

NOTE

CATTLE WATER TROUGHS: DO THEY PROVIDE SUPPLEMENTAL WATER FOR WILDLIFE?

JEFF JONES

U.S. Bureau of Land Management, 5152 Hillside Circle, El Dorado Hills, California 95762, jwjones@blm.gov

Abstract.—Cattle water troughs are widely used on cattle ranches throughout the American west, including the U.S. Bureau of Land Management (BLM) cattle allotments. Many of these BLM water troughs were installed decades ago and have since become unusable; however, the spring box system that provides the water may remain functional. I assisted grazing lessees in replacing two water troughs on BLM allotments in 2020 and 2021. These galvanized steel water troughs were installed for cattle. I used this opportunity to assess whether these troughs provided supplemental water for wildlife. To investigate this question, I installed trail cameras to detect wildlife use at each water trough. Data were collected for approximately 18 mo and 22 bird and 11 mammal species were detected visiting the water troughs during that period. This study provides evidence that wildlife will readily use water troughs installed for cattle in the Sierra Nevada foothills.

Key Words.—cattle; foothills; Sierra Nevada; spring box; thermoregulate; trail cameras; trough; wildlife.

Research has been conducted on wildlife use of water developments in Arizona and Southern California (Bleich et al. 1982; Broyles 1995; Rosenstock et al. 1999; Rich et al. 2019). These water resources were reported to show a benefit to wildlife species, but speculation remained that there may be negative impacts that are currently not studied or understood (Rosenstock et al. 1999). For instance, concentration of avian predators around water sources has been a concern in desert environments (Simpson et al. 2011). DeStafano et al. (2000) noted that a concern of water developments is the attraction of predators, which impact prey populations. In addition to a lack of systematic studies on the effects of these resources for wildlife, the few studies published are widely disparate in design, location, and detail reported. Of note, no published report, whether systematically evaluated or observational, is available for the Sierra Nevada foothills in California. This region supports a rich assemblage of wildlife species (Schoenherr 2007), and water resource availability has a high level of interannual variability. Following numerous anecdotal observations of various species of wildlife using cattle water troughs for drinking and other purposes, I elected to determine the extent of use at troughs by wildlife in my study area in the foothill region of central California.

I used two existing water troughs in Mariposa County, which are on U.S. Bureau of Land Management (BLM) land. This region experiences an average annual temperature range of 5°–20° C and an average annual rainfall of 93 cm, with a high level of year-to-year variation (Barreau et al. 2017). Both water troughs were in typical Chaparral habitat dominated by Toyon (*Heteromeles arbutifolia*), Buckbrush (*Ceanothus cuneatus*), Chamise (*Adenostoma fasciculatum*), Whiteleaf Manzanita (*Arctostaphylos viscida*), Poison Oak (*Toxicodendron diversilobum*), and Grey Pine (*Pinus*

sabiniana). Additionally, Interior Live Oak (*Quercus wislizeni*) and Blue Oak (*Q. douglasii*) occurred in patches of habitat in the surrounding area. Understory vegetation included non-native annual grasses dominated by Medusahead (*Taeniatherum caput-medusae*). Lake McClure reservoir (28 km²), a moderate-sized drinking water reservoir that provided year-round water, was approximately 1–1.5 km from both troughs. Two small stock ponds were also in the general vicinity; both of which were completely dry by late spring (May–June). Each trough was located adjacent to a small creek, which was the water source to each trough. These adjacent creeks provided year-round water, but access was limited due to dense vegetation growing over and around the water. Therefore, the only reliable water source for the immediate area was the water trough.

In the winter of 2020 and summer of 2021, I assisted two lessees in replacing one water trough within their respective BLM cattle allotment (Fig. 1). After new troughs were installed, I placed one Bushnell Trail Camera (Trophy Cam Model 119874 or Core DS Model 119977C; Bushnell, Overland Park, Kansas) at each trough to observe wildlife usage. Metal posts were installed at both ends of Trough 1 to protect the inflow/outflow plumbing. I placed the camera on one of these posts, which resulted in a clear view of the trough and any potential species that might visit. I placed the camera at Trough 1 at a height of approximately 1 m. At Trough 2, I mounted the camera to an adjacent tree (distance of approximately 3 m). To allow smaller species access to the water in the Trough 1, I attached a small section of wood to the side of the water trough to function as a small platform for access to the water by smaller species. In addition, I placed a wildlife escape ramp and large rocks (25–35 cm diameter) in a manner to facilitate access to and escape from the water.



FIGURE 1. Vicinity and location of water troughs in Mariposa County, California.

I checked the trail cameras periodically (every 6–10 weeks), which may have led to a loss of detection of some species. For example, one trail camera was found, on more than one occasion, displaced by cattle and bear activity resulting in loss of potential species detections. The camera position had to be corrected periodically throughout the study. I collected trail camera data from July 2021 to January 2023. Direct photographic observations and presumed behavior of each species were the only data collected. I did not analyze species abundance for this pilot project; therefore, I did make statistical analyses.

The trail cameras documented 22 bird species at Troughs 1 and 2 (Table 1). Many species were

documented drinking water from the trough, while others were observed either perched on the trough (e.g., Lawrence's Goldfinch, *Spinus lawrencei*), bathing in the water (e.g., American Black Bear, *Ursus americanus*), or foraging on insects drawn to the water (e.g., Black Phoebe, *Sayornis nigricans*). Although this data is not indicative of species abundance, these data suggest some species such as Mourning Doves (*Zenaida macroura*) attended the troughs in higher numbers than other species: I observed doves in groups of up to six individuals. Common Ravens (*Corvus corax*) were typically photographed in pairs, while nearly all other species were visiting troughs as individuals. I speculate that additional species visited the trough but



FIGURE 2. Trail camera photograph of an American Black Bear (*Ursus americanus*) using a trough for bathing and presumably thermoregulating.

TABLE 1. Species of birds and mammals photographically recorded by trail cameras at water troughs in Mariposa County, California. I include their inferred behaviors, which included drinking (D), bathing (B), foraging (F), attempted but unable to drink (AD), and photographed at a trough but behavior was undetermined (U).

Species	Detected Use
Birds	
California Quail (<i>Callipepla californica</i>)	U
Mourning Dove (<i>Zenaidura macroura</i>)	D, B
Greater Roadrunner (<i>Geococcyx californianus</i>)	U
Turkey Vulture (<i>Cathartes aura</i>)	D
Cooper's Hawk (<i>Accipiter cooperii</i>)	U
Western Screech Owl (<i>Megascops kennicottii</i>)	F
Acorn Woodpecker (<i>Melanerpes formicivorus</i>)	D
Northern Flicker (<i>Colaptes auratus</i>)	D
American Kestrel (<i>Falco sparverius</i>)	B
Black Phoebe (<i>Savornis nigricans</i>)	D, F
California Scrub Jay (<i>Aphelocoma californica</i>)	D
Common Raven (<i>Corvus corax</i>)	D
American Crow (<i>Corvus brachyrhynchos</i>)	D
Western Bluebird (<i>Sialia mexicana</i>)	AD
American Robin (<i>Turdus migratorius</i>)	U
House Finch (<i>Haemorhous mexicanus</i>)	AD
Lawrence's Goldfinch (<i>Spinus lawrencei</i>)	AD
California Towhee (<i>Melospiza crissalis</i>)	D
Bullock's Oriole (<i>Icterus bullockii</i>)	D
Brown-headed Cowbird (<i>Molothrus ater</i>)	D
Mammals	
Unknown bat species (order: Chiroptera)	D
Virginia Opossum (<i>Didelphis virginiana</i>)	U
Coyote (<i>Canis latrans</i>)	D
Grey Fox (<i>Urocyon cinereoargenteus</i>)	D
American Black Bear (<i>Ursus americanus</i>)	D, B
Raccoon (<i>Procyon lotor</i>)	U
Bobcat (<i>Lynx rufus</i>)	D
Mountain Lion (<i>Puma concolor</i>)	U
Mule Deer (<i>Odocoileus hemionus</i>)	U
Western Gray Squirrel (<i>Sciurus griseus</i>)	U
Black-tailed Hare (<i>Lepus californicus</i>)	U

may have been out of the detection field of the camera. Notably, both House Finches (*Haemorhous mexicanus*) and Lawrence's Goldfinches visited the trough in small flocks but appeared to fail at reaching the water to drink. In addition to the species observed drinking, the cameras detected numerous observations of what I term bathing. For example, an American Kestrel (*Falco sparverius*) was detected bathing by using the escape ramp. Additionally, some species were photographed preying on insects that were present at the water.

I found 11 mammal species using the troughs, with five species photographed drinking water. In addition to using the trough as a water source, American Black Bears were frequently photographed entering the

trough (Fig. 2), presumably to cool off during the heat of the day, which can exceed 38° C daily for several months in this region of California. Thermoregulatory behavior can help to mitigate heat stress and maintain homeostasis for some mammalian species (Sawaya et al. 2017). Research conducted by Sawaya et al. (2017) suggested that natural and artificial water sources play an important role in allowing black bears to thermoregulate and counteract the negative physiological effects of heat stress. It is important to note that the trail camera data was collected during the drought of 2020–2022, and photos of bears bathing were frequently collected during summer and early fall.

During my study, I observed various mammalian predator species but no signs of a predator-prey interaction (e.g., feathers, blood, hair). In one photograph, an owl appeared to capture an unknown prey on the water surface. Use of cattle water troughs has allowed, at the least, some species to expand into areas that, without a water source, was not previously preferred habitat. For example, Black Phoebes are seldom found far from water (Wolf 1991), yet an adult Black Phoebe established a territory at one of the troughs and, therefore, likely expanded the species local range away from Lake McClure. Evelyn et al. (2004) found that the Yuma Myotis (*Myotis yumanensis*) selected roost sites within 132.6 ± 167.5 (standard deviation) m of a water source. In another study, Fringed Myotis (*Myotis thysanodes*) choose roost sites within 117.4 ± 27.3 m of a water source (Weller et al. 2001). Cameras detected bats using the troughs for dinking, and possibly for foraging, but I could not determine the particular species.

My study demonstrates that water troughs installed for cattle will be used by a suite of wildlife species. Although no attempt was made to determine invertebrate use, I speculate that the supplemental water attracted species use to both troughs. A more systematic study of the use of supplemental water sources or the use of livestock water troughs should be considered. Studies should include modifications to water troughs that would facilitate access for smaller seed-eating bird species. Additionally, future studies should include a strict schedule for data collection to limit potential data loss. Artificial water sources, such as water troughs, will likely continue to be used by wildlife in this region of California. This is particularly true during the frequent drought conditions that California is now experiencing, and when other natural water sources are scarce.

Acknowledgments.—I thank Hanna Sheldon and Jeff Alvarez who provided detailed and helpful review of the manuscript, which improved it greatly.

LITERATURE CITED

- Barreau, T., D. Conway, K. Haught, R. Jackson, R. Kreutzer, A. Lockman, and S. Minnick. 2017.

- Physical, mental, and financial impacts from drought in two California Counties. *American Journal of Public Health* 5:783–790.
- Bleich, V.C., L.J. Coombes, and J.H. Davis. 1982. Horizontal wells as a wildlife habitat improvement technique. *Wildlife Society Bulletin* 10:324–328.
- Broyles, B. 1995. Desert wildlife water developments: questioning use in the Southwest. *Wildlife Society Bulletin* 23:663–675.
- DeStefano, S., S. Schmidt, and J.C. deVos, Jr. 2000. Observations of predator activity at wildlife water developments in southern Arizona. *Journal Rangeland Management* 53:255–258.
- Evelyn, M., D. Stiles, and R. Young. 2004. Conservation of bats in suburban landscapes: roost selection by *Myotis yumanensis* in a residential area in California. *Biological Conservation* 115:463–473.
- Rich, L.N., S.R. Beissinger, J.S. BrasHares, and B.J. Furnas. 2019. Artificial water catchments influence wildlife distribution in the Mojave Desert. *Journal of Wildlife Management* 83:855–865.
- Rosenstock, S.S., W.B. Ballard, J.C. deVos, Jr. 1999. Viewpoints: benefits and impacts of wildlife water developments. *Journal of Rangeland Management* 52:302–311.
- Sawaya, M.A., J.B. Ramsey, and P. Ramsey. 2017. American Black Bear thermoregulation at natural and artificial water sources. *Ursus* 27:19–135.
- Schoenherr, A. 2007. *A Natural History of California*, 2nd Edition. University of California Press, Berkeley, California, USA.
- Simpson, N.O., K. Stewart, and V. Bleich. 2011. What have we learned about water developments for wildlife? Not enough! *California Fish and Game* 97:190–209.
- Wolf, B.O. 1991. The reproductive biology and natural history of the Black Phoebe (*Sayornis nigricans Swainson*) in central California. M.S. Thesis, San Jose State University, San Jose, California. 99 p.
- Weller, T., and C. Zabel. 2001. Characteristics of Fringed *Myotis* day roosts in Northern California. *Journal of Wildlife Management* 65:489–497.



JEFF JONES is a Wildlife Biologist working for the Motherlode office of the U.S. Bureau of Land Management (BLM) in El Dorado Hills, California. He chiefly works with Spotted Owls (*Strix occidentalis*), Great Gray Owls (*S. nebulosa*), Red-legged Frogs (*Rana draytonii*), Yellow-legged Frogs (*R. boylei*), and Northwestern Pond Turtles (*Actinemys marmorata*), along with numerous cattle ranchers that lease BLM lands. (Photograph by Sophia Weinmann).