

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
WATERING FACILITY**

(No.)

CODE 614

DEFINITION

A permanent or portable device to provide an adequate amount and quality of drinking water for livestock and/or wildlife.

PURPOSE

To provide access to drinking water for livestock and/or wildlife in order to:

- Meet daily water requirements
- Improve animal distribution

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and/or wildlife.

CRITERIA

General Criteria Applicable To All Purposes

Watering facilities shall conform to all federal, state, and local laws and regulations. Laws and regulations of particular concern are those involving water rights and use, water quality, pollution control, property easements, wetlands, preservation of cultural resources, and endangered species.

Watering facilities shall be designed to provide adequate capacity and supply to meet the daily water requirements of the livestock and/or wildlife planned to use the facility. This will include the storage volume necessary to provide water between periods of replenishment. Minimum daily water requirements for livestock and wildlife are shown in Table 1 below. Refer to the National Range and Pasture Handbook and the Nebraska Stockwater Pipeline Manual for additional guidance on livestock water quantity and quality requirements

Table 1. Minimum Daily Water Requirements for Livestock and Wildlife ^{1/} (Gal/Day)

Livestock or Wildlife Type	Conventional Grazing	Intensive ^{2/} Grazing
Cow	12	17
Cow & Calf	15	20
Dairy Cow (lactating)	25	30
Horse	15	20
Sheep	1.5	3
Goats	1.5	3
Hogs	1.5	3
Bison	20	25
Deer	1-2	-
Pronghorn	1-2	-
Elk	5-8	-
Bighorn Sheep	1-2	-
Wild Turkey	6-9 per facility	-
Game Birds	2-5 per facility	-
Songbirds	1-2 per facility	-

^{1/} These are minimum volumes, if livestock are larger than average or there are other planning issues, the volume of storage should be increased accordingly.

^{2/} Intensive grazing systems typically involve rotating pastures every, one to seven days with livestock and forage conditions being checked daily.

Watering facilities should be located to promote even grazing distribution and reduce grazing pressure on sensitive areas. See Table 2 for appropriate water facility spacing for livestock based on terrain and grazing system.

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Table 2. Suggested Water Facility Spacing

Type of Terrain	Conventional Water Facility Travel Distance	^{1/} Intensive Water Facility Travel Distance
Rough	1/2 mile	1/8 mile (660 ft)
Rolling	3/4 mile	1/6 mile (880 ft)
Level	1 mile	^{2/} 1/4 mile

^{1/} Intensive grazing systems typically involve rotating pastures every, one to seven days with livestock and forage conditions being checked daily.

^{2/} Assumes there are no visual obstructions in any direction between the livestock and the watering facility. If there are visual obstructions for intensive water facility applications use the maximum travel distance for rolling terrain.

Appropriate spacing of watering facilities for wildlife will vary by species due to dependence upon reliable water, mobility, and habitat-related factors. Account for naturally-occurring, permanent water sources such as streams, rivers, lakes, dugouts, ponds, etc. See Table 3 for optimum and maximum spacing between watering facilities by wildlife species.

Table 3. Optimum and Maximum Water Facility Spacing for Select Wildlife Species

Type of Wildlife	Optimum Spacing	Maximum Spacing
Deer	1/2 mile	1 mile
Pronghorn	1 mile	2 miles
Elk	1 mile	2 miles
Bighorn Sheep	1/2 mile	1 mile
Wild Turkey	1/2 mile	1 mile
Prairie Grouse	1 mile	2 miles
Pheasant	1/2 mile	1 mile
Bobwhite Quail	1/4 mile	1/2 mile
Songbirds	1/4 mile	1/2 mile

Watering facilities should be located to provide adequate access to the animals planned to use the facility. Incorporate escape features into the watering facility design. See requirements for interior escape ramps outlined under the "Criteria Applicable to Watering Facilities for Wildlife" section below.

Include design elements to meet the specific needs of the animals that are planned to use the watering facility, both livestock and wildlife.

Protect areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns.

Use criteria in NRCS Conservation Practice Standard 561, Heavy Use Area Protection to design the protection.

Install permanent watering facilities on a firm, level, foundation that will not settle differentially. Examples of suitable foundation materials are bedrock, compacted gravel and stable, well compacted soils.

Design and install watering facilities to prevent overturning by wind and animals.

Design watering facilities and all valves and controls to withstand or be protected from damage by livestock, wildlife, freezing and ice damage.

Construct watering facilities from durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. Follow appropriate NRCS design procedures for the material being used or industry standards where NRCS standards do not exist.

Minimum requirements for typical tank materials are:

- Galvanized Steel Tanks 20 ga
- Polyethylene Tanks 3/16"
- Fiberglass Tanks 3/16"

All non-steel tanks shall be made of ultraviolet resistant materials, or be adequately protected from deterioration due to sunlight.

Concrete tanks shall be constructed from a concrete mix producing a minimum compressive strength of 3,000 psi in 28 days, and must be adequately reinforced.

"Bottomless" tanks must be installed with a base that both supports the tank and limits seepage to an acceptable level. Acceptable base materials are concrete, steel, flexible membranes, or impervious earth.

Flexible membranes used to limit seepage must meet the following requirements. The minimum thickness for flexible membranes shall be 4 mils for polyvinylchloride (PVC) and 8 mils for butyl rubber. At least 6" of

membrane shall be attached to the side of the tank using an adhesive that is appropriate for the material. The membrane shall also be covered with at least 6" of soil.

Base materials using impervious earth should meet the following minimum application rates in a mixed layer based on soil type.

Soil Type	Application Rate (lb/ft ²)
Clay	1.0-1.5
Sandy Silt	1.0-1.5
Silty Sand	1.5-2.0
Clean Sand	2.0-2.5

Use the criteria in NRCS Conservation Practice Standard 516, Pipeline to design piping associated with the watering facility. Include backflow prevention devices on facilities connected to wells, domestic or municipal water systems.

General Criteria for Intensive Grazing Applications

The minimum water storage capacity is the 1 day volume needed to meet the minimum daily requirements shown for intensive grazing in Table 1 above. The volumes shown in Table 1 are minimums. If livestock are larger than average, or there are additional planning considerations, the volumes should be increased accordingly.

Intensive grazing systems must have a dependable water source, i.e. electric well or reliable spring development. The spacing of watering facilities shall not exceed the distances shown for intensive grazing in Table 2 above. Operation and maintenance planning must address the need to check livestock and water supply daily.

General Criteria for Conventional Grazing Applications

Conventional grazing systems are those that do not meet the conditions shown for an intensive grazing system above.

The minimum water storage capacity shall be based on the water source, livestock type, and frequency that the operator intends to check livestock and water supplies.

The minimum number of days of water storage for various water sources is as follows:

- Electric well or reliable spring developments: 2 to 3 days storage
- Solar and wind water sources: 3 to 7 days storage

Watering facility spacing shall not exceed the distances shown for conventional grazing in Table 2 above.

Criteria Applicable to Watering Facilities for Wildlife

Habitat elements other than water are often limiting for targeted wildlife species. Therefore, prior to installing a new watering facility to benefit wildlife, a habitat assessment must be conducted and the planned system must meet wildlife habitat quality criteria (score of 0.5 or higher) for the conservation treatment unit. Rating shall be recorded using the appropriate Habitat Evaluation Worksheet for the associated land use (NE-CPA-32 through NE-CPA-36) or a species-oriented habitat model.

Guzzlers (rain-trap collection watering facilities) must be designed as outlined in Nebraska Conservation Planning Sheet 22 "Watering Facility for Wildlife (Guzzer) Installation and Maintenance."

Ramps must be present on the interior of all tanks or troughs, including those with a dual purpose to provide water for livestock and wildlife, to allow for wildlife to escape and prevent drowning. These ramps will have a slope between 30 and 45 degrees and will be pyramid or cone shaped so that the sides are adjacent to the inside perimeter of the tank. This will prevent entrapped animals from continually swimming under the ramp as they try to escape. Ramps must extend to the bottom of the tank. Materials used must be durable and provide a "graspable" surface. Examples include expanded metal (with <3/4" openings); concrete, fiberglass or plastic composites with roughened or grooved surface; and well-graded rock.

An example design using expanded metal is shown in Appendix A.

Storage tanks not intended for access by wildlife must either include the interior ramp or be adequately covered to exclude incidental entry by all wildlife species.

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All above ground tanks or troughs must be installed or modified using one of the following methods:

- provide a smaller, ground-level trough located off-site from the primary tank, equipped with a suitable float or vacuum valve, and protected from damage by livestock
- ensure that a portion of the perimeter is less than or equal to 20 inches in height by using fill or setting the tank below ground surface to facilitate use by immature ungulates (i.e. deer fawns) AND install a ramp, protected from abuse by livestock, on the outside of the tank and connected to the interior ramp, to facilitate use by small animals including rodents, reptiles, birds, etc.

Water supply must be available throughout the year, even when livestock are not present. Exceptions can be made during the winter for facilities that must be protected from freezing.

Watering facilities which are not intended for use by livestock and which have an inadequate water source to accommodate livestock must be adequately fenced, as needed, to exclude livestock yet allow safe wildlife access. See Fence (382) for design criteria to construct wildlife-friendly fences.

Fence materials and other obstructions must not extend across the water surface of tanks in order to prevent injury or mortality of bats, swallows, and other bird species that access water by skimming the surface.

Watering facilities designed exclusively for wildlife must have a water source available at ground level to maximize access by wildlife and reduce wildlife death loss. This may include either a shallow, off-site trough or a buried storage tank with the rim set at or near ground level and equipped with an inner ramp that meets the slope and material requirements noted above.

CONSIDERATIONS

Design fences associated with the watering facilities to allow safe access and exit for area wildlife species. To protect bats and other species that access water by skimming across the surface, fencing material should not extend

across the water surface. If fencing across the water is necessary it should be made highly visible by avoiding the use of single wire fences and using fencing materials such as woven wire or by adding streamers or coverings on the fence.

For watering facilities that will be accessible to wildlife, give consideration to the effects the location of the facility will have on target and non-target species. Also consider the effect of introducing a new water source within the ecosystem in the vicinity of the facility. This should include things such as the concentration of grazing, predation, entrapment, drowning, disease transmission, hunting and expansion of the wildlife populations beyond the carrying capacity of available habitat.

Where water is supplied continuously or under pressure to the watering facility considers the use of automatic water level controls. Automatic control of water flow will prevent unnecessary overflows and reduce labor involved with manual operations.

Watering facilities often collect debris and algae and should be cleaned on a regular basis. Consider increasing the pipe sizes for inlets and outlets to reduce the chances of clogging. Maintenance of a watering facility can be made easier by providing a method to completely drain the watering facility.

Steep slopes leading to watering facilities can cause erosion problems from overuse by animals as well as problems with piping and valves from excess pressure. Choose the location of watering facilities to minimize these problems from steep topography.

PLANS AND SPECIFICATIONS

Plans and specifications for watering facilities shall provide the information necessary to install the facility. As a minimum this shall include the following:

- A map or aerial photograph showing the location of the facility
- Detail drawings showing the facility, necessary appurtenances (such as foundations, pipes and valves) and stabilization of any areas disturbed by the installation of the facility
- Construction specifications describing the installation of the facility

OPERATION AND MAINTENANCE

Provide an O&M plan specific to the type of watering facility to the landowner. As a minimum include the following items in the plan:

- a monitoring schedule to ensure maintenance of adequate inflow and outflow;
- checking for leaks and repair as necessary;
- if present, the checking of the automatic water level device to insure proper operation;
- checking to ensure that adjacent areas are protected against erosion;
- if present, checking to ensure the outlet pipe is freely operating and not causing erosion problems;
- a schedule for periodic cleaning of the facility.

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[Nebraska Planning Sheet 22: "Watering Facility for Wildlife \(Guzzler\) Installation and Maintenance. June, 2009.](#)

[Nebraska Stockwater Pipeline Manual. January, 2008.](#)