

**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

This practice may be applied as a part of a resource management system to support one or more of the following purposes:

- Protect and enhance vegetative cover through proper distribution of grazing.
- Meet daily water requirements for livestock or wildlife.
- Protect streams, ponds, and other water supplies from contamination by providing alternative sources of water.

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. Livestock watering

from a controlled access point of a stream is not addressed in this standard (use Stream Crossing, 578).

CRITERIA

General Criteria Applicable to All Purposes

Locate the watering facility in such a manner that runoff from the facility does not have the potential to enter wells at the well head. The location shall have easy access, avoiding placement on or near steep slopes where animal access may cause erosion.

For structural facilities the site shall be well drained. If not, drainage measures shall be provided. Watering facilities shall not be located within wetlands or sited where significant wildlife habitat would be impacted by either the facility or damages associated with livestock access.

Areas adjacent to the watering facility that will be trampled by livestock shall be graveled, paved, or otherwise treated to provide firm footing and reduce erosion. Gravel, paving material, or other treatment will not be required if the native materials will provide firm footing and resist erosion without special treatment.

Design of the protective surface around the watering facility for livestock shall be in accordance with NRCS Conservation Practice Standard 561, Heavy Use Area Protection. Protection for an earthen watering facility for wildlife shall be in accordance with NRCS Conservation Practice Standard 342, Critical Area Planting.

This practice may adversely affect cultural resources or endangered species and therefore must comply with NRCS General Manual (GM) 420, Part 401 or 190, Part 410.

All open troughs and tanks shall have a wildlife/animal escape ramp installed that extends from the rim to the bottom of the watering facility in the following geographic areas of the state:

- a. Cumberland Plateau and Mountains
- b. Southern Blue Ridge
- c. Statewide for all goat or sheep operations

At any time the source of water to supply a watering facility comes from a seep/spring, stream or other natural water source, wildlife habitat values and wildlife water needs provided by that water source shall be maintained to acceptable levels for those wildlife species. All necessary permits shall be obtained when pumping from a stream or overflowing and outletting back into a stream.

Criteria Applicable to Proper Distribution by Livestock

The total numbers, locations, and maximum distances between watering facilities or watering facilities and other available water sources for a grazing system will be determined in a manner that insures good grazing distribution.

The 'Cowboy Math (Acres per Paddock)' section of the Tennessee Graze Program must be run to plan watering facility placement. However, it is not required to place watering facilities at intervals recommended by Cowboy Math.

Fencing over and within 10 feet of the edge of the watering facility shall be equivalent to the strength of a welded wire panel or board fence (See Fence Standard, 382).

Avoid placing feeding areas or other concentrated animal activities immediately above a water source.

Criteria Applicable to meet Daily Water Requirements for Livestock or Wildlife

Capacity. A watering facility and water delivery system shall have adequate capacity to meet the daily water requirements of the livestock and/or

wildlife. This will include the storage volume necessary to carry over between periods of replenishment.

A wildlife earthen watering facility shall be a minimum of 1,600 square feet (0.04 ac.) up to a maximum of 4,500 square feet (0.1 ac.) excavated pit with a maximum design depth of four feet, to ensure drinking water will be present in the late summer and fall period in normal rainfall years. All side slopes shall be a minimum 2:1 except that one side shall be a 6:1 or flatter. Soil material shall be disposed of according to the Pond (excavated) standard (378). The drainage area above shall be of sufficient size to provide adequate surface runoff to charge the watering facility. Livestock shall be excluded at all times from the wildlife facility to protect habitat values around the area.

For wildlife, the maximum distance between watering facilities, or from watering facilities and available permanent water sources, shall not exceed 2,640 feet (0.5 mile).

The watering facility for livestock shall be sized and provided in sufficient numbers, as determined using spreadsheet *Livestockwater_.xls* or equivalent program.

Where water is supplied by undependable means (i.e., solar, RAM, etc.), the minimum watering system storage capacity shall be three days. However, if an alternate permanent water source (i.e., pond, lake, stream, etc.) is available, readily accessible, and can be used without negatively affecting other resources, then the three-day storage period is not required. Where practical, place the storage tank above the watering facility to enable gravity flowing water from the storage tank.

Table 1 shall be used for determining minimum daily requirements, capacity, and depth of individual watering facilities for livestock.

Table 1 - Minimum Requirements of Individual Watering Facilities

Kind of Livestock	Water Facility Capacity (gals.)	Depth (inch)	Daily Requirement ^{1/} (Gal/hd/day)	Max. Height above Normal Ground (inches)
Beef Cattle	100 (25) ^{2/}	12	12-20	30
Horse	100 (25) ^{2/}	12	6-14	30
Yearly Bovine	100 (25) ^{2/}	12	10-20	30
Dairy Cattle (drinking only)				
Lactating	100 (25) ^{2/}	12	25-30	30
Non-lactating	100 (25) ^{2/}	12	10-15	30
Sheep & Goats	15	6	2-3	18
Swine	15	6	2-4	18
^{1/} These requirements vary with climatic conditions, kind of feed, size of animals, and other factors and may be increased as necessary. ^{2/} The minimum capacity of individual watering facilities may be reduced to 25 gallons, provided all of the following conditions are met. 1. The pasture is 14 acres or less. 2. Water supply into the watering facility is at least 5 gpm. 3. The minimum storage capacity is met.				

Replenishment Rate. The inflow of water in a three-hour period plus the individual watering facility (watering facility/tank) capacity shall equal or exceed one-half the daily requirement for the livestock using the facility.

Backflow Protection. Watering facilities that have a potential to cross-connect with the public water supply system shall have a properly installed backflow prevention device or air gap as required by the local water utility's Cross-Connection Control Program (Tennessee Code Annotated § 68-221-711 and Tennessee Department of Environment and Conservation (TDEC), Division of Water Supply, Rule 1200-5-1-.17(6)).

Watering facilities connected to potable well systems shall include measures to prevent backflow or back-siphonage to the well. Acceptable measures to prevent backflow are the use of an air gap or double check valve.

Air Gap. Air gaps shall be a minimum of two times the diameter of the supply line above the crest or overflow device of the watering facility. (Example: If the supply line is 1 inch, then the minimum air gap required is 2 inches above the crest of the overflow device.) The supply line and air gap shall be protected from contact by livestock. This shall include measures to protect the air gap from inadvertent splashing by the livestock during watering.

Components. Automatic water level control and/or overflow facilities shall be provided as needed. Valves or pipes shall be protected by shields or covers to prevent damage by livestock. All valves and water control devices shall allow the minimum inflow rate. Overflow shall be piped to a stable or suitable point of release. The pipes shall be protected from freezing and ice damage.

Watering facilities shall be installed in a manner that will prevent the facility from leaking or being overturned.

Watering facilities with a capacity larger than 100 gallons shall be equipped with a minimum 1-inch drain plug to facilitate maintenance of the watering facility.

All exposed pipes, fittings, etc., shall be galvanized or ultraviolet protected as appropriate.

Gravity-fed systems shall have sufficient head to supply the water for the designed number of animals. The minimum elevation head (planned permanent water surface of pond or spring box to lip to watering facility; typically at least four feet) shall be according to manufacturer specifications when water level is controlled by a valve. The minimum elevation head shall be one foot when water flows through the watering facility.

When a roof is placed over the watering facility to provide shade, the roof shall be designed for appropriate wind and snow loads, and shall be durable to withstand anticipated livestock and wildlife activity.

Materials. All materials shall have a life expectancy of twenty years or more. Common construction materials are watertight and consist of reinforced concrete, manufactured freeze-

proof plastic, fiberglass, galvanized steel, or large equipment tires. All designs shall meet the industry standards for the material being used. Generally, applicable design requirements and procedures can be found in the documents referenced at the end of this standard.

Reinforced concrete facilities shall have at least three-inch thick walls and four-inch thick floor with a minimum of eight-gauge welded wire. They shall be constructed from a concrete mix producing a minimum compressive strength of 4,000 psi at 28 days.

Galvanized steel tanks shall have a minimum thickness of 20 gauge.

Plastic or fiberglass watering facilities shall be made of ultraviolet resistant materials or shall have a durable coating to protect the structure from deterioration due to sunlight, with a wall thickness sufficient to provide durability from livestock use.

When a large equipment tire is used as a watering facility, it shall be of suitable quality to perform as intended for the useful life of the practice. The tire shall be free of chemicals injurious to livestock. An approved standard drawing shall be used to prepare site-specific designs for this type of tank.

Water Supply and Outlet Pipe. The watering facility shall be equipped with a suitable water supply pipe, drainage outlet, and overflow outlet, either as individual outlets or a combination of outlets. Drainage outlets for systems with flow-through water must be 1.5 times as big as the inlet pipe and extend at least ten feet from the watering facility. Place a trash rack or other debris removal device on the overflow pipe.

All pipe material and fittings shall comply with local building codes, or be in compliance with Conservation Practice Standard, Pipeline, Code 516. Water supply pipelines are to have a minimum inside diameter of 1 1/4 inches for gravity flow systems or 3/4 inch for pressurized systems. The supply lines shall be connected in

a manner to prevent leakage and provide proper sanitary protection (i.e., backflow prevention).

Ram Pumps. Ram pumps require falling water to pump water uphill. The minimum vertical fall from drive pipe inlet to the ram shall be two feet. In order to provide a constant supply and uniform head of water, the water shall be collected in a durable trash-resistant device (inverted PVC pipe, concrete, or galvanized metal) before it enters the drive pipe to the ram. The length of the drive pipe shall be five times the vertical fall to ensure proper operation. It shall be buried on a constant grade with no turns to the ram. The ram pump shall be located on a concrete foundation and appropriately protected or housed. A gate valve shall be installed near the ram entrance so that periodic maintenance can be done. The installation of a ram pump shall meet or exceed manufacturer's recommendations.

Nose Pumps. Nose pumps shall be anchored to concrete or other approved device to prevent damage by livestock. The installation of a nose pump shall meet or exceed manufacturer's recommendations.

Criteria to protect streams, ponds, and other water supplies from contamination.

Any part of a watering facility and associated heavy use area located upslope and within 50 feet of any sensitive area (i.e. water source, water conveyance, or sinkhole) shall have measures installed to maintain a vegetative buffer between the water facility and the sensitive area for a minimum width of at least 35 feet.

CONSIDERATIONS

With open troughs or tanks consider about 1.5 inches of space per herd animal as a minimum size. For example, a three foot diameter round tank would have a circumference of 113 inches; enough drinking space for 75 head (36 inch diameter x 3.1416 = 113 inch circumference).

The water level in open watering facilities should be maintained at approximately 1.5 inches below the top of the watering facility to avoid water saturating the area surrounding the watering facility and avoid trapping small animals that inadvertently fall in.

Where rotational grazing is practiced, use portable watering facilities that can be relocated to disperse impacts from trampling vegetation. To ensure uniform grazing and waste distribution in the field, cattle should not have to travel more than 800 feet to the watering facility.

Generally, watering facilities should be located within 500 feet of where lactating dairy cattle are grazing.

A watering facility for wildlife should be considered when year round surface water sources are further than 2,640 feet (0.5 mile) apart.

When siting for excavating a watering facility for wildlife avoid excessively large drainage areas, flood prone areas, and potentially high sedimentation delivery that could negatively impact the project.

Wildlife escape ramps should be considered for all open tanks or troughs when the water is deeper than a few inches and the facility wall is higher than 12 inches, to reduce small animal mortality and prevent water contamination from decaying carcasses.

Wildlife escape ramps should be closed against the tank or trough sides to prevent animals from getting trapped behind and under the ramp. Where possible, a watering facility can provide water for two to four pastures. Gates or gaps may be placed adjacent to the watering facility to allow livestock access to the entire watering facility from any one paddock at one time. Avoid placing feeding areas or other concentrated animal activities above a water source.

Ponds serving as a water source for a watering facility should be fenced to prevent cattle from damaging pond banks and creating water quality problems with the water source. The fenced boundary around the pond provides a vegetative filter strip for water entering the pond and protects habitat values. This vegetative filter

should always be wide enough to facilitate safe mowing. Fencing should be installed according to Conservation Practice Standard Code 382 – Fence.

The watering facility should be located so that loafing of the cattle around it is not encouraged. The watering facility placed under trees encourages loafing and also creates maintenance problems with leaves dropping into it. If water temperature is a concern, the watering facility can be partially buried or shaded with a roof.

An alternate permanent water source (such as a pond, lake, stream, etc.) is recommended to have water available for livestock, if the normal water source becomes inoperable.

Consider a fence design around an open watering facility that allows safe access and exit for wildlife species.

To protect bats and other species that access water by skimming across the surface, fencing material should not extend across a tank or trough's water surface. If fencing across the tank or trough 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.

When installing watering facilities consider the location's effect on wildlife populations, including impacts from concentrating wildlife such as predation, disease transmission, and hunting.

In some instances where natural water sources are some distance away, it may be beneficial to install near ground wildlife "guzzlers" attached to troughs or tanks to provide access to water for small game and nongame species.

PLANS AND SPECIFICATIONS

Plans and specifications for installing a watering facility shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. 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 appurtancances (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

An O&M plan specific to the type of installed watering facility shall be provided to the landowner. The plan shall include, but not be limited to, the following provisions:

- Drain livestock watering troughs at least once annually.
- Check for debris, algae, sludge, or other materials in the watering facility that may restrict the inflow or outflow system.
- Check for leaks and repair immediately if any are found.
- Check the automatic water level device to ensure proper operation.
- Check to ensure that adjacent areas are well protected against erosion.
- Check to ensure the outlet pipe is freely operating and not causing erosion or ponding problems.
- Prepare guidance for winter weather, such as adding material in the storage area to allow for ice expansion without damage.
- Exclude livestock from watering facilities constructed specifically for wildlife.

Algae and iron sludge accumulation should be addressed in areas with water quality known to cause problems. Chemicals, i.e. copper, sulfate, and chlorine can be recommended as needed, if local rules and regulations are followed. Copper

based cleaning agents should be avoided with sheep due to toxicity.

Periodic cleaning of the facility will be performed to maintain proper operation and extend its life.

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