

# TECHNICAL NOTE

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USDA – Natural Resources Conservation Service  
Boise, Idaho

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Biology Technical Note No. 23

December 2010 Revision

## WILDLIFE WATERING FACILITIES

**Purpose:** To provide supplemental information, design criteria, structural alternatives and economic information on wildlife watering facilities. This is to be used in conjunction with the Watering Facility (614) standard issued December 2010.

**Background:** This Technical Note provides an update to the previous version of Biology Tech Note No. 23, dated March 2007.

Inadequate water can be a limiting factor for some wildlife populations. Wildlife watering facilities, also called “guzzlers” or “catchments” were first developed in the 1940s to benefit quail in the arid West. New designs were soon added for other upland game birds and big game ungulates. In the 1980s, use of guzzlers expanded to mitigate the loss of natural water sources to development.



Researchers first suggested potential adverse effects from guzzlers in the 1990s. Many native western species do not require free water for drinking, but are able to meet their physiological requirements from food and metabolic processes. Concentrating wildlife around guzzlers can increase opportunities for disease transmission, predation (Fig. 2) and entrapment (Krausman et al. 2006). Expansion of year-round water sources can also lead to increases in the numbers of meso-predators such as coyotes (Arjo et al. 2007). Water in guzzlers evaporates, and can provide breeding sites for mosquitoes that can transmit West Nile virus and other diseases.

A symposium on wildlife water developments held at Arizona State University in 2004 and published in the Wildlife Society Bulletin (Dec 2006: Volume 34, Issue 5), did not support hypothesized negative biological impacts of guzzlers and did suggest potential benefits to a wide array of species. However, Krausman et al. (2006) concluded that “from a scientific standpoint,... lingering questions remain concerning the ultimate benefits of catchments to wildlife populations. Although useful tools for meeting management objectives, catchments have not always yielded the expected benefits. Most importantly, our understanding of the effects of water developments on population performance (i.e., reproduction, recruitment, and survival) rests largely on anecdotal observations and a few correlative studies...long-term, experimental studies [are needed but] have yet to be undertaken, largely because of daunting logistical and other challenges.”



Figure 2. Bobcat with prey at small game guzzler (Photo by: Randy Larsen, Utah State University)

**Procedure:** Consultation with an NRCS or partner biologist, who will complete a habitat evaluation, is needed to determine if free-standing water is indeed a limiting factor for the targeted wildlife species. If other habitat elements such as food or cover are lacking, adding water to the landscape may do little to benefit the targeted species. Guzzlers may be appropriate if food and cover are available but water quantity, quality, or distribution are inadequate or not optimized. They may be particularly valuable in areas where historic springs, streams, and other water resources have been reduced or diverted for other purposes. Summer through early fall is the critical dry period supplemental water should be available. It is often beneficial to combine guzzlers with other practices such as planting of desirable grasses, forbs, and shrubs to increase their value for wildlife.

However, adding supplemental water to an area may concentrate animals and make them more susceptible to predation, diseases, and hunting, so it is essential to carefully consider these potential impacts to target **and non-target** species in the area prior to recommending this practice. Concentrating big game animals around guzzlers may lead to increased crop depredation as well. Supplemental water may also attract undesired animals such as coyotes, skunks, raccoons, etc.

Few scientific studies have documented wildlife water requirements or optimal travel distances to water. Listed below are estimated guidelines for species with references available.

## Estimated Wildlife Water Requirements and Travel Distances

Species	Amount	Distance
Pronghorn	0.25 – 1 gal/animal/day	1 – 4 miles
Mule Deer	0.75 -2 gal/animal/day	0.5 – 4 miles
Chukar	1 gal/bird/180 days	0.5 – 3 miles
California quail	1 gal/bird/180 days	0.25 (chicks) – 1 mile (adults)
Turkey	Water generally not limiting in suitable habitat	0.5 – 1 mile
Pheasant	Water generally not limiting in suitable habitat	0.1 (chicks) – 1 mile (hens)
Gray Partridge	Not required if succulent vegetation, dew, and insects available	0.25 (chicks) – 1 mile (adults)

### Design Criteria

For general design and construction guidance, photos, and drawings of various types of wildlife watering facilities, refer to Brigham and Stevenson (1997, rev. 2003) or Johnson and Jacobs (1986) hyperlinked in the References section below.

#### 1. Storage Tanks

Water storage capacity should be based upon the approximate water requirements of the targeted species as well as the estimated evaporation rate in the area with a surplus to account for non-target species use. Estimate the number of animals expected to use the guzzler, their water requirements, and the number of days water needs to be supplied. Remember that wildlife may only need to use the guzzler for a portion of the year, but more storage capacity may be needed to capture precipitation when it falls to make it available during critical dry periods. Evaporation data is available at: <http://www.kimberly.uidaho.edu/ETIdaho/>

Choose a station location from the drop down list, then “Open water/small stock ponds” from the list of Land Covers. Click on the “precipitation deficit” parameter and use the values in the “**Mean**, Monthly” row for the months water will be provided. Millimeters per day can be converted to inches per month by multiplying by 1.2.

Since guzzlers are partially covered, evaporation rates are expected to be lower than those from open ponds. Use the following formula to calculate the storage tank size needed. If too large a storage tank will be needed, a guzzler may not be a practical way to supply water.

Storage Tank (gal) =

# animals x gal/animal/day x # days water needed + gal evaporation during supply dates

## 2. Water Collecting Aprons

The size of the collection apron needed is determined by the minimum average, annual precipitation and the storage tank capacity. The following formula should be used to calculate the area (ft<sup>2</sup>) of the collecting surface:

$$\text{Area (ft}^2\text{)} = \text{Storage Tank (gal)} \times 1.6 \div \text{Min. Avg. Annual Precip (in)}$$

For example:

A 750-gal cistern tank planned for a site which receives a minimum of 10 inches of precipitation per year would need a collecting surface of about 120 ft<sup>2</sup> (Area = 750 x 1.6 ÷ 10 = 120).

## 3. Wildlife Access

Wildlife access to guzzler water can be provided directly to the storage tank or water can be piped to a separate watering basin depending upon the targeted species (Fig. 3). Open water tanks and watering basins shall be set at ground level with ramps that allow small wildlife access and escape. Design escape ramps to angle from the rim of the tank to the floor (no steeper than 45 degrees) and meet the inside walls of the tank.

Figure 3. Big game watering basin



## 4. Protection of Guzzler

Wildlife guzzlers must be protected from livestock damage and/or use. Enclosure fencing may also be needed to keep big game animals from damaging collection aprons or to keep them out of guzzlers designed for small animals. Fences should be wildlife friendly, considering abilities of wildlife attracted to the water to access it, with special consideration given to juveniles of the species.

When planning big game guzzlers where livestock are present, consider developing other more productive water sources instead in order to provide sufficient water quantity for all animals and reduce the need for fencing.

Above ground facilities, especially aprons, should be camouflaged or screened by vegetation appropriate to the ecological site to reduce damage from vandalism. However, the vegetation should not provide perches or ambush cover for predators.



## **Site selection**

Guzzlers are unlikely to be used by targeted species if they are not located in areas that also provide adequate food and cover resources. Behavioral constraints exist for many wildlife species which may make them reluctant to use watering facilities. For example, gallinaceous birds like chukars are more vulnerable to avian predators if they have to cross large open areas with little shrub cover to access water and therefore guzzlers situated in those areas may be avoided.

### **General Site Selection Criteria:**

- Guzzlers shall be located in close proximity to adequate food and cover for the targeted species.
- Consider the behavioral constraints of the targeted species and select sites that are most likely to be utilized.
- Guzzlers shall not be located where areas of concentrated flow could cause flood damage or siltation.
- Do not place guzzlers in areas that are visible from a road.
- Where feasible, tanks should be placed with openings facing away from the prevailing wind and facing in a northerly direction to minimize sunlight entering tank. Such placement will reduce water temperature, evaporation, and algae growth.
- Placing guzzlers on south facing slopes will help with thawing water in the winter.

### **Operation and Maintenance**

A properly operated and maintained wildlife guzzler can have a life span of 20 years or more. O&M recommendations include the following:

- Guzzler should be inspected at least once each year before the bulk of the precipitation is expected to ensure proper function.
- Remove all debris from the tank, which will help minimize use by disease vectors.
- Repair holes, cracks, or leaks in the collection apron, tank, pipe, and escape ramps as needed.
- Vegetation around the opening of the tank should be cut back so that the opening is accessible, as well as vegetation that could provide perching or ambush cover for predators. Maintain vegetation suited to the ecological site and needed as escape cover by the target species.
- Fences around guzzlers should be checked annually and repaired as needed.
- Guzzlers not designed to operate during freezing weather shall be winterized prior to winter conditions.
- Avoid disturbing area around guzzler during the primary nesting season of April 1 – July 15.

## References

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**Attachments:**

Attachments to this Technical Note will assist the landowner and planner in designing wildlife-friendly livestock watering facilities.

Attachment 1 - "Water for Wildlife – A Handbook for Ranchers and Range Managers," Daniel A.R. Taylor, M. Tuttle. 2007. Bat Conservation International.

Attachment 2 - Technical Note 305 (update). "Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations." November 1989. USDOI/Bureau of Land Management.