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Water for Wildlife

Helping Western bats find a place to drink

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The rusting, round water tank in the Arizona high country is no more than 12 feet (3.5 meters) across and 2 feet (61 centimeters) deep. The water is algae green. But each night, a near-constant stream of bats – sometimes approaching one per second – swoops smoothly down to the water's surface to sip from this vital resource.

Water is scarce in much of the American West, and natural water holes have been disappearing rapidly for 150 years, victims of irrigation, dams and urban/suburban developments. The many water troughs and tanks that ranchers maintain for their livestock are, quite literally, lifesavers for bats and other wildlife.

But all water is not equal. While this Arizona water trough is a safe and accessible resource tapped by thousands of bats, other water supplies can be death traps. A Colorado rancher recently reported finding 46 drowned bats in a single trough made out of an old tractor tire. Although reliable estimates are not available, anecdotal evidence suggests such wildlife drownings are frequent and widespread.

In many Western states, chronic shortages of safe, reliable water threaten the very survival of bat and other wildlife populations, especially in drought years. Bat Conservation International, with leadership support from the Offield Family Foundation, the National Fish and Wildlife Foundation and the USDA-Natural Resources Conservation Service, has taken on the challenge of increasing accessible wildlife water supplies.


After more than two years of research, field tests, analyses and educational efforts, BCI's Water for Wildlife program this year produced a pioneering publication: Water for Wildlife: A Handbook for Ranchers and Range Managers.

The handbook describes the critical water problems facing wildlife and presents the economic – as well as ecological – value of considering the needs of bats, birds and other animals while maintaining water supplies for livestock. The publication provides step-by-step instructions for ensuring that bats and birds that drink on the wing can safely access the water.

Water for Wildlife is being distributed to field offices of federal and state agencies, corporations and others involved in West-ern water issues. We believe it will make a real difference in enhancing wildlife habitat on public and private lands.

The urgency of the problem became clear as we collected standardized data with the collaboration of state and federal agencies. Of 367 water troughs in 11 Western states, more than half had obstructions – braces, fences, wire, etc. – across the water that would prevent bats from drinking. More than a fourth of the tanks at which water levels were noted were empty and another 30 percent had water levels six inches (15 centimeters) or more below the rim, creating a proven hazard for bats and birds that fly down to drink. And fewer than 10 percent of the troughs had an adequate wildlife escape structure – a ramp-like device



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that allows animals that fall into the water to climb out. Clearly, we have major obstacles to overcome.

Bats, with exceptionally narrow requirements for water sources, are especially at risk when water is in short supply. Studies of bat physiology have documented water loss of up to 50 percent of body weight in a single day. Even the most desert-adapted bat species periodically need water, and the loss of a single source can threaten the survival of local populations.

To get water, bats must fly down to the water surface, scoop up a drink and keep flying up and away from the pool – a process that requires an unobstructed “swoop zone,” just as airplane pilots need clear approaches to their runways. Obstacles in the flight path can prove deadly. Like many other animals, bats are very susceptible to drowning if they are trapped in a water tank without an escape route.

The smallest tank that bats can drink from varies according to each species’ flight characteristics. A few bat species, such as the California leaf-nosed bat (*Macrotus californicus*) and the California myotis (*Myotis californicus*), have short, broad wings that make them highly maneuverable. Such species can sometimes drink from a water source as small as 3 by 4 feet (91 x 122 centimeters), although even they seem to prefer larger tanks.

Most bat species, however, have longer, narrower wings and far less maneuverability. They need access to long swoop zones and large, open water sources.

Analysis of data collected by bat biologists around the West indicates that most bat species prefer sources that are at least 10 feet (3 meters) long and 2.5 feet (0.75 meter) wide. Some species apparently require tanks or rivers with stretches of open water at least 50 feet (15 meters) long, and a few of the least maneuverable species need 100 feet (30 meters).

Regardless of the size of the water feature, obstructions over the surface of the water are extremely dangerous for bats that must drink while flying. Collisions can injure bats or cause them to fall into the water, where they frequently drown unless appropriate escape structures are provided.

Safe access to drinking water also requires clear swoop paths into and away from the trough. Trees, brush and other obstructions can keep bats and swallows, nighthawks and other birds that drink in flight from taking advantage of the water.

Another common problem facing bats and birds is low water levels in stock tanks, especially those without escape routes. Turbulent winds combined with limited room to maneuver at smaller tanks can prove disastrous.

Among the most important – and least utilized – tools in ensuring safe water for wildlife are adequate escape structures. As described in the handbook, these can be relatively simple and inexpensive to make out of metal or stone, but they must meet a few critical criteria. Our experiments and field experience have demonstrated the most effective designs.

Escape structures should extend from the rim of the trough and slope no more than 45 degrees into the water. They must also include sides that are flush against the side of the trough. When trapped in water, most animals will swim frantically around the perimeter in search of a way out. They typically swim under escape ramps without sides that block

their path and end up drowning.

To drive those points home to a wide audience, BCI's Water for Wildlife program is initiating a series of demonstration projects to show how appropriately designed, wildlife-friendly water developments can increase local numbers and diversity of bats. This summer, we will be collaborating with range managers and biologists at the Cabeza Prieta National Wildlife Refuge in Arizona, the Department of Defense's White Sands Missile Range in New Mexico and the Humboldt-Toiyabe National Forest in Nevada.

After identifying existing water tanks that are difficult or impossible for bats to use, we plan to modify the water sources or add new ones to ensure bats have safe, reliable access. Then we will monitor the bat populations to develop before-and-after profiles that should demonstrate how even modest modifications to water size and configuration can benefit bats.

We also have several collaborative workshops planned this year to provide hands-on training to more than 200 livestock operators and range and wildlife managers. Workshops are scheduled for Cascabel, Holbrook and Kirkland, Arizona with the Natural Resources Conservation Service (NRCS), the U.S. Forest Service and the Arizona Game & Fish Department as cosponsors; in Elko and Winnemucca, Nevada, with the Forest Service, U.S. Bureau of Land Management and the NRCS cosponsoring; and in Socorro, New Mexico, with the NRCS, the Forest Service, BLM and the Quivira Coalition as cosponsors.

Countless bats are searching for water throughout the North American West, and BCI and its partners are working to make sure they find it.

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