing on breaches, water levels, shoreline integrity, aquatic inhabitants, etc. are recommended periodically, including after heavy rains (NRCS 2016b).

Maintaining earthen dam integrity — Trees should not be permitted to grow on embankment dams because they can cause leaks/seepage (NRCS 2016b). Promoting the establishment of native shoreline vegetation will also reduce effects of sheet erosion and enhance water quality.

Fish

Fish health and vitality — Consider installing supplemental aeration equipment in ponds/tanks to improve gas transfer and water quality, and lower stress levels of resident fish.

Mosquito control — Mosquitos are attracted to water sources for breeding purposes. Consider using native fish such as Gila topminnow (consult the Arizona Game and Fish Department and US Fish and Wildlife Service for permitting information) for mosquito control.

Considerations for Longfin Dace — If stocking longfin dace into a feature, provide clean wash sand near the inlet to promote reproduction; the sand may need to be replaced periodically with fresh wash sand to continue to promote reproduction (THS *et al.* 2010).

Wildlife

Enhancing habitat structure — Consider promoting vegetated banks (NRCS 2011) around ponds/tanks and providing rock piles or enhancing existing rock outcrops around the feature to promote important herpetofaunal habitat structure for thermoregulation and other natural behaviors.

Frog-specific features — To enhance habitat features for native frogs, stack slabs of concrete or flagstone with 1 to 2 inch spacers along the shoreline that gets the most sun exposure (THS *et al.* 2010); see Figure 1.

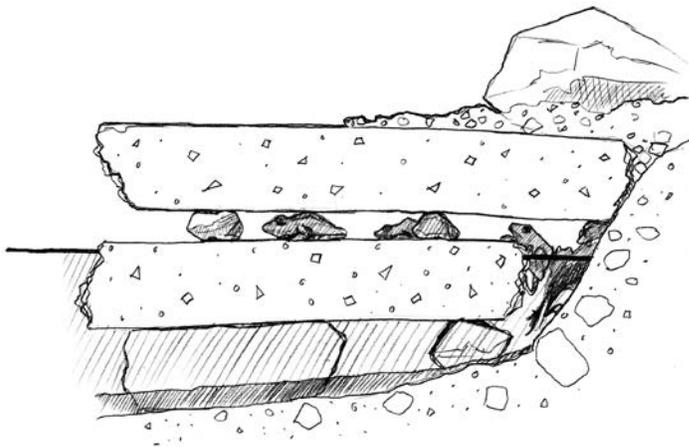


Figure 1: Angle the slabs slightly so the crevasses between the slabs have air pockets where the frogs can hide for extended periods of time. These pockets will protect sluggish frogs on cold winter nights when they are extra vulnerable (Image and figure text courtesy of THS *et al.* (2010)).

Protection and foraging — When at capacity, tanks and ponds should have both deep areas with large rocks or other forms of structure for aquatic vertebrates to use in predator avoidance, as well as shallow, sun-lit areas to provide basking sites, areas of prey acquisition, and general biological productivity (THS *et al.* 2010).

Escape ramps — While important sources of water for livestock and wildlife alike, artificial troughs and drinkers also pose a risk of drowning to small animals that become trapped inside. To help reduce the risk of accidental death of wildlife, Taylor and Tuttle (2007, 2012) provide guidelines for escape ramps. Escape ramps should:

- Extend into the water and meet the inside wall of the watering facility,
- Reach to the bottom of the watering facility or to the depth of the lowest possible water level,
- Be firmly secured to the rim of the watering facility so as not to be displaced by livestock,
- Be built of graspable, long-lasting materials, such as painted or coated metal grating, roughened fiberglass, concrete, rock and mortar, or high-strength plastic composites,
- Have a slope no steeper than 45 degrees,
- Be located to cause minimal interference with livestock drinking, and
- Provide one structure for every 30 linear feet of watering facility edge.

Obstruction concerns — Birds and bats are uniquely at risk of accidental death in artificial waters and require obstructions near the water surface be minimized, adjusted, or preferably removed altogether. NRCS (2014) provides guidance to accomplish this goal:

- All wire fencing material up to 36 inches above the water must be removed. Board and other echolocation material, at least one-inch-wide, may be installed at a height of at least 18 inches above the water, or
- Rearrange the fence line to create an adjustable pivot point thereby removing any obstructions above the water surface while allowing full access to a single trough from two different grazing areas.

Managing water levels — Taylor and Tuttle (2007, 2012) recommend maintaining consistent water levels, at full capacity, especially during periods of drought and during the maternity season for bats which in Arizona, spans April – July. This is most important for small- or medium-sized troughs where it may be advisable to implement a “full or dry” management objective; large troughs with adequate escape structures may still be useful to wildlife without posing increased risks, at intermediate water levels (Taylor and Tuttle 2007, 2012). These water level maintenance goals not only provide more reliable water, but reduce the likelihood of accidental drowning caused by steep sidewalls.

Nonnative species — Under no circumstances should nonnative species (*i.e.* bullfrogs, mosquitofish, warm water sportfish, crayfish, etc.) be introduced into any water feature. Nonnative species remain one of the most significant threats to native aquatic wildlife in the Southwest and continue to drive rangewide declines in many species. See THS *et al.* (2010) for basic information about removing existing nonnative species from your water feature.

Size considerations — When developing water sources for livestock and/or wildlife, whether earthen or artificial, planners should strive to account for lengthening the hydroperiod (the period of time water remains available) and maximizing the versatility of the development for various species of wildlife. These critical factors improve the reliability of water sources on the landscape and account for drinking limitations based on wide-ranging flying capabilities of winged vertebrate species. In short, when installing water developments, the deeper, the larger, the longer (at least 10 feet long by 2.5 feet wide, unobstructed), the better (Taylor and Tuttle 2012).

Engineering specifications for wildlife waters — If designing a water feature specifically for the benefit of native wildlife, we recommend reviewing Arizona Game and Fish Department’s (2014) “Wildlife Water Construction Standards” for many design specifications and considerations.

Future Reading

We recommend reviewing the following references referenced in this guidance and exploring other references that may exist or as they become available online for more information on improving the design, installation, and management of water features to benefit Arizona’s native wildlife.

Literature Cited

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