NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

SPRING DEVELOPMENT

(No.)

CODE 574

DEFINITION

Collection of water from springs or seeps to provide for livestock and wildlife.

PURPOSE

- Improve the quantity of water for livestock and wildlife.
- Improve the quality of water for livestock and wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where a spring or seep will provide a dependable supply of suitable water for the planned use.

CRITERIA

General Criteria Applicable to All Purposes

Design the spring development based on site conditions, to collect sufficient water for the intended purpose of the development while protecting ecological functions of the site.

Identify and evaluate alternative water sources before considering the development of a spring.

Spring development for livestock water may cause adverse impacts to fish and wildlife habitat. Develop only as much water as is needed to facilitate prescribed grazing. Document the need for spring development in either a grazing or wildlife management plan using Conservation Practice Standards 528 - Prescribed Grazing; 644 - Wetland Habitat Management; or 645 - Upland Habitat Management.

Conduct an evaluation of the site to determine:

- Water quantity for the intended purpose, taking into account seasonal fluctuations of springflow discharge, and projected changes in water yield associated with climate change and watershed conditions. This may require site visits over multiple seasons.
- Water quality for the intended purpose.
- Suitability of the spring location for the intended purpose.
- Soil and geologic suitability, including spring classification based on geologic structure and hydrogeology (refer to Chapter 32, Part 631, 210-NEH).
- Potential effects of consumptive use on riparian-wetland health and function, stream flow, water temperature, and local aquifer recharge.
- Potential effects of the impoundment and/or diversion of spring water on existing ecological function, local wildlife, and wildlife habitat using criteria set forth in an approved Wildlife Habitat Evaluation Guide.

If the site is determined to be a wetland, appropriate actions must be taken to avoid, minimize, or mitigate adverse impacts.

Design the spring development so that it is protected from damage by freezing, flooding, livestock, excess sediment, vehicular traffic and water quality contamination.

Maintain fish and wildlife access to water from the spring development.

Source area. Design the spring development to preserve existing morphology of the spring as much as possible. Locate the collection site down slope of the point where the spring or seep emerges.

Exclude livestock from the source area and from nearby sites where springflow supports hydrophytic vegetation.

Develop the spring by removing obstructions to spring flow such as encrustations, fine-grained sediments, rock, slope-wash materials and vegetation. Design the development of the spring to prevent obstructions from reoccurring.

Collection system. A collection system generally consists of tile, perforated pipe, or gravel collectors installed upstream of a cutoff wall. These collectors convey the spring flow to either a spring box or directly to a pipeline, which conveys the flow to the point of use.

The cutoff wall may be constructed of concrete, clay, masonry, plastic sheeting or sheet pile. Filter fabric may be used in lieu of an impervious barrier along the wall(s) of the collection trench as a way to minimize disturbance to the impacted wetland associated with the spring development.

Include a spring box and/or measures as needed to prevent sediment from entering the collection system. A spring box may also be used to store water to meet peak water demands.

Spring box. Where a spring box is used, locate it downhill from the source if possible.

Size the spring box to provide sufficient storage of both sediment and any required water storage. Ensure that the cross-sectional area of the spring box is large enough to allow access for periodic cleaning. Use a minimum cross-sectional area of 1.5 ft^2.

Construct the spring box of a durable material such as concrete, rock, plastic, galvanized steel or wood that is untreated or rot resistant.

Protect the spring box from freezing by burying in the soil or other methods suitable for the site.

Provide the spring box with a tight fitting cover to prevent surface runoff, animals or trash from entering.

Locate the outlet pipe a minimum of 6 inches above the floor of the spring box to allow for sediment collection.

Outlet. Provide the spring development with a means to carry the water to its intended use. If a pipe is used, design the pipe according to Conservation Practice Standard 516 - Livestock Pipeline. Alternative outlet structures shall meet the criteria of Conservation Practice Standard 587 - Structure for Water Control.

If the point of use is above the spring, base the type and size of the pump on available power sources and water delivery needs. The pump shall meet the criteria of Conservation Practice Standard 533 - Pumping Plant.

Facilities intended to provide access to water from the developed spring shall be designed according to Conservation Practice Standard 614 - Watering Facility.

Spring flow management. The spring development will include an overflow system to manage the portion of springflow that exceeds the seasonal water need. An overflow system is required to help maintain existing wetland hydrology, and to avoid negative impacts associated with unmanaged discharge of excess flows.

To minimize potential adverse impacts to wetlands, one of the following measures will be implemented (listed in order of priority):

- Where applicable, install a float valve on the tank/trough, and leave all excess water in the spring.
- Direct overflow back as close to the source as possible to enhance existing wetlands.
- Create new wetland habitat that is capable of providing similar wetland functions as those being lost.

Locate and design the overflow system so that it does not cause erosion, degrade water quality, or create wet conditions near the watering facility.

Size the overflow system based on the maximum flow expected from the spring.

Smooth and grade areas disturbed by construction of the spring development as needed, to properly manage runoff from natural spring flow, collected water, and overflow. Care should be taken to ensure minimum disturbance to the wetland/seep area during construction.

Re-establish vegetation on disturbed areas as soon as practicable after construction. Use native plant materials where possible.

CONSIDERATIONS

Springs often contain rare flora and fauna. Development should minimize disturbance to these species. Policy regarding impact to threatened, endangered, or special concern species must be followed.

Brush removal, excavation, clean-out and withdrawal of water are manipulations that may affect fish and wildlife habitat and wetland functions. However, selective removal of undesirable brush and management for desirable native plants may reduce evapotranspiration losses and conserve biodiversity.

Prior to construction, identify and control any undesirable plant species that may be spread by seed or vegetatively.

Consider how other conservation practices applied within the spring recharge area may increase infiltration of precipitation or snowmelt to augment spring flows.

To the degree possible, exclude livestock from constructed overflow areas to protect water quality and quantity. Where exclusionary fencing is used, design shall consider needs and habits of local wildlife.

Consider including a shutoff valve on the spring outlet pipe for winter shutdown, flow control and maintenance. Open pipe vents should be screened to prevent wildlife entrapment and potential water contamination.

The use of explosives to clear obstructions to springflow is not recommended because the shattering and dislocation of rock resulting from blasting may cause the existing flow to be redirected or cease.

Natural springs and seeps tended to attract prehistoric and historic settlements and activities, which correspondingly increases the likelihood that cultural resources are present in and around the spring.

PLANS AND SPECIFICATIONS

Plans and specifications shall provide details of planned location, materials and construction requirements for the installation of the practice to meet its intended purpose.

As a minimum the plans and specifications shall include:

- A map showing existing topography, the locations and dimensions of all components of the spring development (including overflow management), the areal extent of the planned grading, and area of livestock exclusion.
- Access restriction and overflow management plans.
- Materials to be used including pipe diameter and class, collection system, etc
- Elevations of pertinent components such as collection system, pipes, etc.
- Reference to the associated grazing or wildlife management plan. At a minimum, the plan will include evaluations of and recommendations for stocking rate, forage-animal balance, RDM with monitoring points, and locations of all available water sources.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan shall be provided to, and reviewed with, the landowner. The O&M plan shall contain a schedule for the periodic monitoring of the following items:

- Condition and function of the float valves
- Sediment buildup in the spring box
- Clogging of outlet and overflow pipes
- Diversion of surface water from the collection area and spring box
- Erosion from overflow pipes
- Rodent or other wildlife damage
- Vandalism and theft

When cleaning out sediment from the spring box, place all sediments in the uplands away from the spring and associated wetlands.

Any problems discovered shall be immediately repaired.

REFERENCES

Heath, R.C., 1983, Basic Ground-water Hydrology: US Geological Survey Water Supply Paper 2220, 86 p., http://pubs.er.usgs.gov/publication/wsp2220.

Stevens, L.E., and Meretsky, V.J. 2008, Aridland Springs in North America - Ecology and Conservation: University of Arizona Press, Tucson, AZ, 432 p., http://www.uapress.arizona.edu/Books/bid1963.htm.

USDA- NRCS, 2012, Springs and Wells: National Engineering Handbook (210-NEH), Part 650- Engineering Field Handbook (EFH), Chapter 12, 42 p., http://directives.sc.egov.usda.gov/.

USDA-NRCS, Jan. 2010, Well Design and Spring Development: National Engineering Handbook (210-NEH), Part 631 – Geology, Chapter 32, 55 p., http://directives.sc.egov.usda.gov/.

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NRCS, CA

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