NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

SPRING DEVELOPMENT

(No.)
Code 574

DEFINITION

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

PURPOSES

Improve the quantity and/or quality of water for livestock and wildlife.

CONDITIONS WHERE PRACTICE APPLIES

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

CRITERIA

General Criteria Applicable To All Purposes

Plan, design and construct spring developments in compliance with Federal, state and local laws and regulations.

Impact to cultural resources, wetlands and Federal and state protected species shall be evaluated and avoided or minimized to the extent practicable during planning, design and implementation of this conservation practice in accordance with established National and Florida policy, General Manual (GM) Title 420-Part 401; Title 450-Part 401, Title 190-Parts 410.22 and 410.26, National Planning Procedures Handbook (NPPH) Florida Supplements to Parts 600.1 and 600.6, National Cultural Resources Procedures Handbook (NCRPH), National Food Security Act Manual (NFSAM), and the National Environmental Compliance Handbook (NECH).

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.
- Document the need for spring development in either a grazing or wildlife management plan.

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.

Conduct an evaluation of the site to determine:

- Water quantity for the intended purpose
- Water quality for the intended purpose
- Suitability of the spring location for the intended purpose
- Soil and geologic suitability
- Effects on existing ecological functions of the spring and potential losses from the development, including effects of the impoundment and/or diversion of spring water on local wildlife and wildlife habitat, and the effects of consumptive use on riparian health and function, stream flow, water temperature, and local aquifer recharge.

- If the site is determined to be a wetland, appropriate actions must be taken to avoid, minimize, or mitigate adverse impacts.
- Evaluate impacts to wetland function and value using Wildlife Habitat Evaluation Guides and/or functional assessment tools, where available.
- Design the spring development so that it is protected from damage by freezing, flooding, livestock, excess sediment, vehicular traffic and water quality contamination.

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.

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

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

Collection systems. 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.

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 Florida NRCS conservation practice standard Pumping Plant, Code 533.

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

Spring boxes. Locate the spring box downhill from the source if possible. Protect the spring box from freezing by burying in the soil or other methods suitable for the site.

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.

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.

Outlets. 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 Florida NRCS conservation practice standard Livestock Pipeline, Code 516. Alternative outlet structures shall meet the criteria of Florida NRCS conservation practice standard Structure for Water Control, Code 587.

Facilities intended to provide access to water from the developed spring shall be designed according to Florida NRCS conservation practice standard Watering Facility, Code 614.

Spring flow management. When flow from the spring, whether intermittent or continuous, will exceed the capacity of the collection system, an overflow is required. Size the overflow to carry the maximum flow expected from the spring. Locate the overflow so that it does not cause erosion, degrade water quality or create wet conditions near the watering facility.

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

- Install a float valve on the tank/trough, if applicable, 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.

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.

Vegetative Establishment. Re-establish vegetation on disturbed areas after construction with native plant materials where possible. Establishing vegetation on disturbed areas shall be in accordance with Florida NRCS conservation practice standard Critical Area Planting, Code 342.

CONSIDERATIONS

Springs often contain rare flora and fauna. Development should minimize disturbance to these species.

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

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 to augment spring flows.

To the degree possible, exclude livestock access to existing wet and constructed overflow areas to protect water quality and quantity.

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 for installing spring developments shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

As a minimum the plans and specifications shall include, but not limited to, the following items:

- Location of the spring development.
- Materials to be used including pipe diameter and class, collection system, etc.
- Elevations of pertinent components such as collection system, pipes, etc.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed for this practice and include, as a minimum, but not limited to, the following items:

- Winter freeze and flooding protection.
- Inspecting overflow and valve operations.
- Diversion of surface water from the collection area and spring box monitoring and removal sediment build up in the spring box.
- Monitoring clogging of outlet and overflow pipes and remove obstructions to maintain flow.
- Repairing rodent damage.
- Repair erosion from overflow pipe and maintain a stable outlet,
- Repair damage from vandalism and theft.

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, 2011, Springs and Wells: National Engineering Handbook (210-NEH), Part 650- Engineering Field Handbook (EFH), Chapter 12, 24 p.

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

Florida NRCS Conservation Practice Standards,
Critical Area Planting, Code 342
Pipeline, Code 516
Structure for Water Control, Code 587
Watering Facility, Code 614

General Manual
- Title 420-Part 401
- Title 450-Part 401
- Title 190-Parts 410.22 and 410.26

National Cultural Resources Handbook
National Engineering Handbook - Part 650 -
- Engineering Field Handbook, Chapter 12, Springs and Wells.

National Environmental Compliance Handbook
National Food Security Act Manual
National Planning Procedures Handbook
- Florida Supplements to Parts 600.1 and 600.6