**NATURAL RESOURCES CONSERVATION SERVICE**

**CONSERVATION PRACTICE STANDARD**

# WATERSPREADING

**(Ac.)**

**CODE 640**

## DEFINITION

A system of dams, dikes, ditches, or other means of diverting or collecting runoff from natural channels, gullies, or streams and spreading it over relatively flat areas.

## PURPOSE

Manage runoff from natural precipitation to support desired land use goals or ecological processes.

## CONDITIONS WHERE PRACTICE APPLIES

Waterspreading differs from irrigation in that applications are timed by the availability of natural runoff flow rather than scheduled to meet plant needs. This standard does not apply to Conservation Practice Standard 443 – Irrigation System, Surface and Subsurface.

Although applicable to any climatic condition, areas with an average annual precipitation of 8 to 25 inches show the greatest benefit from waterspreading.

Waterspreading systems apply to areas where:

- Soils have suitable intake rates and adequate water-holding capacities for the type of system and crops to be grown;
- Topography is suitable for the diversion or collection and the benefited area allows uniform spreading of water to achieve the desired result;
- A system can be installed that allows for the production of feed, forage, or grain crops;
- Climatic conditions are such that the additional moisture can be expected to improve plant growth;
- Flows can be collected or diverted, spread and excess water returned without causing excessive erosion;

## CRITERIA

### General Criteria Applicable To All Waterspreading Systems

**Diversion works.** The diversion works shall, require no manual controls to divert the stream into the conveyance system or onto the spreading areas, except on watercourses with expected flow durations of more than 24 hours. Include erosion control at the diversion works, within the spreading area, and at the outlet facilities as an integral part of the waterspreading system.

Provide suitable diversion controls so that only the desired rate of flow enters the conveyance system.

Ensure that no invasive species (plants or animals) can be conveyed and spread to new area or water ways

Where inflows contain sediment in amounts that will either reduce the life of the system or damage soil characteristics, a low-flow bypass shall be installed to exclude bedload from the system.

Inlet control(s) must be adjustable to exclude flow from the spreading areas at undesirable times, such as when crops are to be mechanically harvested. The diverted flow

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must not cause undue maintenance problems in the diversion works, conveyance system or the spreading area.

**Conveyance system.** The conveyance system shall have the capacity to safely convey the design flow from the diversion works to the spreading area.

**Spreading area.** Ditches, dikes, diversions, conduits, and similar structures will be arranged and located to spread diffused flow over the land surface or to pond water over the land, depending on the type of system selected. All slopes will be stable and graded to the slope necessary for management and harvesting operations.

**Outlet works.** A provision must be made for returning excess water from the system to the stream channel or other parts of the system without causing excessive erosion and in time to prevent crop damage by ponded water. The flow line of the structure used for this purpose should be below ground level to improve flow characteristics.

**Additional Criteria Applicable To Detention-Type Waterspreading Systems**

**Topography** Drainage shall be provided for each basin by grading a channel along the uphill side of each dike toward each drain.

**Water impounding dike.** The maximum depth of water impounded against dikes will be 3 feet except across channels, sloughs, swales, or gullies less than 40 feet wide, where up to 5 feet of depth will be allowed. Water depth greater than this requires embankment design according to Conservation Practice Standard (378) Pond.

Minimum top width of dikes at design top elevation will be 3 feet. Freeboard from design water surface to dike top shall be 1.0 foot or the wave height from wind and fetch length calculations, whichever is greater (see Outlet works section for added criteria).

Side slopes of dikes will not be steeper than two horizontal to one vertical (2:1). They should be flatter as needed for stability and 4:1 or flatter for safe mowing or other operations of farm equipment.

**Outlet works.** Dikes with a total water storage capacity less than the 10-year, 24-hour runoff volume from the contributing area must have at least one outlet or overflow section that is at least 1.0 ft below the design top elevation. This may be a vegetated spillway, stable rock, weir overflow structure, pipe outlet, or some combination of these.

The minimum design inflow rate is (1) the maximum diverted rate of flow or (2) the 10-year 24-hour peak flow from the contributing area, whichever is less. Total capacity of the outlet must exceed the routed design inflow to the impoundment.

**Vegetative Cover.** All areas where vegetation has been disturbed during construction should be seeded following completion of construction. Seedbed preparation, seeding, sodding, fertilizing, and/or mulching shall comply with NRCS technical standard Critical Area Planting (342).

**CONSIDERATIONS**

When planning this practice, consider the following, as applicable:

- Other practices needed such as brush removal, fencing, and seeding, when planning a waterspreading system.
- Crops to be grown. Potential benefits are highest with forage, hay or seed crops having maximum effective rooting depth.
- Effect on soils. Waterspreading systems should not be installed on soils where the hazard of erosion is high. Effects of livestock use of the spreading areas. Manage livestock to prevent compaction when soils are wet and to prevent range degradation by overuse.
- Climate. Northern and mountainous regions receive a large percentage of annual runoff from snowmelt. Volumes, quality, and conditions during snowmelt become important to system design. Typically, a detention type system should

be used if snowmelt runoff is diverted, to prevent erosion and promote infiltration.

- Slopes greater than 2 percent should generally be avoided. Cost escalates rapidly as slope increases. Effective basin slope may be flattened by taking borrow along top of each basin (immediately below next dike above).
- The reduction of downstream surface water quantity, and effects on potential users. Evaluate both the volume of water diverted and volume of return flows.
- Effects of increased soil moisture and ground water quantity on the waterspreading areas.
- Sediment, pathogens, adsorbed and dissolved nutrients and pesticides, and soluble chemicals infiltrating in the waterspreading areas.
- Potential chemical degradation of return flows leaving the waterspreading areas. Consider rate and volume of return flows, chemicals used, time of chemical application in comparison to predictable storm events, and the nature of sediments transported.
- Potential ground water degradation from applied chemicals caused by increased infiltration. Important factors include available soil moisture storage, evapotranspiration, type and amounts of chemicals used and saline geology.
- Adverse affects to fish, wildlife, and cultural resources
- Land leveling, land forming, land smoothing, obstruction removal, and similar practices may be performed for more uniform distribution of water and increased operation efficiency.

**PLANS AND SPECIFICATIONS**

Plans and specifications for waterspreading shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. As a minimum, plans shall include: plan map showing location of diversions, ditches, spreading area, elevations, north arrow and scale

**OPERATION AND MAINTENANCE**

An Operation and Maintenance (O&M) plan shall be developed for use by the landowner or operator. The plan should be consistent with the purposes of the practice, intended life, and the criteria for its design.

Minimum operation requirements to be addressed in the O&M plan are:

1. Specific instructions and operational requirements to safely divert the desired volume of water into the system, store as applicable, and release return flows.
2. Average water yields by event, times to fill and empty the system, and any other hydrologic and hydraulic information needed to operate the system as designed.
3. Soil infiltration and water-holding capacities, anticipated crops to be grown, effects of inundation, and any other information that will assist the operator in making sound economic and environmental decisions.

Minimum maintenance requirements to be addressed in the O&M plan are:

1. Prompt service, repair, or replacement of components as necessary to maintain their full function.
2. Removal of debris and foreign material from structures, ditches, and other components that might hinder operation.
3. Maintenance of good vegetative cover on all slopes and watercourses