

TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE STATE OF WYOMING NATURAL RESOURCES CONSERVATION SERVICE

BIOLOGY TECHNICAL NOTE NO. 44

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Wildlife Watering Facilities – Guzzlers 12/10/2010

A wildlife watering facility may be a guzzler, spring development, pond, wetland, or other type of water supply. This document provides specifications for guzzlers.

General guidelines:

Guzzler is a term used to describe a self-filling, constructed wildlife watering facility that collects, stores, and makes water available for wildlife. It may be commercially constructed as a single unit or it may be composed of several distinct components designed to capture precipitation, store the captured water, and make the stored water available.

The major components of guzzlers are a precipitation collection apron made of concrete, rubber, plastic, metal, or treated soil; a storage tank; a drinking tank (under some circumstances, both a storage and drinking tank may be necessary) and an escape ramp. A float system or a trough may also be needed depending on the design. Conservation practice standard Water Harvesting Catchment (636) and Watering Facility (614) are appropriate for the design and construction specifications of guzzlers. Standard drawings are available as attachments to this technical note at: <http://www.wy.nrcs.usda.gov/technical/wyeng/stdwgs/guzzler.html>

In lieu of the above mentioned standard drawings, employees with appropriate job approval authority may approve alternate designs provided by customers, which may include commercial designs.

All wildlife watering facility designs must be approved by someone with adequate job approval authority.

Wildlife watering facilities will be designed to provide adequate water during the normal “frost free period as a minimum”, referred to as the design period. Frost free probabilities can be obtained after selecting the closest weather station listed at <http://www.wrcc.dri.edu/summary/climsmwy.html> . Unless the planner has technical reasons to deviate, the facility will be designed based on the 28 degree, 50% probability. For example: For Lusk, the 28 degree, 50% probability equals approximately 135 days. Thus, the facility will be designed to meet wildlife water consumption needs for 135 days.

Facilities must be designed to allow safe wildlife access and egress for all species in the project area.

It is recommended facilities have the capability for being drained for cleaning and/or winterization.

The following technical information will help determine spacing and volume needed in wildlife watering facilities for the targeted animals.

Site Selection:

A guzzler will be placed outside gullies, arroyos, or draws to avoid flood damage and siltation. Guzzlers will be protected from sunlight as much as possible. Orienting the tank so the open end faces north helps keep water temperatures down and will minimize evaporation if no shade is available. South facing slopes are preferable to north facing slopes to help with thawing in the winter. Consider the effects of wind direction and intensity on the structure and the wildlife utilizing the structure. Design, place, and orient accordingly to mitigate for these effects.

Spacing and Water Use:

Spacing of wildlife watering facilities is based on estimated distances Wyoming wildlife will travel to water. The following distances are suggested spacing for wildlife watering facilities (Hoffman, et.al. 1993, Rintamaki 1986, SCS 1973, Schmidt 1996, Obert & Jasmer 2010). The water consumption information will be used in determining size of apron and storage needed.

Target Species	Optimum Spacing (Miles)	Daily Water Consumption (Gallons)
Mourning dove	2	2-5 gal/flock/day
Pronghorn antelope	1	1-2 gal/animal/day
Mule deer	1	1-3 gal/animal/day
Elk	1	5-8 gal/animal/day
Sharptailed Grouse	1	2-5 gal/flock/day
Turkey	1	6-9 gal/flock/day
Chukar	1	2-5 gal/flock/day
Songbird's	0.5 to 1	1-2 gal/flock/day
Pheasant	0.5 to 1	2-5 gal/flock/day
Gray (Hungarian) Partridge	0.5 to 1	2-5 gal/flock/day

Efficiency and life spans of apron materials (Kie et.al. 1996)

Apron Material	Water Yield Efficiency	Typical Lifespan
Steel	98%	25 years
Asphalt roofing	86-92%	8 years
Plastic covered with 1 inch of gravel	66-87%	8-15 years
Butyl rubber	98%	15-20 years
Asphalt paving	95%	15 years

The tank will be sized to hold enough water for the target species for the design period. Water storage needs are calculated using the expected number of animals and their water needs for the period of use. For example: A small flock of pheasants (20 birds) in the Lusk area uses 2 gallons of water per day or 270 gallons/year (2 gallons/day x 135 days/year = 270 gallons/year) during the frost free period.

The apron will be sized using the low number in the average annual precipitation range. Wyoming precipitation maps are available at:

http://efotg.sc.egov.usda.gov/references/public/WY/Annual_Precip_Map.pdf

Potential yield of the apron surface will be calculated using the following formula based on the lowest average annual precipitation amounts. For example, if you are located in the 13-14 inch precipitation zone, you would use 13 inches as your average minimum precipitation amount.

$$\text{Apron size (sq.ft.)} = \frac{\text{Gallons needed} \times 12}{\text{Average minimum precipitation} \times 7.48 \times \text{Efficiency}}$$

In the above Lusk example, the project is located in a 13-14" precipitation zone, so we use 13" as our average minimum precipitation. We want to use a round steel apron on a prefabricated guzzler. Plug these numbers into the above equation and the result is (270 gallons x 12) / (13 x 7.48 x 0.98) = 34 sq. ft. (apron size). For a round apron, this equates to a 6 foot diameter apron. The closest size in prefabricated guzzlers is 8 feet in diameter so you would select the 8 foot diameter, round guzzler design that will hold at least 270 gallons of water. The tables at the end of this document provide common design sizes.

Additional Requirements, Concerns, and Considerations:

A guzzler may concentrate wildlife in one spot, creating the potential for predation and disease.

Use fencing to control livestock access to the guzzler. If a water development is for both livestock and wildlife, consider developing and fencing out a separate wildlife watering area.

Compensation for leakage and evaporation will require upward adjustments of component sizes.

References:

Hoffman, R.W., H.G. Shaw, M.A. Rumble, B.F. Wakeling, C.M. Mollohan, S.D. Schemnitz, R. Engel-Wilson, D.A. Hengel. 1993. Management guidelines for Merriam's wild turkeys. Colorado Division of Wildlife Report #18. 24 pp.

Kie, J.G., V.C. Bleich, A.L. Medina, J.D. Yoakum, and J.W. Thomas. 1996. Managing rangelands for wildlife. Chapter 27 in Research and Management Techniques for Wildlife and Habitats, Ed. T.A, Bookhout. Pub. The Wildlife Society. 740 pp.

Obert, P. and G. Jasmer. 2010. Personal communication on wildlife water needs.

Rintamaki, R. 1986. Wyoming Biology Technical Notes #105(Elk), #110 (Mule deer), #114 (Pronghorn), #216 (Mourning dove), #220 (Sage grouse).

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Schmidt, R. 1996. Wildlife Watering Facility Standard and Specification. Nevada Field Office Technical Guide. 24 pp.

Snyder, W.D. 1969. A modified gallinaceous guzzler for scaled quail. Colorado Game, Fish, and Parks Outdoor Facts publication #65. 2 pp.

Spence, Ed. 1997. Personal communication on practical aspects of guzzler installation.

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Water Yield Calculations

Round Apron Diameter in Feet	Average Precip. Amount	Efficiency of Apron Materials	Apron Area in Square Feet	Yield in Gallons = Storage Tank Size*
4	10	0.98	13	77
8	10	0.98	50	307
12	10	0.98	113	691
16	10	0.98	201	1228
4	12	0.98	13	92
8	12	0.98	50	368
12	12	0.98	113	829
16	12	0.98	201	1474
4	14	0.98	13	107
8	14	0.98	50	430
12	14	0.98	113	967
16	14	0.98	201	1720
4	16	0.98	13	123
8	16	0.98	50	491
12	16	0.98	113	1105
16	16	0.98	201	1965

*The planner must compare the gallons yielded with the number of gallons needed for the targeted species. Be sure to use the correct precipitation amount for your location.

Note: Efficiency is based upon selection of material.